

IMEFY S.L.



ENVIRONMENTAL PRODUCT DECLARATION

PRODUCT NAME

Distribution transformer immersed in mineral oil with a power from 50KVA,100KVA,160KVA,250KVA,400KVA (24kV and 36kV)

SITE

Pi la Cañada, Av Siglo XXI, s/n –45470 –Los Yébenes (Toledo, Spain)

In accordance with ISO 14025 and EN 50693:2019

Program Operator	EPDItaly
Publisher	EPDItaly

Declaration Number	<i>IMEFY01</i>
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General information

EPD OWNER	IMEFY S.L. INDUSTRIAS MECANO ELECTRICAS FONTECHA YEBENES
MANUFACTURER ADDRESS	Pi la Cañada, Av Siglo XXI, s/n –45470 –Los Yébenes (Toledo, Spain)
Company contact	IMEFY, (+34) 925 320 300, IMEFY@IMEFY.com, https://IMEFY.com/en/
PROGRAM OPERATOR	EPDItaly - info@epditaly.it , via Gaetano De Castillia n° 10 - 20124 Milano, Italia
Declared product & Functional unit	FU: single voltage transformer, which measures and detect the busbars voltage, during a service of 35 years, including the packaging.
INDEPENDENT VERIFICATION	<p>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 carried out according to ISO 14025: 2010.</p> <p><input type="checkbox"/>INTERNAL <input checked="" type="checkbox"/>EXTERNAL</p> <p>Third party verification carried out by: ICMQ spa Accredited by: ACCREDIA</p>
CPC CODE	46121 "Electrical transformers"
PCR	<p>EPDItaly007 – PCR for Electronic and Electrical Products and Systems, Rev. 2, 2020/10/21.</p> <p>SubPCR: EPDItaly018 – ELECTRONIC AND ELECTRICAL PRODUCTS AND SYSTEMS – POWER TRANSFORMERS, Rev 3.5, 13/12/2021.</p>
COMPANY CONTACT	(+34) 925 320 300 · IMEFY@IMEFY.com, https://IMEFY.com/en/
TECHNICAL SUPPORT	Marcel Gómez Consultoría Ambiental, Barcelona, Spain
Reference PCR and version number	Core PCR: EPDItaly007 – PCR for Electronic and Electrical Products and Systems, Rev. 2, 2020/10/21.
Other reference documents	<p>EN 50693:2019 Product category rules for life cycle assessments of electronic and electrical products and systems</p> <p>Regulations of the EPDItaly Programme rev. 5.0 (1st July 2020)</p>
Product RSL description	35 years
Markets of applicability	<p>World (raw materials),</p> <p>Spain (production)</p> <p>Europe (use and end of life)</p>
LCA study	This EPD is based on the LCA study described in the bibliography
EPD type	Product specific
EPD scope	Cradle to grave
Year of reported primary data	2020
LCA software	SimaPro 9.3.0.3 (2020)
LCI database	Ecoinvent v3.8 (2021)
LCIA methodology	EN 50693:2019
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.

2. INTRODUCTION

IMEFY, S.L. was founded in Los Yébenes (Toledo-Spain) in 1973 as manufacturer of dielectric liquids distribution transformers (mineral oil, synthetic or natural esters), followed a bit later by cast resin distribution transformers, being pioneer in Spain in the wake of its implantation in the year 1982 and later, the manufacturer of power transformers, reaching power ratings up to 160 MVA and voltage ratings up to 245 kV.

IMEFY has achieved these milestones thanks to the availability of the most advanced Engineering and Manufacturing resources, as well as a highly qualified team. This has allowed us to grow, with transformers installed in the five continents.

Thanks to this, IMEFY belongs to several working groups within the national and international scope, where the Regulations for this type of machinery are elaborated.

3. THE COMPANY

IMEFY Raw Materials and Final Product Laboratories are equipped with the last and higher technology in order to carry out exhaustive controls and the most in-depth tests required by National and International Standards. Given the high qualification of the human team and the high accuracy level of the instrumentation, all endorsed by the corresponding calibration certificates issued by official laboratories, IMEFY Laboratories are recognized by its clients with the highest degree of Quality and Reliability.

IMEFY Management, according to its established MISSION and VISION, has a priority aim that the products IMEFY designs, manufactures and markets meet the legal requirements, the regulations applicable to the Company, those demanded by customers and those volunteers requirements defined by itself, reaching the goal of satisfying our customers, both from the Quality Management and from the environmental sustainability framework, establishing as a commitment the protection of the environment, including the pollution prevention.

Therefore, the Management Policy is based on the global context of the Organization, which determines a Strategic Plan, developing the objectives and necessary resources to achieve the goals, based on knowledge, awareness, motivation and participation of all the staff of the Company in the activities related to the Quality and Environment Management.

To achieve this aim, the IMEFY Management establishes and documents the procedures that guarantees that the activities, processes and products developed are planned, controlled and evaluated based on prevention in management and continuous improvement.

IMEFY Management, in order to determine the leadership of the Organization and the different responsibilities, elaborates the Organizational Chart of the company where the different Management Areas are established, including R&D&I, to give greater value to prevention and thus supporting the Global Strategic Plan.

Finally, IMEFY established the need to communicate to all interested parties its Management Policy, making them participate in the performance of the management, both Quality and Environment.

IMEFY as a company dedicated to manufacture products within electrical sector, has to live up to the requirements which such a strategic sector requires. So, besides having the required levels of quality (UNE-EN-ISO 9001) and Environmental Management System (UNE-EN-ISO 14001) for over 15 years, IMEFY considers as a priority the Quality Control Plans, which allow us to make and test everything that is designed and manufactured. To do this, IMEFY dedicates the personal resources, with a highly qualified staff, as well as technical and financial resources, all of them necessary to carry out standard and voluntary operational controls.

Engineering Area of IMEFY has as its main scope the CALCULATION AND DEVELOPMENT of the different projects which will be manufactured. It is also responsible for elaboration of the TECHNICAL BIDS and serves as technical support to other areas. This Area has the necessary human resources, as graduates, high degree engineers and assistants, all of them having extensive experience in the calculation of electrical and mechanical projects, especially in the field of different types of transformers that IMEFY designs and manufactures.

IMEFY engineers are continuously updated of the latest developments and continuing advances in the field of transformers through specialized courses, active participation in technical forums, both national and international, as well as membership of Technical Committees, participating in the drafting of national and international standards, such as the AEN / CTN 207 / SC 14 AENOR or IEC (International Electrotechnical Commission) committee 14.

The Area of Engineering of IMEFY has also the collaboration and support of a high-level CONSULTANTS with an experience of over 40 years in the design and manufacture of transformers of all types and complexity (oven, traction substation, generation etc.)

Regarding TECHNICAL MEANS, we have the most modern means at the level of computer equipment, software for mechanical and electrical design from leading companies in the design sector and also software for the calculation and design of transformers of our own development based on experience of our personnel and technical staff together with the experience accumulated during more than 40 years in the manufacture of transformers.

4. LCA INFORMATION.

Functional unit: 1 transformer, during a service of 35 years, including related accessories and packaging.

Reference service life: 35 years.

PRODUCT DESCRIPTION

This EPD presents the LCA results of EACH DISTRIBUTION TRANSFORMERS IMMERSSED IN MINERAL OIL with power from 50KVA to 400 kVA and rated voltage 24kV and 36kV.

Unit (power and voltage)	Weight (kg)	Power (KVA)	Voltage (KV)
Transformer 1: 50 KVA SERIE 24KV	900	50	24
Transformer 2: 50 KVA SERIE 36KV	760	50	36
Transformer 3: 100 KVA SERIE 24KV	930	100	24
Transformer 4 100 KVA SERIE 36KV	830	100	36
Transformer 5: 160 KVA SERIE 24KV	1180	160	24
Transformer 6: 160KVA SERIE 36KV	1100	160	36
Transformer 7: 250KVA SERIE 24KV	1500	250	24
Transformer 8: 250KVA SERIE 36KV	1250	250	36
Transformer 9: 400KVA SERIE 24KV	2050	400	24
Transformer 10: 400KVA SERIE 36KV	1700	400	36

The results are representative for each of the transformers included in the EPD.

Material content

The material composition of this transformers series is shown in the following table and figures:

Product composition, in kg	50KV A SERIE 24KV	50 KVA SERIE 36KV	100 KVA SERIE 24KV	100 KVA SERIE 36KV	160 KVA SERIE 24KV	160KVA SERIE 36KV	250KVA SERIE 24KV	250KVA SERIE 36KV	400KVA SERIE 24KV	400KVA SERIE 36KV
Silicon Steel	360	290	395	335	560	465	745	545	985	760
Aluminum	133	86	134	109	151	140	204	161	311	244
Steel	150	140	150	140	175	185	180	185	250	240
Insulating paper	31	28	24	23	25	23	27	21	38	36
Steel accessories	11	10	11	10	12	12	12	12	16	15
Mineral oil	180	170	175	175	210	230	280	255	360	340
Resin	20	20	20	20	20	23	25	28	25	28
Others	16	16	22	18	28	22	27	43	66	37
Total	900	760	930	830	1180	1100	1500	1250	2050	1700

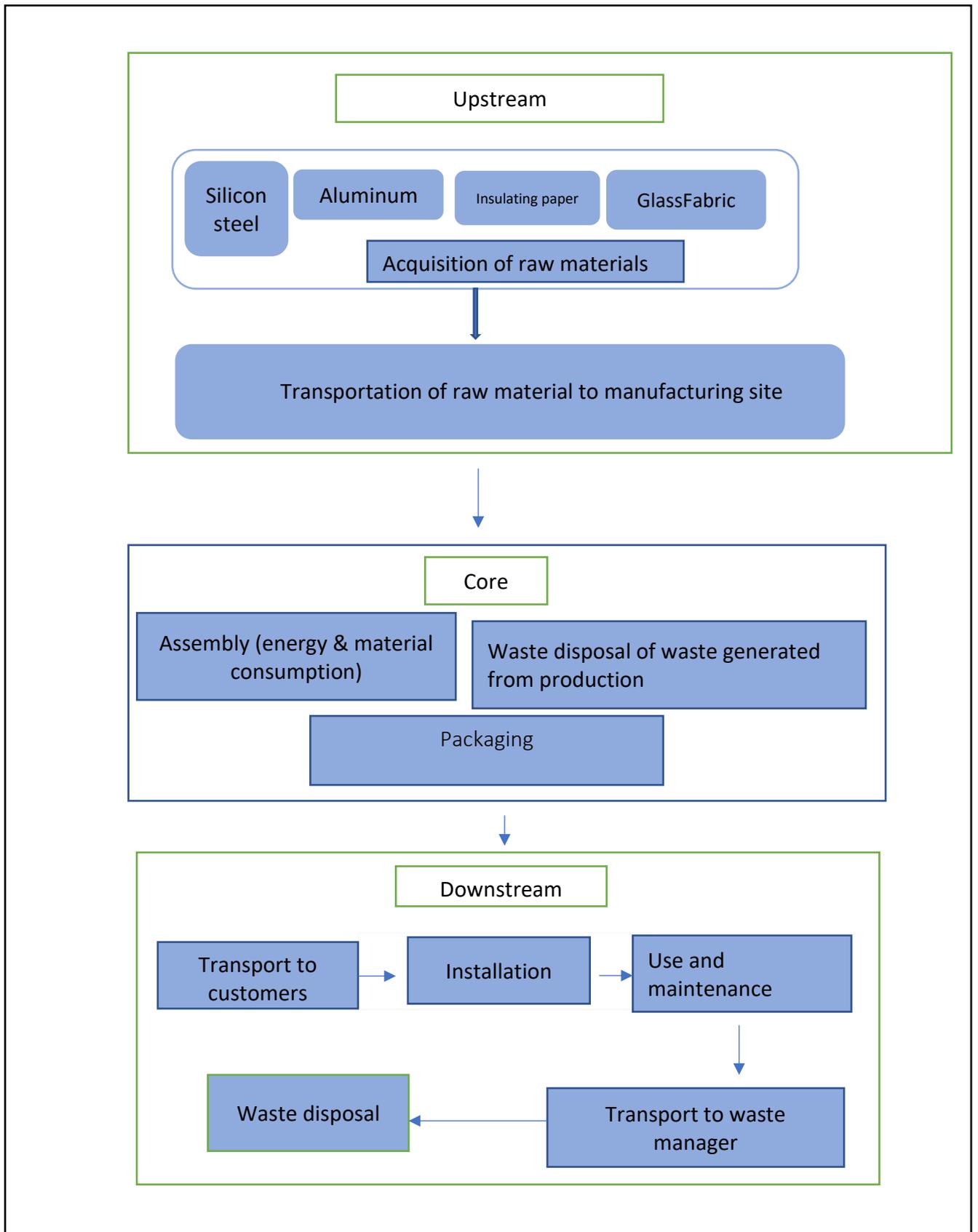
Time and geographical representativeness: data from factory (primary data) is from 2020, which is a representative production year. IMEFY manufacturing plant is based in Spain. The amount used of raw materials as well as energy consumption, waste production, pollutant emissions and transport distance have been obtained from the manufacturing plant (primary data).

Database(s) and LCA software used: generic data on the impact per unit of matter or energy have been taken to determine emissions per kg of matter, kWh of energy or tkm transported. These data have been obtained from the Ecoinvent database version 3.8, allocation cut off by classification and Simapro 9.3.0.3 Software used for the calculations. The impact models used are those indicated in EN 50693:2019

5. SYSTEM BOUNDARIES, SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION.

Description of system boundaries: From cradle to grave or “Cradle to grave”.

System diagram:



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

MANUFACTURING STAGE		DISTRIBUTION STAGE	INSTALLATION STAGE	USE & Maintenance STAGE	END-OF-LIFE STAGE De-installation
UPSTREAM MODULE	CORE MODULE	DOWNSTREAM MODULE			
Extraction of raw materials,	Manufacturing of the product	Transport to customers	Installation of the transformer	Maintenance and use cycle of transformer	Transport to waste manager
Transportation of raw materials to the manufacturing company	Product assembly				Shredding /Landfill/ recycling
	Packaging				

More information: <https://IMEFY.com/en/company/>

- The modularity principle, as well as the polluter-payer principle have been followed.
- Cut off rules: according to EN 50693 a maximum of 5% of the overall environmental impact of the analysed product system could be cut-off. This is specified in PCR EPDItaly018-Power transformers as “Materials making up the transformer itself whose total mass do not exceed 1% of the total weight of the device”. Allocation procedure: where necessary (energy, waste generation) an allocation based in mass has been used.
- The quality of the input data has been evaluated according to its technological, temporal and geographical coverage.
- According to EN 50693, the next processes have not been included since its impact is not significant:
 - Environmental impact from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process.
 - Personnel-related impacts, such as transportation to and from work.
 - Long term emissions.

Scope of EPD: The life cycle of the product is considered, from the extraction of raw materials to disposal of the product at the end of its life, according to the cradle to grave approach - "from cradle to grave". The modules included in the evaluation, in accordance with the PCR and the reference technical standard, are reported by following:

The stages of the product life cycle and the information considered for the evaluation of IMEFY transformer are:

UPSTREAM

This module takes into account the extraction and processing of raw materials and the production of energy which is consumed at the manufacturing plant and the transport of the different raw materials from the manufacturer to the factory where the final product is assembled. The transformer is made of many materials like Silicon steel, Aluminum, insulating paper, glass fabric + adhesive silicone, steel, mineral bases, vegetable esters, aluminum, Bakelite, porcelain / resin / brass, Nitrile, heterophasic copolymer, electrolytic. Is considered that the steel purchased contains an 18% of recycled steel (data taken from PEFCR methodology, of the European commission).

On this module is also considered the processing of the materials as those can be used by IMEFY, for example, in the case of the steel and the aluminum, a metal working process is considered as an upstream processing.

CORE

This module includes the consumption of energy during the manufacturing process of the different IMEFY products. At the same time, the transport and management of factory-originated waste are considered. Product losses that occur during the manufacturing are considered on the study, which are assessed as a waste going out the plant.

The packaging materials are not considered since there's no packaging materials used for the distribution of the transformers.

Regarding the electricity mix, IMEFY disposes of solar panels which generates up to a 15,4% of the electricity consumed on the plant, while the resting 84,6% is coming from the grid.

DOWNSTREAM

Description of scenarios and additional technical information about the transportation of the product to the customer. For this stage, an averaged distance considering the units sold is calculated, representing the distance traveled by the analyzed product.

Downstream also consider installation, use and maintenance, transport of the product to the waste manager and Disposal of the product. For the installation no material or energy is consumed. Is not considered any maintenance operation in a standard and regular use of the transformer.

There is no direct energy consumed (passive machine) nor oil replacement in the use phase, so use phase remains zero.

It's considered on the use phase the electricity consumption due charging losses, as expressed on the PCR. The following formula is used for the calculation of this energetic input.

The total energy consumed shall be expressed in kWh and it can be computed via the following formula:

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

For the EOL scenario, 100km distance is considered as distance from dismantle site to the waste management site. A process of shredding is considered for the dismantling, for the whole weight of the transformer.

All the material are landfilled. Except for Steel, Aluminum and Oil. Steel is 20% landfilled and 80% recycled. Aluminum and oil are 10% landfilled and 90% Recycled.

6. ENVIRONMENTAL IMPACT ASSESSMENT

The environmental impact assessment has been done for each product. The results of the LCIA (Life Cycle Impact Assessment) are relative expressions and do not predict final impacts by category, exceedances of thresholds, safety margins or risks.

50 KVA SERIE 24KV

Environmental impacts

Indicator	Unit	Total	Upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Global Warming Potential total (GWP-total)	kg CO ₂ eq.	5,95E+04	6,88E+03	3,79E+02	4,22E+01	0,00E+00	5,21E+04	5,18E+01
Global Warming Potential total (GWP-fossil)	kg CO ₂ eq.	5,90E+04	6,80E+03	3,77E+02	4,22E+01	0,00E+00	5,17E+04	5,16E+01
Global Warming Potential total (GWPbiogenic)	kg CO ₂ eq.	3,68E+02	6,14E+01	3,78E-01	1,42E-02	0,00E+00	3,06E+02	1,27E-01
Global Warming Potential total (GWP-luluc)	kg CO ₂ eq.	1,39E+02	1,63E+01	1,20E+00	1,57E-02	0,00E+00	1,22E+02	8,08E-02
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	3,05E-03	4,99E-04	3,36E-05	9,70E-06	0,00E+00	2,51E-03	4,06E-06
Acidification potential, Accumulated Exceedance (AP)	mol H ⁺ eq.	3,14E+02	3,94E+01	1,48E+00	1,89E-01	0,00E+00	2,72E+02	2,46E-01
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EPfreshwater)	kg P eq.	5,92E+00	3,06E-01	6,85E-03	3,44E-04	0,00E+00	5,61E+00	2,26E-03
Formation potential of tropospheric ozone (POCP)	kg NMVOC eq.	1,36E+02	2,60E+01	7,61E-01	1,94E-01	0,00E+00	1,09E+02	1,49E-01
Abiotic Depletion for non-fossil resources potential (ADP-minerals&metals)	kg Sb eq.	5,09E-02	4,79E-02	1,18E-05	9,59E-05	0,00E+00	2,85E-03	2,84E-05
Abiotic Depletion for non-fossil resources potential (ADP-fossil)	MJ	1,21E+06	8,50E+04	6,95E+03	6,45E+02	0,00E+00	1,12E+06	7,25E+02
Water deprivation potential, deprivationweighted water consumption (WDP)	m ³	1,35E+04	1,37E+03	9,91E+01	2,40E+00	0,00E+00	1,21E+04	9,38E+00

Results for 50 KVA Serie 24KV

Material for recycling (MFR)	kg	6,72E+02	0,00E+00	1,87E+01	0,00E+00	0,00E+00	0,00E+00	6,53E+02
Components for reuse (CRU)	kg	0,00E+00						
Exported thermal energy (ETE)	kg	0,00E+00						
Exported electricity energy (EEE)	MJ	0,00E+00						

Results for 50 KVA Serie 24KV

50 KVA SERIE 36KV

Environmental impacts

Indicator	Unit	Total	Upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Global Warming Potential total (GWP-total)	kg CO ₂ eq.	6,34E+04	5,20E+03	3,79E+02	3,57E+01	0,00E+00	5,78E+04	4,38E+01
Global Warming Potential total (GWP-fossil)	kg CO ₂ eq.	6,29E+04	5,14E+03	3,77E+02	3,56E+01	0,00E+00	5,73E+04	4,36E+01
Global Warming Potential total (GWPbiogenic)	kg CO ₂ eq.	3,88E+02	4,86E+01	3,78E-01	1,20E-02	0,00E+00	3,39E+02	1,08E-01
Global Warming Potential total (GWP-luluc)	kg CO ₂ eq.	1,48E+02	1,17E+01	1,20E+00	1,33E-02	0,00E+00	1,35E+02	6,83E-02
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	3,24E-03	4,15E-04	3,36E-05	8,19E-06	0,00E+00	2,78E-03	3,46E-06
Acidification potential, Accumulated Exceedance (AP)	mol H ⁺ eq.	3,33E+02	2,93E+01	1,48E+00	1,60E-01	0,00E+00	3,02E+02	2,08E-01
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EPfreshwater)	kg P eq.	6,46E+00	2,36E-01	6,85E-03	2,90E-04	0,00E+00	6,22E+00	1,91E-03
Formation potential of tropospheric ozone (POCP)	kg NMVOC eq.	1,43E+02	2,07E+01	7,61E-01	1,64E-01	0,00E+00	1,21E+02	1,27E-01
Abiotic Depletion for non-fossil resources potential (ADP-minerals&metals)	kg Sb eq.	4,62E-02	4,29E-02	1,18E-05	8,10E-05	0,00E+00	3,16E-03	2,43E-05
Abiotic Depletion for non-fossil resources potential (ADP-fossil)	MJ	1,32E+06	6,72E+04	6,95E+03	5,44E+02	0,00E+00	1,24E+06	6,15E+02
Water deprivation potential, deprivationweighted water consumption (WDP)	m ³	1,45E+04	1,06E+03	9,91E+01	2,02E+00	0,00E+00	1,34E+04	8,03E+00

Results for 50 KVA Serie 36KV

Use of resources

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Use of renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	2,29E+05	7,25E+03	8,06E+02	6,01E+00	0,00E+00	2,21E+05	5,26E+01
Use of renewable primary energy used as raw materials	MJ	4,62E+02	4,62E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use a renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	2,29E+05	7,71E+03	8,06E+02	6,01E+00	0,00E+00	2,21E+05	5,26E+01
Use of non-renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	1,38E+06	7,14E+04	7,45E+03	5,78E+02	0,00E+00	1,30E+06	6,54E+02
Use of non-renewable primary energy used as raw materials	MJ	2,82E+02	2,82E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	1,38E+06	7,17E+04	7,45E+03	5,78E+02	0,00E+00	1,30E+06	6,54E+02
Use of secondary materials	kg	8,37E+01	8,37E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water	m3	1,09E+03	3,83E+01	1,51E+00	6,04E-02	0,00E+00	1,05E+03	2,66E-01

Results for 50 KVA Serie 36KV

Waste generation and inputs/outputs of the system

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Non-Hazardous waste disposed (HWD)	kg	3,13E+03	1,02E+03	7,83E+01	4,99E+01	0,00E+00	1,75E+03	2,30E+02
Hazardous waste disposed (NHWD)	kg	5,92E-01	2,30E-01	4,18E-03	1,31E-03	0,00E+00	3,56E-01	4,74E-04
Radioactive waste disposed (RWD)	kg	9,48E+00	2,28E-01	2,83E-02	3,58E-03	0,00E+00	9,22E+00	2,45E-03
Materials for energy recovery (MER)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling (MFR)	kg	5,59E+02	0,00E+00	1,87E+01	0,00E+00	0,00E+00	0,00E+00	5,40E+02
Components for reuse (CRU)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy (ETE)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electricity energy (EEE)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Results for 50 KVA Serie 36KV

100 KVA SERIE 24KV

Environmental impacts

Indicator	Unit	Total	Upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Global Warming Potential total (GWP-total)	kg CO ₂ eq.	9,39E+04	7,12E+03	3,79E+02	4,36E+01	0,00E+00	8,63E+04	5,34E+01
Global Warming Potential total (GWP-fossil)	kg CO ₂ eq.	9,31E+04	7,03E+03	3,77E+02	4,36E+01	0,00E+00	8,56E+04	5,32E+01
Global Warming Potential total (GWPbiogenic)	kg CO ₂ eq.	5,72E+02	6,49E+01	3,78E-01	1,47E-02	0,00E+00	5,06E+02	1,31E-01
Global Warming Potential total (GWP-luluc)	kg CO ₂ eq.	2,20E+02	1,69E+01	1,20E+00	1,62E-02	0,00E+00	2,02E+02	8,34E-02
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	4,70E-03	5,07E-04	3,36E-05	1,00E-05	0,00E+00	4,15E-03	4,17E-06
Acidification potential, Accumulated Exceedance (AP)	mol H ⁺ eq.	4,93E+02	4,05E+01	1,48E+00	1,95E-01	0,00E+00	4,51E+02	2,53E-01
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EPfreshwater)	kg P eq.	9,61E+00	3,19E-01	6,85E-03	3,55E-04	0,00E+00	9,29E+00	2,33E-03
Formation potential of tropospheric ozone (POCP)	kg NMVOC eq.	2,08E+02	2,67E+01	7,61E-01	2,01E-01	0,00E+00	1,80E+02	1,53E-01
Abiotic Depletion for non-fossil resources potential (ADP-minerals&metals)	kg Sb eq.	5,42E-02	4,93E-02	1,18E-05	9,91E-05	0,00E+00	4,72E-03	2,90E-05
Abiotic Depletion for non-fossil resources potential (ADP-fossil)	MJ	1,95E+06	8,78E+04	6,95E+03	6,66E+02	0,00E+00	1,85E+06	7,48E+02
Water deprivation potential, deprivationweighted water consumption (WDP)	m ³	2,15E+04	1,41E+03	9,91E+01	2,48E+00	0,00E+00	2,00E+04	9,61E+00

Results for 100 KVA Serie 24KV

Use of resources

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Use of renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	3,40E+05	9,71E+03	8,06E+02	7,36E+00	0,00E+00	3,30E+05	6,43E+01
Use of renewable primary energy used as raw materials	MJ	3,96E+02	3,96E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use a renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	3,41E+05	1,01E+04	8,06E+02	7,36E+00	0,00E+00	3,30E+05	6,43E+01
Use of non-renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	2,05E+06	9,33E+04	7,45E+03	7,07E+02	0,00E+00	1,94E+06	7,95E+02

Use of non-renewable primary energy used as raw materials	MJ	2,82E+02	2,82E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	2,05E+06	9,36E+04	7,45E+03	7,07E+02	0,00E+00	1,94E+06	7,95E+02
Use of secondary materials	kg	1,07E+02	1,07E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00						
Use of non-renewable secondary fuels	MJ	0,00E+00						
Net use of fresh water	m3	1,62E+03	5,17E+01	1,51E+00	7,39E-02	0,00E+00	1,57E+03	3,20E-01

Results for 100 KVA Serie 24KV

Waste generation and inputs/outputs of the system

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	EoL
Non-Hazardous waste disposed (HWD)	kg	4,38E+03	1,37E+03	7,83E+01	6,11E+01	0,00E+00	2,61E+03	2,60E+02
Hazardous waste disposed (NHWD)	kg	8,31E-01	2,93E-01	4,18E-03	1,61E-03	0,00E+00	5,31E-01	5,72E-04
Radioactive waste disposed (RWD)	kg	1,41E+01	2,85E-01	2,83E-02	4,38E-03	0,00E+00	1,38E+01	2,97E-03
Materials for energy recovery (MER)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling (MFR)	kg	6,98E+02	0,00E+00	1,87E+01	0,00E+00	0,00E+00	0,00E+00	6,79E+02
Components for reuse (CRU)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy (ETE)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electricity energy (EEE)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Results for 100 KVA Serie 24KV

100 KVA SERIE 36KV

Environmental impacts

Indicator	Unit	Total	Upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Global Warming Potential total (GWP-total)	kg CO ₂ eq.	1,02E+05	6,05E+03	3,79E+02	3,89E+01	0,00E+00	9,57E+04	4,77E+01
Global Warming Potential total (GWP-fossil)	kg CO ₂ eq.	1,01E+05	5,98E+03	3,77E+02	3,89E+01	0,00E+00	9,49E+04	4,75E+01
Global Warming Potential total (GWPbiogenic)	kg CO ₂ eq.	6,18E+02	5,56E+01	3,78E-01	1,31E-02	0,00E+00	5,62E+02	1,17E-01
Global Warming Potential total (GWP-luluc)	kg CO ₂ eq.	2,39E+02	1,42E+01	1,20E+00	1,45E-02	0,00E+00	2,24E+02	7,45E-02
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	5,10E-03	4,55E-04	3,36E-05	8,94E-06	0,00E+00	4,60E-03	3,74E-06
Acidification potential, Accumulated Exceedance (AP)	mol H ⁺ eq.	5,37E+02	3,43E+01	1,48E+00	1,74E-01	0,00E+00	5,00E+02	2,27E-01
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EPfreshwater)	kg P eq.	1,06E+01	2,72E-01	6,85E-03	3,17E-04	0,00E+00	1,03E+01	2,08E-03
Formation potential of tropospheric ozone (POCP)	kg NMVOC eq.	2,25E+02	2,34E+01	7,61E-01	1,79E-01	0,00E+00	2,00E+02	1,37E-01
Abiotic Depletion for non-fossil resources potential (ADP-minerals&metals)	kg Sb eq.	5,08E-02	4,55E-02	1,18E-05	8,85E-05	0,00E+00	5,24E-03	2,62E-05
Abiotic Depletion for non-fossil resources potential (ADP-fossil)	MJ	2,14E+06	7,63E+04	6,95E+03	5,95E+02	0,00E+00	2,06E+06	6,69E+02
Water deprivation potential, deprivationweighted water consumption (WDP)	m ³	2,35E+04	1,21E+03	9,91E+01	2,21E+00	0,00E+00	2,21E+04	8,65E+00

Results for 100 KVA Serie 36KV

Use of resources

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Use of renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	3,75E+05	8,30E+03	8,06E+02	6,56E+00	0,00E+00	3,66E+05	5,74E+01
Use of renewable primary energy used as raw materials	MJ	3,80E+02	3,80E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Total use a renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	3,75E+05	8,68E+03	8,06E+02	6,56E+00	0,00E+00	3,66E+05	5,74E+01
Use of non-renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	2,25E+06	8,11E+04	7,45E+03	6,31E+02	0,00E+00	2,16E+06	7,11E+02
Use of non-renewable primary energy used as raw materials	MJ	2,82E+02	2,82E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	2,25E+06	8,14E+04	7,45E+03	6,31E+02	0,00E+00	2,16E+06	7,11E+02
Use of secondary materials	kg	9,26E+01	9,26E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00						
Use of non-renewable secondary fuels	MJ	0,00E+00						
Net use of fresh water	m3	1,79E+03	4,42E+01	1,51E+00	6,59E-02	0,00E+00	1,74E+03	2,88E-01

Results for 100 KVA Serie 36KV

Waste generation and inputs/outputs of the system

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Non-Hazardous waste disposed (HWD)	kg	4,44E+03	1,17E+03	7,83E+01	5,45E+01	0,00E+00	2,90E+03	2,39E+02
Hazardous waste disposed (NHWD)	kg	8,52E-01	2,57E-01	4,18E-03	1,43E-03	0,00E+00	5,90E-01	5,13E-04
Radioactive waste disposed (RWD)	kg	1,56E+01	2,53E-01	2,83E-02	3,91E-03	0,00E+00	1,53E+01	2,66E-03
Materials for energy recovery (MER)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling (MFR)	kg	6,19E+02	0,00E+00	1,87E+01	0,00E+00	0,00E+00	0,00E+00	6,01E+02
Components for reuse (CRU)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy (ETE)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electricity energy (EEE)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Results for 100 KVA Serie 36KV

160KVA SERIE 24KV

Environmental impacts

Indicator	Unit	Total	Upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Global Warming Potential total (GWP-total)	kg CO ₂ eq.	1,31E+05	8,83E+03	3,79E+02	5,54E+01	0,00E+00	1,22E+05	6,77E+01
Global Warming Potential total (GWP-fossil)	kg CO ₂ eq.	1,30E+05	8,72E+03	3,77E+02	5,53E+01	0,00E+00	1,21E+05	6,74E+01
Global Warming Potential total (GWPbiogenic)	kg CO ₂ eq.	7,99E+02	8,49E+01	3,78E-01	1,86E-02	0,00E+00	7,14E+02	1,65E-01
Global Warming Potential total (GWP-luluc)	kg CO ₂ eq.	3,06E+02	2,02E+01	1,20E+00	2,06E-02	0,00E+00	2,84E+02	1,06E-01
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	6,53E-03	6,33E-04	3,36E-05	1,27E-05	0,00E+00	5,85E-03	5,26E-06
Acidification potential, Accumulated Exceedance (AP)	mol H ⁺ eq.	6,87E+02	4,94E+01	1,48E+00	2,48E-01	0,00E+00	6,36E+02	3,21E-01
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EPfreshwater)	kg P eq.	1,35E+01	4,04E-01	6,85E-03	4,51E-04	0,00E+00	1,31E+01	2,95E-03
Formation potential of tropospheric ozone (POCP)	kg NMVOC eq.	2,89E+02	3,33E+01	7,61E-01	2,55E-01	0,00E+00	2,54E+02	1,93E-01
Abiotic Depletion for non-fossil resources potential (ADP-minerals&metals)	kg Sb eq.	6,60E-02	5,92E-02	1,18E-05	1,26E-04	0,00E+00	6,65E-03	3,65E-05
Abiotic Depletion for non-fossil resources potential (ADP-fossil)	MJ	2,73E+06	1,10E+05	6,95E+03	8,45E+02	0,00E+00	2,61E+06	9,46E+02
Water deprivation potential, deprivationweighted water consumption (WDP)	m ³	3,00E+04	1,76E+03	9,91E+01	3,14E+00	0,00E+00	2,81E+04	1,21E+01

Results for 160 KVA Serie 24KV

Use of resources

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Use of renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	4,77E+05	1,21E+04	8,06E+02	9,33E+00	0,00E+00	4,65E+05	8,16E+01
Use of renewable primary energy used as raw materials	MJ	4,13E+02	4,13E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use a renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	4,78E+05	1,25E+04	8,06E+02	9,33E+00	0,00E+00	4,65E+05	8,16E+01

Use of non-renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	2,87E+06	1,17E+05	7,45E+03	8,98E+02	0,00E+00	2,74E+06	1,01E+03
Use of non-renewable primary energy used as raw materials	MJ	2,82E+02	2,82E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	2,87E+06	1,17E+05	7,45E+03	8,98E+02	0,00E+00	2,74E+06	1,01E+03
Use of secondary materials	kg	1,44E+02	1,44E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00						
Use of non-renewable secondary fuels	MJ	0,00E+00						
Net use of fresh water	m3	2,28E+03	6,41E+01	1,51E+00	9,37E-02	0,00E+00	2,21E+03	4,04E-01

Results for 160 KVA Serie 24KV

Waste generation and inputs/outputs of the system

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EOI	
Non-Hazardous waste disposed (HWD)	kg	5,92E+03	1,76E+03	7,83E+01	7,75E+01	0,00E+00	3,68E+03	3,20E+02
Hazardous waste disposed (NHWD)	kg	1,12E+00	3,62E-01	4,18E-03	2,04E-03	0,00E+00	7,49E-01	7,22E-04
Radioactive waste disposed (RWD)	kg	1,98E+01	3,65E-01	2,83E-02	5,56E-03	0,00E+00	1,94E+01	3,76E-03
Materials for energy recovery (MER)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling (MFR)	kg	8,89E+02	0,00E+00	1,87E+01	0,00E+00	0,00E+00	0,00E+00	8,70E+02
Components for reuse (CRU)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy (ETE)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electricity energy (EEE)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Results for 160 KVA Serie 24KV

160KVA SERIE 36KV.

Environmental impacts

Indicator	Unit	Total	Upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EOI	
Global Warming Potential total (GWP-total)	kg CO ₂ eq.	1,43E+05	8,01E+03	3,79E+02	5,16E+01	0,00E+00	1,35E+05	6,32E+01
Global Warming Potential total (GWP-fossil)	kg CO ₂ eq.	1,42E+05	7,92E+03	3,77E+02	5,16E+01	0,00E+00	1,34E+05	6,29E+01
Global Warming Potential total (GWPbiogenic)	kg CO ₂ eq.	8,67E+02	7,51E+01	3,78E-01	1,74E-02	0,00E+00	7,91E+02	1,55E-01
Global Warming Potential total (GWP-luluc)	kg CO ₂ eq.	3,35E+02	1,84E+01	1,20E+00	1,92E-02	0,00E+00	3,15E+02	9,86E-02
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	7,13E-03	5,99E-04	3,36E-05	1,19E-05	0,00E+00	6,48E-03	4,93E-06
Acidification potential, Accumulated Exceedance (AP)	mol H ⁺ eq.	7,52E+02	4,52E+01	1,48E+00	2,31E-01	0,00E+00	7,05E+02	3,00E-01
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EPfreshwater)	kg P eq.	1,49E+01	3,62E-01	6,85E-03	4,20E-04	0,00E+00	1,45E+01	2,76E-03
Formation potential of tropospheric ozone (POCP)	kg NMVOC eq.	3,14E+02	3,10E+01	7,61E-01	2,37E-01	0,00E+00	2,82E+02	1,81E-01
Abiotic Depletion for non-fossil resources potential (ADP-minerals&metals)	kg Sb eq.	6,29E-02	5,53E-02	1,18E-05	1,17E-04	0,00E+00	7,37E-03	3,43E-05
Abiotic Depletion for non-fossil resources potential (ADP-fossil)	MJ	3,00E+06	1,01E+05	6,95E+03	7,88E+02	0,00E+00	2,89E+06	8,84E+02
Water deprivation potential, deprivationweighted water consumption (WDP)	m ³	3,29E+04	1,60E+03	9,91E+01	2,93E+00	0,00E+00	3,12E+04	1,14E+01

Results for 160 KVA Serie 36KV

Use of resources

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EOI	
Use of renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	5,27E+05	1,09E+04	8,06E+02	8,70E+00	0,00E+00	5,15E+05	7,61E+01
Use of renewable primary energy used as raw materials	MJ	3,80E+02	3,80E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use a renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	5,27E+05	1,12E+04	8,06E+02	8,70E+00	0,00E+00	5,15E+05	7,61E+01

Use of non-renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	3,15E+06	1,08E+05	7,45E+03	8,37E+02	0,00E+00	3,04E+06	9,40E+02
Use of non-renewable primary energy used as raw materials	MJ	3,25E+02	3,25E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	3,15E+06	1,08E+05	7,45E+03	8,37E+02	0,00E+00	3,04E+06	9,40E+02
Use of secondary materials	kg	1,26E+02	1,26E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00						
Use of non-renewable secondary fuels	MJ	0,00E+00						
Net use of fresh water	m3	2,52E+03	5,80E+01	1,51E+00	8,74E-02	0,00E+00	2,46E+03	3,79E-01

Results for 160 KVA Serie 36KV

Waste generation and inputs/outputs of the system

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	EoL
Non-Hazardous waste disposed (HWD)	kg	6,11E+03	1,57E+03	7,83E+01	7,23E+01	0,00E+00	4,08E+03	3,07E+02
Hazardous waste disposed (NHWD)	kg	1,18E+00	3,40E-01	4,18E-03	1,90E-03	0,00E+00	8,30E-01	6,77E-04
Radioactive waste disposed (RWD)	kg	2,19E+01	3,38E-01	2,83E-02	5,18E-03	0,00E+00	2,15E+01	3,52E-03
Materials for energy recovery (MER)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling (MFR)	kg	8,26E+02	0,00E+00	1,87E+01	0,00E+00	0,00E+00	0,00E+00	8,07E+02
Components for reuse (CRU)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy (ETE)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electricity energy (EEE)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Results for 160 KVA Serie 36KV

250 KVA SERIE 24KV

Environmental impacts

Indicator	Unit	Total	Upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Global Warming Potential total (GWP-total)	kg CO ₂ eq.	1,77E+05	1,15E+04	3,79E+02	7,04E+01	0,00E+00	1,65E+05	8,59E+01
Global Warming Potential total (GWP-fossil)	kg CO ₂ eq.	1,76E+05	1,13E+04	3,77E+02	7,03E+01	0,00E+00	1,64E+05	8,55E+01
Global Warming Potential total (GWPbiogenic)	kg CO ₂ eq.	1,08E+03	1,10E+02	3,78E-01	2,37E-02	0,00E+00	9,69E+02	2,09E-01
Global Warming Potential total (GWP-luluc)	kg CO ₂ eq.	4,15E+02	2,70E+01	1,20E+00	2,62E-02	0,00E+00	3,86E+02	1,34E-01
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	8,82E-03	8,23E-04	3,36E-05	1,62E-05	0,00E+00	7,94E-03	6,65E-06
Acidification potential, Accumulated Exceedance (AP)	mol H ⁺ eq.	9,30E+02	6,43E+01	1,48E+00	3,15E-01	0,00E+00	8,63E+02	4,07E-01
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EPfreshwater)	kg P eq.	1,83E+01	5,24E-01	6,85E-03	5,73E-04	0,00E+00	1,78E+01	3,75E-03
Formation potential of tropospheric ozone (POCP)	kg NMVOC eq.	3,90E+02	4,33E+01	7,61E-01	3,24E-01	0,00E+00	3,45E+02	2,45E-01
Abiotic Depletion for non-fossil resources potential (ADP-minerals&metals)	kg Sb eq.	7,99E-02	7,06E-02	1,18E-05	1,60E-04	0,00E+00	9,04E-03	4,61E-05
Abiotic Depletion for non-fossil resources potential (ADP-fossil)	MJ	3,70E+06	1,43E+05	6,95E+03	1,07E+03	0,00E+00	3,55E+06	1,20E+03
Water deprivation potential, deprivationweighted water consumption (WDP)	m ³	4,06E+04	2,27E+03	9,91E+01	4,00E+00	0,00E+00	3,82E+04	1,53E+01

Results for 250 KVA Serie 24KV

Use of resources

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Use of renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	6,48E+05	1,57E+04	8,06E+02	1,19E+01	0,00E+00	6,31E+05	1,04E+02
Use of renewable primary energy used as raw materials	MJ	4,46E+02	4,46E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use a renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	6,48E+05	1,61E+04	8,06E+02	1,19E+01	0,00E+00	6,31E+05	1,04E+02

Use of non-renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	3,88E+06	1,52E+05	7,45E+03	1,14E+03	0,00E+00	3,72E+06	1,28E+03
Use of non-renewable primary energy used as raw materials	MJ	3,53E+02	3,53E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	3,88E+06	1,53E+05	7,45E+03	1,14E+03	0,00E+00	3,72E+06	1,28E+03
Use of secondary materials	kg	1,80E+02	1,80E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00						
Use of non-renewable secondary fuels	MJ	0,00E+00						
Net use of fresh water	m3	3,09E+03	8,35E+01	1,51E+00	1,19E-01	0,00E+00	3,01E+03	5,11E-01

Results for 250 KVA Serie 24KV

Waste generation and inputs/outputs of the system

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	EoL
Non-Hazardous waste disposed (HWD)	kg	7,85E+03	2,27E+03	7,83E+01	9,86E+01	0,00E+00	5,00E+03	3,97E+02
Hazardous waste disposed (NHWD)	kg	1,48E+00	4,53E-01	4,18E-03	2,59E-03	0,00E+00	1,02E+00	9,14E-04
Radioactive waste disposed (RWD)	kg	2,69E+01	4,76E-01	2,83E-02	7,06E-03	0,00E+00	2,63E+01	4,76E-03
Materials for energy recovery (MER)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling (MFR)	kg	1,14E+03	0,00E+00	1,87E+01	0,00E+00	0,00E+00	0,00E+00	1,12E+03
Components for reuse (CRU)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy (ETE)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electricity energy (EEE)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Results for 250 KVA Serie 24KV

250 KVA SERIE 36KV

Environmental impacts

Indicator	Unit	Total	Upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EOI	
Global Warming Potential total (GWP-total)	kg CO ₂ eq.	1,93E+05	9,10E+03	3,79E+02	5,87E+01	0,00E+00	1,83E+05	7,17E+01
Global Warming Potential total (GWP-fossil)	kg CO ₂ eq.	1,91E+05	8,99E+03	3,77E+02	5,86E+01	0,00E+00	1,82E+05	7,14E+01
Global Warming Potential total (GWPbiogenic)	kg CO ₂ eq.	1,16E+03	8,54E+01	3,78E-01	1,97E-02	0,00E+00	1,08E+03	1,76E-01
Global Warming Potential total (GWP-luluc)	kg CO ₂ eq.	4,52E+02	2,14E+01	1,20E+00	2,18E-02	0,00E+00	4,29E+02	1,12E-01
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	9,54E-03	6,77E-04	3,36E-05	1,35E-05	0,00E+00	8,81E-03	5,59E-06
Acidification potential, Accumulated Exceedance (AP)	mol H ⁺ eq.	1,01E+03	5,12E+01	1,48E+00	2,63E-01	0,00E+00	9,58E+02	3,40E-01
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EPfreshwater)	kg P eq.	2,02E+01	4,12E-01	6,85E-03	4,77E-04	0,00E+00	1,97E+01	3,13E-03
Formation potential of tropospheric ozone (POCP)	kg NMVOC eq.	4,20E+02	3,51E+01	7,61E-01	2,70E-01	0,00E+00	3,83E+02	2,05E-01
Abiotic Depletion for non-fossil resources potential (ADP-minerals&metals)	kg Sb eq.	7,09E-02	6,07E-02	1,18E-05	1,33E-04	0,00E+00	1,00E-02	3,89E-05
Abiotic Depletion for non-fossil resources potential (ADP-fossil)	MJ	4,06E+06	1,15E+05	6,95E+03	8,95E+02	0,00E+00	3,94E+06	1,00E+03
Water deprivation potential, deprivationweighted water consumption (WDP)	m ³	4,43E+04	1,81E+03	9,91E+01	3,33E+00	0,00E+00	4,24E+04	1,29E+01

Results for 250 KVA Serie 36KV

Use of resources

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EOI	
Use of renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	7,14E+05	1,24E+04	8,06E+02	9,89E+00	0,00E+00	7,00E+05	8,65E+01
Use of renewable primary energy used as raw materials	MJ	3,47E+02	3,47E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use a renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	7,14E+05	1,27E+04	8,06E+02	9,89E+00	0,00E+00	7,00E+05	8,65E+01

Use of non-renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	4,26E+06	1,22E+05	7,45E+03	9,51E+02	0,00E+00	4,13E+06	1,07E+03
Use of non-renewable primary energy used as raw materials	MJ	3,95E+02	3,95E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	4,26E+06	1,23E+05	7,45E+03	9,51E+02	0,00E+00	4,13E+06	1,07E+03
Use of secondary materials	kg	1,45E+02	1,45E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00						
Use of non-renewable secondary fuels	MJ	0,00E+00						
Net use of fresh water	m3	3,41E+03	6,64E+01	1,51E+00	9,93E-02	0,00E+00	3,34E+03	4,29E-01

Results for 250 KVA Serie 36KV

Waste generation and inputs/outputs of the system

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Non-Hazardous waste disposed (HWD)	kg	7,86E+03	1,80E+03	7,83E+01	8,21E+01	0,00E+00	5,55E+03	3,45E+02
Hazardous waste disposed (NHWD)	kg	1,52E+00	3,79E-01	4,18E-03	2,16E-03	0,00E+00	1,13E+00	7,67E-04
Radioactive waste disposed (RWD)	kg	2,97E+01	3,84E-01	2,83E-02	5,88E-03	0,00E+00	2,92E+01	3,99E-03
Materials for energy recovery (MER)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling (MFR)	kg	9,26E+02	0,00E+00	1,87E+01	0,00E+00	0,00E+00	0,00E+00	9,07E+02
Components for reuse (CRU)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy (ETE)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electricity energy (EEE)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Results for 250 KVA Serie 36KV

400 KVA SERIE 24KV

Environmental impacts

Indicator	Unit	Total	Upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Global Warming Potential total (GWP-total)	kg CO ₂ eq.	2,47E+05	1,62E+04	3,79E+02	9,62E+01	0,00E+00	2,30E+05	1,17E+02
Global Warming Potential total (GWP-fossil)	kg CO ₂ eq.	2,45E+05	1,60E+04	3,77E+02	9,61E+01	0,00E+00	2,28E+05	1,17E+02
Global Warming Potential total (GWPbiogenic)	kg CO ₂ eq.	1,50E+03	1,50E+02	3,78E-01	3,23E-02	0,00E+00	1,35E+03	2,85E-01
Global Warming Potential total (GWP-luluc)	kg CO ₂ eq.	5,79E+02	3,94E+01	1,20E+00	3,58E-02	0,00E+00	5,38E+02	1,83E-01
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	1,22E-02	1,12E-03	3,36E-05	2,21E-05	0,00E+00	1,11E-02	9,06E-06
Acidification potential, Accumulated Exceedance (AP)	mol H ⁺ eq.	1,30E+03	9,16E+01	1,48E+00	4,31E-01	0,00E+00	1,20E+03	5,55E-01
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EPfreshwater)	kg P eq.	2,55E+01	7,31E-01	6,85E-03	7,83E-04	0,00E+00	2,48E+01	5,13E-03
Formation potential of tropospheric ozone (POCP)	kg NMVOC eq.	5,42E+02	6,00E+01	7,61E-01	4,42E-01	0,00E+00	4,81E+02	3,33E-01
Abiotic Depletion for non-fossil resources potential (ADP-minerals&metals)	kg Sb eq.	1,03E-01	9,02E-02	1,18E-05	2,19E-04	0,00E+00	1,26E-02	6,26E-05
Abiotic Depletion for non-fossil resources potential (ADP-fossil)	MJ	5,15E+06	1,99E+05	6,95E+03	1,47E+03	0,00E+00	4,94E+06	1,64E+03
Water deprivation potential, deprivationweighted water consumption (WDP)	m ³	5,65E+04	3,17E+03	9,91E+01	5,46E+00	0,00E+00	5,32E+04	2,07E+01

Results for 400 KVA Serie 24KV

Use of resources

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Use of renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	9,02E+05	2,22E+04	8,06E+02	1,62E+01	0,00E+00	8,79E+05	1,42E+02
Use of renewable primary energy used as raw materials	MJ	6,27E+02	6,27E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use a renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	9,02E+05	2,28E+04	8,06E+02	1,62E+01	0,00E+00	8,79E+05	1,42E+02

Use of non-renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	5,40E+06	2,11E+05	7,45E+03	1,56E+03	0,00E+00	5,18E+06	1,74E+03
Use of non-renewable primary energy used as raw materials	MJ	3,53E+02	3,53E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	5,40E+06	2,11E+05	7,45E+03	1,56E+03	0,00E+00	5,18E+06	1,74E+03
Use of secondary materials	kg	2,45E+02	2,45E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00						
Use of non-renewable secondary fuels	MJ	0,00E+00						
Net use of fresh water	m3	4,31E+03	1,18E+02	1,51E+00	1,63E-01	0,00E+00	4,19E+03	6,96E-01

Results for 400 KVA Serie 24KV

Waste generation and inputs/outputs of the system

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EoL	
Non-Hazardous waste disposed (HWD)	kg	1,09E+04	3,15E+03	7,83E+01	1,35E+02	0,00E+00	6,97E+03	5,33E+02
Hazardous waste disposed (NHWD)	kg	2,06E+00	6,33E-01	4,18E-03	3,54E-03	0,00E+00	1,42E+00	1,25E-03
Radioactive waste disposed (RWD)	kg	3,74E+01	6,46E-01	2,83E-02	9,65E-03	0,00E+00	3,67E+01	6,49E-03
Materials for energy recovery (MER)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling (MFR)	kg	1,54E+03	0,00E+00	1,87E+01	0,00E+00	0,00E+00	0,00E+00	1,52E+03
Components for reuse (CRU)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy (ETE)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electricity energy (EEE)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Results for 400 KVA Serie 24KV

400 KVA SERIE 36KV

Environmental impacts

Indicator	Unit	Total	Upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EOI	
Global Warming Potential total (GWP-total)	kg CO ₂ eq.	2,69E+05	1,30E+04	3,79E+02	7,98E+01	0,00E+00	2,55E+05	9,74E+01
Global Warming Potential total (GWP-fossil)	kg CO ₂ eq.	2,66E+05	1,28E+04	3,77E+02	7,97E+01	0,00E+00	2,53E+05	9,70E+01
Global Warming Potential total (GWPbiogenic)	kg CO ₂ eq.	1,62E+03	1,20E+02	3,78E-01	2,68E-02	0,00E+00	1,50E+03	2,38E-01
Global Warming Potential total (GWP-luluc)	kg CO ₂ eq.	6,30E+02	3,11E+01	1,20E+00	2,97E-02	0,00E+00	5,97E+02	1,52E-01
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	1,33E-02	9,40E-04	3,36E-05	1,83E-05	0,00E+00	1,23E-02	7,57E-06
Acidification potential, Accumulated Exceedance (AP)	mol H ⁺ eq.	1,41E+03	7,36E+01	1,48E+00	3,57E-01	0,00E+00	1,33E+03	4,61E-01
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EPfreshwater)	kg P eq.	2,81E+01	5,83E-01	6,85E-03	6,49E-04	0,00E+00	2,75E+01	4,25E-03
Formation potential of tropospheric ozone (POCP)	kg NMVOC eq.	5,84E+02	4,92E+01	7,61E-01	3,67E-01	0,00E+00	5,34E+02	2,78E-01
Abiotic Depletion for non-fossil resources potential (ADP-minerals&metals)	kg Sb eq.	9,10E-02	7,68E-02	1,18E-05	1,81E-04	0,00E+00	1,40E-02	5,25E-05
Abiotic Depletion for non-fossil resources potential (ADP-fossil)	MJ	5,65E+06	1,62E+05	6,95E+03	1,22E+03	0,00E+00	5,48E+06	1,36E+03
Water deprivation potential, deprivationweighted water consumption (WDP)	m ³	6,17E+04	2,56E+03	9,91E+01	4,53E+00	0,00E+00	5,90E+04	1,74E+01

Results for 400 KVA Serie 36KV

Use of resources

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EOI	
Use of renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	9,94E+05	1,77E+04	8,06E+02	1,34E+01	0,00E+00	9,75E+05	1,17E+02
Use of renewable primary energy used as raw materials	MJ	5,94E+02	5,94E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use a renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	9,94E+05	1,83E+04	8,06E+02	1,34E+01	0,00E+00	9,75E+05	1,17E+02

Use of non-renewable primary energy, excluding the resources of non-renewable primary energy used as a raw materials	MJ	5,93E+06	1,72E+05	7,45E+03	1,29E+03	0,00E+00	5,75E+06	1,45E+03
Use of non-renewable primary energy used as raw materials	MJ	3,95E+02	3,95E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy (primary energy and resources of renewable primary energy used as raw materials)	MJ	5,93E+06	1,72E+05	7,45E+03	1,29E+03	0,00E+00	5,75E+06	1,45E+03
Use of secondary materials	kg	1,95E+02	1,95E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	0,00E+00						
Use of non-renewable secondary fuels	MJ	0,00E+00						
Net use of fresh water	m3	4,75E+03	9,45E+01	1,51E+00	1,35E-01	0,00E+00	4,65E+03	5,81E-01

Results for 400 KVA Serie 36KV

Waste generation and inputs/outputs of the system

Indicator	Unit	Total	upstream	Core	Downstream			
			Manufacturing	Distribution	Installation	Use	EOI	
Non-Hazardous waste disposed (HWD)	kg	1,09E+04	2,51E+03	7,83E+01	1,12E+02	0,00E+00	7,73E+03	4,59E+02
Hazardous waste disposed (NHWD)	kg	2,10E+00	5,24E-01	4,18E-03	2,94E-03	0,00E+00	1,57E+00	1,04E-03
Radioactive waste disposed (RWD)	kg	4,13E+01	5,33E-01	2,83E-02	8,00E-03	0,00E+00	4,07E+01	5,41E-03
Materials for energy recovery (MER)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling (MFR)	kg	1,28E+03	0,00E+00	1,87E+01	0,00E+00	0,00E+00	0,00E+00	1,26E+03
Components for reuse (CRU)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported thermal energy (ETE)	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported electricity energy (EEE)	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Results for 400 KVA Serie 36KV

7. Interpretation of results

The interpretation of results is done for the 50 KVA SERIE 24 KV transformer. The product stage (UPSTREAM) is the life cycle stage with the 2nd largest impact for all the impact categories analyzed except for Abiotic depletion for non-fossil resources (ADP-minerals&metals) (94%), upstream representing between 94% ADP-minerals&metals to 5% (Eutrophication - freshwater (EP-freshwater)).

The Core module represents a lowest impact for all the impact categories analyzed. In relation to Downstream representing between 6% ADP-minerals&metals to 95% (Eutrophication - freshwater (EP-freshwater)).

The electricity consumption during use is the main contributor of the life cycle environmental impacts.

One transformer is selected for the interpretation, but this interpretation is the same for the other nineteen transformers.

Impact category	Unit	Upstream	Core	Downstream
Global warming total (GWP-total)	kg CO ₂ eq	12%	1%	88%
Ozone layer depletion (ODP)	kg CFC 11 eq	16%	1%	83%
Acidification (AP)	mol H ⁺ eq	13%	0%	87%
Eutrophication - freshwater (EP-freshwater)	kg PO ₄ eq	5%	0%	95%
Trophospheric Ozone Formation (POCP)	kg NMVOC eq	19%	1%	80%
Abiotic depletion for non-fossil resources (ADP-minerals&metals)	kg Sb eq	94%	0%	6%
Abiotic depletion for fossil resources (ADP-fossil)	MJ, net calorific value	7%	1%	92%
Water user deprivation (WDP)	m ³	10%	1%	89%

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