Shanghai Sieyuan Power Capacitor Co. Ltd.

ENVIRONMENTAL PRODUCT DECLARATION

PRODUCT NAME:

HF P/N	BAM7.96-200-1W	BAM8.382-484-1W	BAM19.92-800-1W	TBBX25-6000/333-BLW	TBBX20-4000/333-BLW
	TBBX15-4000/333-BLW	TBBX11-3000/333-BLW	TBBX10-3000/333-BLW	TBB13.8-7200/200-BLW	TBB69-40000/420-BLW
Type	Power Capacitor	Power Capacitor	Power Capacitor	Power Capacitor	Power Capacitor

PLANTS LOCATION: Shanghai Xinzhuang Industrial Park 201108

In accordance with ISO 14025 and EN 50693

Program Operator	EPDItaly
Publisher	EPDItaly

Declaration Number	Sieyuan2301
Registration Number	EPDITALY0543

Issue date	2023/11/17
Valid to	2028/11/17
Revision date	2024/01/30

GENERAL INFORMATION

EPD OWNER	
Name of the company	Shanghai Sieyuan Power Capacitor Co. Ltd.
Registered office	1199 Shenfu Road, Minhang district, Shanghai
Contacts for information on the EPD	Ms. Xingyuan Guo, gxy.15195@sieyuan.com

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

INFORMATION ON THE EPD	
Product name (s)	BAM7.96-200-1W BAM8.382-484-1W BAM19.92-800-1W TBBX25-6000/333-BLW TBBX20-4000/333-BLW TBBX15-4000/333-BLW TBBX11-3000/333-BLW TBBX10-3000/333-BLW TBB13.8-7200/200-BLW TBB69-40000/420-BLW
Site (s)	Shanghai Xinzhuang Industrial Park 201108
Short description and technical information of the product (s)	The power capacitors are designed for power factor correction, power quality improvement, and transmission line loss reduction. Reference service life: 20 years
Field of application of the product (s)	Power transmission and distribution
Product (s) reference standards (if any)	
CPC Code (number) https://unstats.un.org/unsd/classifications/Econ	46
EPD Type	Product specific EPD

VERIFICATION INFORMATION	
PCR (title, version, date of publication or update)	PCR EPDItaly007 Electronic and electrical products and systems, REV.3, 2023/01/13 The EN50693 Product category rules for life cycle assessments of electronic and electrical products
EPDItaly Regulation (version, date of publication or update)	Regulations of the EPDItaly Programme, version 5.2, 2022/02/16
Project Report LCA	This EPD study is based on the LCA study described in the LCA report
Independent Verification Statement	The PCR review was performed by Eng.Elena Neri - info@epditaly.it. 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. In particular, EPDs of construction products may not be comparable if they do not comply with EN 15804: 2012 + A2: 2019.
Liability Statement	The EPD Owner releases EPDItaly from any non-compliance with environmental legislation. The holder of the declaration will be responsible for the information and supporting evidence. EPDItaly disclaims any responsibility for the information, data and results provided by the EPD Owner for life cycle assessment.

OTHER INFORMATION	
Contact information of EPD Owner	Xingyuan Guo gxy.15195@sieyuan.com
Technical support	Ecovane Envrionmental support@1mi1.cn
LCA software	SimaPro 9.5.0.0 (2023)
LCI database	Ecoinvent v3.9.1 (2023)

CONTENTS

DESCRIPTION OF THE ORGANIZATION

Shanghai Sieyuan Power Capacitor Co. Ltd. (short for Sieyuan Capacitor), located in Shanghai Xinzhuang Industrial Park, is a high-tech enterprise of power capacitor manufacturing invested by Sieyuan Electric Co. Sieyuan Capacitor has been working hard and striving for continuous improvement for more than ten years. Now, Sieyuan Capacitor has supplied more than 400,000 power capacitors to customers worldwide.

Product voltages range from 6 kV to 1000 kV AC and from ±220 kV to ±1100 kV DC, with applications in power transmission, rail transportation, high-speed rail, metallurgy, petrochemical, coal mining, utilities, etc. Service coverage: branches and regional networks in more than 60 countries and regions to meet rapid response needs. All the products of Sieyuan Capacitor comply with the relevant new standards at home and abroad and have passed the KEMA type test, CESI type test, and LAPEM certification. Looking ahead, Sieyuan Capacitor will continue to innovate to meet global customers' product and service needs, aspire to be a world-leading enterprise, serve customers wholeheartedly, and strive to create greater value and success for our customers.

Name and location of production site(s) within the organization

Table1 Location of Capacitors assembly

Component / Process	Manufacturing company name and address	Manufacturing country
Capacitor production	Shanghai Sieyuan Power Capacitor, Shanghai XinZhuang Industrial Park	China

PRODUCT INTRODUCTION

This EPD report analyzes the capacitor products consisting of the unit capacitors BAM7.96-200-1W, BAM8.382-484-1W, BAM19.92-800-1W, five tank capacitors TBBX25-6000/333-BLW, TBBX20-4000/333-BLW, TBBX15-4000/333-BLW, TBBX11-3000/333-BLW, TBBX10-3000/333-BLW, two frame capacitors TBB13.8-7200/200-BLW, TBB69-40000/420-BLW. Examples of the Capacitor product are shown in Figure 1.

Figure 1 Unit/Tank/Frame capacitors

Table 2 The information for the Capacitors under the EPD report

Specification	Weight(kg)	Rated voltage (kV)	Phase	Capacitor(kVar)	Rated frequency
Unit capacitors					
BAM7.96-200-1W	36.2	7.96	1	200	50
BAM8.382-484-1W	73.9	8.382	1	484	50
BAM19.92-800-1W	108	19.92	1	800	50
Tank capacitors					
TBBX25-6000/333-BLW	4500	25	3	6000	50
TBBX20-4000/333-BLW	3600	20	3	4000	50
TBBX15-4000/333-BLW	3600	15	3	4000	50
TBBX11-3000/333-BLW	3600	11	3	3000	50
TBBX10-3000/333-BLW	3400	10	3	3000	50
Frame capacitors					
TBB13.8-7200/200-BLW	3535	13.8	3	7200	60
TBB69-40000/420-BLW	25908.46	69	3	40000	60

The capacitors are designed for power factor correction, power quality improvement, and transmission line loss reduction. The details for the capacitors are provided in Table 2. These products can be continuously operated under 1.05 times rated voltage and under 1.1 times rated voltage for up to 12 hours daily. These products can be operated under steady over-current (rms), which has the value if 1.3 times the rated current caused by over-voltage and high harmonic. The material composition of the capacitors are provided in the following Table 3. Additional components and materials for tank and frame capacitors are shown in Table 4-6.

Table 3 The Capacitor material composition including packaging

Materials	Unit	BAM7.96-200-1W	BAM8.382-484-1W	BAM19.92-800-1W	TBBX25-6000	TBBX20-4000	TBBX15-4000	TBBX11-3000	TBBX10-3000	TBB13.8-7200/200-BLW	TBB69-40000/420-BLW
Stainless steel	kg	6.71	11.57	16.56	175.392	109.68	109.728	82.296	82.26	241.56	956.06
Paper	kg	2.22	6.1	10.56	76.68	37.56	44.1012	29.1069	28.17	79.92	513.48
Conductive copper	kg	0.4	0.64	0.66	55.629	51.96	51.966	50.2245	50.22	119.4	161.44
Brass	kg	0.28	0.28	0.28	4.95	3.36	3.3	2.475	2.52	10.08	26.88
Aluminum	kg	3.67	9.72	13.03	134.1	81.12	72.36	55.89	60.84	132.12	1129.66
Insulation oil	kg	7.5	17	23.9	270	160.8	158.4	122.4	120.6	270	1474.59
Solder	kg	0.2	0.15	0.36	9.72	6	5.9712	4.4784	4.5	7.2	14.4
Polypropylene	kg	8.42	22.64	33.16	311.5314	199.32	202.6476	151.8957	149.49	303.12	1708.75
Ceramic	kg	6.3	5.04	8	126	60.48	60.48	45.36	45.36	226.8	483.84
Solvent	kg	0.33	0.46	0.69	7.974	4.92	4.9008	3.69	3.69	11.88	38.4
Resistor	kg	0.05	0.14	0.31	1.26	1.2	1.2	0.9	0.9	1.8	16.32
Low-alloyed Steel	kg	0	0	0	3300	3100	3100	3100	3100	1450	8000
Polyvinylidenchloride	kg	0	0	0	14	14	14	14	14	15	20
Solvent for paint	kg	0	0	0	200	175	175	175	175	0	0
Packaging materials											
Metal	kg	0.35	0.85	1.40	2.33	1.55	1.55	1.16	1.16	5.06	28.21
Plastic	kg	0.18	0.45	0.74	9.25	6.17	6.17	4.62	4.62	8.46	47
Wood	kg	5.77	13.95	18.47	86.49	57.66	57.66	43.25	43.25	323.14	1795.25

Table 4 Additional components for tank&frame capacitors

Capacitor	Reactor	Transformer	Disconnect switch	Insulator	Fan	Grounding Switch	Breaker	Arrester
TBBX25-6000/333-BLW	CKDK-25kV-126A-0.05mH(1)	LZZBW-33 (1)	JN2-40.5/1250-3 (1)	ZNJ-36 (13)	F2E-320B-230 (2)	/	/	/
TBBX20-4000/333-BLW	CKDK-20kV-105A-0.05mH(1)	LZZBW-24 (1)	JN2-24/1250-3 (1)	ZNJ-24 (13)				
TBBX15-4000/333-BLW	CKDK-15kV-140A-0.05mH (1)							
TBBX11-3000/333-BLW	CKDK-11kV-143A-0.05mH (1)							
TBBX10-3000/333-BLW	CKDK-10kV-158A-0.05mH(1)							
TBB13.8-7200/200-BLW	CKDK-13.8kV-76A-0.03mH(1)		/	C4-125III (24)	/	JW12-24/630-4 (1)	/	/
TBB69-40000/420-BLW	CKGKL-69kV-169A-0.35mH(2)	LVB-66 (8)	GW4A-72.5 (2)	C10-150III (36) C10-200III (24) C10-325III (24)	/	JW10-72.5 (2)	LW36-145 (2)	YH10W-60/170 (6)

*The quantity of the components is showed after the component

Table 5 Raw materials for components

Components	Unit	Reactor CKDK-10/11/15/20/25kV	Reactor CKDK-13.8kV	Reactor CKGKL-69kV	Transformer LZZBW-33	Transformer LZZBW-24	Transformer LVB-66	Disconnect switch JN2-40.5	Disconnect switch JN2-24	Disconnect switch GW4A-72.5	Grounding switch JW10-24	Grounding switch JW10-72.5	Breaker LW36-145	Arrester YH10W-60/170	Fan F2E-320B-230	Insulator ZNJ-36	Insulator ZNJ-24	Insulator C10-150III	Insulator C10-200III	Insulator C10-325III	Insulator C4-125III
Steel	kg	0	9.99	9.99	33	13	25.8	165.3	109.3	255.578	132.2125	264.425	607.283	2.5	2.2	0	0	3.2	3.2	3.2	3.2
Aluminium	kg	35	46	46	0	0	29	26.5	18.5	43.632	26.3365	52.673	186.8067	0.5	3.6	0	0	0	0	0	0
Copper	kg	0	0	0	8.82	5.1	10	31.3	27.2	9.51	1.415	2.83	0.24	0	0	0	0	0	0	0	0
Stainless steel	kg	0	1	1	0	0	4.5	0	0	14.05	8.7675	17.535	159.167	0	0	0	0	0	0	0	0
Epoxy resin	kg	23	16.9	16.9	32	14.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ceramic	kg	0	0	0	0	0	0	0	0	270	322.5	645	0	0	0	0	0	8.6	23.5	40.6	8.6
Silicon	kg	23	56.4	56.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubber	kg	0	0.2	0.2	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Fibre	kg	0	0	0	1.8	1.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glass fibre	kg	0	0	0	0	0	0	0	0	0	0	0	0	3.1	0	0	0	0	0	0	0
Nylon	kg	0	0	0	0	1	0	0	0	0	0	0	0	0	0.4	0	0	0	0	0	0
Brass	kg	0	0	0	0	2	0	0	0	0	0	0	0	0	0.34	0	0	0	0	0	0
Zinc oxide	kg	0	0	0	0	3	0	0	0	0	0	0	0	4.5	0	0	0	0	0	0	0
Transformer oil	kg	0	0	0	0	4	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Insulator	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.2	5.5	0	0	0	0
Cement	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	1.2	3.5	0.8
Flange	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.6	7.6	7.6	2.5
Bushing	kg	0	0	0	0	5	60	0	0	0	0	0	25.8	0	0	0	0	0	0	0	0
Manufacturing																					
Argon	kg	0	0	0	0.0428	0.0589	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
platic	kg	0	1.2	1.3	0.2	0.2	0	0	0	3.928	1.658	3.316	0	0	0.02	0	0	0	0	0	0
Wood	kg	0	55	65	10	6	118	0	0	0	0	0	0	6	0.03	0	0	0	0	0	0
Corrugated board	kg	0	0	0	0	0	0	0	0	120	30	60	350	0	0	0	0	2	2	2	1.2
Paper	kg	0	0	1	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Water	kg	0	0	0	3	2	0	0	0	0	0	0	0	5	0	0	0	2	2	2	2
Electricity	kWh	1000	850	950	25	18	20	20	15	32	10	19	233.18	47.808	1	0	0	0	0	0	0
Natural gas	m3	0	0	0	0	2.1	0	0	0	0	0	0	0	0.972	0	0	0	0.002	0.002	0.002	0.002

LCA BACKGROUND INFORMATION

DECLARED UNIT (FUNCTIONAL UNIT)

The functional unit in this LCA is one piece of the capacitor product. According to the producer, the reference service life of the capacitor product is 20 years.

SYSTEM BOUNDARIES

The system boundary considered in this LCA study is from the cradle to the grave. According to EPDItaly007 and EN50693, the life cycle stage must refer to segmentation in the following modules: manufacturing, distribution, installation, use&maintainance, and de-installation&End-of-Life.

All the capacitor products are assembled at the Shanghai manufacturing site. The BAM7.96-200-1W product is transported to Sao Paulo and Rio in Brazil and sold in Brazil. The BAM8.382-484-1W and BAM19.92-800-1W products are transported to Argentina for sale. All the tank capacitors TBBX25-6000/333-BLW, TBBX20-4000/333-BLW, TBBX15-4000/333-BLW, TBBX11-3000/333-BLW, TBBX10-3000/333-BLW are sold to Spain, both frame capacitors TBB13.8-7200/200-BLW, TBB69-40000/420-BLW are sold to Brazil. After the serving life, the capacitor product enters the EoL stage at the respective geographical site. Thus, the geography boundary for the capacitor products is manifold. The product manufacturing occurs in China, while geographical boundaries for the product use&maintainance and de-installation&EoL include Spain, Brazil or Argentina.

Table 7 Division and declarations of life cycle stages

	Manufacturing		Distribution	Installation	Use&Maintenance	De-installation&EoL
Included (X) or not declared (ND)	X	X	X	X	X	X

Note: X=Declared Module, MND=Module not Declared in this LCA study

TEMPORAL AND GEOGRAPHICAL BOUNDARIES

All primary data collected from Sieyuan Capacitor are from 2022.1.1~2022.12.31. Secondary data are also representative for this year, as provided by ecoinvent v3.9.1.

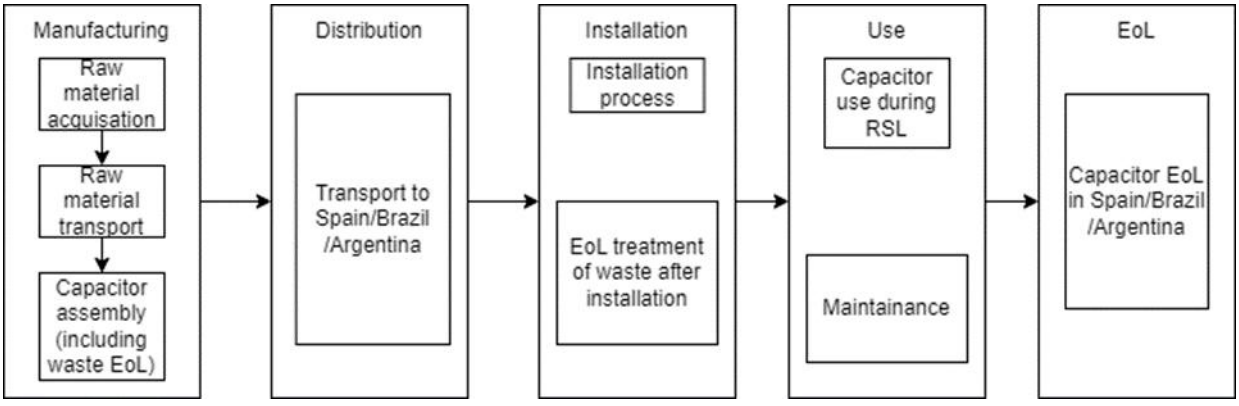

Figure 2 System boundary of the capacitor product

EXCLUDED PROCESSES

- The following steps/stages are not included in the system boundary due to reason that the elements below are considered irrelevant or not within the boundary to the LCA study of capacitor products：
- Production and disposal of the infrastructure and capital equipment (buildings, machines, transport media, roads, etc.) during electrical products manufacturing, installation, and maintenance;
- Some of the auxiliary materials, such as gases during the manufacturing process as the consumption is low based on the information provided by the producer (Table 8);
- Storage phases and sales of electrical products are excluded due to negligible impact;
- Product losses due to abnormal damage such as natural disasters or fire accidents. These losses would mostly be accidental;
- Handling operations at the distribution center and retail outlet are excluded due to small contribution and negligible impact.

KEY ASSUMPTIONS

The key assumptions of this LCA study are as follows：

- The manufacturing, distribution, and Use stages data are mainly from the producer. Thus, certain key assumptions are within the EoL stages.
- The solid waste transport from the installation stage (mainly the packaging waste) is assumed to be same as the final product EoL, 20km
- The incineration/landfill ratio of the plastic EoL for Brazil/Argentina is assumed to be 60/40, for Spain is assumed to be 14/86.
- The EoL management scenario for the waste wood product in Argentina is assumed to be the same as in Brazil, which is 12% for recycling, 67% for incineration, and 21% for landfill. For the waste wood in Spain is 30% for recycling, 9.7% for incineration, and 60.3% for landfill.

CUT-OFF CRITERIA

According to PCR, data for elementary flows to and from the product system contributing to less than 5% of the declared environmental impacts can be neglected, which was strictly followed by this study. The following material inputs are cut-off due to their small values:

Table 8 Cut-off flows

Capacitor	Auxiliary materials	Mass (kg)	Ratio(%)
BAM7.96-200-1W	Gases	0.000417	<0.01%
	Plastics	0.000005	
	Fabrics	0.008680	
BAM8.382-484-1W	Gases	0.001010	
	Plastics	0.000013	
	Fabrics	0.021006	
BAM19.92-800-1W	Gases	0.001669	
	Plastics	0.000022	
	Fabrics	0.034721	
TBBX25-6000/333-BLW	Gases	0.011990	
	Plastics	0.000157	
TBBX20-4000/333-BLW	Gases	0.007993	
	Plastics	0.000105	
TBBX15-4000/333-BLW	Gases	0.007993	
	Plastics	0.000105	

TBBX11-3000/333-BLW	Gases	0.005995	
	Plastics	0.000078	
TBBX10-3000/333-BLW	Gases	0.005995	
	Plastics	0.000078	
TBB13.8-7200/200-BLW	Gases	0.014388	
	Plastics	0.299237	
TBB69-40000/420-BLW	Gases	0.079932	
	Plastics	0.001046	

DATA QUALITY

In this EPD, both primary and secondary data are used. Site specific foreground data have been provided by Sieyuan Capacitor. Main data sources are the bill of materials available on theenterprise resource planning. For all processes for which primary are not available, generic data originating from the Ecoinvent v 3.9.1 database, allocation cut-off by classification, are used. The Ecoinvent database is available in the SimaPro 9.5.0.0 software used for the calculations.

ALLOCATION RULES

Multi-Output allocation is based on a quantitative calculation of the resource consumption and the emissions for example in relation to the distribution of functions, physical properties or economic aspects. Physical properties, such as mass, net calorific values, etc., shall be preferred, otherwise economic aspects, such as man-hours, operating hours or manufacturing cost may be used. In this study, allocation based on the specific capacitor of the product is applied in case of inputs partitioning is needed.

The allocation strategy for the EoL process per PCR follows the same strategy listed in the EN50693. Thus, the “cut-off” strategy is applied. This scenario allocates the entire environmental impacts of waste treatment procedures (from deconstruction to the waste processing) to the producer. The recycled materials, on the other hand, are burden-free. An important note is that when materials have reached a so-called “end-of-waste” state, the coverage of the waste processing is thus terminated. Any inputs/flows related to refine gross recycled materials for actual applications are beyond the product system boundary.

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 EPDItaly007 the environmental impact indicators must be determined using the characterization factors and impact assessment methods specified in EN 15804 + A2 Method V1.04. Meanwhile PCR EPDItaly007 also stipulates to include resource use and waste production descriptive indicators.

Table 9 Environmental, resource and waste indicators

Impact categories		**Units**
Global Warming potential (GWP)	Fossil (GWP, f)	kg CO_2 eq.
	Biogenic (GWP,b)	kg CO_2 eq.
	Land use and land transformation (GWP, luluc)	kg CO_2 eq.
	Total(GWP, t)	kg CO_2 eq.
Ozone Depletion (ODP)		kg of CFC-11 equivalents
Acidification potential (AP)		mol H+ eq
Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater)		kg P eq.
Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine)		Kg N eq
Eutrophication potential, Accumulated Exceedance (EP-terrestrial)		mol N eq.
Photochemical ozone formation potential (POCP)		kg NMVOC-eq.
Consumption of abiotic resources - minerals and materials (ADPE)		kg Sb eq.
Consumption of abiotic resources - fossil resources (ADPF)		MJ, net calorific value
Water consumption (WDP)		m^3 water eq. deprived

Resource use	
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material (PENRE)	MJ, net calorific value
Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE)	MJ, net calorific value
Use of non-renewable primary energy resources used as raw material (PENRM)	MJ, net calorific value
Use of renewable primary energy resources used as raw material (PERM)	MJ, net calorific value
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ, net calorific value
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ, net calorific value
Net use of fresh water (FW)	m^3
Use of secondary raw materials (MS)	MJ, net calorific value
Use of renewable secondary fuels (RSF)	MJ, net calorific value
Use of non-renewable secondary fuels (NRSF)	MJ, net calorific value
Waste production	
Hazardous waste disposed (HWD)	kg
Non-hazardous waste disposed (NHWD)	kg
Radio active waste disposed (RWD)	kg
Material for energy recovery (MER)	kg
Materials for recycling (MFR)	kg
Components for reuse (CRU)	kg
Exported thermal energy (ETE)	MJ
Exported electricity energy (EEE)	MJ

ELECTRICITY MIX

In this LCA, different electricity mix data is taken where the process takes place based on grid mixes of the country from the Ecoinvent database. For example, the electricity production mix in Shanghai is sourced from “Electricity, medium voltage {CN-ECGC} | market for electricity, medium voltage | Cut-off, U”. (See Table 10).

Table 10 Electricity profiles

Country involved	Production mix	Electricity mix technology reference
China	Electricity, medium voltage {CN-ECGC}	market for electricity, medium voltage | Cut-off, U	2022
Brazil	Electricity, medium voltage {BR}| market group for electricity, medium voltage | Cut-off, U	2022
Argentina	Electricity, medium voltage {AR}| market group for electricity, medium voltage | Cut-off, U	2022
Spain	Electricity, medium voltage {ES}| market for electricity, medium voltage | Cut-off, U	2022

INVENTORY ANALYSIS

The Ecoinvent v3.9.1 by cut-off classification system processes are used to model the background system of the processes.

The raw material inputs are modelled with data from Ecoinvent representing a global market (GLO) or rest-of-world (ROW) coverage. These datasets are assumed to be representative.

UPSTREAM

Raw materials extraction: can be referred to Table 3-6. One important note should be taken to interpret the value correctly: the applied names, such as Stainless steel, Aluminum, conductive copper, PP, etc., are materials. Thus, corresponding transforming/manufacturing/treating processes must be accompanied if the producer, in this case, the manufacturing site of the capacitor product, did not directly purchase the materials in the original forms. The blue-coded items are based on independently modeled LCI datasets (primary data collected from Sieyuan capacitor).

Raw materials transport: Concerning raw material and auxiliary material transportation, all the materials are sourced from domestic suppliers and are transported by truck. The dataset in Ecoinvent 3.9, " Transport, freight, lorry 7.5-16 metric ton, EURO5 {RoW}| market for transport, freight, lorry 7.5-16 metric ton, EURO5 | Cut-off, U " was used for modeling. The LCI measures the transportation in kgkm, which is the mass of the materials being transported multiplied by the route's distance.

CORE

Capacitor manufacturing: The production inventory is from Jan. 2022 to Dec. 2022. The electricity consumption data was calculated and provided by Sieyuan Capacitor. The solid wastes are treated by recycling through the transport of 11.6km. The hazardous wastes are treated by incineration at a distance of 39km.

Product distribution: The products transportation route can be found in Table 11.

Table 11 Product distributions for the capacitor products

Country	Route	Type	Distance(km)
Spain	Manufacturing site to Shanghai Port	Lorry 35 metric ton, euro5	59
	Shanghai port to Barcelona port	Freight, sea, container ship	13000
	Barcelona port to substation	Lorry 35 metric ton, euro5	100
Brazil	Manufacturing site to Shanghai Port	Lorry 35 metric ton, euro5	59
	Shanghai port to Santos port	Freight, sea, container ship	21812
	Santos port to substation	Lorry 35 metric ton, euro5	1700
Argentina	Manufacturing site to Shanghai Port	Lorry 35 metric ton, euro5	59
	Shanghai port to Santos port	Freight, sea, container ship	25815
	Santos port to substation	Lorry 35 metric ton, euro5	100

DOWNSTREAM

It should be stated that unit capacitor BAM7.96-200-1W is installed and used in Brazil, unit capacitors BAM8.382-482-1W and BAM19.92-800-1W are in Argentina, all the tank capacitors are in Spain, all the frame capacitors are in Brazil.

Installation: As for the installation, it is assumed that a 50Wh/kg product specific electricity rate is need to implement the capacitor for use. The packaging materials can be broadly categorized as metals, wood and plastics. The metals are treated with inert materials for landfill and wood/plastics are directed into municipal solid waste (MSW) in the respective geographical region.

Use and maintenance: The energy consumption of unit capacitor is calculated using the following formula

$$\mathrm{E_{use}[kWh]} = \mathrm{SEC}(\frac{\mathrm{kWh}}{\mathrm{KVar} * \mathrm{year}}) * \mathrm{Capacity(KVar)} * \mathrm{RSL(year)}\ \#(1)$$

Where: SEC is the specific energy consumption normalized by the product's capacity per year. Capacity is the Kvar capacity of the product. RSL is the reference service life.

Table 12 Energy use by the unit capacitors

Capacitor model	SEC (kWh/(KVar Year)	Capacity (KVar)	RSL(year)	Weighted average energy consumption (kWh)
BAM7.96-200-1W	0.151848	200	20	607
BAM8.382-484-1W		484		1470
BAM19.92-800-1W		800		2430

The total electricity consumed by tank capacitors and frame capacitor TBB13.8-7200/200-BLW including the total annual power consumption of unit capacitor, electric reactor, conductor, DC components and AC components, which is shown in Table 13. For frame capacitor TBB69-40000/420-BLW including the total annual power consumption of unit capacitor, electric reactor, conductor, transformer, disconnect switch, breaker, DC components and AC components, which is shown in Table 14.

Table 13 Energy use by the tank capacitors and frame capacitor TBB13.8-7200/200-BLW

Capacitor model	Weighted annual energy consumption (kWh)					Total energy consumption per year (kWh / year)
	Capacitors	Electric reactor	Conductor	DC components	AC components	
TBBX25-6000/333-BLW	911	142	105	584	396.7	2138.7
TBBX20-4000/333-BLW	607	99	73	584	396.7	1759.7
TBBX15-4000/333-BLW	607	175	129	584	396.7	1891.7
TBBX11-3000/333-BLW	455	183	135	584	396.7	1753.7
TBBX10-3000/333-BLW	455	222	164	584	396.7	1821.7
TBB13.8-7200/200-BLW	1080	1342	543	/	94.7	3059.7

Table 14 Energy use by the frame capacitor TBB69-40000/420-BLW

Capacitor model	Weighted annual energy consumption (kWh)							Total energy consumption per year (kWh / year)
	Capacitors	Electric reactor	Conductor	DC&AC components	Transformer	Disconnect switch	Breaker	
TBB69-40000/420-BLW	6123	2081	431	6701	118	20	21	15495

The maintenance of unit capacitors does not require any energy consumption for maintenance. For the maintenance of the tank capacitors and frame capacitor TBB13.8-7200/200-BLW, 20kWh electricity is needed per year for 20 RSL. For the maintenance of frame capacitor TBB69-40000/420-BLW, 50kWh electricity is needed per year for 20 RSL.

DEINSTALLATION AND END OF LIFE

It should be stated that unit capacitor BAM7.96-200-1W is de-installed in Brazil, unit capacitors BAM8.382-482-1W and BAM19.92-800-1W are in Argentina, all the tank capacitors are in Spain, all the frame capacitors are in Brazil. The de-installation consumption is assumed to be the same as the installation process. The disassembly and pretreatment energy consumption is 2 kWh/kg for unit capacitor and 1 kWh/kg for tank and frame capacitors. The "Cut-off approach", inputs/outputs associated burden of the EoL process is fully allocated to the current life cycle (or the producer), as mentioned beforehand, was applied. The ratios for recycling, incineration and landfill are provided by the Sieyuan Capacitor. Detailed information can be found in Table 15.

Table 15 Scenario for Sieyuan capacitor products

Item	Unit	Unit capacitor	Tank capacitor	Frame capacitor TBB13.8-7200/200-BLW	Frame capacitor TBB69-40000/420-BLW
Waste transport distance	Km	20	20	20	20
De-installation consumption	kWh/kg	0.05	0.05	0.05	0.05
Disassembly and pretreatment energy consumption	kWh/kg	2	1	1	1
Recycling ratio	%	30	80	31	21
Landfill ratio	%	54	10	14	23
Incineration ratio	%	16	10	55	56

IMPACT INDICATORS

The impact indicators are divided into the contribution of the processes to the different modules (upstream, core and downstream) and stages (manufacturing, distribution, use and end-of-life). The results are shown in Table 16-45. It should be stated that the result of ADP-minerals&metals and ADP-fossil shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

BAM7.96-200-1W

Table 16 Environmental impacts for BAM7.96-200-1W

Impact category	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
GWP-total	kg CO2 eq	4.21E+02	1.92E+02	2.87E+01	7.78E+00	1.39E+02	5.26E+01
GWP-fossil	kg CO2 eq	3.39E+02	1.95E+02	2.87E+01	6.10E-01	7.38E+01	4.10E+01
GWP-biogenic	kg CO2 eq	6.84E+01	-2.90E+00	2.67E-02	7.13E+00	5.42E+01	9.94E+00
GWP-luluc	kg CO2 eq	1.36E+01	4.60E-01	1.48E-02	3.94E-02	1.15E+01	1.62E+00
ODP	kg CFC11 eq	5.57E-06	2.43E-06	5.77E-07	1.01E-08	2.21E-06	3.52E-07
AP	mol H+ eq	2.48E+00	1.42E+00	4.43E-01	3.17E-03	5.22E-01	9.86E-02
EP-freshwater	kg P eq	1.17E-01	9.69E-02	1.76E-03	1.18E-04	1.36E-02	4.74E-03
EP-marine	kg N eq	5.01E-01	2.31E-01	1.39E-01	1.34E-03	9.77E-02	3.19E-02
EP-terrestrial	mol N eq	5.17E+00	2.49E+00	1.52E+00	8.00E-03	9.82E-01	1.70E-01
POCP	kg NMVOC eq	1.78E+00	9.82E-01	4.29E-01	2.36E-03	3.06E-01	5.65E-02
ADP-minerals&metals	kg Sb eq	1.89E-02	1.82E-02	8.83E-05	7.88E-06	3.35E-04	3.15E-04
ADP-fossil	MJ	4.62E+03	3.02E+03	3.72E+02	5.11E+00	1.06E+03	1.64E+02
WDP	m3 depriv.	3.08E+02	4.35E+01	1.23E+00	7.69E-01	2.29E+02	3.30E+01

Table 17 Resource use results for BAM7.96-200-1W

Resource use indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
PENRT	MJ	4.62E+03	3.02E+03	3.72E+02	5.11E+00	1.06E+03	1.64E+02
PERT	MJ	3.42E+03	5.19E+02	4.28E+00	8.88E+00	2.53E+03	3.63E+02
PENRE	MJ	4.25E+03	2.65E+03	3.72E+02	5.11E+00	1.06E+03	1.64E+02
PERE	MJ	3.29E+03	3.86E+02	4.28E+00	8.88E+00	2.53E+03	3.63E+02
PENRM	MJ	3.73E+02	3.73E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	1.33E+02	1.33E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	1.62E+01	1.35E+00	4.30E-02	4.42E-02	1.29E+01	1.84E+00
MS	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 18 Waste production results for BAM7.96-200-1W

Waste production indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
HWD	kg	3.36E-02	2.68E-02	2.36E-03	2.34E-05	3.71E-03	7.40E-04
NHWD	kg	1.12E+02	6.34E+01	1.08E+01	1.75E+00	1.34E+01	2.26E+01
RWD	kg	5.70E-03	2.76E-03	6.28E-05	9.19E-06	2.50E-03	3.66E-04
MER	kg	9.57E+00	1.82E-01	0.00E+00	3.95E+00	0.00E+00	5.43E+00
MFR	kg	1.28E+01	8.10E-01	0.00E+00	7.27E-01	0.00E+00	1.12E+01
CRU	kg	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
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

BAM8.382-484-1W

Table 19 Environmental impacts for BAM8.382-484-1W

Impact category	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
GWP-total	kg CO2 eq	1.22E+03	4.13E+02	5.27E+01	1.94E+01	6.03E+02	1.36E+02
GWP-fossil	kg CO2 eq	1.18E+03	4.21E+02	5.26E+01	2.50E+00	5.81E+02	1.27E+02
GWP-biogenic	kg CO2 eq	2.37E+01	-9.21E+00	5.93E-02	1.68E+01	8.55E+00	7.44E+00
GWP-luluc	kg CO2 eq	1.65E+01	1.02E+00	2.76E-02	3.85E-02	1.38E+01	1.57E+00
ODP	kg CFC11 eq	3.15E-05	5.12E-06	1.14E-06	6.77E-08	2.25E-05	2.62E-06
AP	mol H+ eq	4.90E+00	2.64E+00	1.02E+00	5.57E-03	1.08E+00	1.50E-01
EP-freshwater	kg P eq	1.94E-01	1.59E-01	2.87E-03	1.80E-04	2.54E-02	6.66E-03
EP-marine	kg N eq	1.11E+00	4.70E-01	3.20E-01	3.14E-03	2.56E-01	6.44E-02
EP-terrestrial	mol N eq	1.16E+01	4.95E+00	3.50E+00	1.83E-02	2.74E+00	3.59E-01
POCP	kg NMVOC eq	4.61E+00	2.03E+00	9.63E-01	6.96E-03	1.42E+00	1.83E-01
ADP-minerals&metals	kg Sb eq	1.99E-02	1.77E-02	1.69E-04	1.02E-05	1.64E-03	3.97E-04
ADP-fossil	MJ	1.90E+04	6.73E+03	6.55E+02	3.22E+01	1.04E+04	1.20E+03
WDP	m3 depriv.	1.03E+03	9.45E+01	1.70E+00	2.25E+00	8.31E+02	9.58E+01

Table 20 Resource use results for BAM8.382-484-1W

Resource use indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
PENRT	MJ	1.90E+04	6.73E+03	6.55E+02	3.22E+01	1.04E+04	1.20E+03
PERT	MJ	3.51E+03	1.16E+03	7.22E+00	6.04E+00	2.09E+03	2.46E+02
PENRE	MJ	1.86E+04	6.36E+03	6.55E+02	3.22E+01	1.04E+04	1.20E+03
PERE	MJ	3.38E+03	1.03E+03	7.22E+00	6.04E+00	2.09E+03	2.46E+02
PENRM	MJ	3.73E+02	3.73E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	1.33E+02	1.33E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FW	m3	2.18E+01	1.35E+00	6.48E-02	5.00E-02	1.83E+01	2.11E+00
MS	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 21 Waste production results for BAM8.382-484-1W

Waste production indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
HWD	kg	1.08E-01	5.67E-02	4.16E-03	1.36E-04	4.16E-02	4.98E-03
NHWD	kg	1.99E+02	1.19E+02	3.86E+00	4.20E+00	2.84E+01	4.40E+01
RWD	kg	5.61E-02	5.74E-03	9.73E-05	1.26E-04	4.50E-02	5.14E-03
MER	kg	2.10E+01	4.41E-01	0.00E+00	9.59E+00	0.00E+00	1.10E+01
MFR	kg	2.56E+01	1.97E+00	0.00E+00	1.72E+00	0.00E+00	2.19E+01
CRU	kg	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
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

BAM19.92-800-1W

Table 22 Environmental impacts for BAM19.92-800-1W

Impact category	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
GWP-total	kg CO2 eq	1.91E+03	6.08E+02	7.68E+01	2.61E+01	9.97E+02	2.03E+02
GWP-fossil	kg CO2 eq	1.85E+03	6.22E+02	7.67E+01	3.78E+00	9.60E+02	1.88E+02
GWP-biogenic	kg CO2 eq	3.31E+01	-1.61E+01	8.64E-02	2.23E+01	1.41E+01	1.26E+01
GWP-luluc	kg CO2 eq	2.69E+01	1.62E+00	4.03E-02	5.69E-02	2.28E+01	2.33E+00
ODP	kg CFC11 eq	5.04E-05	7.52E-06	1.66E-06	9.96E-08	3.72E-05	3.87E-06
AP	mol H+ eq	7.27E+00	3.76E+00	1.49E+00	7.96E-03	1.79E+00	2.21E-01
EP-freshwater	kg P eq	2.88E-01	2.31E-01	4.19E-03	2.56E-04	4.20E-02	9.86E-03
EP-marine	kg N eq	1.69E+00	6.98E-01	4.66E-01	4.41E-03	4.24E-01	9.52E-02
EP-terrestrial	mol N eq	1.76E+01	7.36E+00	5.11E+00	2.57E-02	4.53E+00	5.30E-01
POCP	kg NMVOC eq	7.01E+00	2.97E+00	1.40E+00	9.92E-03	2.35E+00	2.71E-01
ADP-minerals&metals	kg Sb eq	3.55E-02	3.19E-02	2.46E-04	1.50E-05	2.71E-03	5.88E-04
ADP-fossil	MJ	2.98E+04	9.91E+03	9.54E+02	4.72E+01	1.71E+04	1.78E+03
WDP	m3 depriv.	1.66E+03	1.37E+02	2.47E+00	3.35E+00	1.37E+03	1.42E+02

Table 23 Resource use results for BAM19.92-800-1W

Resource use indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
PENRT	MJ	2.98E+04	9.91E+03	9.54E+02	4.72E+01	1.71E+04	1.78E+03
PERT	MJ	5.74E+03	1.90E+03	1.05E+01	8.93E+00	3.46E+03	3.64E+02
PENRE	MJ	2.83E+04	8.45E+03	9.54E+02	4.72E+01	1.71E+04	1.78E+03
PERE	MJ	4.27E+03	4.35E+02	1.05E+01	8.93E+00	3.46E+03	3.64E+02
PENRM	MJ	1.47E+03	1.47E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	5.63E+02	5.63E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	3.76E+01	4.19E+00	9.45E-02	7.43E-02	3.02E+01	3.12E+00
MS	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 24 Waste production results for BAM19.92-800-1W

Waste production indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
HWD	kg	1.58E-01	7.60E-02	6.06E-03	1.98E-04	6.88E-02	7.37E-03
NHWD	kg	2.94E+02	1.70E+02	5.63E+00	5.91E+00	4.70E+01	6.51E+01
RWD	kg	9.11E-02	8.76E-03	1.42E-04	1.86E-04	7.44E-02	7.61E-03
MER	kg	2.97E+01	7.29E-01	0.00E+00	1.28E+01	0.00E+00	1.62E+01
MFR	kg	3.81E+01	3.37E+00	0.00E+00	2.30E+00	0.00E+00	3.24E+01
CRU	kg	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
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TBBX25-6000

Table 25 Environmental impacts for TBBX25-6000

Impact category	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
GWP-total	kg CO2 eq	3.93E+04	2.36E+04	1.39E+03	1.92E+02	1.16E+04	2.55E+03
GWP-fossil	kg CO2 eq	3.89E+04	2.33E+04	1.39E+03	1.74E+02	1.14E+04	2.53E+03
GWP-biogenic	kg CO2 eq	2.88E+02	2.00E+02	1.53E+00	1.71E+01	6.18E+01	6.83E+00
GWP-luluc	kg CO2 eq	1.25E+02	3.19E+01	7.28E-01	4.73E-01	8.31E+01	9.27E+00
ODP	kg CFC11 eq	7.60E-04	4.35E-04	2.98E-05	7.59E-06	2.55E-04	3.20E-05
AP	mol H+ eq	2.66E+02	1.72E+02	2.64E+01	1.06E+00	5.91E+01	8.10E+00
EP-freshwater	kg P eq	1.68E+01	1.40E+01	7.68E-02	2.25E-02	2.28E+00	4.08E-01
EP-marine	kg N eq	4.80E+01	2.67E+01	8.25E+00	2.01E-01	1.14E+01	1.45E+00
EP-terrestrial	mol N eq	5.06E+02	2.82E+02	9.04E+01	1.77E+00	1.17E+02	1.51E+01
POCP	kg NMVOC eq	1.82E+02	1.10E+02	2.49E+01	1.12E+00	4.11E+01	5.19E+00
ADP-minerals&metals	kg Sb eq	1.56E+00	1.51E+00	4.43E-03	1.05E-03	2.96E-02	2.01E-02
ADP-fossil	MJ	6.85E+05	3.09E+05	1.74E+04	7.63E+03	3.15E+05	3.58E+04
WDP	m3 depriv.	1.02E+04	1.64E+03	4.64E+01	5.00E+01	7.52E+03	9.03E+02

Table 26 Resource use results for TBBX25-6000

Resource use indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
PENRT	MJ	6.85E+05	3.09E+05	1.74E+04	7.63E+03	3.15E+05	3.58E+04
PERT	MJ	1.17E+05	3.79E+04	1.92E+02	4.41E+02	6.92E+04	8.95E+03
PENRE	MJ	6.71E+05	2.95E+05	1.74E+04	7.63E+03	3.15E+05	3.58E+04
PERE	MJ	1.12E+05	3.36E+04	1.92E+02	4.41E+02	6.92E+04	8.95E+03
PENRM	MJ	1.42E+04	1.42E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	4.23E+03	4.23E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	2.23E+02	9.46E+01	1.75E+00	9.18E-01	1.11E+02	1.44E+01
MS	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 27 Waste production results for TBBX25-6000

Waste production indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
HWD	kg	3.60E+00	2.79E+00	1.10E-01	5.74E-02	5.56E-01	8.08E-02
NHWD	kg	8.42E+03	6.79E+03	1.47E+02	7.09E+01	7.97E+02	6.19E+02
RWD	kg	3.04E+00	3.71E-01	2.62E-03	1.29E-02	2.39E+00	2.64E-01
MER	kg	4.65E+02	5.46E+00	0.00E+00	9.28E+00	0.00E+00	4.50E+02
MFR	kg	3.65E+03	2.44E+01	0.00E+00	2.88E+01	0.00E+00	3.60E+03
CRU	kg	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
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TBBX20-4000

Table 28 Environmental impacts for TBBX20-4000

Impact category	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
GWP-total	kg CO2 eq	3.31E+04	2.00E+04	1.11E+03	1.72E+02	9.54E+03	2.27E+03
GWP-fossil	kg CO2 eq	3.27E+04	1.97E+04	1.11E+03	1.60E+02	9.42E+03	2.26E+03
GWP-biogenic	kg CO2 eq	3.39E+02	2.69E+02	1.23E+00	1.14E+01	5.10E+01	5.50E+00
GWP-luluc	kg CO2 eq	1.02E+02	2.51E+01	5.82E-01	3.85E-01	6.85E+01	7.42E+00
ODP	kg CFC11 eq	6.28E-04	3.61E-04	2.38E-05	7.30E-06	2.11E-04	2.57E-05
AP	mol H+ eq	2.22E+02	1.45E+02	2.11E+01	9.84E-01	4.88E+01	6.52E+00
EP-freshwater	kg P eq	1.42E+01	1.19E+01	6.14E-02	1.91E-02	1.88E+00	3.20E-01
EP-marine	kg N eq	4.01E+01	2.25E+01	6.60E+00	1.81E-01	9.39E+00	1.46E+00
EP-terrestrial	mol N eq	4.19E+02	2.36E+02	7.23E+01	1.63E+00	9.64E+01	1.22E+01
POCP	kg NMVOC eq	1.50E+02	9.12E+01	1.99E+01	1.07E+00	3.38E+01	4.25E+00
ADP-minerals&metals	kg Sb eq	1.21E+00	1.16E+00	3.55E-03	8.55E-04	2.44E-02	1.61E-02
ADP-fossil	MJ	5.64E+05	2.55E+05	1.39E+04	7.28E+03	2.60E+05	2.87E+04
WDP	m3 depriv.	8.11E+03	1.10E+03	3.71E+01	4.15E+01	6.20E+03	7.26E+02

Table 29 Resource use results for TBBX20-4000

Resource use indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
PENRT	MJ	5.64E+05	2.55E+05	1.39E+04	7.28E+03	2.60E+05	2.87E+04
PERT	MJ	9.52E+04	3.05E+04	1.54E+02	3.56E+02	5.70E+04	7.16E+03
PENRE	MJ	5.55E+05	2.46E+05	1.39E+04	7.28E+03	2.60E+05	2.87E+04
PERE	MJ	9.24E+04	2.77E+04	1.54E+02	3.56E+02	5.70E+04	7.16E+03
PENRM	MJ	9.16E+03	9.16E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	2.84E+03	2.84E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	1.80E+02	7.45E+01	1.40E+00	7.85E-01	9.16E+01	1.17E+01
MS	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 30 Waste production results for TBBX20-4000

Waste production indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
HWD	kg	3.02E+00	2.35E+00	8.82E-02	5.66E-02	4.59E-01	6.48E-02
NHWD	kg	7.07E+03	5.75E+03	1.17E+02	4.94E+01	6.57E+02	4.96E+02
RWD	kg	2.51E+00	3.16E-01	2.09E-03	1.04E-02	1.97E+00	2.12E-01
MER	kg	3.70E+02	3.65E+00	0.00E+00	6.19E+00	0.00E+00	3.60E+02
MFR	kg	2.92E+03	1.63E+01	0.00E+00	1.92E+01	0.00E+00	2.88E+03
CRU	kg	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
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TBBX15-4000

Table 31 Environmental impacts for TBBX15-4000

Impact category	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
GWP-total	kg CO2 eq	3.37E+04	1.99E+04	1.11E+03	1.63E+02	1.03E+04	2.27E+03

GWP-fossil	kg CO2 eq	3.33E+04	1.96E+04	1.11E+03	1.60E+02	1.01E+04	2.26E+03
GWP-biogenic	kg CO2 eq	3.23E+02	2.58E+02	1.23E+00	2.70E+00	5.48E+01	5.50E+00
GWP-luluc	kg CO2 eq	1.07E+02	2.49E+01	5.82E-01	3.85E-01	7.36E+01	7.42E+00
ODP	kg CFC11 eq	6.43E-04	3.60E-04	2.38E-05	7.30E-06	2.26E-04	2.57E-05
AP	mol H+ eq	2.26E+02	1.45E+02	2.11E+01	9.84E-01	5.24E+01	6.52E+00
EP-freshwater	kg P eq	1.43E+01	1.19E+01	6.14E-02	1.91E-02	2.02E+00	3.20E-01
EP-marine	kg N eq	4.07E+01	2.24E+01	6.60E+00	1.81E-01	1.01E+01	1.46E+00
EP-terrestrial	mol N eq	4.25E+02	2.36E+02	7.23E+01	1.63E+00	1.04E+02	1.22E+01
POCP	kg NMVOC eq	1.53E+02	9.09E+01	1.99E+01	1.07E+00	3.64E+01	4.25E+00
ADP-minerals&metals	kg Sb eq	1.21E+00	1.16E+00	3.55E-03	8.55E-04	2.63E-02	1.61E-02
ADP-fossil	MJ	5.83E+05	2.54E+05	1.39E+04	7.28E+03	2.79E+05	2.87E+04
WDP	m3 depriv.	8.57E+03	1.10E+03	3.71E+01	4.15E+01	6.66E+03	7.26E+02

Table 32 Resource use results for TBBX15-4000

Resource use indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
PENRT	MJ	5.83E+05	2.54E+05	1.39E+04	7.28E+03	2.79E+05	2.87E+04
PERT	MJ	9.95E+04	3.06E+04	1.54E+02	3.56E+02	6.12E+04	7.16E+03
PENRE	MJ	5.74E+05	2.45E+05	1.39E+04	7.28E+03	2.79E+05	2.87E+04
PERE	MJ	9.66E+04	2.77E+04	1.54E+02	3.56E+02	6.12E+04	7.16E+03
PENRM	MJ	9.31E+03	9.31E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	2.95E+03	2.95E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	1.86E+02	7.42E+01	1.40E+00	7.85E-01	9.84E+01	1.17E+01
MS	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 33 Waste production results for TBBX15-4000

Waste production indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
HWD	kg	3.03E+00	2.33E+00	8.82E-02	5.66E-02	4.93E-01	6.48E-02
NHWD	kg	7.10E+03	5.73E+03	1.17E+02	4.94E+01	7.06E+02	4.96E+02
RWD	kg	2.65E+00	3.16E-01	2.09E-03	1.04E-02	2.11E+00	2.12E-01
MER	kg	3.70E+02	3.65E+00	0.00E+00	6.19E+00	0.00E+00	3.60E+02
MFR	kg	2.92E+03	1.63E+01	0.00E+00	1.92E+01	0.00E+00	2.88E+03
CRU	kg	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
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TBBX11-3000

Table 34 Environmental impacts for TBBX11-3000

Impact category	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
GWP-total	kg CO2 eq	3.21E+04	1.90E+04	1.11E+03	1.62E+02	9.51E+03	2.26E+03
GWP-fossil	kg CO2 eq	3.16E+04	1.87E+04	1.11E+03	1.60E+02	9.39E+03	2.24E+03
GWP-biogenic	kg CO2 eq	3.67E+02	3.08E+02	1.23E+00	2.10E+00	5.08E+01	5.50E+00
GWP-luluc	kg CO2 eq	9.93E+01	2.26E+01	5.82E-01	3.85E-01	6.83E+01	7.42E+00
ODP	kg CFC11 eq	6.17E-04	3.50E-04	2.38E-05	7.29E-06	2.10E-04	2.57E-05
AP	mol H+ eq	2.15E+02	1.38E+02	2.11E+01	9.83E-01	4.86E+01	6.54E+00
EP-freshwater	kg P eq	1.37E+01	1.15E+01	6.14E-02	1.91E-02	1.88E+00	3.14E-01
EP-marine	kg N eq	3.89E+01	2.13E+01	6.60E+00	1.77E-01	9.36E+00	1.47E+00
EP-terrestrial	mol N eq	4.06E+02	2.24E+02	7.23E+01	1.62E+00	9.61E+01	1.22E+01
POCP	kg NMVOC eq	1.45E+02	8.63E+01	1.99E+01	1.07E+00	3.37E+01	4.27E+00

ADP-minerals&metals	kg Sb eq	1.09E+00	1.05E+00	3.55E-03	8.55E-04	2.44E-02	1.61E-02
ADP-fossil	MJ	5.48E+05	2.39E+05	1.39E+04	7.28E+03	2.59E+05	2.87E+04
WDP	m3 depriv.	8.33E+03	1.34E+03	3.71E+01	4.14E+01	6.18E+03	7.29E+02

Table 35 Resource use results for TBBX11-3000

Resource use indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
PENRT	MJ	5.48E+05	2.39E+05	1.39E+04	7.28E+03	2.59E+05	2.87E+04
PERT	MJ	9.27E+04	2.82E+04	1.54E+02	3.56E+02	5.68E+04	7.16E+03
PENRE	MJ	5.41E+05	2.32E+05	1.39E+04	7.28E+03	2.59E+05	2.87E+04
PERE	MJ	9.04E+04	2.59E+04	1.54E+02	3.56E+02	5.68E+04	7.16E+03
PENRM	MJ	7.04E+03	7.04E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	2.36E+03	2.36E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	1.91E+02	7.82E+01	1.40E+00	7.85E-01	9.84E+01	1.17E+01
MS	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 36 Waste production results for TBBX11-3000

Waste production indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
HWD	kg	2.87E+00	2.20E+00	8.82E-02	5.66E-02	4.57E-01	6.47E-02
NHWD	kg	6.77E+03	5.47E+03	1.17E+02	3.93E+01	6.55E+02	4.96E+02
RWD	kg	2.49E+00	3.02E-01	2.09E-03	1.04E-02	1.96E+00	2.12E-01
MER	kg	3.67E+02	2.74E+00	0.00E+00	4.64E+00	0.00E+00	3.60E+02
MFR	kg	2.91E+03	1.22E+01	0.00E+00	1.44E+01	0.00E+00	2.88E+03
CRU	kg	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
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TBBX10-3000

Table 37 Environmental impacts for TBBX10-3000

Impact category	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
GWP-total	kg CO2 eq	3.23E+04	1.91E+04	1.05E+03	1.59E+02	9.88E+03	2.13E+03
GWP-fossil	kg CO2 eq	3.18E+04	1.88E+04	1.05E+03	1.57E+02	9.75E+03	2.12E+03
GWP-biogenic	kg CO2 eq	3.71E+02	3.10E+02	1.16E+00	2.09E+00	5.28E+01	5.20E+00
GWP-luluc	kg CO2 eq	1.02E+02	2.27E+01	5.50E-01	3.65E-01	7.09E+01	7.01E+00
ODP	kg CFC11 eq	6.23E-04	3.51E-04	2.25E-05	7.23E-06	2.18E-04	2.43E-05
AP	mol H+ eq	2.16E+02	1.38E+02	2.00E+01	9.66E-01	5.05E+01	6.17E+00
EP-freshwater	kg P eq	1.38E+01	1.15E+01	5.80E-02	1.83E-02	1.95E+00	2.97E-01
EP-marine	kg N eq	3.89E+01	2.13E+01	6.23E+00	1.74E-01	9.72E+00	1.39E+00
EP-terrestrial	mol N eq	4.05E+02	2.24E+02	6.83E+01	1.59E+00	9.98E+01	1.15E+01
POCP	kg NMVOC eq	1.45E+02	8.64E+01	1.88E+01	1.06E+00	3.50E+01	4.03E+00
ADP-minerals&metals	kg Sb eq	1.10E+00	1.05E+00	3.35E-03	8.13E-04	2.53E-02	1.52E-02
ADP-fossil	MJ	5.56E+05	2.40E+05	1.31E+04	7.21E+03	2.69E+05	2.71E+04
WDP	m3 depriv.	8.52E+03	1.34E+03	3.50E+01	3.96E+01	6.42E+03	6.88E+02

Table 38 Resource use results for TBBX10-3000

Resource use indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
PENRT	MJ	5.56E+05	2.39E+05	1.31E+04	7.21E+03	2.69E+05	2.71E+04
PERT	MJ	9.45E+04	2.82E+04	1.45E+02	3.37E+02	5.90E+04	6.77E+03
PENRE	MJ	5.49E+05	2.33E+05	1.31E+04	7.21E+03	2.69E+05	2.71E+04
PERE	MJ	9.21E+04	2.59E+04	1.45E+02	3.37E+02	5.90E+04	6.77E+03
PENRM	MJ	6.94E+03	6.94E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	2.35E+03	2.35E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	1.86E+02	7.85E+01	1.32E+00	7.54E-01	9.48E+01	1.11E+01
MS	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 39 Waste production results for TBBX10-3000

Waste production indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
HWD	kg	2.89E+00	2.22E+00	8.33E-02	5.64E-02	4.75E-01	6.11E-02
NHWD	kg	6.77E+03	5.47E+03	1.11E+02	3.90E+01	6.80E+02	4.68E+02
RWD	kg	2.55E+00	3.02E-01	1.98E-03	9.82E-03	2.03E+00	2.00E-01
MER	kg	3.47E+02	2.74E+00	0.00E+00	4.64E+00	0.00E+00	3.40E+02
MFR	kg	2.75E+03	1.22E+01	0.00E+00	1.44E+01	0.00E+00	2.72E+03
CRU	kg	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
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TBB13.8-7200/200-BLW

Table 40 Environmental impacts for TBB13.8-7200/200-BLW

Impact category	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
GWP-total	kg CO2 eq	3.83E+04	1.74E+04	2.39E+03	1.89E+02	1.41E+04	4.12E+03
GWP-fossil	kg CO2 eq	3.15E+04	1.79E+04	2.39E+03	1.05E+02	7.49E+03	3.66E+03
GWP-biogenic	kg CO2 eq	5.47E+03	-4.93E+02	2.22E+00	8.04E+01	5.50E+03	3.80E+02
GWP-luluc	kg CO2 eq	1.28E+03	2.92E+01	1.23E+00	3.87E+00	1.16E+03	8.08E+01
ODP	kg CFC11 eq	5.80E-04	2.83E-04	4.80E-05	4.96E-06	2.24E-04	1.97E-05
AP	mol H+ eq	2.62E+02	1.66E+02	3.68E+01	7.03E-01	5.30E+01	5.29E+00
EP-freshwater	kg P eq	1.43E+01	1.25E+01	1.46E-01	1.27E-02	1.38E+00	2.37E-01
EP-marine	kg N eq	4.55E+01	2.24E+01	1.15E+01	1.92E-01	9.91E+00	1.44E+00
EP-terrestrial	mol N eq	4.82E+02	2.45E+02	1.26E+02	1.20E+00	9.95E+01	1.04E+01
POCP	kg NMVOC eq	1.60E+02	8.90E+01	3.57E+01	7.40E-01	3.10E+01	3.21E+00
ADP-minerals&metals	kg Sb eq	1.63E+00	1.57E+00	7.34E-03	8.18E-04	3.40E-02	1.59E-02
ADP-fossil	MJ	3.87E+05	2.36E+05	3.10E+04	4.40E+03	1.07E+05	8.51E+03
WDP	m3 depriv.	2.80E+04	2.81E+03	1.02E+02	8.50E+01	2.33E+04	1.74E+03

Table 41 Resource use results for TBB13.8-7200/200-BLW

Resource use indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
PENRT	MJ	3.87E+05	2.36E+05	3.10E+04	4.40E+03	1.07E+05	8.51E+03
PERT	MJ	3.20E+05	4.45E+04	3.56E+02	8.76E+02	2.57E+05	1.82E+04
PENRE	MJ	3.73E+05	2.22E+05	3.10E+04	4.40E+03	1.07E+05	8.51E+03
PERE	MJ	3.12E+05	3.57E+04	3.56E+02	8.76E+02	2.57E+05	1.82E+04
PENRM	MJ	1.38E+04	1.38E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	8.80E+03	8.80E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	1.52E+03	1.07E+02	3.58E+00	4.57E+00	1.31E+03	9.45E+01
MS	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 42 Waste production results for TBB13.8-7200/200-BLW

Waste production indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
HWD	kg	9.07E+00	8.42E+00	1.96E-01	3.77E-02	3.76E-01	3.88E-02
NHWD	kg	8.82E+03	5.66E+03	8.97E+02	2.16E+02	1.36E+03	6.85E+02
RWD	kg	5.63E-01	2.84E-01	5.22E-03	1.09E-03	2.54E-01	1.86E-02
MER	kg	1.13E+03	6.57E+00	0.00E+00	3.22E+01	0.00E+00	1.10E+03
MFR	kg	2.01E+03	2.93E+01	0.00E+00	4.04E+01	0.00E+00	1.94E+03
CRU	kg	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
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TBB69-40000/420-BLW

Table 43 Environmental impacts for TBB69-40000/420-BLW

Impact category	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
GWP-total	kg CO2 eq	2.29E+05	1.13E+05	1.75E+04	1.10E+03	7.16E+04	2.55E+04
GWP-fossil	kg CO2 eq	1.96E+05	1.18E+05	1.75E+04	5.88E+02	3.79E+04	2.22E+04
GWP-biogenic	kg CO2 eq	2.61E+04	-5.02E+03	1.63E+01	4.79E+02	2.78E+04	2.78E+03
GWP-luluc	kg CO2 eq	6.72E+03	1.95E+02	9.04E+00	2.83E+01	5.89E+03	5.92E+02
ODP	kg CFC11 eq	3.80E-03	2.15E-03	3.52E-04	2.67E-05	1.13E-03	1.39E-04
AP	mol H+ eq	1.34E+03	7.64E+02	2.70E+02	4.05E+00	2.68E+02	3.80E+01
EP-freshwater	kg P eq	6.42E+01	5.44E+01	1.07E+00	8.34E-02	6.99E+00	1.66E+00
EP-marine	kg N eq	2.81E+02	1.33E+02	8.46E+01	1.09E+00	5.02E+01	1.18E+01
EP-terrestrial	mol N eq	2.89E+03	1.38E+03	9.26E+02	6.89E+00	5.04E+02	7.16E+01
POCP	kg NMVOC eq	9.63E+02	5.17E+02	2.62E+02	3.99E+00	1.57E+02	2.28E+01
ADP-minerals&metals	kg Sb eq	4.45E+00	4.10E+00	5.38E-02	5.84E-03	1.72E-01	1.16E-01
ADP-fossil	MJ	2.37E+06	1.52E+06	2.27E+05	2.29E+04	5.42E+05	6.21E+04
WDP	m3 depriv.	1.46E+05	1.47E+04	7.51E+02	6.07E+02	1.18E+05	1.25E+04

Table 44 Resource use results for TBB69-40000/420-BLW

Resource use indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
PENRT	MJ	2.37E+06	1.52E+06	2.27E+05	2.29E+04	5.42E+05	6.21E+04
PERT	MJ	1.75E+06	3.13E+05	2.61E+03	6.39E+03	1.30E+06	1.33E+05
PENRE	MJ	2.29E+06	1.44E+06	2.27E+05	2.29E+04	5.42E+05	6.21E+04
PERE	MJ	1.69E+06	2.47E+05	2.61E+03	6.39E+03	1.30E+06	1.33E+05
PENRM	MJ	7.82E+04	7.82E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	6.56E+04	6.56E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	7.96E+03	5.97E+02	2.62E+01	3.30E+01	6.62E+03	6.86E+02
MS	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 45 Waste production results for TBB69-40000/420-BLW

Waste production indicators	Unit	Total	Manufacturing	Distribution	Installation	Use&Maintenance	De-installation&EoL
HWD	kg	5.32E+01	4.94E+01	1.44E+00	1.92E-01	1.90E+00	2.81E-01
NHWD	kg	5.74E+04	3.55E+04	6.58E+03	1.21E+03	6.89E+03	7.25E+03
RWD	kg	3.12E+00	1.65E+00	3.83E-02	7.48E-03	1.29E+00	1.36E-01
MER	kg	7.04E+03	1.42E+03	0.00E+00	1.79E+02	0.00E+00	5.44E+03

MFR	kg	1.49E+04	1.63E+02	0.00E+00	2.24E+02	0.00E+00	1.45E+04
CRU	kg	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
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

REFERENCES

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