ENVIRONMENTAL PRODUCT DECLARATION

CYG INSULATOR CO,.LTD.

ENVIRONMENTAL PRODUCT DECLARATION

Composite Insulators

GSCC010/01,GSCC010/02,GSCC010/08, GSCC010/09,GSCC010/14,GSCC010/10, GSCH004/2,GSCH004/8,GSCH004/9, R 12,5 EH 325 L

Road No.2,Niushan Foreign Economy Industrial Park, Dongcheng District, Dongguan City,523128,Guangdong Province, China

In accordance with ISO 14025 and EN 50693:2019

Program Operator	EPDItaly
Publisher	EPDItaly

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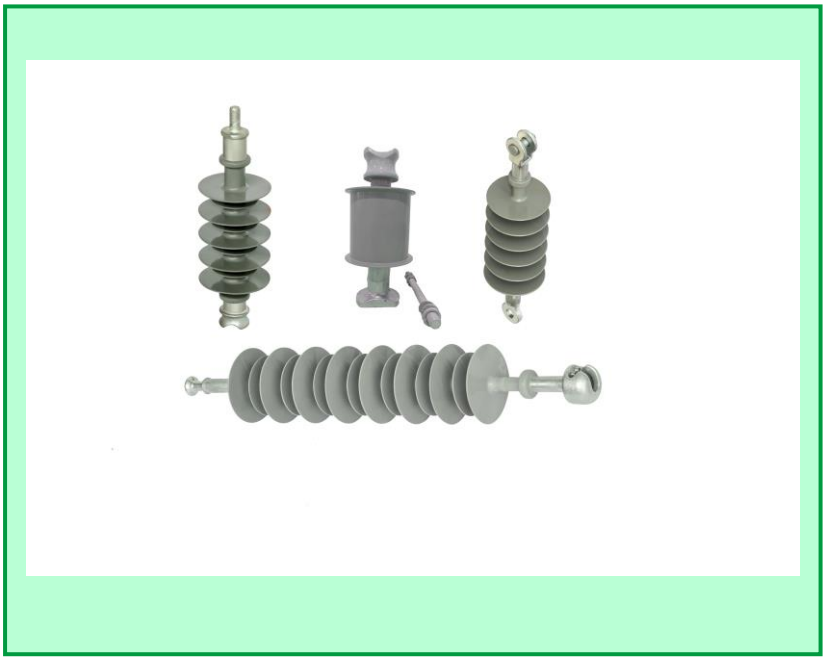

GENERAL INFORMATION

EPD OWNER	
Name of the company	CYG INSULATOR CO,.LTD.
Registered office	Road No.2,Niushan Foreign Economy Industrial Park, Dongcheng District, Dongguan City,523128,Guangdong Province, China
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PROGRAM OPERATOR	
EPDItaly	Via Gaetano De Castillia n° 10 - 20124 Milano, Italy

INFORMATION ON THE EPD	
Product name (s)	Composite Insulators GSCC010/01,GSCC010/02,GSCC010/08,GSCC010/09,GSCC010/14,GSCC010/10,GSCH004/2,GSCH004/8,GSCH004/9, R 12,5 EH 325 L
Site (s)	Road No.2,Niushan Foreign Economy Industrial Park, Dongcheng District, Dongguan City,523128,Guangdong Province, China
Short description and technical information of the product (s)	Composite Insulators Used For HV Transmission Line（110KV -1100KV） Composite Insulators & Surge Arrester Used For MV Distribution Line(1KV-69KV) Composite Insulators Used For Substation(10KV-800KV) Composite Insulators Used For Electric Railway Composite Insulation Components Used For Electric Equipment
Field of application of the product (s)	Insulators
Product (s) reference standards (if any)	EN 50693:2019 – Product category rules for life cycle assessment of electronic and electrical products and systems
CPC Code (number) https://unstats.un.org/unsd/classifications/Econ	4621'Insulator'

VERIFICATION INFORMATION	
PCR (title, version, date of publication or update)	EPDItaly007 – PCR for Electronic and electrical products and systems, Rev. 3, 2023/01/13 EPDItaly010 – PCR for Electronic and electrical products and systems - Insulators, Rev. 0, 2020/03/16
EPDItaly Regulation (version, date of publication or update)	Regulations of the EPDItaly Programm Rev.5.2, 2022/02/16
Project Report LCA	CYG Composite Insulator LCA Report
Independent Verification Statement	The PCR review was performed by XXXX - info@epditaly.it. Independent verification of the declaration and data, carried out according to ISO 14025: 2010. g Internal ☑ External Third party verification carried out by: ICMQ S.p.A., via Gaetano De Castillia n ° 10 - 20124 Milan, Italy. Accredited by Accredia.
Comparability Statement	Environmental statements published within the same product category, but from different programs, may not be comparable.
Liability Statement	The EPD Owner releases 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

Contents

1. Company information

CYG Insulator Co,. Ltd.(CYG Insulator), the leading composite insulator manufacturer in china, a controlled subsidiary of Changyuan Technology Group Ltd.(SH: 600525), established in 1994,is an national hi-tech enterprise specially engaged in the research &design, manufacture and sales of composite insulators for transmission line(TL)， substation(SS), distribution line(DL), electrical railway(Rail) and composite insulation components(CIC).

CYG Insulator, holding over 45 pieces of patents, has pioneered the segmented injection molding technology and the 100% automated production factory for HTV silicone rubber with his own formula patent.

CYG Insulator has dozens of senior professional and technical personnel covering HV/MV electrical specialist, polymer chemistry and materials specialist, machinery and structure specialist, which is the biggest number of the technical research team in this field in china.

CYG Insulator has the capacity and ability of researching, manufacturing and inspection both ±1100kV HVDC and 1100kV HVAC and below voltage. The factory has the advanced manufacturing facilities covering two sets of 100% auto silicone rubber lines, over 30sets of whole injection machines along with 300 injection moldings and over 10 sets finpower-made crimpling machines. Also CYG Insulator has the test & inspection facilities covering the chemical/Physical lab, Mechanical Lab, Aging Lab and Electrical Lab.

Now CYG Insulator has become a top lever composite insulator manufacturer and provider in manufacturing technology, production capacity, product quality and market shares. And its products have recognized and praised by various consumers from 36 countries and region.

Based on 29 years experience in the HTV silicone rubber filed and injection technology, Since 2012 CYG Insulator has developed, manufactured and marketed the composite hollow insulators products and the composite substation post insulators products.

2. Product Information

In this study, life cycle assessment of a total of 10 insulators were conducted. Parameters of the insulators were shown below.

Table 2.2.1 – Parameters of the insulator(per unit)

Sr No	Eenl Global code	Enel Country	Country code	Designation	Max. Voltage (kV)	Specified mechanical load (kN)	Min. Creepage distance (mm)	Min. Arcing distance (mm)	Wet power frequency withstand voltage (kV)	Dry lightning impulse withstand voltage (kV)	Total Length (mm)	Total weight (kg)
MV insulator according to GSCC010 -Rev.2												
1	GSCC010/01	Argentina/ Brazil/ Colombia / Chile/ Peru	0106-0278 / 990293/ 300013/ 300016/ 300019	CS 70 CT 125/900-455	24	70	900	210	50	125	455±10	1.66
2	GSCC010/02	Argentina/ Brazil/ Chile	0106-0277 / GSCH004-9 / 300017	CS 70 CT 170/1250-555	36	70	1250	285	70	170	555±10	1.96
3	GSCC010/08	Argentina/ Brazil/ Colombia / Chile/ Peru	0106-0276 / GSCH004-8 / 300010 / 300015 / 300018	CLP 5-125NRN-745	24	10	745	210	50	125	335±10	3.87
4	GSCC010/09	Argentina/ Brazil/ Chile	0106-0275 / 71280A / 300014	CLP 5-170NRN- 1120	36	10	1120	285	70	170	370±10	5.88
5	GSCC010/14	Brazil	GSCH004-2	CLP 6-160NRN-560	24	12.5	560	241	70	160	305±5	3.02
MV insulator according to GSCC010 -Rev.2												
6	GSCC010/10	Spain	300032	CS 70 EB 170/900- 555	36	70	900	350	70	170	555±10	1.66

MV insulator according to GSCH004 Rev.00												
7	GSCH004/2	Brazil	GSCC010-2	CS 120 SB-325/2.250	72.5	120	2250	570	140	325	762±30	3.54
8	GSCH004/8	Brazil	321294/ GSCC010-9	CS 120 SB-650/3.625	145	120	3625	1195	275	650	1380±30	4.29
9	GSCH004/9	Brazil	GSCC010/01	CS 120 SB-650/4.500	145	120	4500	1195	275	650	1380±30	5.35
Line post insulator according to E-LT-002Rev.: Nro. 5 DIC 2008												
10	R 12,5 EH 325 L	Brazil	GSCC010-8	R 12,5 EH 325 L(FZSW-69/12.5)	72.5	12.5	2300	740	140	325	900±20	13.39

The percentage of product composition are shown in table below.

Table 2.2.2 – Composition of the insulator(per unit)

Composition ratio	**Code**	**GSCC010/01**	**GSCC010/02**	**GSCC010/08**	**GSCC010/09**	**GSCC010/010**	**GSCC010/014**	**GSCH004/2**	**GSCH004/8**	**GSCH004/9**	**R 12,5 EH 325 L**
Rubber	M-321	38.55%	45.92%	24.42%	24.66%	38.13%	28.61%	59.32%	57.58%	64.98%	27.78%
Steel	M-119	51.81%	43.88%	62.40%	66.67%	50.00%	47.48%	30.08%	24.83%	19.94%	35.55%
Glass	M-161	7.71%	8.16%	10.54%	6.94%	9.49%	12.19%	8.47%	14.08%	12.06%	29.34%
Epoxy resin	M-302	1.93%	2.04%	2.64%	1.73%	2.37%	3.05%	2.12%	3.52%	3.01%	7.33%
Ceramic	M160	0.00%	0.00%	0.00%	0.00%	0.00%	8.68%	0.00%	0.00%	0.00%	0.00%

Table 2.2.3 – Weight of the insulator(per unit)

Item	GSCC010-1	GSCC010-2	GSCC010-8	GSCC010-9	GSCC010-10	GSCC010-14	GSCH004-2	GSCH004-8	GSCH004-9	71280A
Composite Insulator	1.66	1.96	3.87	5.88	1.66	3.02	3.54	4.29	5.34	13.39
Packaging-Paperboard	0.28	0.30	0.42	0.49	0.30	0.42	0.00	0.00	0.00	0.00
Packaging-Wood box	0.30	0.30	0.30	0.30	0.30	0.30	1.25	1.01	1.08	3.33

Total	2.24	2.56	4.59	6.67	2.26	3.74	4.79	5.30	6.42	16.72

3. Life Cycle Assessment Information

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

3.1. Declared unit

According to PCR EPDItaly010, the declared unit related to the functional unit is a single insulator during a service life of 20 years.

3.2. System, temporal, and geographical boundaries

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

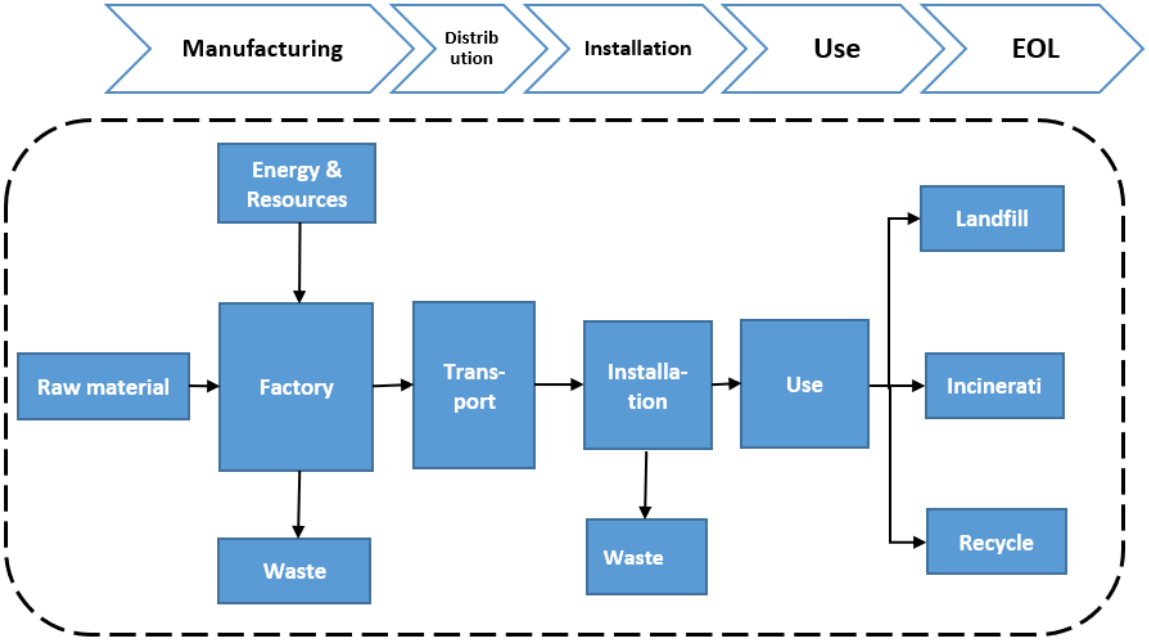

Figure 3.2.1: Phases and processes included

Manufacturing stage. This phase includes the upstream and core modules described previously (raw material transformation, transportation of raw materials and semi-finished products, production of the finished product packaging, generation of process waste including its transportation to the disposal site, energy and material consumption associated to plant operations);

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

Installation stage. This module includes the end of life of packaging, the energy consumption associated to installation and setup, scrap and waste generated during the installation stage; According to PCR, considering that the insulator’s installation does not require any relevant inputs in terms of materials and energy, a cut-off on the impacts included in the module is made.

Use & Maintenance Stage. This module includes the energy consumed by the transformer to operate during its entire reference service life, ordinary scheduled maintenance and extraordinary scheduled maintenance. According to PCR, unlike other electrical devices that have a constant (albeit modest) electrical power usage during operation, the insulator is a passive component. Consequently, the product's use stage is cut-offed.

End of Life Stage. This module includes the transportation of the insulator to the collection site, disassembly operations, distribution and destination of the various material flows to be sent for recycling or disposal.

It should be noted that the construction, maintenance, and decommissioning of infrastructure, i.e. buildings and machinery, as well as the occupation of industrial land have not been considered, as their contribution to the environmental impact of the declared unit is considered negligible.

For the study, reference was made to the data deriving from the BOMs of the specific products, whose production began in 2022 (reference year). For plant consumption, reference was made to the data related to the CYG production plant and referred to the year 2022 June –2023 May, considered representative (at the time of conducting the study, this is the last complete calendar year for which the data are available).

The suppliers of raw materials and semifinished products are located in China. Where possible, the specific origin of the raw material has been investigated and characterized accordingly. For the downstream phases, an average scenario was considered, as downstream buyers locate globaly.

3.3. Impact categories

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

Indicator name and abbrevation (EN)	Unit (EN)
Global Warming Potential – fossil fuels (GWP-fossil)	kg CO_2 eq.
Global Warming Potential – biogenic (GWP-biogenic)	kg CO_2 eq.
Global Warming Potential – land use and land use change (GWP-luluc)	kg CO_2 eq.
Global Warming Potential – total (GWP-total)	kg CO_2 eq.
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq.
Acidifcation potential, Accumulated Exceedance (AP)	mol H+ eq.
Eutrophication potential – freshwater (EP-freshwater)	kg P eq.
Eutrophication aquatic marine (EP-marine)	kg N eq.
Eutrophication terrestrial (EP-terrestrial)	mol N eq.
Photochemical Ozone Creation Potential (POCP)	kg NMVOC eq.
Abiotic depletion potential – non-fossil resources (ADPE)	kg Sb eq.
Abiotic depletion potential – fossil resources (ADPF)	MJ, net calorific value
Water (user) deprivation potential (WDP)	m^3 world eq. Deprived

*Please also noted that the EN 15804+A2 method is based on the EF 3.0 version for this study.

3.4. Cut-off

According to EPD Italy Regulations and PCR EPDItaly010, the following flows and operations are cut-offed:

- Production, use and disposal of the packaging of components and the packaging of semi-finished intermediates.
- Materials making up the insulator itself whose total mass does not exceed 0.5% of the total weight of the device.
- Impacts related to the insulator's use and maintenance, as insulators does not have a constant (albeit modest) electrical power usage during operation and no scheduled interventions are foreseen.
- Input and output of masterbatch\ Adhensive and Acohol used during rubber mixing are cut offed as they only accounts for 0.3% of rubber weight and less than 0.5% of insulator weight, which comply with the Cut-off criteria.

3.5. Allocation Principles

Due to the characteristics of insulator products, different types of insulators size and weight differently, and their power consumption per unit product differ. In order to reasonably allocate the total electricity consumption of producing one certain type of insulator, annual consumptions of water and electricity were divided by annual production of standard insulator and application of corrective factors based on product dimensions to calculate the unit consumption.

In addition, the default distribution rule for the environmental impacts and benefits of reuse, recovery and/or recycling is based on the polluter pays principle (PPP), which means that the recovery or reuse beneficiary bears the environmental impacts and benefits associated with the recovery or reuse treatment, and the original product manufacturer does not have to bear this part of the impact burden. It also does not participate in the sharing of benefits (environmental impact of the production of the same product avoided by recycling and reuse).

3.6. Limitation and Assumption

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

Table 3.6.1 – Assumptions for each stage of the life cycle

Life cycle module	Life cycle stage	Assumption
MANUFACTURING STAGE	Upstream Module	• Raw material information is provided by CYG according to product's bill of material. The reference annual average rubber yield is 99.84% for rubber mixing process, and rubber utilization rate is 94.54% for insulator manufacturing. • Raw material transportation distance was provided by CYG according to its upstream supplier and online map. • The density of wood package is assumed to be 768kg/m^3 as plywood is used.
	Core Module	• China consumption electricity mix was used in the core module as residual mix is not available.
DISTRIBUTION STAGE	Downstream Module	• The average downstream transport distance is weighted based on the same distribution ratio, inland transport is assumed by truck freight and sea transport is by ship.
INSTALLATION STAGE		• The transportation packaging of insulators were disposed after distribution of client, it is assumed to be incinerated for woods and treated as average paperboard treatment method in global market.

USE & Maintenance STAGE		/
END-OF-LIFE STAGE De-installation		• According to expert judgement, disposed insulators are manually cut to separate recyclable fittings and rubber, of which 80% of rubber and metal can be downcycled, and the remaining 20% disposed, with rubber being incinerated and steel being landfilled. • The remaining material is ECR fiberglass rod, it is assumed to be incinerated as hazardous waste. • In this module, it is assumed that transport distance from installation to waste treatment is 1000km as it may cover most destination.

4. Inventory analysis

In this EPD, where available, reference was made to primary data. Where access to this type of data was not possible, datasets from the Ecoinvent v3.9 database were used as reference.

Data collection was carried out by preparing a sheet that collected input and output data, in terms of mass, energy consumption were obtained within production site. The data collection sheet was verified and checked by mass balances and reporting any inconsistencies that were clarified and resolved.

In the study, SimaPro 9.5 software was used to establish the model for the life cycle of products and calculate LCA results.

5. Environmental Impact Assessment

5.1 GSCC010/01

Potential Environmental impact of each lifecycle stage are shown below.

Table 5.1.1 – Environmental impact descriptive parameters

Impact category	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Climate change	kg CO_2 eq	1.46E+01	7.96E+00	2.76E+00	1.37E+00	1.44E+00	0.00E+00	1.11E+00
Climate change - Fossil	kg CO_2 eq	1.37E+01	8.38E+00	2.77E+00	1.36E+00	9.84E-02	0.00E+00	1.11E+00
Climate change - Biogenic	kg CO_2 eq	8.99E-01	-4.29E-01	-1.56E-02	1.16E-03	1.34E+00	0.00E+00	1.07E-03
Climate change - Land use and LU change	kg CO_2 eq	1.21E-02	9.87E-03	1.12E-03	8.23E-04	4.84E-05	0.00E+00	2.60E-04
Ozone depletion	kg CFC11 eq	2.58E-04	2.58E-04	8.74E-09	2.08E-08	1.51E-09	0.00E+00	3.09E-08
Acidification	mol H+ eq	7.93E-02	4.39E-02	1.48E-02	1.81E-02	6.00E-04	0.00E+00	1.96E-03
Eutrophication, freshwater	kg P eq	3.27E-03	2.48E-03	5.64E-04	8.54E-05	9.58E-06	0.00E+00	1.35E-04
Eutrophication, marine	kg N eq	1.91E-02	9.75E-03	3.31E-03	4.95E-03	4.00E-04	0.00E+00	6.56E-04
Eutrophication, terrestrial	mol N eq	1.97E-01	1.00E-01	3.24E-02	5.43E-02	2.47E-03	0.00E+00	6.89E-03
Photochemical ozone formation	kg NMVOC eq	6.34E-02	3.57E-02	8.59E-03	1.57E-02	1.02E-03	0.00E+00	2.36E-03
Resource use, minerals and metals	kg Sb eq	8.18E-05	6.58E-05	1.10E-05	3.21E-06	2.87E-07	0.00E+00	1.49E-06
Resource use, fossils	MJ	1.48E+02	9.62E+01	2.61E+01	1.80E+01	1.33E+00	0.00E+00	6.19E+00
Water use	m^3 depriv.	5.86E-01	1.52E+00	-1.10E+00	6.78E-02	3.82E-03	0.00E+00	8.83E-02

Parameters describing resource use are shown below.

Table 5.1.2 – Parameters describing resource use

Parameter	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material (PENRE)	MJ, net calorific value	1.23E+02	7.14E+01	2.61E+01	1.80E+01	1.33E+00	0.00E+00	6.19E+00
Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE)	MJ, net calorific value	1.63E+01	1.28E+01	3.13E+00	1.96E-01	1.80E-02	0.00E+00	1.36E-01
Use of non-renewable primary energy resources used as raw material (PENRM)	MJ, net calorific value	2.48E+01	2.48E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable primary energy resources used as raw material (PERM)	MJ, net calorific value	9.00E+00	9.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ, net calorific value	1.48E+02	9.62E+01	2.61E+01	1.80E+01	1.33E+00	0.00E+00	6.19E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ, net calorific value	2.53E+01	2.18E+01	3.13E+00	1.96E-01	1.80E-02	0.00E+00	1.36E-01
Net use of fresh water (FW)	m^3	3.15E-02	5.19E-02	-2.53E-02	2.20E-03	1.64E-04	0.00E+00	2.44E-03
Use of secondary raw materials (MS)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	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 (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste production descriptive parameters are shown below.

Table 5.1.3 – Waste production descriptive parameters

Parameter	Unit of measurement	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Hazardous waste disposed (HWD)	kg	1.60E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-01
Non-hazardous waste disposed (NHWD)	kg	8.77E-01	0.00E+00	0.00E+00	0.00E+00	5.77E-01	0.00E+00	3.00E-01
Radioactive waste disposed (RWD)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	1.24E+00	0.00E+00	3.70E-02	0.00E+00	0.00E+00	0.00E+00	1.20E+00
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)	MJ	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

5.2 GSCC010/02

Potential Environmental impact of each lifecycle stage are shown below.

Table 5.2.1 – Environmental impact descriptive parameters

Impact category	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Climate change	kg CO_2 eq	1.73E+01	9.96E+00	2.76E+00	1.60E+00	1.51E+00	0.00E+00	1.43E+00
Climate change - Fossil	kg CO_2 eq	1.62E+01	1.03E+01	2.77E+00	1.60E+00	1.02E-01	0.00E+00	1.43E+00
Climate change - Biogenic	kg CO_2 eq	9.99E-01	-3.93E-01	-1.56E-02	1.32E-03	1.41E+00	0.00E+00	1.31E-03
Climate change - Land use and LU change	kg CO_2 eq	1.41E-02	1.17E-02	1.12E-03	9.69E-04	5.00E-05	0.00E+00	3.15E-04
Ozone depletion	kg CFC11 eq	3.63E-04	3.63E-04	8.74E-09	2.43E-08	1.57E-09	0.00E+00	3.83E-08
Acidification	mol H+ eq	9.52E-02	5.57E-02	1.48E-02	2.17E-02	6.24E-04	0.00E+00	2.37E-03
Eutrophication, freshwater	kg P eq	3.80E-03	2.96E-03	5.64E-04	9.88E-05	9.85E-06	0.00E+00	1.67E-04
Eutrophication, marine	kg N eq	2.25E-02	1.21E-02	3.31E-03	5.93E-03	4.21E-04	0.00E+00	7.88E-04

Eutrophication, terrestrial	mol N eq	2.33E-01	1.25E-01	3.24E-02	6.50E-02	2.57E-03	0.00E+00	8.27E-03
Photochemical ozone formation	kg NMVOC eq	7.48E-02	4.35E-02	8.59E-03	1.88E-02	1.06E-03	0.00E+00	2.82E-03
Resource use, minerals and metals	kg Sb eq	9.96E-05	8.28E-05	1.10E-05	3.71E-06	2.97E-07	0.00E+00	1.80E-06
Resource use, fossils	MJ	1.75E+02	1.19E+02	2.61E+01	2.10E+01	1.37E+00	0.00E+00	7.44E+00
Water use	m^3 depriv.	9.54E-01	1.86E+00	-1.10E+00	7.85E-02	4.11E-03	0.00E+00	1.12E-01

Parameters describing resource use are shown below.

Table 5.2.2 – Parameters describing resource use

Parameter	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material (PENRE)	MJ, net calorific value	1.40E+02	8.42E+01	2.61E+01	2.10E+01	1.37E+00	0.00E+00	7.44E+00
Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE)	MJ, net calorific value	1.87E+01	1.51E+01	3.13E+00	2.27E-01	1.86E-02	0.00E+00	1.67E-01
Use of non-renewable primary energy resources used as raw material (PENRM)	MJ, net calorific value	3.46E+01	3.46E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable primary energy resources used as raw material (PERM)	MJ, net calorific value	9.34E+00	9.34E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ, net calorific value	1.75E+02	1.19E+02	2.61E+01	2.10E+01	1.37E+00	0.00E+00	7.44E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ, net calorific value	2.80E+01	2.45E+01	3.13E+00	2.27E-01	1.86E-02	0.00E+00	1.67E-01
Net use of fresh water (FW)	m^3	4.51E-02	6.46E-02	-2.53E-02	2.55E-03	1.74E-04	0.00E+00	3.08E-03
Use of secondary raw materials (MS)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	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 (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste production descriptive parameters are shown below.

Table 5.2.3 – Waste production descriptive parameters

Parameter	Unit of measurement	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Hazardous waste disposed (HWD)	kg	2.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-01
Non-hazardous waste disposed (NHWD)	kg	9.55E-01	0.00E+00	0.00E+00	0.00E+00	6.03E-01	0.00E+00	3.52E-01
Radioactive waste disposed (RWD)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	1.46E+00	0.00E+00	4.91E-02	0.00E+00	0.00E+00	0.00E+00	1.41E+00
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)	MJ	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

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Potential Environmental impact of each lifecycle stage are shown below.

Table 5.3.1 – Environmental impact descriptive parameters

Impact category	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Climate change	kg CO_2 eq	2.82E+01	1.67E+01	4.14E+00	2.80E+00	1.91E+00	0.00E+00	2.59E+00
Climate change - Fossil	kg CO_2 eq	2.68E+01	1.71E+01	4.16E+00	2.79E+00	1.22E-01	0.00E+00	2.58E+00
Climate change - Biogenic	kg CO_2 eq	1.37E+00	-4.08E-01	-2.35E-02	2.37E-03	1.79E+00	0.00E+00	2.95E-03
Climate change - Land use and LU change	kg CO_2 eq	2.16E-02	1.75E-02	1.68E-03	1.69E-03	5.98E-05	0.00E+00	6.88E-04
Ozone depletion	kg CFC11 eq	3.81E-04	3.81E-04	1.31E-08	4.26E-08	1.87E-09	0.00E+00	9.36E-08
Acidification	mol H+ eq	1.48E-01	8.34E-02	2.21E-02	3.70E-02	7.67E-04	0.00E+00	4.99E-03
Eutrophication, freshwater	kg P eq	6.68E-03	5.24E-03	8.46E-04	1.75E-04	1.14E-05	0.00E+00	4.07E-04

Eutrophication, marine	kg N eq	3.60E-02	1.87E-02	4.96E-03	1.01E-02	5.46E-04	0.00E+00	1.62E-03
Eutrophication, terrestrial	mol N eq	3.73E-01	1.93E-01	4.86E-02	1.11E-01	3.14E-03	0.00E+00	1.69E-02
Photochemical ozone formation	kg NMVOC eq	1.25E-01	7.27E-02	1.29E-02	3.22E-02	1.34E-03	0.00E+00	5.82E-03
Resource use, minerals and metals	kg Sb eq	1.98E-04	1.71E-04	1.64E-05	6.58E-06	3.55E-07	0.00E+00	3.88E-06
Resource use, fossils	MJ	2.90E+02	1.96E+02	3.92E+01	3.68E+01	1.64E+00	0.00E+00	1.59E+01
Water use	m^3 depriv.	1.48E+00	2.74E+00	-1.64E+00	1.39E-01	5.90E-03	0.00E+00	2.34E-01

Parameters describing resource use are shown below.

Table 5.3.2 – Parameters describing resource use

Parameter	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material (PENRE)	MJ, net calorific value	2.52E+02	1.58E+02	3.92E+01	3.68E+01	1.64E+00	0.00E+00	1.59E+01
Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE)	MJ, net calorific value	2.43E+01	1.88E+01	4.70E+00	4.01E-01	2.23E-02	0.00E+00	3.82E-01
Use of non-renewable primary energy resources used as raw material (PENRM)	MJ, net calorific value	3.85E+01	3.85E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable primary energy resources used as raw material (PERM)	MJ, net calorific value	1.09E+01	1.09E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ, net calorific value	2.90E+02	1.96E+02	3.92E+01	3.68E+01	1.64E+00	0.00E+00	1.59E+01
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ, net calorific value	3.52E+01	2.97E+01	4.70E+00	4.01E-01	2.23E-02	0.00E+00	3.82E-01
Net use of fresh water (FW)	m^3	6.64E-02	9.31E-02	-3.78E-02	4.50E-03	2.31E-04	0.00E+00	6.39E-03
Use of secondary raw materials (MS)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	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 (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste production descriptive parameters are shown below.

Table 5.3.3 – Waste production descriptive parameters

Parameter	Unit of measurement	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Hazardous waste disposed (HWD)	kg	5.10E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.10E-01
Non-hazardous waste disposed (NHWD)	kg	1.40E+00	0.00E+00	0.00E+00	0.00E+00	7.23E-01	0.00E+00	6.72E-01
Radioactive waste disposed (RWD)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	3.36E+00	0.00E+00	5.16E-02	0.00E+00	0.00E+00	0.00E+00	2.69E+00
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)	MJ	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

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Potential Environmental impact of each lifecycle stage are shown below.

Table 5.4.1 – Environmental impact descriptive parameters

Impact category	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Climate change	kg CO_2 eq	3.90E+01	2.53E+01	4.14E+00	4.16E+00	2.15E+00	0.00E+00	3.28E+00
Climate change - Fossil	kg CO_2 eq	3.74E+01	2.56E+01	4.16E+00	4.16E+00	1.33E-01	0.00E+00	3.28E+00
Climate change - Biogenic	kg CO_2 eq	1.65E+00	-3.48E-01	-2.35E-02	3.43E-03	2.02E+00	0.00E+00	3.52E-03
Climate change - Land use and LU change	kg CO_2 eq	2.91E-02	2.40E-02	1.68E-03	2.52E-03	6.56E-05	0.00E+00	8.85E-04
Ozone depletion	kg CFC11 eq	5.85E-04	5.84E-04	1.31E-08	6.33E-08	2.06E-09	0.00E+00	9.97E-08
Acidification	mol H+ eq	2.09E-01	1.22E-01	2.21E-02	5.66E-02	8.50E-04	0.00E+00	6.69E-03
Eutrophication, freshwater	kg P eq	9.49E-03	7.94E-03	8.46E-04	2.58E-04	1.24E-05	0.00E+00	4.38E-04

Eutrophication, marine	kg N eq	5.05E-02	2.72E-02	4.96E-03	1.54E-02	6.19E-04	0.00E+00	2.25E-03
Eutrophication, terrestrial	mol N eq	5.28E-01	2.83E-01	4.86E-02	1.69E-01	3.47E-03	0.00E+00	2.37E-02
Photochemical ozone formation	kg NMVOC eq	1.80E-01	1.08E-01	1.29E-02	4.89E-02	1.51E-03	0.00E+00	8.11E-03
Resource use, minerals and metals	kg Sb eq	2.28E-04	1.96E-04	1.64E-05	9.66E-06	3.89E-07	0.00E+00	5.08E-06
Resource use, fossils	MJ	4.08E+02	2.91E+02	3.92E+01	5.47E+01	1.80E+00	0.00E+00	2.12E+01
Water use	m^3 depriv.	2.67E+00	3.82E+00	-1.64E+00	2.04E-01	6.94E-03	0.00E+00	2.74E-01

Parameters describing resource use are shown below.

Table 5.4.2 – Parameters describing resource use

Parameter	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material (PENRE)	MJ, net calorific value	3.51E+02	2.34E+02	3.92E+01	5.47E+01	1.80E+00	0.00E+00	2.12E+01
Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE)	MJ, net calorific value	3.15E+01	2.57E+01	4.70E+00	5.90E-01	2.44E-02	0.00E+00	4.51E-01
Use of non-renewable primary energy resources used as raw material (PENRM)	MJ, net calorific value	5.71E+01	5.71E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable primary energy resources used as raw material (PERM)	MJ, net calorific value	1.17E+01	1.17E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ, net calorific value	4.08E+02	2.91E+02	3.92E+01	5.47E+01	1.80E+00	0.00E+00	2.12E+01
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ, net calorific value	4.32E+01	3.74E+01	4.70E+00	5.90E-01	2.44E-02	0.00E+00	4.51E-01
Net use of fresh water (FW)	m^3	1.10E-01	1.33E-01	-3.78E-02	6.63E-03	2.64E-04	0.00E+00	7.58E-03
Use of secondary raw materials (MS)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	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 (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste production descriptive parameters are shown below.

Table 5.4.3 – Waste production descriptive parameters

Parameter	Unit of measurement	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Hazardous waste disposed (HWD)	kg	5.82E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.10E-01
Non-hazardous waste disposed (NHWD)	kg	5.37E+00	0.00E+00	0.00E+00	0.00E+00	7.87E-01	0.00E+00	1.07E+00
Radioactive waste disposed (RWD)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	4.38E+00	0.00E+00	7.92E-02	0.00E+00	0.00E+00	0.00E+00	4.30E+00
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)	MJ	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

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Potential Environmental impact of each lifecycle stage are shown below.

Table 5.5.1 – Environmental impact descriptive parameters

Impact category	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Climate change	kg CO_2 eq	1.49E+01	8.05E+00	2.76E+00	1.37E+00	1.51E+00	0.00E+00	1.20E+00
Climate change - Fossil	kg CO_2 eq	1.39E+01	8.47E+00	2.77E+00	1.37E+00	1.02E-01	0.00E+00	1.19E+00
Climate change - Biogenic	kg CO_2 eq	9.58E-01	-4.34E-01	-1.56E-02	1.17E-03	1.41E+00	0.00E+00	1.20E-03
Climate change - Land use and LU change	kg CO_2 eq	1.24E-02	1.02E-02	1.12E-03	8.27E-04	5.00E-05	0.00E+00	2.82E-04
Ozone depletion	kg CFC11 eq	2.55E-04	2.55E-04	8.74E-09	2.09E-08	1.57E-09	0.00E+00	3.66E-08
Acidification	mol H+ eq	7.99E-02	4.44E-02	1.48E-02	1.81E-02	6.24E-04	0.00E+00	2.08E-03
Eutrophication, freshwater	kg P eq	3.30E-03	2.48E-03	5.64E-04	8.60E-05	9.85E-06	0.00E+00	1.59E-04

Eutrophication, marine	kg N eq	1.92E-02	9.88E-03	3.31E-03	4.96E-03	4.21E-04	0.00E+00	6.84E-04
Eutrophication, terrestrial	mol N eq	1.98E-01	1.02E-01	3.24E-02	5.44E-02	2.57E-03	0.00E+00	7.16E-03
Photochemical ozone formation	kg NMVOC eq	6.40E-02	3.61E-02	8.59E-03	1.58E-02	1.06E-03	0.00E+00	2.45E-03
Resource use, minerals and metals	kg Sb eq	9.00E-05	7.39E-05	1.10E-05	3.24E-06	2.97E-07	0.00E+00	1.60E-06
Resource use, fossils	MJ	1.50E+02	9.77E+01	2.61E+01	1.81E+01	1.37E+00	0.00E+00	6.59E+00
Water use	m^3 depriv.	6.27E-01	1.55E+00	-1.10E+00	6.82E-02	4.11E-03	0.00E+00	9.93E-02

Parameters describing resource use are shown below.

Table 5.5.2 – Parameters describing resource use

Parameter	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material (PENRE)	MJ, net calorific value	1.25E+02	7.30E+01	2.61E+01	1.81E+01	1.37E+00	0.00E+00	6.59E+00
Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE)	MJ, net calorific value	1.62E+01	1.27E+01	3.13E+00	1.97E-01	1.86E-02	0.00E+00	1.54E-01
Use of non-renewable primary energy resources used as raw material (PENRM)	MJ, net calorific value	2.47E+01	2.47E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable primary energy resources used as raw material (PERM)	MJ, net calorific value	9.34E+00	9.34E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ, net calorific value	1.50E+02	9.77E+01	2.61E+01	1.81E+01	1.37E+00	0.00E+00	6.59E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ, net calorific value	2.55E+01	2.20E+01	3.13E+00	1.97E-01	1.86E-02	0.00E+00	1.54E-01
Net use of fresh water (FW)	m^3	3.23E-02	5.24E-02	-2.53E-02	2.21E-03	1.74E-04	0.00E+00	2.73E-03
Use of secondary raw materials (MS)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	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 (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste production descriptive parameters are shown below.

Table 5.5.3 – Waste production descriptive parameters

Parameter	Unit of measurement	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Hazardous waste disposed (HWD)	kg	1.97E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.97E-01
Non-hazardous waste disposed (NHWD)	kg	8.96E-01	0.00E+00	0.00E+00	0.00E+00	6.03E-01	0.00E+00	2.93E-01
Radioactive waste disposed (RWD)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	1.20E+00	0.00E+00	3.46E-02	0.00E+00	0.00E+00	0.00E+00	1.17E+00
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)	MJ	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

5.6 GSCC010/14

Potential Environmental impact of each lifecycle stage are shown below.

Table 5.6.1 – Environmental impact descriptive parameters

Impact category	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Climate change	kg CO_2 eq	2.43E+01	1.29E+01	4.14E+00	2.39E+00	1.91E+00	0.00E+00	2.90E+00
Climate change - Fossil	kg CO_2 eq	2.29E+01	1.33E+01	4.16E+00	2.39E+00	1.22E-01	0.00E+00	2.89E+00
Climate change - Biogenic	kg CO_2 eq	1.35E+00	-4.19E-01	-2.35E-02	1.92E-03	1.79E+00	0.00E+00	3.49E-03
Climate change - Land use and LU change	kg CO_2 eq	1.91E-02	1.52E-02	1.68E-03	1.46E-03	5.98E-05	0.00E+00	7.34E-04
Ozone depletion	kg CFC11 eq	3.48E-04	3.48E-04	1.31E-08	3.64E-08	1.87E-09	0.00E+00	1.25E-07
Acidification	mol H+ eq	1.30E-01	6.86E-02	2.21E-02	3.35E-02	7.67E-04	0.00E+00	5.00E-03
Eutrophication, freshwater	kg P eq	5.49E-03	3.95E-03	8.46E-04	1.46E-04	1.14E-05	0.00E+00	5.38E-04

Eutrophication, marine	kg N eq	3.13E-02	1.52E-02	4.96E-03	9.10E-03	5.46E-04	0.00E+00	1.53E-03
Eutrophication, terrestrial	mol N eq	3.24E-01	1.57E-01	4.86E-02	9.98E-02	3.14E-03	0.00E+00	1.58E-02
Photochemical ozone formation	kg NMVOC eq	1.05E-01	5.65E-02	1.29E-02	2.88E-02	1.34E-03	0.00E+00	5.46E-03
Resource use, minerals and metals	kg Sb eq	1.83E-04	1.57E-04	1.64E-05	5.47E-06	3.55E-07	0.00E+00	4.04E-06
Resource use, fossils	MJ	2.43E+02	1.55E+02	3.92E+01	3.14E+01	1.64E+00	0.00E+00	1.61E+01
Water use	m^3 depriv.	1.10E+00	2.34E+00	-1.64E+00	1.16E-01	5.90E-03	0.00E+00	2.86E-01

Parameters describing resource use are shown below.

Table 5.6.2 – Parameters describing resource use

Parameter	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material (PENRE)	MJ, net calorific value	2.08E+02	1.20E+02	3.92E+01	3.14E+01	1.64E+00	0.00E+00	1.61E+01
Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE)	MJ, net calorific value	2.22E+01	1.67E+01	4.70E+00	3.36E-01	2.23E-02	0.00E+00	4.56E-01
Use of non-renewable primary energy resources used as raw material (PENRM)	MJ, net calorific value	3.51E+01	3.51E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable primary energy resources used as raw material (PERM)	MJ, net calorific value	1.09E+01	1.09E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ, net calorific value	2.43E+02	1.55E+02	3.92E+01	3.14E+01	1.64E+00	0.00E+00	1.61E+01
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ, net calorific value	3.31E+01	2.76E+01	4.70E+00	3.36E-01	2.23E-02	0.00E+00	4.56E-01
Net use of fresh water (FW)	m^3	5.26E-02	7.87E-02	-3.78E-02	3.78E-03	2.31E-04	0.00E+00	7.69E-03
Use of secondary raw materials (MS)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	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 (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste production descriptive parameters are shown below.

Table 5.6.3 – Waste production descriptive parameters

Parameter	Unit of measurement	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Hazardous waste disposed (HWD)	kg	7.22E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.22E-01
Non-hazardous waste disposed (NHWD)	kg	1.18E+00	0.00E+00	0.00E+00	0.00E+00	7.23E-01	0.00E+00	4.60E-01
Radioactive waste disposed (RWD)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	1.89E+00	0.00E+00	4.72E-02	0.00E+00	0.00E+00	0.00E+00	1.84E+00
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)	MJ	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

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Potential Environmental impact of each lifecycle stage are shown below.

Table 5.7.1 – Environmental impact descriptive parameters

Impact category	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Climate change	kg CO_2 eq	2.97E+01	1.89E+01	2.76E+00	3.07E+00	2.05E+00	0.00E+00	2.92E+00
Climate change - Fossil	kg CO_2 eq	2.95E+01	2.06E+01	2.78E+00	3.06E+00	2.16E-01	0.00E+00	2.92E+00
Climate change - Biogenic	kg CO_2 eq	1.28E-01	-1.69E+00	-1.56E-02	2.45E-03	1.83E+00	0.00E+00	2.44E-03
Climate change - Land use and LU change	kg CO_2 eq	2.26E-02	1.89E-02	1.12E-03	1.87E-03	1.06E-04	0.00E+00	5.79E-04
Ozone depletion	kg CFC11 eq	8.46E-04	8.46E-04	8.75E-09	4.66E-08	3.30E-09	0.00E+00	7.16E-08
Acidification	mol H+ eq	1.80E-01	1.17E-01	1.48E-02	4.29E-02	1.11E-03	0.00E+00	4.36E-03
Eutrophication, freshwater	kg P eq	6.68E-03	5.59E-03	5.64E-04	1.87E-04	2.44E-05	0.00E+00	3.12E-04

Eutrophication, marine	kg N eq	4.15E-02	2.46E-02	3.31E-03	1.17E-02	4.52E-04	0.00E+00	1.45E-03
Eutrophication, terrestrial	mol N eq	4.43E-01	2.62E-01	3.24E-02	1.28E-01	4.73E-03	0.00E+00	1.52E-02
Photochemical ozone formation	kg NMVOC eq	1.40E-01	8.77E-02	8.59E-03	3.68E-02	1.52E-03	0.00E+00	5.18E-03
Resource use, minerals and metals	kg Sb eq	1.84E-04	1.62E-04	1.10E-05	7.01E-06	6.29E-07	0.00E+00	3.30E-06
Resource use, fossils	MJ	3.20E+02	2.38E+02	2.61E+01	4.02E+01	2.90E+00	0.00E+00	1.36E+01
Water use	m^3 depriv.	3.46E+00	4.19E+00	-1.10E+00	1.49E-01	-1.48E-03	0.00E+00	2.18E-01

Parameters describing resource use are shown below.

Table 5.7.2 – Parameters describing resource use

Parameter	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material (PENRE)	MJ, net calorific value	2.40E+02	1.57E+02	2.61E+01	4.02E+01	2.90E+00	0.00E+00	1.36E+01
Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE)	MJ, net calorific value	4.64E+01	4.25E+01	3.13E+00	4.31E-01	4.00E-02	0.00E+00	3.10E-01
Use of non-renewable primary energy resources used as raw material (PENRM)	MJ, net calorific value	8.01E+01	8.01E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable primary energy resources used as raw material (PERM)	MJ, net calorific value	2.25E+01	2.25E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ, net calorific value	3.20E+02	2.38E+02	2.61E+01	4.02E+01	2.90E+00	0.00E+00	1.36E+01
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ, net calorific value	6.89E+01	6.50E+01	3.13E+00	4.31E-01	4.00E-02	0.00E+00	3.10E-01
Net use of fresh water (FW)	m^3	1.28E-01	1.43E-01	-2.53E-02	4.84E-03	1.29E-04	0.00E+00	6.04E-03
Use of secondary raw materials (MS)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	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 (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste production descriptive parameters are shown below.

Table 5.7.3 – Waste production descriptive parameters

Parameter	Unit of measurement	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Hazardous waste disposed (HWD)	kg	3.75E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.75E-01
Non-hazardous waste disposed (NHWD)	kg	1.88E+00	0.00E+00	0.00E+00	0.00E+00	1.25E+00	0.00E+00	6.33E-01
Radioactive waste disposed (RWD)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	2.65E+00	0.00E+00	1.15E-01	0.00E+00	0.00E+00	0.00E+00	2.53E+00
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)	MJ	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

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Potential Environmental impact of each lifecycle stage are shown below.

Table 5.8.1 – Environmental impact descriptive parameters

Impact category	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Climate change	kg CO_2 eq	3.62E+01	2.28E+01	4.14E+00	3.39E+00	1.65E+00	0.00E+00	4.23E+00
Climate change - Fossil	kg CO_2 eq	3.60E+01	2.40E+01	4.16E+00	3.39E+00	1.74E-01	0.00E+00	4.23E+00
Climate change - Biogenic	kg CO_2 eq	2.12E-01	-1.25E+00	-2.35E-02	2.72E-03	1.48E+00	0.00E+00	4.05E-03
Climate change - Land use and LU change	kg CO_2 eq	2.62E-02	2.14E-02	1.68E-03	2.07E-03	8.54E-05	0.00E+00	8.83E-04
Ozone depletion	kg CFC11 eq	9.95E-04	9.95E-04	1.31E-08	5.16E-08	2.66E-09	0.00E+00	1.35E-07
Acidification	mol H+ eq	2.15E-01	1.38E-01	2.21E-02	4.75E-02	9.01E-04	0.00E+00	6.29E-03
Eutrophication, freshwater	kg P eq	8.12E-03	6.47E-03	8.46E-04	2.07E-04	1.97E-05	0.00E+00	5.82E-04

Eutrophication, marine	kg N eq	4.86E-02	2.84E-02	4.96E-03	1.29E-02	3.65E-04	0.00E+00	2.00E-03
Eutrophication, terrestrial	mol N eq	5.17E-01	3.03E-01	4.86E-02	1.41E-01	3.82E-03	0.00E+00	2.07E-02
Photochemical ozone formation	kg NMVOC eq	1.63E-01	1.01E-01	1.29E-02	4.08E-02	1.23E-03	0.00E+00	7.11E-03
Resource use, minerals and metals	kg Sb eq	2.93E-04	2.64E-04	1.64E-05	7.76E-06	5.08E-07	0.00E+00	4.93E-06
Resource use, fossils	MJ	3.85E+02	2.79E+02	3.92E+01	4.45E+01	2.34E+00	0.00E+00	1.99E+01
Water use	m^3 depriv.	3.58E+00	4.70E+00	-1.64E+00	1.65E-01	-1.19E-03	0.00E+00	3.56E-01

Parameters describing resource use are shown below.

Table 5.8.2 – Parameters describing resource use

Parameter	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material (PENRE)	MJ, net calorific value	2.89E+02	1.83E+02	3.92E+01	4.45E+01	2.34E+00	0.00E+00	1.99E+01
Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE)	MJ, net calorific value	4.83E+01	4.26E+01	4.70E+00	4.76E-01	3.23E-02	0.00E+00	5.21E-01
Use of non-renewable primary energy resources used as raw material (PENRM)	MJ, net calorific value	9.65E+01	9.65E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable primary energy resources used as raw material (PERM)	MJ, net calorific value	1.82E+01	1.82E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ, net calorific value	3.85E+02	2.79E+02	3.92E+01	4.45E+01	2.34E+00	0.00E+00	1.99E+01
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ, net calorific value	6.65E+01	6.07E+01	4.70E+00	4.76E-01	3.23E-02	0.00E+00	5.21E-01
Net use of fresh water (FW)	m^3	1.40E-01	1.62E-01	-3.78E-02	5.35E-03	1.05E-04	0.00E+00	9.68E-03
Use of secondary raw materials (MS)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	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 (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste production descriptive parameters are shown below.

Table 5.8.3 – Waste production descriptive parameters

Parameter	Unit of measurement	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Hazardous waste disposed (HWD)	kg	7.55E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.55E-01
Non-hazardous waste disposed (NHWD)	kg	1.72E+00	0.00E+00	0.00E+00	0.00E+00	1.01E+00	0.00E+00	7.07E-01
Radioactive waste disposed (RWD)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	2.96E+00	0.00E+00	1.35E-01	0.00E+00	0.00E+00	0.00E+00	2.83E+00
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)	MJ	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

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Potential Environmental impact of each lifecycle stage are shown below.

Table 5.9.1 – Environmental impact descriptive parameters

Impact category	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Climate change	kg CO_2 eq	4.52E+01	3.00E+01	4.14E+00	4.11E+00	1.77E+00	0.00E+00	5.18E+00
Climate change - Fossil	kg CO_2 eq	4.48E+01	3.11E+01	4.16E+00	4.10E+00	1.86E-01	0.00E+00	5.18E+00
Climate change - Biogenic	kg CO_2 eq	3.51E-01	-1.21E+00	-2.35E-02	3.29E-03	1.58E+00	0.00E+00	4.58E-03
Climate change - Land use and LU change	kg CO_2 eq	3.26E-02	2.73E-02	1.68E-03	2.51E-03	9.14E-05	0.00E+00	1.02E-03
Ozone depletion	kg CFC11 eq	1.40E-03	1.40E-03	1.31E-08	6.25E-08	2.85E-09	0.00E+00	1.47E-07
Acidification	mol H+ eq	2.69E-01	1.81E-01	2.21E-02	5.75E-02	9.63E-04	0.00E+00	7.41E-03
Eutrophication, freshwater	kg P eq	9.99E-03	8.24E-03	8.46E-04	2.51E-04	2.11E-05	0.00E+00	6.34E-04

Eutrophication, marine	kg N eq	6.01E-02	3.68E-02	4.96E-03	1.56E-02	3.91E-04	0.00E+00	2.39E-03
Eutrophication, terrestrial	mol N eq	6.41E-01	3.92E-01	4.86E-02	1.71E-01	4.08E-03	0.00E+00	2.49E-02
Photochemical ozone formation	kg NMVOC eq	2.01E-01	1.29E-01	1.29E-02	4.94E-02	1.31E-03	0.00E+00	8.51E-03
Resource use, minerals and metals	kg Sb eq	3.36E-04	3.04E-04	1.64E-05	9.39E-06	5.43E-07	0.00E+00	5.72E-06
Resource use, fossils	MJ	4.80E+02	3.61E+02	3.92E+01	5.39E+01	2.50E+00	0.00E+00	2.32E+01
Water use	m^3 depriv.	4.90E+00	5.93E+00	-1.64E+00	2.00E-01	-1.27E-03	0.00E+00	4.12E-01

Parameters describing resource use are shown below.

Table 5.9.2 – Parameters describing resource use

Parameter	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material (PENRE)	MJ, net calorific value	3.46E+02	2.27E+02	3.92E+01	5.39E+01	2.50E+00	0.00E+00	2.32E+01
Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE)	MJ, net calorific value	5.84E+01	5.25E+01	4.70E+00	5.77E-01	3.46E-02	0.00E+00	5.85E-01
Use of non-renewable primary energy resources used as raw material (PENRM)	MJ, net calorific value	1.34E+02	1.34E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable primary energy resources used as raw material (PERM)	MJ, net calorific value	1.95E+01	1.95E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ, net calorific value	4.80E+02	3.61E+02	3.92E+01	5.39E+01	2.50E+00	0.00E+00	2.32E+01
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ, net calorific value	7.79E+01	7.20E+01	4.70E+00	5.77E-01	3.46E-02	0.00E+00	5.85E-01
Net use of fresh water (FW)	m^3	1.89E-01	2.09E-01	-3.78E-02	6.49E-03	1.12E-04	0.00E+00	1.13E-02
Use of secondary raw materials (MS)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	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 (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste production descriptive parameters are shown below.

Table 5.9.3 – Waste production descriptive parameters

Parameter	Unit of measurement	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Hazardous waste disposed (HWD)	kg	8.05E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.05E-01
Non-hazardous waste disposed (NHWD)	kg	1.99E+00	0.00E+00	0.00E+00	0.00E+00	1.08E+00	0.00E+00	9.07E-01
Radioactive waste disposed (RWD)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	3.82E+00	0.00E+00	1.89E-01	0.00E+00	0.00E+00	0.00E+00	3.63E+00
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)	MJ	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

5.10 R 12,5 EH 325 L

Potential Environmental impact of each lifecycle stage are shown below.

Table 5.10.1 – Environmental impact descriptive parameters

Impact category	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Climate change	kg CO_2 eq	9.87E+01	5.73E+01	8.28E+00	1.07E+01	5.45E+00	0.00E+00	1.70E+01
Climate change - Fossil	kg CO_2 eq	9.85E+01	6.20E+01	8.32E+00	1.07E+01	5.75E-01	0.00E+00	1.70E+01
Climate change - Biogenic	kg CO_2 eq	9.35E-02	-4.76E+00	-4.69E-02	8.57E-03	4.87E+00	0.00E+00	2.17E-02
Climate change - Land use and LU change	kg CO_2 eq	7.25E-02	5.80E-02	3.35E-03	6.53E-03	2.82E-04	0.00E+00	4.29E-03
Ozone depletion	kg CFC11 eq	1.50E-03	1.50E-03	2.62E-08	1.63E-07	8.78E-09	0.00E+00	8.28E-07
Acidification	mol H+ eq	5.66E-01	3.41E-01	4.43E-02	1.50E-01	2.97E-03	0.00E+00	2.79E-02
Eutrophication, freshwater	kg P eq	2.34E-02	1.75E-02	1.69E-03	6.54E-04	6.50E-05	0.00E+00	3.55E-03

Eutrophication, marine	kg N eq	1.34E-01	7.39E-02	9.92E-03	4.07E-02	1.20E-03	0.00E+00	8.16E-03
Eutrophication, terrestrial	mol N eq	1.43E+00	7.86E-01	9.73E-02	4.46E-01	1.26E-02	0.00E+00	8.32E-02
Photochemical ozone formation	kg NMVOC eq	4.60E-01	2.73E-01	2.58E-02	1.29E-01	4.05E-03	0.00E+00	2.89E-02
Resource use, minerals and metals	kg Sb eq	1.43E-03	1.35E-03	3.29E-05	2.45E-05	1.68E-06	0.00E+00	2.32E-05
Resource use, fossils	MJ	1.07E+03	7.50E+02	7.84E+01	1.40E+02	7.72E+00	0.00E+00	9.05E+01
Water use	m^3 depriv.	1.22E+01	1.31E+01	-3.29E+00	5.20E-01	-3.93E-03	0.00E+00	1.80E+00

Parameters describing resource use are shown below.

Table 5.10.2 – Parameters describing resource use

Parameter	Unit	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material (PENRE)	MJ, net calorific value	8.96E+02	5.79E+02	7.84E+01	1.40E+02	7.72E+00	0.00E+00	9.05E+01
Use of renewable primary energy excluding renewable primary energy resources used as raw material (PERE)	MJ, net calorific value	1.24E+02	1.10E+02	9.39E+00	1.50E+00	1.07E-01	0.00E+00	2.85E+00
Use of non-renewable primary energy resources used as raw material (PENRM)	MJ, net calorific value	1.72E+02	1.72E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable primary energy resources used as raw material (PERM)	MJ, net calorific value	6.00E+01	6.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ, net calorific value	1.07E+03	7.50E+02	7.84E+01	1.40E+02	7.72E+00	0.00E+00	9.05E+01
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ, net calorific value	1.84E+02	1.70E+02	9.39E+00	1.50E+00	1.07E-01	0.00E+00	2.85E+00
Net use of fresh water (FW)	m^3	4.04E-01	4.15E-01	-7.56E-02	1.69E-02	3.45E-04	0.00E+00	4.78E-02
Use of secondary raw materials (MS)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)	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 (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste production descriptive parameters are shown below.

Table 5.10.3 – Waste production descriptive parameters

Parameter	Unit of measurement	Total	Upstream Module	Core	Downstream			
			Manufacturing		Distribution	Installation	Use	End of Life
Hazardous waste disposed (HWD)	kg	4.91E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.91E+00
Non-hazardous waste disposed (NHWD)	kg	5.03E+00	0.00E+00	0.00E+00	0.00E+00	3.33E+00	0.00E+00	1.70E+00
Radioactive waste disposed (RWD)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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	6.99E+00	0.00E+00	2.03E-01	0.00E+00	0.00E+00	0.00E+00	6.78E+00
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)	MJ	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

6. References

- ISO 14040:2006 Environmental management — Life cycle assessment — Requirements and guidelines
- ISO 14044:2006 Environmental management — Life cycle assessment — Principles and framework
- EPDItaly007 – PCR for Electronic and electrical products and systems, Rev. 3, 2023/01/13
- EPDItaly010 – PCR for Electronic and electrical products and systems - Insulators, Rev. 0, 2020/03/16
- EN 50693:2019 Product category rules for life cycle assessments of electronic and electrical products and systems
- Regulations of the EPDItaly Programm Rev.5.2, 2022/02/16
- CYG Composite Insulator LCA Report
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