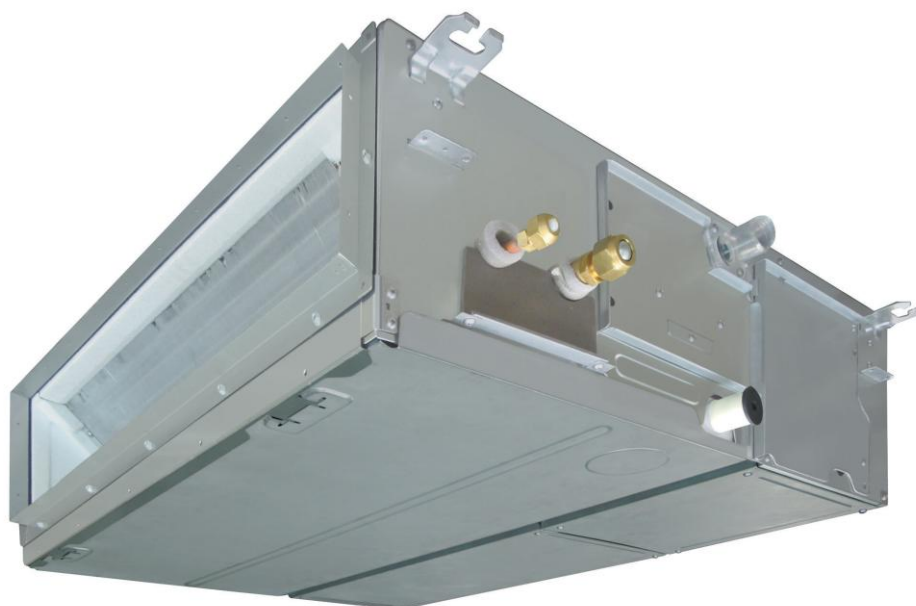


Product Environmental Profile

**Toshiba VRF duct / MMD-UP0121BHP-E
Duct Indoor Unit**

**Toshiba
Carrier Corporation**



1 – GENERAL INFORMATIONS

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1 – GENERAL INFORMATIONS

1.1 Commercial reference of the reference product

Reference product:	VRF duct / MMD-UP0121BHP-E
Product family:	VRF duct Indoor Unit
Product sub-category:	VRF duct Indoor Unit
Technology:	Air/Air
Type:	Reversible
Function:	Heating and/or cooling capacity
References covered:	MMD-UP0121BHP-E, MMD-UP0051BHP-E, MMD-UP0071BHP-E, MMD-UP0091BHP-E, MMD-UP0151BHP-E, MMD-UP0181BHP-E, MMD-UP0241BHP-E, MMD-UP0271BHP-E, MMD-UP0301BHP-E, MMD-UP0361BHP-E, MMD-UP0481BHP-E, MMD-UP0561BHP-E, MMD-UP0031SPHY-E, MMD-UP0051SPHY-E, MMD-UP0071SPHY-E, MMD-UP0091SPHY-E, MMD-UP0121SPHY-E, MMD-UP0151SPHY-E, MMD-UP0181SPHY-E, and MMD-UP0241SPHY-E, MMD-UP0271SPHY-E, MMD-UP0181HP-E, MMD-UP0241HP-E, MMD-UP0271HP-E, MMD- MMD-UP0361HP-E, MMD-UP0481HP-E, MMD-UP0561HP-E, MMD-UP0721HP-E1, and MMD-UP0961HP-E1.
Homogeneous environmental family:	The reference device is part of a range comprising several sizes with identical functions meeting the same standards, identical technology, and manufacturing processes, and operating in a similar way.

1.2 Functional Unit

To transmit 1kW of heating or cooling, according to the reference usage scenario defined in the EN 14825 standard and during the 22-year reference lifetime of the product.

Functional Unit factor:

Prev=(theating*Ph + tcooling*Pc) (theating+tcooling) =3.92

1.3 Declared Unit

To produce heating or cooling thanks to VRF duct indoor unit of 3.92 kW according to the appropriate usage scenario and during the 22-year reference lifetime of the product.

1.4 Additional environmental information

The environmental impacts of the product are assessed in accordance with ISO 14040 and 14044 standards using One Click LCA V0.44.6. This analysis covers all stages of the product's lifecycle, including manufacturing, distribution, installation (including packaging end-of-life), disposal, and benefits and loads beyond the system boundary.

1.5 Manufacturing

- Production



The Life Cycle Analysis (LCA) supporting this product environmental profile (PEP) was conducted in accordance with the criteria outlined in PCR-ed4-EN-2021-09-06 and PSR-0013-ed3.1-EN-2025-10-20 under the PEP ecopassport® programme. The product's life cycle begins with the extraction and refining of raw materials, including metals, non-metals, plastics, electronics, and packaging. These materials are processed into components through molding or machining and assembled into the final product using welding, soldering, or adhesion. Packaging materials are used to protect the product during transportation. Raw materials were sourced from suppliers in Asia and transported to the manufacturing facility via road and sea. Primary data provided by the manufacturer covers the calendar year 2024. This stage was modeled based on the weight of materials and the transport distances from supplier locations to the manufacturing site, using Toshiba's supplier list. Regional electricity production datasets from ecoinvent were used to account for energy consumption during manufacturing. Specific energy data from Toshiba's Thailand facility was applied to components and assemblies produced in-house for the Toshiba VRF duct R32, while generic ecoinvent datasets were used for externally sourced components. Waste generated during manufacturing—primarily from component assembly—is accounted for using Toshiba's data. In line with PCR-ed4-EN-2021 09 06 recommendations, a default transport distance of 100 kilometers to the waste processing facility was applied.

- Energy model

Market for electricity, medium voltage (reference product: electricity, medium voltage), Thailand; Ecoinvent v3.11.

1.6 Distribution



At this stage, all units are shipped from the manufacturing facility in Thailand to installation sites in France. Transportation impacts associated with the delivery of the final product to the installation site (A4 stage) include direct exhaust emissions from fuel combustion as well as upstream environmental impacts from fuel production. Transportation distances are considered as per PCR-ed4-EN-2021 09 06.

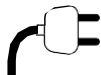
1 – GENERAL INFORMATIONS

1.7 Installation



No energy is required for the installation of the product at the site, as the process relies primarily on manual labor and does not involve any specialized procedures or equipment. The disposal of packaging materials is accounted for during the installation phase, including transportation over a distance of 100 kilometers to the waste processing and disposal facility. Packaging waste treatment is modeled in accordance with PSR-0013-ed3.1-EN-2025-10-20.

1.8 Use



This stage includes all energy and materials related to product use, as well as the impact of operational energy consumption over the reference service life of 22 years. For the VRF duct unit, the use phase covers operational energy use and atmospheric emissions (B6). The stages of refrigerant leakage (B1) and maintenance (B2) are zero for this assessment because the indoor unit is not connected to an outdoor unit and therefore does not contain any refrigerant. Additionally, the stages of repair (B3), replacement (B4), refurbishment (B5) are not applicable, in accordance with PSR-0013-ed3.1-EN-2025-10-20 guidelines. The product has no operational water consumption and does not generate condensate; therefore, the water usage is zero.

The product's operational energy use and environmental impact have been assessed over its service life of 22 years, with distribution to customers in France. Energy consumption during the operational phase is calculated using the formula specified in PSR-0013-ed3.1-EN-2025-10-20. The VRF duct unit consumes energy during its use phase, and the typical scenario for calculating environmental impacts related to this energy consumption is defined in PSR-0013-ed3.1-EN-2025-10-20.

The energy consumption C_{tot} in the use stage is calculated in heating and cooling mode use as follow:

$$C_{indoor\ unit} = P_{input} * (t_{heating} + t_{cooling}) * RLT$$

Where:

- $C_{indoor\ unit}$ = Total energy consumption = 2310 kWh
- P_{input} = 0.06 kW
- P_h = Heating capacity of the equipment (per European eco-design standards) = 4.0 kW
- P_c = Cooling capacity of the equipment (per European eco-design standards) = 3.6 kW
- $t_{heating}$ = Equivalent active mode hours in heating mode = 1400 hours
- $t_{cooling}$ = Equivalent active mode hours in cooling mode = 350 hours
- RLT = Reference lifetime of the equipment = 22 years
- Technology: Air/air VRF duct P<12 kW

- Energy model

Market for electricity, low voltage (Reference product: electricity, low voltage), France; Ecoinvent v3.11.

1.9 End of life



The deconstruction phase of the VRF duct unit primarily involves manual labor, which results in minimal environmental impact, as per EN 15804:2012+A2:2019. It is assumed that the unit is transported by truck to a waste facility located 100 km away for dismantling. At the end of its life, materials are disposed of through recycling, landfill, or incineration, with rates sourced from PCR-ed4-EN-2021-09-06 and other credible references. Steel is efficiently managed, with 80% recycled and 20% landfilled. Aluminum is recycled at 70%, with 30% going to landfill, while copper shows a 60% recycling rate and 40% landfill disposal. Polypropylene (PP), ABS, and PS—commonly used plastics—have lower recycling rates, with only 20% recycled, 40% landfilled, and 40% incinerated without energy recovery. Other plastics or those containing additives or fillers (e.g., glass fibers) are split evenly, with 50% landfilled and 50% incinerated. Rubber is not recycled and is also divided equally between landfill and incineration (50% each). Printed Circuit Boards (PCBs), based on the PCB E-Scrap Market report, have a low recycling rate of 12.5%, with 87.5% ending up in landfill. Lastly, cardboard is highly sustainable, with 91% recycled and 5% incinerated, with 4% landfill disposal. This data underscores the need for improved recycling systems, especially for plastics and electronics, while highlighting the success of metal and packaging material recovery.

1.10 Benefits and loads beyond the system boundary D

Module D accounts for potential benefits beyond the system boundary in accordance with EN 15804+A2, PEP-PCR ed4 and PSR 0013-ed3.1. It includes substitution benefits from recycled outputs in A5 and C3, where recovered metals, plastics, PCBs and cardboard are assumed to replace equivalent virgin materials. Only recycling and energy-recovery routes generate credits; landfill, non-energy incineration and refrigerant destruction do not. Burdens from collection, transport and sorting are already included in C1–C4, so Module D reports only the net avoided impacts and does not influence the primary life-cycle results.

1 – GENERAL INFORMATIONS

1.11 Technical description of the device

The VRF duct / MMD-UP0121BHP-E is a concealed duct-type indoor unit designed for Toshiba's VRF systems, featuring a compact design with a depth of 275 mm for easy ceiling installation. It delivers a nominal cooling capacity of 3.6 kW and heating capacity of 4.0 kW, operating quietly with sound pressure levels as low as 23 dB(A). The unit supports adjustable external static pressure up to 150 Pa and provides airflow rates of 390, 480, and 570 m³/h across low, medium, and high fan speeds. It includes flare-type pipe connections with diameters of 1/4 inch for liquid and 3/8 inch for gas, along with a VP25 drainpipe. The unit dimensions are 275 × 700 × 750 mm, and it weighs approximately 26.37 kg. It features a built-in drain pump with a lift capability of up to 850 mm and is compatible with both wired and wireless remote controllers. The unit operates on a single-phase 220–240 V, 50 Hz power supply and consumes approximately 0.060 kW during operation.

Parameters	Units	VRF duct / MMD-UP0121 BHP-E	MMD-UP0051 BHP-E	MMD-UP0071 BHP-E	MMD-UP0091 BHP-E	MMD-UP0151 BHP-E	MMD-UP0181 BHP-E	MMD-UP0241 BHP-E	MMD-UP0271 BHP-E	MMD-UP0301 BHP-E	MMD-UP0361 BHP-E	MMD-UP0481 BHP-E	MMD-UP0561 BHP-E
Heating power	kW	4.00	1.90	2.50	3.20	5.00	6.30	8.00	9.00	10	12.5	16.00	18.00
Cooling capacity	kW	3.60	1.70	2.20	2.80	4.50	5.60	7.10	8.00	9.00	11.20	14.00	16.00
Pinput	kW	0.06	0.06	0.06	0.06	0.11	0.11	0.14	0.14	0.16	0.22	0.29	0.29
Product weight	kg	26.37	23.00	23.00	23.00	30.00	30.00	30.00	30.00	40	40	40.00	40.00

Parameters	Units	MMD-UP0031 SPHY-E	MMD-UP0051 SPHY-E	MMD-UP0071 SPHY-E	MMD-UP0091 SPHY-E	MMD-UP0121 SPHY-E	MMD-UP0151 SPHY-E	MMD-UP0181 SPHY-E	MMD-UP0241 SPHY-E	MMD-UP0271 SPHY-E
Heating power	kW	1.00	1.90	2.50	3.20	4.00	5.00	6.30	8.00	9.00
Cooling capacity	kW	0.90	1.70	2.20	2.80	3.60	4.50	5.60	7.10	8.00
Pinput	kW	0.018	0.02	0.026	0.029	0.031	0.035	0.044	0.067	0.072
Product weight	kg	15.00	16.00	15.00	15.00	15.00	19.00	19.00	22.00	22.00

Parameters	Units	MMD-UP0181 HP-E	MMD-UP0241 HP-E	MMD-UP0271 HP-E	MMD-UP0361 HP-E	MMD-UP0481 HP-E	MMD-UP0561 HP-E	MMD-UP0721 HP-E1	MMD-UP0961 HP-E1
Heating power	kW	6.30	8.00	9.00	12.50	16.00	18.00	25.00	31.50
Cooling capacity	kW	5.60	7.10	8.00	11.20	14.00	16.00	22.40	28.00
Pinput	kW	0.13	0.14	0.19	0.23	0.30	0.40	0.54	0.79
Product weight	kg	34.00	34.00	34.00	43.00	43.00	43.00	97.00	97.00

1.12 Sales scenarios

Sales of the device are distributed as follows:

Region name	Shares in Sales (%)	
France	100	%

This distribution affects the distance travelled during the phase and the electric mix used during the usage phase.

2 – CONSTITUENT MATERIALS

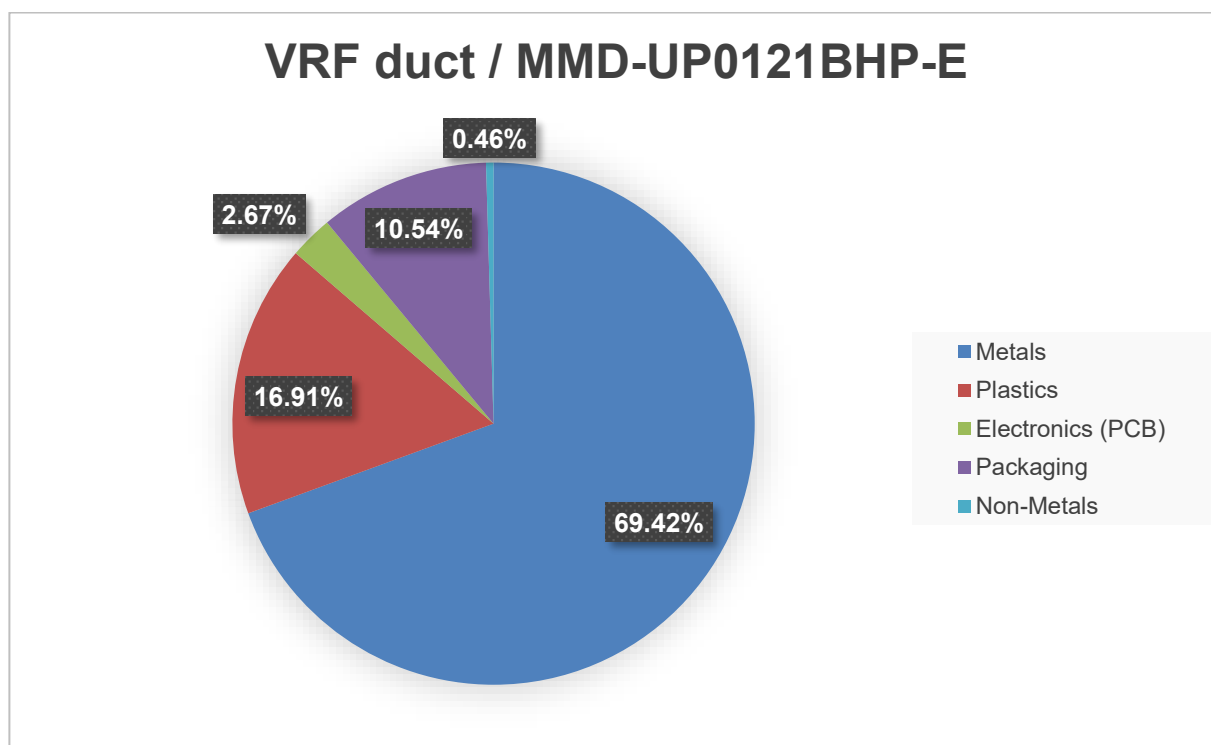
2.1 Reference product

Modelled total weight with other necessary details:

Modeled total weight with other necessary details.								
PEP Category		Material Category	Weight in [kg]	Weight in [%]	Overall Percentage %	Post-consumer material, weight-%	Biogenic material, kg C / declared unit	Biogenic material, kg C / functional unit
Metals		Steel	14.21	53.89	69.42	0.00	0.00	0.00
		Aluminum	1.60	6.06		0.00	0.00	0.00
		Copper	2.50	9.47		0.00	0.00	0.00
Plastics		ABS	2.41	9.15	16.91	0.00	0.00	0.00
		BMS	0.94	3.56		0.00	0.00	0.00
		Polystyrene	0.14	0.51		0.00	0.00	0.00
		Polyamide 66	0.03	0.13		0.00	0.00	0.00
		Polypropylene	0.01	0.03		0.00	0.00	0.00
		Silicon	0.93	3.53		0.00	0.00	0.00
Non-Metals		EPDM	0.12	0.46	0.46	0.00	0.00	0.00
Others	Electronics	Electronics (PCB)	0.70	2.67	2.67	0.00	0.00	0.00
						0.00	0.00	0.00
	Packaging	Corrugated fiberboard	2.22	8.43	8.43	0.00	1.11	0.28
		Expanded Polystyrene	0.56	2.11	2.11	0.00	0.00	0.00
						0.00	0.00	0.00
Total			26.37	100.00	100.00	0.00	1.11	0.28

**1 kg biogenic carbon is equivalent to 44/12 kg of CO₂ (EN 16449:2014)

2.2 Constituent materials



3 – ENVIRONMENTAL IMPACTS

3.1 LCA impacts per Functional Unit

The impact results presented below were obtained using the methods defined in PCR-ed4-EN-2021 09 06 and PSR-0013-ed3.1-EN-2025-10-20. The results have been developed considering the supply of 1 kW of heating and cooling. The real impact of the life cycle stages of the installed product in real situation is to be calculated by the user of the result by multiplying the impact considered by the total heating and cooling capacity in kW.

CORE ENVIRONMENTAL IMPACT INDICATORS – EF 3.1

Impact Category	Unit	Total	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
GWP – total ¹	kg CO ₂ eq/FU	2.34E+02	1.76E+02	2.32E+00	6.81E-01	5.18E+01	0.00E+00	0.00E+00	MND	MND	MND	5.18E+01	0.00E+00	3.99E+00	0.00E+00	1.14E-01	2.54E+00	1.34E+00	-1.71E+01
GWP – fossil	kg CO ₂ eq/FU	2.34E+02	1.76E+02	2.31E+00	2.06E-01	5.18E+01	0.00E+00	0.00E+00	MND	MND	MND	5.18E+01	0.00E+00	3.98E+00	0.00E+00	1.14E-01	2.53E+00	1.34E+00	-1.70E+01
GWP – biogenic	kg CO ₂ eq/FU	0.00E+00	-4.74E-01	0.00E+00	4.74E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP – LULUC	kg CO ₂ eq/FU	4.23E-01	3.60E-01	1.16E-03	1.54E-05	5.31E-02	0.00E+00	0.00E+00	MND	MND	MND	5.31E-02	0.00E+00	9.14E-03	0.00E+00	4.11E-05	9.08E-03	1.88E-05	-2.78E-02
Ozone depletion pot.	kg CFC-11eq/FU	1.06E-05	9.08E-06	3.37E-08	4.23E-10	1.45E-06	0.00E+00	0.00E+00	MND	MND	MND	1.45E-06	0.00E+00	3.87E-08	0.00E+00	2.27E-09	3.57E-08	7.42E-10	-1.00E-07
Acidification potential	mol H ⁺ eq/FU	1.98E+00	1.53E+00	4.08E-02	1.28E-04	3.90E-01	0.00E+00	0.00E+00	MND	MND	MND	3.90E-01	0.00E+00	1.24E-02	0.00E+00	2.38E-04	1.17E-02	3.83E-04	-3.11E-01
EP-freshwater ²	kg Peq/FU	2.61E-01	2.31E-01	1.20E-04	8.32E-06	2.76E-02	0.00E+00	0.00E+00	MND	MND	MND	2.76E-02	0.00E+00	1.46E-03	0.00E+00	7.68E-06	1.42E-03	3.32E-05	-2.58E-02
EP-marine	kg Neq/FU	3.35E-01	2.44E-01	1.01E-02	3.75E-04	7.45E-02	0.00E+00	0.00E+00	MND	MND	MND	7.45E-02	0.00E+00	5.67E-03	0.00E+00	5.71E-05	2.48E-03	3.14E-03	-2.65E-02
EP-terrestrial	mol Neq/FU	3.41E+00	2.65E+00	1.12E-01	4.34E-04	6.20E-01	0.00E+00	0.00E+00	MND	MND	MND	6.20E-01	0.00E+00	2.68E-02	0.00E+00	6.15E-04	2.44E-02	1.80E-03	-3.09E-01
POCP ("smog") ³	kg NMVOCeq/FU	1.01E+00	7.65E-01	3.21E-02	1.57E-04	2.04E-01	0.00E+00	0.00E+00	MND	MND	MND	2.04E-01	0.00E+00	8.97E-03	0.00E+00	3.95E-04	8.06E-03	5.15E-04	-9.26E-02
ADP-minerals & metals ⁴	kg Sb ₂ eq/FU	4.90E-02	4.64E-02	4.64E-06	1.84E-07	2.51E-03	0.00E+00	0.00E+00	MND	MND	MND	2.51E-03	0.00E+00	1.46E-05	0.00E+00	3.80E-07	1.41E-05	1.11E-07	-2.93E-03
ADP-fossil resources	MJ/FU	9.14E+03	2.30E+03	3.01E+01	3.39E-01	6.76E+03	0.00E+00	0.00E+00	MND	MND	MND	6.76E+03	0.00E+00	4.09E+01	0.00E+00	1.61E+00	3.88E+01	5.41E-01	-1.89E+02
Water use ⁵	m ³ e depr/FU	4.07E+02	3.19E+02	1.11E-01	1.83E-02	8.57E+01	0.00E+00	0.00E+00	MND	MND	MND	8.57E+01	0.00E+00	1.97E+00	0.00E+00	7.98E-03	1.87E+00	9.08E-02	-5.64E+00

MND abbreviation stands for Module Not Declared

1. GWP = Global Warming Potential

2. EP = Eutrophication potential. Required characterization method and data are in kg P-eq. Multiply by 3.07 to get PO₄e

3. POCP = Photochemical ozone formation

4. ADP = Abiotic depletion potential

5. EF 3.1 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EF 3.1

Impact Category	Unit	Total	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Particulate matter	Incidence /FU	1.49E-05	1.12E-05	1.14E-07	1.91E-09	3.37E-06	0.00E+00	0.00E+00	MND	MND	MND	3.37E-06	0.00E+00	2.40E-07	0.00E+00	8.42E-09	2.28E-07	3.83E-09	-1.60E-06
Ionizing radiation ⁶	kBq U235eq/FU	3.23E+02	1.83E+01	1.88E-02	1.50E-03	3.04E+02	0.00E+00	0.00E+00	MND	MND	MND	3.04E+02	0.00E+00	7.07E-01	0.00E+00	2.07E-03	7.04E-01	6.56E-04	-8.55E-01
Ecotoxicity (freshwater)	CTUeq/FU	2.58E+04	2.12E+04	3.42E+00	2.70E+00	3.39E+03	0.00E+00	0.00E+00	MND	MND	MND	3.39E+03	0.00E+00	1.20E+03	0.00E+00	2.14E-01	9.13E+01	1.11E+03	-2.53E+03
Human toxicity, cancer	CTUh/FU	1.92E-07	1.42E-07	4.46E-10	2.86E-11	3.93E-08	0.00E+00	0.00E+00	MND	MND	MND	3.93E-08	0.00E+00	1.00E-08	0.00E+00	1.92E-11	9.80E-09	2.11E-10	-3.37E-08
Human tox. non-cancer	CTUh/FU	1.17E-05	9.44E-06	1.28E-08	1.20E-09	2.20E-06	0.00E+00	0.00E+00	MND	MND	MND	2.20E-06	0.00E+00	4.91E-08	0.00E+00	1.02E-09	3.93E-08	8.83E-09	-2.39E-06
SQP ⁷	- /FU	1.28E+03	8.44E+02	9.80E+00	2.40E-01	3.83E+02	0.00E+00	0.00E+00	MND	MND	MND	3.83E+02	0.00E+00	4.37E+01	0.00E+00	9.72E-01	4.18E+01	8.98E-01	-1.40E+02

MND abbreviation stands for Module Not Declared

6. EF 3.1 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator

7. SQP = Land use related impacts/soil quality

3 – ENVIRONMENTAL IMPACTS

USE OF NATURAL RESOURCES

Impact Category	Unit	Total	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Renew. PER as energy ⁸	MJ/FU	9.88E+02	3.11E+02	3.19E-01	-9.11E+00	6.81E+02	0.00E+00	0.00E+00	MND	MND	MND	6.81E+02	0.00E+00	4.76E+00	0.00E+00	2.81E-02	4.72E+00	1.36E-02	-1.90E+01
Renew. PER as material	MJ/FU	1.65E+01	1.88E+01	0.00E+00	-9.41E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	7.12E+00	0.00E+00	0.00E+00	7.12E+00	0.00E+00	-1.92E-01
Total use of renew. PER	MJ/FU	1.01E+03	3.32E+02	3.19E-01	-1.85E+01	6.81E+02	0.00E+00	0.00E+00	MND	MND	MND	6.81E+02	0.00E+00	1.19E+01	0.00E+00	2.81E-02	1.18E+01	1.36E-02	-1.92E+01
Non-re. PER as energy	MJ/FU	9.04E+03	2.27E+03	3.01E+01	-4.77E+00	6.76E+03	0.00E+00	0.00E+00	MND	MND	MND	6.76E+03	0.00E+00	-1.34E+01	0.00E+00	1.61E+00	2.70E+01	-4.21E+01	-1.84E+02
Non-re. PER as material	MJ/FU	1.10E+01	1.07E+01	0.00E+00	-5.79E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	6.15E+00	0.00E+00	0.00E+00	6.15E+00	0.00E+00	-4.64E+01
Total use of non-re. PER	MJ/FU	9.05E+03	2.28E+03	3.01E+01	-1.06E+01	6.76E+03	0.00E+00	0.00E+00	MND	MND	MND	6.76E+03	0.00E+00	-7.32E+00	0.00E+00	1.61E+00	3.32E+01	-4.21E+01	-2.31E+02
Secondary materials	kg/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renew. secondary fuels	MJ/FU	1.13E-01	1.09E-01	9.87E-05	3.60E-06	3.93E-03	0.00E+00	0.00E+00	MND	MND	MND	3.93E-03	0.00E+00	4.78E-04	0.00E+00	9.44E-06	4.59E-04	8.88E-06	-5.84E-02
Non-ren. secondary fuels	MJ/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m ³ /FU	9.53E+00	7.47E+00	3.01E-03	5.10E-05	2.00E+00	0.00E+00	0.00E+00	MND	MND	MND	2.00E+00	0.00E+00	4.86E-02	0.00E+00	2.19E-04	4.82E-02	1.20E-04	-1.47E-01

MND abbreviation stands for Module Not Declared

8) PER abbreviation stands for primary energy resources

END OF LIFE – WASTE

Impact Category	Unit	Total	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Hazardous waste	kg/FU	2.61E+01	1.97E+01	4.59E-02	4.74E-03	4.52E+00	0.00E+00	0.00E+00	MND	MND	MND	4.52E+00	0.00E+00	1.81E+00	0.00E+00	2.34E-03	1.53E+00	2.76E-01	-5.26E+00
Non-hazardous waste	kg/FU	7.86E+02	6.30E+02	7.53E-01	3.60E-01	1.46E+02	0.00E+00	0.00E+00	MND	MND	MND	1.46E+02	0.00E+00	8.69E+00	0.00E+00	4.92E-02	6.58E+00	2.06E+00	-1.08E+02
Radioactive waste	kg/FU	9.22E-02	4.49E-03	4.59E-06	3.83E-07	8.75E-02	0.00E+00	0.00E+00	MND	MND	MND	8.75E-02	0.00E+00	1.81E-04	0.00E+00	5.15E-07	1.81E-04	1.64E-07	-2.13E-04

MND abbreviation stands for Module Not Declared

END OF LIFE – OUTPUT FLOWS

Impact Category	Unit	Total	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Components for re-use	kg/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg/FU	4.24E+00	0.00E+00	0.00E+00	5.15E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	3.72E+00	0.00E+00	0.00E+00	3.72E+00	0.00E+00	0.00E+00
Materials for energy rec	kg/FU	6.18E-01	0.00E+00	0.00E+00	9.97E-02	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	5.18E-01	0.00E+00	0.00E+00	0.00E+00	5.18E-01	0.00E+00
Exported energy	MJ/FU	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

MND abbreviation stands for Module Not Declared

ENVIRONMENTAL IMPACTS – TRACI 2.1.

Impact Category	Unit	Total	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	
Global Warming Pot.	kg CO ₂ eq/FU	2.34E+02	1.77E+02	2.29E+00	2.36E-01	5.13E+01	0.00E+00	0.00E+00	MND	MND	MND	5.13E+01	0.00E+00	3.95E+00	0.00E+00	1.13E-01	2.52E+00	1.32E+00	-1.70E+01
Ozone Depletion	kg CFC-11eq/FU	1.20E-05	1.04E-05	3.55E-08	4.46E-10	1.53E-06	0.00E+00	0.00E+00	MND	MND	MND	1.53E-06	0.00E+00	4.07E-08	0.00E+00	2.40E-09	3.75E-08	7.81E-10	-1.13E-07
Acidification	kg SO ₂ eq/FU	1.63E+00	1.27E+00	3.47E-02	1.15E-04	3.19E-01	0.00E+00	0.00E+00	MND	MND	MND	3.19E-01	0.00E+00	1.05E-02	0.00E+00	2.03E-04	9.90E-03	3.65E-04	-2.47E-01
Eutrophication	kg Neq/FU	3.72E-01	3.32E-01	1.49E-03	9.08E-05	3.62E-02	0.00E+00	0.00E+00	MND	MND	MND	3.62E-02	0.00E+00	2.63E-03	0.00E+00	2.73E-05	2.37E-03	2.29E-04	-2.07E-02
POCP ("smog")	kg O ₃ eq/FU	1.84E+01	1.41E+01	6.58E-01	2.50E-03	3.44E+00	0.00E+00	0.00E+00	MND	MND	MND	3.44E+00	0.00E+00	1.56E-01	0.00E+00	4.31E-03	1.41E-01	1.06E-02	-1.54E+00
ADP-fossil	MJ/FU	3.52E+01	3.21E+00	3.01E+01	1.90E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	1.72E+00	0.00E+00	1.61E+00	0.00E+00	1.11E-01	0.00E+00

MND abbreviation stands for Module Not Declared

3 – ENVIRONMENTAL IMPACTS

3.2 LCA impacts per Declared Unit

In the scope of building Life Cycle Analysis, the environmental impacts of the entire product over its reference service life should be considered, not the principle results of the PEP which correspond to the functional unit of the product. It is therefore necessary to multiply the principle results of the PEP by the FU Factor of the reference product, and if necessary, apply the extrapolation rules.

CORE ENVIRONMENTAL IMPACT INDICATORS – EF 3.1

Impact Category	Unit	Total	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
GWP – total ¹	kg CO ₂ eq	9.18E+02	6.88E+02	9.08E+00	2.67E+00	2.03E+02	0.00E+00	0.00E+00	MND	MND	MND	2.03E+02	0.00E+00	1.56E+01	0.00E+00	4.48E-01	9.94E+00	5.24E+00	-6.69E+01
GWP – fossil	kg CO ₂ eq	9.16E+02	6.88E+02	9.07E+00	8.07E-01	2.03E+02	0.00E+00	0.00E+00	MND	MND	MND	2.03E+02	0.00E+00	1.56E+01	0.00E+00	4.48E-01	9.91E+00	5.24E+00	-6.68E+01
GWP – biogenic	kg CO ₂ eq	0.00E+00	-1.86E+00	0.00E+00	1.86E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP – LULUC	kg CO ₂ eq	1.66E+00	1.41E+00	4.56E-03	6.03E-05	2.08E-01	0.00E+00	0.00E+00	MND	MND	MND	2.08E-01	0.00E+00	3.58E-02	0.00E+00	1.61E-04	3.56E-02	7.38E-05	-1.09E-01
Ozone depletion pot.	kg CFC-11eq	4.16E-05	3.56E-05	1.32E-07	1.66E-09	5.70E-06	0.00E+00	0.00E+00	MND	MND	MND	5.70E-06	0.00E+00	1.52E-07	0.00E+00	8.91E-09	1.40E-07	2.91E-09	-3.92E-07
Acidification potential	mol H ⁺ eq	7.75E+00	6.01E+00	1.60E-01	5.01E-04	1.53E+00	0.00E+00	0.00E+00	MND	MND	MND	1.53E+00	0.00E+00	4.84E-02	0.00E+00	9.32E-04	4.60E-02	1.50E-03	-1.22E+00
EP- freshwater ²	kg P eq	1.02E+00	9.07E-01	4.70E-04	3.26E-05	1.08E-01	0.00E+00	0.00E+00	MND	MND	MND	1.08E-01	0.00E+00	5.74E-03	0.00E+00	3.01E-05	5.58E-03	1.30E-04	-1.01E-01
EP-marine	kg N eq	1.31E+00	9.56E-01	3.96E-02	1.47E-03	2.92E-01	0.00E+00	0.00E+00	MND	MND	MND	2.92E-01	0.00E+00	2.22E-02	0.00E+00	2.24E-04	9.72E-03	1.23E-02	-1.04E-01
EP-terrestrial	mol N eq	1.34E+01	1.04E+01	4.39E-01	1.70E-03	2.43E+00	0.00E+00	0.00E+00	MND	MND	MND	2.43E+00	0.00E+00	1.05E-01	0.00E+00	2.41E-03	9.57E-02	7.04E-03	-1.21E+00
POCP ("smog") ³	kg NMVOC eq	3.96E+00	3.00E+00	1.26E-01	6.17E-04	7.98E-01	0.00E+00	0.00E+00	MND	MND	MND	7.98E-01	0.00E+00	3.52E-02	0.00E+00	1.55E-03	3.16E-02	2.02E-03	-3.63E-01
ADP-minerals & metals ⁴	kg Sb eq	1.92E-01	1.82E-01	1.82E-05	7.22E-07	9.82E-03	0.00E+00	0.00E+00	MND	MND	MND	9.82E-03	0.00E+00	5.71E-05	0.00E+00	1.49E-06	5.52E-05	4.34E-07	-1.15E-02
ADP-fossil resources	MJ	3.58E+04	9.03E+03	1.18E+02	1.33E+00	2.65E+04	0.00E+00	0.00E+00	MND	MND	MND	2.65E+04	0.00E+00	1.60E+02	0.00E+00	6.30E+00	1.52E+02	2.12E+00	-7.41E+02
Water use ⁵	m ³ e depr.	1.59E+03	1.25E+03	4.35E-01	7.17E-02	3.36E+02	0.00E+00	0.00E+00	MND	MND	MND	3.36E+02	0.00E+00	7.72E+00	0.00E+00	3.13E-02	7.33E+00	3.56E-01	-2.21E+01

MND abbreviation stands for Module Not Declared

1. GWP = Global Warming Potential

2. EP = Eutrophication potential. Required characterization method and data are in kg P-eq. Multiply by 3.07 to get PO₄e

3. POCP = Photochemical ozone formation

4. ADP = Abiotic depletion potential

5. EF 3.1 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EF 3.1

Impact Category	Unit	Total	Manufacturing	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
Particulate matter	Incidence	5.84E-05	4.38E-05	4.45E-07	7.49E-09	1.32E-05	0.00E+00	0.00E+00	MND	MND	MND	1.32E-05	0.00E+00	9.42E-07	0.00E+00	3.30E-08	8.94E-07	1.50E-08	-6.27E-06
Ionizing radiation ⁶	kBq U235 eq	1.26E+03	7.17E+01	7.36E-02	5.89E-03	1.19E+03	0.00E+00	0.00E+00	MND	MND	MND	1.19E+03	0.00E+00	2.77E+00	0.00E+00	8.13E-03	2.76E+00	2.57E-03	-3.35E+00
Ecotoxicity (freshwater)	CTUeq	1.01E+05	8.31E+04	1.34E+01	1.06E+01	1.33E+04	0.00E+00	0.00E+00	MND	MND	MND	1.33E+04	0.00E+00	4.70E+03	0.00E+00	8.38E-01	3.58E+02	4.34E+03	-9.90E+03
Human toxicity, cancer	CTUh	7.51E-07	5.56E-07	1.75E-09	1.12E-10	1.54E-07	0.00E+00	0.00E+00	MND	MND	MND	1.54E-07	0.00E+00	3.93E-08	0.00E+00	7.51E-11	3.84E-08	8.26E-10	-1.32E-07
Human tox. non-cancer	CTUh	4.59E-05	3.70E-05	5.02E-08	4.72E-09	8.62E-06	0.00E+00	0.00E+00	MND	MND	MND	8.62E-06	0.00E+00	1.93E-07	0.00E+00	3.99E-09	1.54E-07	3.46E-08	-9.37E-06
SQP ⁷	-	5.02E+03	3.31E+03	3.84E+01	9.39E-01	1.50E+03	0.00E+00	0.00E+00	MND	MND	MND	1.50E+03	0.00E+00	1.71E+02	0.00E+00	3.81E+00	1.64E+02	3.52E+00	-5.50E+02

MND abbreviation stands for Module Not Declared

6. EF 3.1 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator

7. SQP = Land use related impacts/soil quality

3 – ENVIRONMENTAL IMPACTS

USE OF NATURAL RESOURCES

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
Renew. PER as energy ⁸	MJ	3.87E+03	1.22E+03	1.25E+00	-3.57E+01	2.67E+03	0.00E+00	0.00E+00	MND	MND	MND	2.67E+03	0.00E+00	1.87E+01	0.00E+00	1.10E-01	1.85E+01	5.33E-02	-7.46E+01
Renew. PER as material	MJ	6.47E+01	7.37E+01	0.00E+00	-3.69E+01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	2.79E+01	0.00E+00	0.00E+00	2.79E+01	0.00E+00	-7.54E-01
Total use of renew. PER	MJ	3.95E+03	1.30E+03	1.25E+00	-7.26E+01	2.67E+03	0.00E+00	0.00E+00	MND	MND	MND	2.67E+03	0.00E+00	4.66E+01	0.00E+00	1.10E-01	4.64E+01	5.33E-02	-7.54E+01
Non-re. PER as energy	MJ	3.54E+04	8.90E+03	1.18E+02	-1.87E+01	2.65E+04	0.00E+00	0.00E+00	MND	MND	MND	2.65E+04	0.00E+00	-5.27E+01	0.00E+00	6.30E+00	1.06E+02	-1.65E+02	-7.23E+02
Non-re. PER as material	MJ	4.33E+01	4.19E+01	0.00E+00	-2.27E+01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	2.41E+01	0.00E+00	0.00E+00	2.41E+01	0.00E+00	-1.82E+02
Total use of non-re. PER	MJ	3.55E+04	8.94E+03	1.18E+02	-4.14E+01	2.65E+04	0.00E+00	0.00E+00	MND	MND	MND	2.65E+04	0.00E+00	-2.87E+01	0.00E+00	6.30E+00	1.30E+02	-1.65E+02	-9.05E+02
Secondary materials	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renew. secondary fuels	MJ	4.44E-01	4.26E-01	3.87E-04	1.41E-05	1.54E-02	0.00E+00	0.00E+00	MND	MND	MND	1.54E-02	0.00E+00	1.87E-03	0.00E+00	3.70E-05	1.80E-03	3.48E-05	-2.29E-01
Non-ren. secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m ³	3.73E+01	2.93E+01	1.18E-02	2.00E-04	7.84E+00	0.00E+00	0.00E+00	MND	MND	MND	7.84E+00	0.00E+00	1.90E-01	0.00E+00	8.58E-04	1.89E-01	4.72E-04	-5.78E-01

MND abbreviation stands for Module Not Declared

8. PER abbreviation stands for primary energy resources

END OF LIFE – WASTE

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
Hazardous waste	kg	1.02E+02	7.74E+01	1.80E-01	1.86E-02	1.77E+01	0.00E+00	0.00E+00	MND	MND	MND	1.77E+01	0.00E+00	7.10E+00	0.00E+00	9.16E-03	6.01E+00	1.08E+00	-2.06E+01
Non-hazardous waste	kg	3.08E+03	2.47E+03	2.95E+00	1.41E+00	5.73E+02	0.00E+00	0.00E+00	MND	MND	MND	5.73E+02	0.00E+00	3.41E+01	0.00E+00	1.93E-01	2.58E+01	8.06E+00	-4.22E+02
Radioactive waste	kg	3.61E-01	1.76E-02	1.80E-05	1.50E-06	3.43E-01	0.00E+00	0.00E+00	MND	MND	MND	3.43E-01	0.00E+00	7.11E-04	0.00E+00	2.02E-06	7.08E-04	6.42E-07	-8.34E-04

MND abbreviation stands for Module Not Declared

END OF LIFE – OUTPUT FLOWS

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	1.66E+01	0.00E+00	0.00E+00	2.02E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	1.46E+01	0.00E+00	0.00E+00	1.46E+01	0.00E+00	0.00E+00
Materials for energy rec	kg	2.42E+00	0.00E+00	0.00E+00	3.91E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	2.03E+00	0.00E+00	0.00E+00	0.00E+00	2.03E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

MND abbreviation stands for Module Not Declared

ENVIRONMENTAL IMPACTS – TRACI 2.1.

Impact Category	Unit	Total	Manufact-uring	Distribution & Installation		B1-B7	Use							C1-C4	End of Life				Benefits and Loads
			A1-A3	A4	A5		B1	B2	B3	B4	B5	B6	B7		C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ eq	9.18E+02	6.92E+02	8.97E+00	9.25E-01	2.01E+02	0.00E+00	0.00E+00	MND	MND	MND	2.01E+02	0.00E+00	1.55E+01	0.00E+00	4.41E-01	9.87E+00	5.19E+00	-6.66E+01
Ozone Depletion	kg CFC-11eq	4.72E-05	4.09E-05	1.39E-07	1.75E-09	6.00E-06	0.00E+00	0.00E+00	MND	MND	MND	6.00E-06	0.00E+00	1.59E-07	0.00E+00	9.39E-09	1.47E-07	3.06E-09	-4.43E-07
Acidification	kg SO ₂ eq	6.39E+00	4.96E+00	1.36E-01	4.50E-04	1.25E+00	0.00E+00	0.00E+00	MND	MND	MND	1.25E+00	0.00E+00	4.10E-02	0.00E+00	7.94E-04	3.88E-02	1.43E-03	-9.67E-01
Eutrophication	kg N eq	1.46E+00	1.30E+00	5.83E-03	3.56E-04	1.42E-01	0.00E+00	0.00E+00	MND	MND	MND	1.42E-01	0.00E+00	1.03E-02	0.00E+00	1.07E-04	9.29E-03	8.96E-04	-8.11E-02
POCP ("smog")	kg O ₃ eq	7.21E+01	5.54E+01	2.58E+00	9.81E-03	1.35E+01	0.00E+00	0.00E+00	MND	MND	MND	1.35E+01	0.00E+00	6.10E-01	0.00E+00	1.69E-02	5.52E-01	4.14E-02	-6.05E+00
ADP-fossil	MJ	1.38E+02	1.26E+01	1.18E+02	7.44E-01	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	0.00E+00	0.00E+00	6.74E+00	0.00E+00	6.30E+00	0.00E+00	4.36E-01	0.00E+00

MND abbreviation stands for Module Not Declared

5 – DECLARATION AND CONTACT INFORMATION

4.1 Extrapolation Coefficients

The products mentioned in the LCA report belong to the same homogeneous environmental family as the reference product. The group of products shall have the following characteristics:

- Same main functionality,
- Same product standards,
- Similar manufacturing technology: same type of materials and manufacturing processes.

The extrapolation coefficients for similar commercial references are as follows

#	Stages/Models	MMD-UP0051 BHP-E	MMD-UP0071 BHP-E	MMD-UP0091 BHP-E	MMD-UP0151 BHP-E	MMD-UP0181 BHP-E	MMD-UP0241 BHP-E	MMD-UP0271 BHP-E	MMD-UP0301 BHP-E	MMD-UP0361 BHP-E	MMD-UP0481 BHP-E	MMD-UP0561 BHP-E	MMD-UP0121 BHP-E
Functional Unit	Manufacturing stage	2.02	1.54	1.20	0.98	0.78	0.61	0.54	0.64	0.51	0.41	0.36	1.00
	Distribution stage	2.02	1.54	1.20	0.98	0.78	0.61	0.54	0.64	0.51	0.41	0.36	1.00
	Installation stage	1.69	1.28	1.00	0.64	0.51	0.40	0.36	0.32	0.26	0.20	0.18	1.00
	B6 stage	2.11	1.61	1.26	1.47	1.17	1.17	1.04	1.07	1.34	1.41	1.24	1.00
	C stage	2.05	1.57	1.22	1.02	0.81	0.64	0.57	0.68	0.54	0.43	0.38	1.00
	D stage	2.02	1.54	1.20	0.98	0.78	0.61	0.54	0.64	0.51	0.41	0.36	1.00
Declared Unit	Manufacturing stage	0.96	0.96	0.96	1.22	1.22	1.22	1.22	1.60	1.60	1.60	1.60	1.00
	Distribution stage	0.96	0.96	0.96	1.22	1.22	1.22	1.22	1.60	1.60	1.60	1.60	1.00
	Installation stage	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	1.00
	B6 stage	1.00	1.00	1.00	1.83	1.83	2.33	2.33	2.67	4.19	5.52	5.52	1.00
	C stage	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	1.00
	D stage	0.96	0.96	0.96	1.22	1.22	1.22	1.22	1.60	1.60	1.60	1.60	1.00

#	Stages/Models	MMD-UP0031 SPHY-E	MMD-UP0051 SPHY-E	MMD-UP0071 SPHY-E	MMD-UP0091 SPHY-E	MMD-UP0121 SPHY-E	MMD-UP0151 SPHY-E	MMD-UP0181 SPHY-E	MMD-UP0241 SPHY-E	MMD-UP0271 SPHY-E
Functional Unit	Manufacturing stage	2.28	1.28	0.91	0.71	0.57	0.58	0.46	0.42	0.37
	Distribution stage	2.28	1.28	0.91	0.71	0.57	0.58	0.46	0.42	0.37
	Installation stage	3.20	1.69	1.28	1.00	0.80	0.64	0.51	0.40	0.36
	B6 stage	1.20	0.70	0.70	0.61	0.52	0.47	0.47	0.56	0.53
	C stage	2.17	1.23	0.87	0.68	0.54	0.57	0.45	0.42	0.37
	D stage	2.28	1.28	0.91	0.71	0.57	0.58	0.46	0.42	0.37
Declared Unit	Manufacturing stage	0.57	0.61	0.57	0.57	0.57	0.72	0.72	0.83	0.83
	Distribution stage	0.57	0.61	0.57	0.57	0.57	0.72	0.72	0.83	0.83
	Installation stage	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	B6 stage	0.30	0.33	0.43	0.48	0.52	0.58	0.73	1.12	1.20
	C stage	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	D stage	0.57	0.61	0.57	0.57	0.57	0.72	0.72	0.83	0.83

5 – DECLARATION AND CONTACT INFORMATION

#	Stages/Models	MMD-UP0181 HP-E	MMD-UP0241 HP-E	MMD-UP0271 HP-E	MMD-UP0361 HP-E	MMD-UP0481 HP-E	MMD-UP0561 HP-E	MMD-UP0721 HP-E	MMD-UP0961 HP-E
Functional Unit	Manufacturing stage	0.82	0.65	0.57	0.52	0.42	0.37	0.60	0.47
	Distribution stage	0.82	0.65	0.57	0.52	0.42	0.37	0.60	0.47
	Installation stage	0.51	0.40	0.36	0.26	0.20	0.18	0.13	0.10
	B6 stage	1.33	1.17	1.41	1.40	1.45	1.72	1.66	1.94
	C stage	0.86	0.68	0.60	0.55	0.44	0.39	0.65	0.52
	D stage	0.82	0.65	0.57	0.52	0.42	0.37	0.60	0.47
Declared Unit	Manufacturing stage	1.29	1.29	1.29	1.63	1.63	1.63	3.68	3.68
	Distribution stage	1.29	1.29	1.29	1.63	1.63	1.63	3.68	3.68
	Installation stage	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	B6 stage	2.08	2.33	3.17	4.38	5.71	7.62	10.29	15.05
	C stage	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	D stage	1.29	1.29	1.29	1.63	1.63	1.63	3.68	3.68

The extrapolation coefficients are given for the environmental impact of the functional unit, i.e., the emission of 1 kW of cooling or heating capacity. For each stage of the life cycle, the environmental impacts of the product in question are calculated by multiplying the impacts of the declaration corresponding to the reference product by the extrapolation coefficient.

5 – DECLARATION AND CONTACT INFORMATION

5.1 Declaration

Registration number: TACE-00003-V01.01-EN	Drafting rules: PEP-PCR-ed4-EN-2021 09 06 » Supplemented by « PSR-0013-ed3.1-EN-2025-10-20»
Verifier accreditation number: VH42	Information and reference documents: www.pep-ecopassport.org
Date of issue: 07-2026	Validity period: 5 years
Independent verification of the declaration and data, in compliance with ISO 14025: 2006	
Internal : ☐	External : ☒
The PCR review was conducted by a panel of experts chaired by Julie ORGELET (Demain)	
PEP are compliant with NF C08-100-1:2016 and EN 50693 :2019 or NF E38-500:2022	
The elements of the present PEP cannot be compared with elements from another program.	
Document in compliance with ISO 14025: 2006 "Environmental labels and declarations. Type III environmental declarations"	



5.2 Contact information

The illustrations in this document are provided for information only and do not contain any sales offer or contact.

The manufacturer reserves the right to change any product specifications without notice.

PEP Owner

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5.3 References

1. EN 14511 – Air Conditioners, Heat Pumps, and Chillers Performance Standard.
2. EN 14825 – Seasonal Performance and Part-Load Testing Standard.
3. EN 15804+A2 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.
4. EN 16147--Heat pumps with electrically driven compressors.
5. F-Gas-European regulation n° 517/2014 relating to fluorinated greenhouse gases.
6. ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations Principles and procedures.
7. ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.
8. ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.
9. ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.
10. PCR-ed4-EN-2021 09 06; Product Category Rules for Electrical, Electronic and HVAC-R Products.
11. PSR-0013-ed3.1-EN-2025 06 17; SPECIFIC RULES FOR THERMODYNAMIC GENERATORS WITH ELECTRIC COMPRESSION FOR SPACE HEATING AND/OR COOLING AND/OR THE PRODUCTION OF DOMESTIC HOT WATER.
12. Regulation (EU) 1516/2007- REGULATION (EC) No 1516/2007 OF THE COMMISSION dated 19 December 2007 establishing, pursuant to Regulation (EC) No 842/2006 of the European Parliament and of the Council.
13. Regulation (EU) No. 813/2013- REGULATION (EU) No. 813/2013 of the Commission dated 2 August 2013 in application of Directive 2009/125/EC of the European Parliament.