Product Environmental Profile

EV Charging Station

Troniq Modular and High Power Product Line

THP 400

General Information

Information about the PEP ecopassport® program

Register Number: **EVTR-00001-V01.01-EN**	Drafting Rules: ***"PCR-ed4-EN-2021 09 06"*** ***supplemented by "PSR-0018-ed1.3-FR-2025 04 08"***
Verifier accreditation number: **VH49**	Information and reference documents: **www.pep-ecopassport.org**
Date of publication: **01-2026**	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 (DDemain)

PEPs are compliant with XP C08-100-1:2016 and EN 50693:2019 or NF E38-500 :2022
The components of the present PEP may not be compared with components from any other program

Document complies with ISO 14025:2006 "Environmental labels and declarations. Type III environmental declarations"

Company Information

Information

Product Brand	**Troniq**
Company Name	**EVBOX**
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Website	**https://evbox.com/en/**

Reference Product

The reference product covered by the environmental declaration is the Troniq High Power, a public charging station. Its commercial reference is DC18-881-J14-513.

Its technical characteristics are as follows:

Commercial reference	DC18-881-J14-513
Product family	Active product
Station type	Public DC charging stations
Installation type	Installation in public spaces – in France
Charging type	Fast
Number of charging points	2
Charging mode	Mode 4
Presence of additional sockets	Available option: AC socket (not covered by this study)
Reference power	Maximum 400 kW, average charging session of 50 kW for one hour
Current type	DC
Reference lifetime	10 years

The charging station is composed of:

- outer frame
- 2 CCS2 cables, also called COMBO mobile connectors. However, no CHAdeMO mobile connector is included.
- electrical protection devices
- a communication unit
- a supervision unit
- a payment unit
- a metering unit
- an access control unit
- a display screen

Additional elements may be added to the charging station but are not considered in the present analysis as they are optional. These include:

- an AC socket base (Type 2, 32 A, 3-phase)
- a domestic socket (16 A)

The functional unit, as defined in paragraph 3.1.1 of the PSR, is as follows: *Supply 1 kWh to one vehicle in accordance with the reference use scenario at the charging point.*

The reference flow formula is given in paragraph 3.10.1 of the PSR used.

The reference flow is equal to 1/average amount of energy delivered for a charging point on the station's DVR, i.e. equal to 1 / 3,650,000 = 0.00000027.

The reference flow is defined as a product unit multiplied by 0.00000027.

The characteristics used to define this amount of energy are as follows, for the station <180 kW :

→ Power delivered for a recharge (defined by the PSR) = 50 kW

→ Reference lifetime (defined by the PSR) = 10 years

→ Number of periodic recharges (defined by the PSR) = 10 per day

→ Effective charging time (defined by the PSR) = 1 hour

→ Number of charges = 73 000 units

The characteristics used to define this amount of energy are as follows, for the station >180 kW :

→ Power delivered for a recharge = 50 kWh

→ Reference lifetime (defined by the PSR) = 10 years

→ Number of periodic recharges (defined by the PSR) = 10 per day"

Temporal and geographical representativeness

The PEP is representative of a charging station manufactured in 2024, assembled in France, distributed in France, and used and disposed of in France.

Constituent Materials

A breakdown of the weight according to the different parts of the product gives:

Part of the product	**Weight (kg)**
Station	686
Packaging	66

The product is made of the following materials:

Material category	Sub-material category	Percentage
Plastic	Polyethylene	2,5%
Plastic	Plastic	0,1%
Plastic	Nylon	0,1%
Plastic	PVC	0,0%
Total - Plastic		**2,7%**
Metal	Steel	49,3%
Metal	Copper	2,3%
Metal	Aluminum	1,8%
Metal	Other - metal	0,2%
Total - Metal		**53,5%**
Other	Power module	20,0%
Other	Other - electronic products	8,9%
Other	Cable	6,6%
Other	Wood	6,5%
Other	Cardboard	1,8%
Other	Other	0,0%
Total - Others		**43,8%**

Homogeneous environmental families

The PEP may cover products other than the reference product if they belong to a homogeneous environmental family. This means that the product group must meet the following characteristics:

→ Same function

→ Same product standard

→ Same manufacturing technology

In accordance with these rules, 12 other charging stations in the range are covered by this PEP, namely:

- TMod 90kW - Troniq Modular - 90 kW - DC18-xx1-314-511
- TMod 120kW - Troniq Modular - 120 kW - DC18-xx1-414-511
- TMod 150kW - Troniq Modular - 150 kW - DC18-xx1-514-511
- TMod 180kW - Troniq Modular - 180 kW - DC18-xx1-614-511

- TMod 210kW - Troniq Modular - 210 kW - DC18-xx1-714-511
- TMod 240kW - Troniq Modular - 240 kW - DC18-xx1-814-511
- THP 200kW - Troniq High Power - 200 kW - DC18-xx1-E14-513
- THP 240kW - Troniq High Power - 240 kW - DC18-xx1-F14-513
- THP 280kW - Troniq High Power - 280 kW - DC18-xx1-G14-513
- THP 320kW - Troniq High Power – 320 kW - DC18-xx1-H14-513
- THP 360kW - Troniq High Power - 360 kW - DC18-xx1-I14-513
- TUHP 480kW - Troniq Ultra High Power - 480 kW - DC18-771-L14-514

Additional environmental information

Manufacturing (A1-A3):

The Troniq High Power charging station is made up of numerous components produced by multiple suppliers located around the world. EVBox assembles these components at its site.

All components of the charging station, charging cables and packaging are taken into account. Elements connecting to the electrical network, supervision network and communication network are excluded.

Losses during the assembly phase and waste related to component packaging are taken into account and come from EVBox's monitoring.

Manufacturing losses are unknown. We use the data from scenario 3.5.1.1 of PSR-0018-ed1.3-EN-2025 04 08, equal to 30%.

The assembly phase requires standard tools, whose electricity consumption is monitored by EVBox. This consists exclusively of French electricity from the grid.

Once assembled, the charging station is packaged for transport. The packaging is mainly made of cardboard and wood.

The station is then stored in a storage area.

The assembly plant is located at Léognan, France, the storage facility is located nearby at Bassens, France.

Distribution (A4):

The station is then delivered to its installation site by road. This analysis only concerns stations sold in France.

Installation (A5):

Standard tools are required for installation. Product installation components that are not supplied with the product are not taken into account. The electrical networks required for product installation are not taken into account.

EVBox conducts tests before its charging stations are used. Electricity flows through the charging stations in a closed circuit before they are put into production. No primary energy data was used.

The processing of charging station packaging waste is taken into account in this stage of the life cycle.

Maintenance (B2):

EVBox carries out annual inspections to monitor the condition of its charging stations. Some parts are replaced, if necessary, during these inspections.

The technicians responsible for these inspections travel in commercial vehicles. They carry out one inspection per year throughout the charging station's lifetime and travel an average of 100 km.

Repair (B3):

Acts of vandalism sometimes require repairs to the charging stations. Certain parts are replaced as needed, such as screen and cable.

Use (B6):

Two charging cables are used to operate Troniq High Power charging stations. The charging station is connected to the electricity grid.

The impact of the charging station's intrinsic consumption required for users to operate the station is taken into account in this step.

The PSR provides a method for calculating the intrinsic consumption of charging stations as well as losses related to station use. Usage scenarios are defined and presented in Appendix ed3.1-EN-2024 09 26 (file: PSR-0018-ANNEX-ed3.1-EN-2024 09 26).

However, the scenarios presented in the PSR and its appendix are not suitable for high-power charging stations (>180 kWh), such as the Troniq High Power.

Following discussions with PEP ecopassport program, we use the following values.

→ Station charging power: 80 kW (This charging power is defined based on EVBOX measurement data)

→ Recharge time: 0.63 hours (38 minutes) – based on the average value of energy delivered by the charging station as defined by the PSR (= 50 kWh).

The data used to estimate this consumption are as follows:

→ Losses = (1-E)*Qd

→ Where Qd = power delivered to users = 3,650,000 kWh

→ E = efficiency = 95.5%

Intrinsic consumption = (Pactive*%Tactive+Pstandby*%Tstandby+Poff*%Toff)*DVR

- Pactive = 0.1910 kW
- %Active = 52%
- Standby active = 0.21 kW
- %Standby = 0%
- Off-peak = 0.2 kW
- %Off = 48%

End of Life (C1-C4):

At end of life, the stations are discarded, with no further information on the treatment and recovery processes carried out. We therefore use scenario 2.5.6 of PCR-4-ed4-EN-2021 and the data in Table G.4 No primary energy data was used.

Energy model used

LCA Phase	Energy Model	Comments
Manufacturing	Chinese electricity mix from the Ecoinvent 3.11 database: market for electricity, low voltage | China, Southwest Grid (CN-SWG) | 2021-2024	Significant secondary data
Assembly	French electricity mix from the Ecoinvent 3.11 database: market for electricity, low voltage | France (FR) | 2020-2024	Primary data
Use	French electricity mix from the Ecoinvent 3.11 database: market for electricity, low voltage | France (FR) | 2020-2024	Significant secondary data

Environmental impacts

The Orki LCA software was used to conduct this study. Orki is based on the Ecoinvent (version 3.11) and ADEME (version v23.8) databases. These databases are regularly updated and are based on current data that is representative of industry practices.

Declared unit

As a reminder, the declared unit is a charging station defined as follows: to ensure the recharging of electric vehicles or rechargeable hybrids through two recharging points during a reference lifetime of 10 years.

The charging station is composed of a charging system with its packaging and installation components delivered with the product.

Impacts	Unit	Production	Installation		Use								End of life	Total A-C	Benefits and Loads Beyond System Boundaries (D)
		Subtotal A1–A3	A4 – Transport to installation site	A5 – Installation	B1 – Use	B2 – Maintenance	B3 – Repair	B4 – Replacement	B5 – Refurbishment	B6 – Operational energy use	B7 – Operational water use	Subtotal B1–B7	Subtotal C1–C4		
Acidification	mol H+ eq	1,22E+02	2,03E-01	4,99E-01	0,00E-00	1,88E+00	5,17E+00	0,00E-00	0,00E-00	1,20E+02	0,00E-00	1,28E+02	5,28E+00	2,56E+02	-3,13E+01
Climate change	$kgCO_2$ eq	1,34E+04	8,35E+01	1,10E+02	0,00E-00	4,64E+02	3,90E+02	0,00E-00	0,00E-00	1,63E+04	0,00E-00	1,72E+04	1,15E+03	3,19E+04	-6,34E+03
Climate change – biogenic	$kgCO_2$ eq	4,54E+01	4,91E-02	7,60E+00	0,00E-00	-2,03E-01	-1,85E+00	0,00E-00	0,00E-00	3,80E+02	0,00E-00	3,78E+02	1,06E+01	4,42E+02	-3,50E+02
Climate change – fossil	$kgCO_2$ eq	1,33E+04	8,34E+01	1,03E+02	0,00E-00	4,64E+02	3,91E+02	0,00E-00	0,00E-00	1,59E+04	0,00E-00	1,68E+04	1,14E+03	3,14E+04	-5,99E+03
Climate change – land use and land use change (LULUC)	$kgCO_2$ eq	2,31E+01	3,11E-02	1,71E-02	0,00E-00	2,57E-01	6,31E-01	0,00E-00	0,00E-00	1,64E+01	0,00E-00	1,73E+01	1,64E-01	4,05E+01	-6,70E+00
Ecotoxicity (freshwater)	CTUe	3,74E+05	1,49E+02	7,15E+01	0,00E-00	2,16E+03	3,07E+04	0,00E-00	0,00E-00	9,57E+04	0,00E-00	1,29E+05	1,52E+03	5,04E+05	-6,89E+04

Eutrophication – freshwater	kg P eq	2,14E+01	6,10E-03	2,30E-03	0,00E-00	7,58E-02	2,21E+00	0,00E-00	0,00E-00	8,49E+00	0,00E-00	1,08E+01	3,42E-02	3,22E+01	-4,45E+00
Eutrophication – marine	kg N eq	2,15E+01	5,33E-02	2,18E-01	0,00E-00	5,40E-01	1,44E+00	0,00E-00	0,00E-00	2,29E+01	0,00E-00	2,49E+01	2,26E+00	4,89E+01	-6,65E+00
Eutrophication – terrestrial	kg N eq	2,37E+02	5,77E-01	2,38E+00	0,00E-00	5,83E+00	1,63E+01	0,00E-00	0,00E-00	1,91E+02	0,00E-00	2,13E+02	2,45E+01	4,78E+02	-6,43E+01
Human toxicity – cancer effects	CTUh	1,44E-05	1,39E-08	7,41E-09	0,00E-00	2,48E-07	3,01E-07	0,00E-00	0,00E-00	1,21E-05	0,00E-00	1,27E-05	1,00E-07	2,72E-05	-7,74E-06
Human toxicity – non-cancer effects	CTUh	7,30E-04	8,14E-07	2,32E-07	0,00E-00	5,19E-06	5,14E-05	0,00E-00	0,00E-00	6,77E-04	0,00E-00	7,34E-04	3,60E-06	1,47E-03	-1,11E-04
Ionising radiation	kBq U-235 eq	1,21E+03	1,42E+00	6,32E-01	0,00E-00	9,34E+00	3,34E+01	0,00E-00	0,00E-00	9,38E+04	0,00E-00	9,38E+04	7,11E+00	9,50E+04	-4,24E+02
Land use		9,17E+04	1,27E+03	1,57E+02	0,00E-00	2,23E+03	3,79E+03	0,00E-00	0,00E-00	1,18E+05	0,00E-00	1,24E+05	3,91E+03	2,21E+05	-4,31E+04
Resource use – minerals and metals	kg Sb eq	3,25E+00	2,48E-04	7,39E-05	0,00E-00	4,82E-03	8,59E-02	0,00E-00	0,00E-00	7,71E-01	0,00E-00	8,61E-01	1,25E-03	4,12E+00	-1,43E-01
Resource use – energy carriers (non-renewable)	MJ	1,72E+05	1,27E+03	1,24E+03	0,00E-00	6,23E+03	4,82E+03	0,00E-00	0,00E-00	2,08E+06	0,00E-00	2,10E+06	1,43E+04	2,28E+06	-6,86E+04
Ozone depletion	kg CFC-11 eq	3,40E-04	1,89E-06	1,43E-06	0,00E-00	7,95E-06	9,68E-06	0,00E-00	0,00E-00	4,48E-04	0,00E-00	4,65E-04	1,72E-05	8,25E-04	-5,50E-05
Particulate matter formation	disease incidence	1,09E-03	8,28E-06	1,23E-05	0,00E-00	3,03E-05	4,26E-05	0,00E-00	0,00E-00	1,04E-03	0,00E-00	1,11E-03	1,36E-04	2,35E-03	-5,95E-04
Photochemical ozone formation	kg NMVOC eq	7,16E+01	3,39E-01	9,46E-01	0,00E-00	2,20E+00	3,54E+00	0,00E-00	0,00E-00	6,26E+01	0,00E-00	6,84E+01	9,95E+00	1,51E+02	-2,01E+01
Water use	m³	5,10E+03	7,36E+00	2,86E+00	0,00E-00	5,16E+01	1,43E+02	0,00E-00	0,00E-00	2,64E+04	0,00E-00	2,66E+04	3,87E+01	3,17E+04	-2,50E+03
Use of renewable primary energy resources (PERE)	MJ	2,54E+04	1,95E+01	4,02E+02	0,00E-00	1,64E+02	9,68E+02	0,00E-00	0,00E-00	2,10E+05	0,00E-00	2,11E+05	4,85E+01	2,37E+05	-1,32E+04
Use of renewable primary energy resources used as material (PERM)	MJ	1,04E+02	0,00E-00	-8,24E+02	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	-7,19E+02	0,00E-00
Total renewable primary energy use (PERT)	MJ	2,61E+04	1,95E+01	1,99E+00	0,00E-00	1,64E+02	9,68E+02	0,00E-00	0,00E-00	2,10E+05	0,00E-00	2,11E+05	4,85E+01	2,37E+05	-1,32E+04
Use of non-renewable primary energy resources (PENRE)	MJ	1,65E+05	1,27E+03	1,67E+02	0,00E-00	6,13E+03	4,76E+03	0,00E-00	0,00E-00	2,08E+06	0,00E-00	2,10E+06	2,90E+03	2,26E+06	-7,04E+04
Use of non-renewable primary energy resources used as material (PENRM)	MJ	1,53E+03	0,00E-00	-1,30E+02	0,00E-00	9,86E+01	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	9,86E+01	-6,80E+02	8,17E+02	0

Total non-renewable primary energy use (PENRT)	MJ	1,67E+05	1,27E+03	3,69E+01	0,00E-00	6,23E+03	4,76E+03	0,00E-00	0,00E-00	2,08E+06	0,00E-00	2,10E+06	2,22E+03	2,27E+06	-7,04E+04
Use of secondary materials	kg	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	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 renewable secondary fuels	MJ	6,20E+00	7,05E-03	1,82E-03	0,00E-00	4,57E-02	2,39E-01	0,00E-00	0,00E-00	1,21E+00	0,00E-00	1,49E+00	4,16E-02	7,75E+00	-3,69E+00
Use of non-renewable secondary fuels	MJ	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00
Net use of fresh water	m³	1,15E+02	1,71E-01	6,26E-02	0,00E-00	1,24E+00	3,36E+00	0,00E-00	0,00E-00	6,15E+02	0,00E-00	6,20E+02	9,47E-01	7,36E+02	-4,51E+01
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	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	kg	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	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	0,00E-00	0,00E-00	5,65E+01	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	5,14E+02	5,71E+02	0,00E-00
Exported energy – total	MJ	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00
Exported energy – electricity	MJ	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00
Exported energy – heat	MJ	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00
Non-hazardous waste disposed	kg	6,84E+04	3,77E+01	1,99E+01	0,00E-00	4,32E+02	1,93E+03	0,00E-00	0,00E-00	4,50E+04	0,00E-00	4,73E+04	3,38E+02	1,16E+05	-4,53E+04
Hazardous waste disposed	kg	3,82E+03	1,85E+00	8,32E-01	0,00E-00	2,58E+01	5,71E+01	0,00E-00	0,00E-00	1,39E+03	0,00E-00	1,47E+03	1,13E+01	5,31E+03	-3,53E+03
Radioactive waste disposed	kg	3,01E-04	3,48E-04	1,61E-04	0,00E+00	2,31E-03	8,24E-03	0,00E+00	0,00E+00	2,70E+01	0,00E+00	2,70E+01	1,75E-03	2,73E+01	-1,08E-01
Biogenic carbon content (packaging)	kg C	3,09E+01	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	3,09E+01	0,00E-00
Biogenic carbon content (product)	kg C	3,65E-01	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	3,65E-01	0,00E-00

Biogenic carbon content	**Unit (kg C)**
Biogenic carbon content in the product	0,365
Biogenic carbon content in accompanying packaging	30,88

Functional unit

The contribution analysis of elementary flows in environmental indicators was calculated using the Environmental Footprint 3.1 (EF 3.1) method.

As a reminder, the functional unit is " *Supply 1 kWh to one vehicle in accordance with the reference use scenario at the charging point".*

In order to develop the PEP, the impacts were reported in relation to the supply of 1 kWh of energy delivered. The impact of the stages in the life cycle of the installed product is to be calculated by the user of the declaration by multiplying the impact considered by the amount of electricity delivered by the product over its lifetime.

Environmental impacts:

Impacts	Unit	Production	Installation		Use								End of life	Total A-C	Benefits and Loads Beyond System Boundaries (D)
		Subtotal A1–A3	A4 – Transport to installation site	A5 – Installation	B1 – Use	B2 – Maintenance	B3 – Repair	B4 – Replacement	B5 – Refurbishment	B6 – Operational energy use	B7 – Operational water use	Subtotal B1–B7	Subtotal C1–C4		
Acidification	mol H+ eq	3,35E-05	5,56E-08	1,37E-07	0,00E-00	5,14E-07	1,42E-06	0,00E-00	0,00E-00	3,30E-05	0,00E-00	3,49E-05	1,45E-06	7,01E-05	-8,59E-06
Climate change	$kgCO_2$ eq	3,66E-03	2,29E-05	3,02E-05	0,00E-00	1,27E-04	1,07E-04	0,00E-00	0,00E-00	4,47E-03	0,00E-00	4,70E-03	3,15E-04	8,74E-03	-1,74E-03
Climate change – biogenic	$kgCO_2$ eq	1,24E-05	1,35E-08	2,08E-06	0,00E-00	-5,58E-08	-5,08E-07	0,00E-00	0,00E-00	1,04E-04	0,00E-00	1,04E-04	2,89E-06	1,21E-04	-9,58E-05
Climate change – fossil	$kgCO_2$ eq	3,65E-03	2,29E-05	2,81E-05	0,00E-00	1,27E-04	1,07E-04	0,00E-00	0,00E-00	4,36E-03	0,00E-00	4,59E-03	3,12E-04	8,60E-03	-1,64E-03
Climate change – land use and land use change (LULUC)	$kgCO_2$ eq	6,32E-06	8,53E-09	4,67E-09	0,00E-00	7,05E-08	1,73E-07	0,00E-00	0,00E-00	4,48E-06	0,00E-00	4,73E-06	4,50E-08	1,11E-05	-1,83E-06
Ecotoxicity (freshwater)	CTUe	1,02E-01	4,07E-05	1,96E-05	0,00E-00	5,92E-04	8,40E-03	0,00E-00	0,00E-00	2,62E-02	0,00E-00	3,52E-02	4,18E-04	1,38E-01	-1,89E-02
Eutrophication – freshwater	kg P eq	5,86E-06	1,67E-09	6,29E-10	0,00E-00	2,08E-08	6,07E-07	0,00E-00	0,00E-00	2,33E-06	0,00E-00	2,95E-06	9,37E-09	8,82E-06	-1,22E-06
Eutrophication – marine	kg N eq	5,90E-06	1,46E-08	5,97E-08	0,00E-00	1,48E-07	3,94E-07	0,00E-00	0,00E-00	6,27E-06	0,00E-00	6,81E-06	6,20E-07	1,34E-05	-1,82E-06
Eutrophication – terrestrial	kg N eq	6,50E-05	1,58E-07	6,51E-07	0,00E-00	1,60E-06	4,48E-06	0,00E-00	0,00E-00	5,24E-05	0,00E-00	5,84E-05	6,71E-06	1,31E-04	-1,76E-05
Human toxicity – cancer effects	CTUh	3,95E-12	3,81E-15	2,03E-15	0,00E-00	6,80E-14	8,24E-14	0,00E-00	0,00E-00	3,32E-12	0,00E-00	3,47E-12	2,74E-14	7,46E-12	-2,12E-12
Human toxicity – non-cancer effects	CTUh	2,00E-10	2,23E-13	6,34E-14	0,00E-00	1,42E-12	1,41E-11	0,00E-00	0,00E-00	1,86E-10	0,00E-00	2,01E-10	9,86E-13	4,02E-10	-3,04E-11
Ionising radiation	kBq U-235 eq	3,31E-04	3,88E-07	1,73E-07	0,00E-00	2,56E-06	9,14E-06	0,00E-00	0,00E-00	2,57E-02	0,00E-00	2,57E-02	1,95E-06	2,60E-02	-1,16E-04

Land use		2,51E-02	3,49E-04	4,29E-05	0,00E-00	6,11E-04	1,04E-03	0,00E-00	0,00E-00	3,23E-02	0,00E-00	3,39E-02	1,07E-03	6,05E-02	-1,18E-02
Resource use – minerals and metals	kg Sb eq	8,92E-07	6,81E-11	2,03E-11	0,00E-00	1,32E-09	2,35E-08	0,00E-00	0,00E-00	2,11E-07	0,00E-00	2,36E-07	3,43E-10	1,13E-06	-3,93E-08
Resource use – energy carriers (non-renewable)	MJ	4,72E-02	3,47E-04	3,40E-04	0,00E-00	1,71E-03	1,32E-03	0,00E-00	0,00E-00	5,71E-01	0,00E-00	5,74E-01	3,92E-03	6,26E-01	-1,88E-02
Ozone depletion	kg CFC-11 eq	9,30E-11	5,18E-13	3,92E-13	0,00E-00	2,18E-12	2,65E-12	0,00E-00	0,00E-00	1,23E-10	0,00E-00	1,27E-10	4,72E-12	2,26E-10	-1,51E-11
Particulate matter formation	disease incidence	2,98E-10	2,27E-12	3,36E-12	0,00E-00	8,31E-12	1,17E-11	0,00E-00	0,00E-00	2,84E-10	0,00E-00	3,04E-10	3,72E-11	6,45E-10	-1,63E-10
Photochemical ozone formation	kg NMVOC eq	1,96E-05	9,30E-08	2,59E-07	0,00E-00	6,02E-07	9,71E-07	0,00E-00	0,00E-00	1,72E-05	0,00E-00	1,87E-05	2,73E-06	4,14E-05	-5,52E-06
Water use	m³	1,40E-03	2,02E-06	7,83E-07	0,00E-00	1,41E-05	3,93E-05	0,00E-00	0,00E-00	7,23E-03	0,00E-00	7,29E-03	1,06E-05	8,70E-03	-6,85E-04
Use of renewable primary energy resources (PERE)	MJ	6,96E-03	5,35E-06	1,10E-04	0,00E-00	4,50E-05	2,65E-04	0,00E-00	0,00E-00	5,74E-02	0,00E-00	5,78E-02	1,33E-05	6,48E-02	-3,63E-03
Use of renewable primary energy resources used as material (PERM)	MJ	2,86E-04	0,00E-0	-2,26E-04	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	-1,97E-04	0,00E-00
Total renewable primary energy use (PERT)	MJ	7,16E-03	5,35E-06	5,44E-07	0,00E-00	4,50E-05	2,65E-04	0,00E-00	0,00E-00	5,74E-02	0,00E-00	5,78E-02	1,33E-05	6,49E-02	-3,63E-03
Use of non-renewable primary energy resources (PENRE)	MJ	4,52E-02	3,47E-04	4,57E-05	0,00E-00	1,68E-03	1,30E-03	0,00E-00	0,00E-00	5,71E-01	0,00E-00	5,74E-01	7,93E-04	6,20E-01	-1,93E-02
Use of non-renewable primary energy resources used as material (PENRM)	MJ	4,19E-04	0,00E-0	-3,56E-05	0,00E-00	2,70E-05	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	2,70E-05	-1,86E-04	2,24E-04	0,00E-00
Total non-renewable primary energy use (PENRT)	MJ	4,56E-02	3,47E-04	1,01E-05	0,00E-00	1,71E-03	1,30E-03	0,00E-00	0,00E-00	5,71E-01	0,00E-00	5,74E-01	6,07E-04	6,21E-01	-1,93E-02
Use of secondary materials	kg	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	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 renewable secondary fuels	MJ	1,70E-06	1,93E-09	4,99E-10	0,00E-00	1,25E-08	6,56E-08	0,00E-00	0,00E-00	3,30E-07	0,00E-00	4,08E-07	1,14E-08	2,12E-06	-1,01E-06
Use of non-renewable secondary fuels	MJ	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00
Net use of fresh water	m³	3,15E-05	4,68E-08	1,72E-08	0,00E-00	3,40E-07	9,20E-07	0,00E-00	0,00E-00	1,69E-04	0,00E-00	1,70E-04	2,60E-07	2,02E-04	-1,23E-05

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	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	kg	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	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	0,00E-00	0,00E-00	1,55E-05	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	1,41E-04	1,56E-04	0,00E-00
Exported energy – total	MJ	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00
Exported energy – electricity	MJ	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00
Exported energy – heat	MJ	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00
Non-hazardous waste disposed	kg	1,87E-02	1,03E-05	5,46E-06	0,00E-00	1,18E-04	5,29E-04	0,00E-00	0,00E-00	1,23E-02	0,00E-00	1,30E-02	9,25E-05	3,18E-02	-1,24E-02
Hazardous waste disposed	kg	1,05E-03	5,06E-07	2,28E-07	0,00E-00	7,08E-06	1,57E-05	0,00E-00	0,00E-00	3,81E-04	0,00E-00	4,04E-04	3,11E-06	1,45E-03	-9,68E-04
Radioactive waste disposed	kg	8,25E-08	9,54E-11	4,41E-11	0,00E-00	6,32E-10	2,25E-09	0,00E+00	0,00E+00	7,37E-06	0,00E+00	7,37E-06	4,79E-10	7,46E-06	-2,94E-08
Biogenic carbon content (packaging)	kg C	8,46E-06	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	8,46E-06	0,00E-00
Biogenic carbon content (product)	kg C	1,00E-07	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	0,00E-00	1,00E-07	0,00E-00

Biogenic carbon content	Unit (kg C)
Biogenic carbon content in the product	1.00E-7
Biogenic carbon content in accompanying packaging	8,46E-6

Extrapolation rules

The PEP can cover products different from the reference product if they belong to a homogeneous environmental family. This means that the group of products must satisfy the following characteristics:

→ same function;

→ same product standard;

→ same manufacturing technology: the same type of materials and same manufacturing processes.

The Troniq product family satisfy these conditions, so extrapolation rules were applied to assess the environmental impact of the products belonging to the family, following the PCR indication. No extrapolation rules for differential circuit breakers are set in the PSR, thus the next steps have been followed to define the extrapolation rule:

▪ Analyse the products covered by the PEP belonging to the same homogenous family;

▪ Perform the LCA of a representative product of the homogeneous family;

▪ Identify and quantify the product parameters that vary between the various products of the homogeneous environmental family (i.e. dimensions, the weight of parts, materials, energy consumption. etc.).

Lastly, a sensitivity analysis was performed for each life cycle stage to identify which parameters of the ones selected are sensitive to environmental impacts to create extrapolation rules.

The parameters considered relevant for the calculation of the extrapolation coefficients are as follows:

▪ for the manufacturing:

- weight of the cabinet
- weight of the cable management system
- weight of the charging cable
- weight of the input box
- weight of the output box

▪ for the distribution, end-of-life and module D:

- total weight

▪ for the installation:

- weight of the packaging

▪ for the use stage:

- energy consumption.

The extrapolation rules have been calculated based on the environmental impact assessment results of the reference product Troniq High Power 400 kW and the sensitivity analysis. To evaluate the environmental performance of all the variants, multiplication factors were extrapolated to be used for the impact's calculation. The impact of each product was related to the reference product for the main the life cycle stages.

To determinate the environmental impacts associated with each product, the multiplication factor must be multiplied by the impacts of the reference product.

The extrapolation coefficients at the declared unit and at the functional unit levels are the same.

Phase A1-A3 :

Product name	TMod 90kW	TMod 120kW	TMod 150kW	TMod 180kW	TMod 210kW	TMod 240kW	THP 200kW	THP 240kW	THP 280kW	THP 320kW	THP 360kW	TUHP 480kW
Acidification	0,72	0,77	0,81	0,86	0,90	0,95	0,81	0,86	0,89	0,93	0,96	1,06
Climate change	0,74	0,78	0,82	0,86	0,90	0,94	0,83	0,87	0,90	0,94	0,96	1,04
Climate change – biogenic	0,66	0,48	0,27	0,09	-0,10	-0,28	1,47	1,23	1,34	1,13	1,24	0,09
Climate change – fossil	0,74	0,78	0,82	0,86	0,90	0,94	0,83	0,87	0,90	0,94	0,96	1,04
Climate change – land use and land use change (LULUC)	0,75	0,79	0,84	0,88	0,92	0,96	0,83	0,87	0,89	0,93	0,96	1,05
Ecotoxicity (freshwater)	0,80	0,83	0,87	0,90	0,93	0,96	0,87	0,90	0,92	0,95	0,97	1,03
Eutrophication – freshwater	0,79	0,82	0,85	0,88	0,91	0,95	0,87	0,90	0,92	0,95	0,97	1,02
Eutrophication – marine	0,76	0,80	0,84	0,88	0,92	0,96	0,84	0,88	0,90	0,94	0,96	1,04

Eutrophication – terrestrial	0,76	0,80	0,84	0,88	0,92	0,95	0,84	0,88	0,90	0,94	0,96	1,04
Human toxicity – cancer effects	0,73	0,77	0,81	0,85	0,89	0,93	0,84	0,87	0,90	0,94	0,96	1,04
Human toxicity – non-cancer effects	0,71	0,77	0,82	0,87	0,92	0,97	0,79	0,84	0,87	0,92	0,95	1,08
Ionising radiation	0,74	0,78	0,82	0,87	0,91	0,95	0,83	0,87	0,89	0,93	0,96	1,05
Land use	0,76	0,80	0,84	0,88	0,91	0,95	0,85	0,89	0,91	0,94	0,96	1,03
Resource use – minerals and metals	0,79	0,83	0,87	0,91	0,95	0,99	0,84	0,88	0,90	0,94	0,96	1,06
Resource use – energy carriers (non-renewable)	0,73	0,77	0,82	0,86	0,90	0,95	0,82	0,87	0,89	0,93	0,96	1,05
Ozone depletion	0,75	0,80	0,85	0,90	0,95	0,99	0,80	0,85	0,88	0,93	0,95	1,07
Particulate matter formation	0,75	0,78	0,82	0,86	0,90	0,93	0,85	0,88	0,91	0,94	0,96	1,02
Photochemical ozone formation	0,73	0,77	0,82	0,86	0,91	0,95	0,82	0,86	0,89	0,93	0,96	1,05
Water use	0,74	0,78	0,82	0,86	0,90	0,94	0,84	0,88	0,90	0,94	0,96	1,04
Use of renewable primary energy resources (PERE)	0,76	0,79	0,83	0,86	0,90	0,93	0,86	0,89	0,91	0,94	0,97	1,03
Use of renewable primary energy resources used as material (PERM)	0,74	0,83	0,93	1,03	1,12	1,21	0,71	0,82	0,80	0,91	0,89	1,14
Total renewable primary energy use (PERT)	0,76	0,79	0,83	0,87	0,90	0,94	0,85	0,89	0,91	0,94	0,96	1,03
Use of non-renewable primary energy resources (PENRE)	0,73	0,77	0,81	0,86	0,90	0,94	0,82	0,87	0,89	0,93	0,96	1,05
Use of non-renewable primary energy resources used as material (PENRM)	0,74	0,79	0,84	0,89	0,94	0,99	0,81	0,87	0,88	0,93	0,95	1,10
Total non-renewable primary energy use (PENRT)	0,73	0,77	0,81	0,86	0,90	0,94	0,82	0,87	0,89	0,93	0,96	1,05
Use of secondary materials	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Use of renewable secondary fuels	0,73	0,77	0,81	0,86	0,90	0,94	0,83	0,87	0,90	0,94	0,96	1,03
Use of non-renewable secondary fuels	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Net use of fresh water	0,74	0,78	0,82	0,86	0,90	0,94	0,83	0,87	0,89	0,93	0,96	1,05
Components for re-use	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Materials for energy recovery	0,89	0,95	1,02	1,07	1,13	1,19	0,82	0,89	0,87	0,94	0,93	1,06
Materials for recycling	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Exported energy – total	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Exported energy – electricity	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Exported energy – heat	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Non-hazardous waste disposed	0,72	0,76	0,80	0,84	0,88	0,92	0,83	0,87	0,90	0,94	0,96	1,03
Hazardous waste disposed	0,76	0,78	0,81	0,84	0,86	0,89	0,89	0,92	0,93	0,96	0,97	1,00
Radioactive waste disposed	0,74	0,78	0,82	0,87	0,91	0,95	0,83	0,87	0,89	0,93	0,96	1,05
Biogenic carbon content (packaging)	0,87	0,87	0,87	0,87	0,87	0,87	1,00	1,00	1,00	1,00	1,00	1,07
Biogenic carbon content (product)	0,51	0,60	0,70	0,79	0,88	0,97	0,61	0,69	0,76	0,85	0,91	1,15

Phase A4, A5, B2, B3, B6 et C:

Product name	TMod 90kW	TMod 120kW	TMod 150kW	TMod 180kW	TMod 210kW	TMod 240kW	THP 200kW	THP 240kW	THP 280kW	THP 320kW	THP 360kW	TUHP 480kW
A4	0,71	0,75	0,79	0,83	0,87	0,91	0,83	0,87	0,90	0,93	0,96	1,05
A5	0,94	0,94	0,94	0,94	0,94	0,94	1,00	1,00	1,00	1,00	1,00	1,11
B2	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
B3	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
B6	1,07	1,07	1,07	1,07	1,10	1,09	0,99	0,99	0,99	0,99	1,00	1,00
C	0,68	0,73	0,78	0,82	0,87	0,91	0,81	0,86	0,88	0,93	0,95	1,05

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