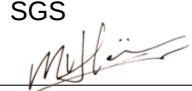
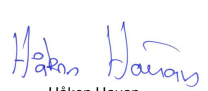


ENVIRONMENTAL PRODUCT DECLARATION

Argeno 125 1002174

Type III according to ISO 14025



Owner of the declaration: Fronius International GmbH	Program holder and publisher: The Norwegian EPD foundation
Registration number: NEPD-14405-14833	Issue date: 11.12.2025 Valid to: 11.12.2030
IN COMPLIANCE WITH ISO 14025, EN 50693, PCR EPDItaly007 and Sub- PCR EPDItaly032	
EPD type: specific product	EPD scope: Cradle to Grave
Independent verification: Independent verification of the declaration and data, according to ISO14025:2011-10 ☐ Internal ☒ External according to external certified EPD management system & tool verification by Elisabet Amat, Greenize External verification by Martijn van Hovell, SGS 	Program instructions: The Norwegian EPD Foundation/EPD-Norge, General Programme Instructions 2024.09.18 version 4  Håkon Hauan Managing Director of EPD-Norway ver-161225

General information

This environmental product declaration (EPD) is based on the international standard ISO 14025 ("Environmental labels and declarations — Type III environmental declarations"). The data in this EPD has been evaluated on a full- scale life cycle assessment (LCA) study according to ISO 14040/44, taking into account the product category rules (PCR) for electronic and electrotechnical products and systems defined in EN 50693, as well as PCR EPDItaly007 Electronic and electrical products and systems and PCR EPDItaly032 – Power Inverters.

Fronius International is dedicated to an environmentally conscious design of its products in line with IEC 62430 and has implemented an integrated management system according to ISO 9001, ISO 14001 and ISO 45001.

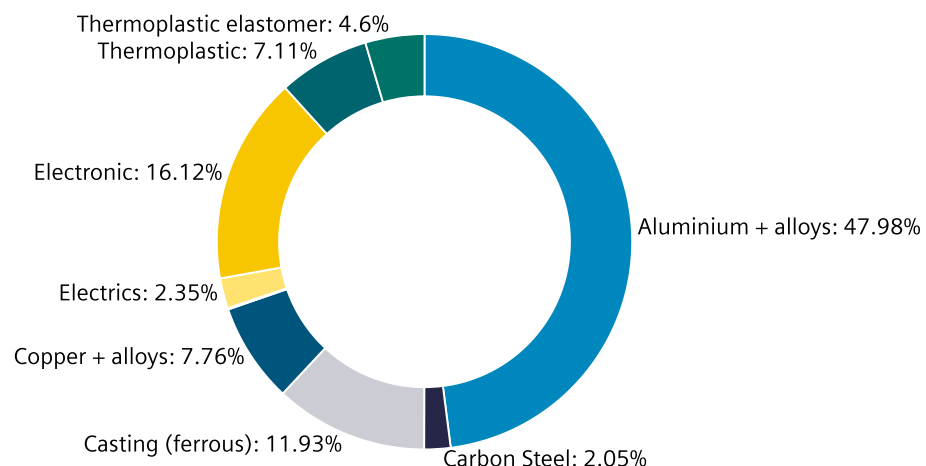
Products	Argeno 125
Represented by	1002174
Product Description	PV String inverter for commercial and industrial solar power plants according to IEC 62109-1/-2, manufactured in Neckarsulm, up to 125kVA.
Functional Unit	Assembly and use of one Argeno 125 triphase PV string inverter with a nominal PV input voltage of 620 V, a nominal AC voltage of 400 V, operating maintenance free for a reference service life of 25 years in Austria. - Max AC output current: 3 x 180.4 A - Standby power use consumption: 4.8 W - Power use consumption: 125 kW - Output rated AC power: 125 kVA - Energy efficiency: 98.7 % - Dimension: 1069 mm x 754 mm x 330 mm
Production Site	Power Inverter factory Neckarsulm, Germany

Material composition

The product weight of 82.5 kg combined with the packaging weight of 6.44 kg results in a total weight of 88.94 kg. The following chart outlines the overall material composition of the reference product, excluding packaging.

Packaging consists of: Corrugated box (average composition).

Product Weight 82.5 kg



Substance assessment

At Fronius International, we are committed to the development and production of environmentally sound and sustainably produced equipment. This includes avoiding hazardous substances in our products without compromising their benefits for our customers.

All products complies with product-related environmental regulations, like RoHS, REACH, WEEE.

System boundaries and scenarios

The EPD covers the cradle to grave of the product including the following stages.

Manufacturing stage			Distribution	Installation	Use stage							End-of-Life stage				Benefits & loads beyond system boundary
Raw materials	Transport	Production	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-Installation	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling Potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	0	0	0	0	0	0	X	0	0	X	X	X	X

Temporal and geographical scope and representativeness

Primary data of 2024; Secondary data: Green Digital Twin v.4.0, LCA Database based on MLC CUP 2024.1. The materials and components used in production are globally sourced and have been selected from Sphera data sets according to the global or regional representativeness.

Data quality

Both primary and secondary data are used. To ensure the high quality and completeness of the LCA results, primary data have been used whenever possible. The main sources for primary data are the bill of materials and the bill of processes. Site specific data are provided by manufacturer's reporting system. Datasets for resources, such as electrical energy or natural gas, are chosen from the region where the device is produced and assembled. If primary data are not available, datasets reflecting state-of-the-art manufacturing technology are considered. Generic data originating from the LCA tool: Green Digital Twin v.4.0., Database: manufacturer's LCA Database based on MLC CUP 2024.1.

Allocation

Amount of resources used and waste generated in production at Fronius International is allocated based on annual production volume. For the end-of-life allocation, the "Polluter Pays" principle is adopted as required by the PCR EPD Italy 007. Waste treatment processes are allocated to the product system that generates the waste until the end-of-waste state is reached. The environmental burdens of recycling and energy recovery processes are therefore allocated to the product system that generates the waste, while the product system that uses the exported energy and recycled materials receives it burden-free. Potential benefits and avoided loads from recovery and recycling processes are considered in separate Benefits & Loads beyond system boundary section.

Cut-off	According to EN 50693, the cut-off criteria can be set to a maximum of 5 % of the overall environmental impacts. In this LCA, stickers, labels, tape, and staples used in the packaging have been excluded as their weights are negligible below 1%.
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Scenarios:

The following information describes the scenarios in the different modules of the EPD.

Manufacturing	This stage covers the extraction of natural resources, production of raw materials, manufacturing, packaging, and upstream transportation.
Transportation to production site	Road Truck (12-14 t)
Production energy model used	German (renewable mix) is used in operations: 0.05 kg CO ₂ eq/kWh 66.07 kWh x 0.05 kg CO ₂ /kWh = 3.30 kg CO ₂ eq. Residual mix Germany; GWP = 0.7199 kg CO ₂ eq./kWh [Source: AIB]
Distribution	This stage covers the product's distribution.
Distribution: Transport model use	Truck-trailer (up to 28 t) 300 km
Installation	This stage covers the End-of-Life treatment of transport packaging.
Installation: Energy model used	Not relevant
Use	This stage covers the operational energy use. All other modules do not apply for this product. Different operating conditions can lead to deviations from the reference scenario.
Use: Energy model used and use scenario	Austria (renewable mix); 0.01457 kgCO ₂ /kWh; 67275 kWh * 0.01457 kgCO ₂ /kWh = 981 kg CO ₂ eq. Residual mix Austria is N/A [Source: AIB]. Proxy data of Austria (renewable mix) used, because no solar power mix available. RSL of 25 years, avg. local annual sunshine of 1623 h, energy efficiency of 0.987 and an output rated AC power of 125 kW.
EoL	This stage covers the disassembly, material recycling in addition to thermal treatment of all recoverable materials and the disposal of all other materials.
EoL: Transport model use	Road Truck-trailer, up to 28t gross weight 50.0 km
EoL: Energy model used	EMEA

Life cycle assessment - results

The following impact categories characterize the product's environmental footprint. They have been calculated with LCIA methodology EN15804+A2 (EF 3.1); LCA tool: Green Digital Twin (GDT), Database: manufacturer's LCA Database (based on MLC CUP 2024.1, formerly GaBi).

To ensure the high quality and completeness of the LCA results, primary data have been used whenever possible. Datasets for resources, such as electrical energy or natural gas, are chosen from the region where the device is produced and assembled. If primary data are not available, datasets reflecting state-of-the-art manufacturing technology are considered.

Environmental performance indicators

Indicators	Unit	Total - (w/o D)	A1-A3	A4	A5	B1-B7	C1-C4	D
			Manufacturing	Distribution	Installation	Use stage	End of life	Benefits & loads
CC- total	kg CO ₂ eq	1.98E+3	9.67E+2	2.98E+0	0.00E+0	9.74E+2	3.31E+1	-3.33E+2
CC- fossil	kg CO ₂ eq	1.90E+3	9.63E+2	2.92E+0	0.00E+0	9.02E+2	3.30E+1	-3.32E+2
CC- biogenic	kg CO ₂ eq	7.15E+1	2.51E+0	6.98E-3	0.00E+0	6.90E+1	1.44E-2	0.00E+0
CC- luluc	kg CO ₂ eq	4.58E+0	1.48E+0	4.91E-2	0.00E+0	3.04E+0	1.00E-2	-6.84E-1
ODP	kg CFC-11 eq	2.83E-7	1.80E-8	4.31E-13	0.00E+0	2.65E-7	3.42E-11	-2.37E-9
AP	Mole of H ⁺ eq	2.00E+1	6.35E+0	4.39E-3	0.00E+0	1.37E+1	2.26E-2	-2.64E+0
EP- freshwater	kg P eq	1.23E-1	4.23E-3	1.25E-5	0.00E+0	1.19E-1	2.56E-5	-3.87E-4
EP- marine	kg N eq	5.93E+0	8.64E-1	1.65E-3	0.00E+0	5.05E+0	9.76E-3	-3.21E-1
EP- terrestrial	Mole of N eq	5.46E+1	9.29E+0	1.95E-2	0.00E+0	4.52E+1	1.12E-1	-3.50E+0
POCP	kg NMVOC eq	1.23E+1	2.70E+0	4.37E-3	0.00E+0	9.60E+0	2.54E-2	-9.89E-1
ADP- M & M	kg Sb eq	4.87E-2	4.52E-2	2.55E-7	0.00E+0	3.47E-3	3.39E-7	-2.64E-2
ADP- fossil	MJ	1.97E+4	1.26E+4	3.85E+1	0.00E+0	7.07E+3	4.65E+1	-4.07E+3
WDP	m ³ world eq deprived water	9.93E+2	2.56E+2	4.53E-2	0.00E+0	7.34E+2	3.40E+0	-7.21E+1
PM	Disease incidences	1.90E-4	7.65E-5	4.32E-8	0.00E+0	1.13E-4	1.09E-7	-3.07E-5
IRP	kBq U235 eq	6.07E+1	3.56E+1	1.02E-2	0.00E+0	2.43E+1	7.78E-1	-4.19E+1
ETP- fw	CTUe	3.17E+4	6.86E+3	2.86E+1	0.00E+0	2.48E+4	1.89E+1	-1.15E+3
HTP- c	CTUh	1.21E-5	4.96E-7	5.77E-10	0.00E+0	1.16E-5	9.02E-10	-1.17E-7
HTP- nc	CTUh	3.93E-5	1.10E-5	2.59E-8	0.00E+0	2.82E-5	2.17E-8	-3.45E-6
SQP	dimensionless (pt)	3.66E+5	2.83E+3	1.89E+1	0.00E+0	3.63E+5	1.76E+1	-2.46E+2

CC-total: Climate change; **CC-fossil:** Climate change fossil; **CC-biogenic:** Climate change biogenic; **CC-LULUC:** Climate change land use and land use change; **ODP:** Depletion potential of the stratospheric ozone layer; **AP:** Acidification potential, accumulated exceedance; **EP-freshwater:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-marine:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-terrestrial:** Eutrophication potential, accumulated exceedance; **POCP:** Formation potential of tropospheric ozone; **ADP-M&M:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources; **WDP:** Water deprivation potential, deprivation weighted water consumption; **PM:** Particulate matter emissions; **IRP:** Ionizing radiation, human health; **ETP-fw:** Ecotoxicity freshwater; **HTP-c:** Human toxicity, cancer effects; **HTP-nc:** Human toxicity, non-cancer effects; **SQP:** Land use related impacts / soil quality

Resource use indicators and biogenic carbon content

Indicators	Unit	Total - (w/o D)	A1-A3	A4	A5	B1-B7	C1-C4	D
			Manufacturing	Distribution	Installation	Use stage	End of life	Benefits & loads
PERE	MJ	4.67E+5	4.46E+3	3.32E+0	0.00E+0	4.64E+5	2.31E+1	-1.74E+3
PERM	MJ	9.72E+1	9.72E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	4.67E+5	4.56E+3	3.32E+0	0.00E+0	4.64E+5	2.31E+1	-1.74E+3
PENRE	MJ	1.57E+4	1.26E+4	3.85E+1	0.00E+0	7.08E+3	4.65E+1	-4.08E+3
PENRM	MJ	2.71E+1	2.78E+2	0.00E+0	0.00E+0	0.00E+0	-2.51E+2	0.00E+0
PENRT	MJ	1.57E+4	1.29E+4	3.85E+1	0.00E+0	7.08E+3	-2.04E+2	-4.08E+3
SM	kg	9.33E+0	9.33E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	m3	2.55E+2	8.36E+0	3.70E-3	0.00E+0	2.52E+2	8.73E-2	-5.00E+0
BIOGCPRODUCT	kg of C	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
BIOGCPACKAGING	kg of C	2.81E+0	2.81E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

PERE: Use of renewable primary energy; **PERM:** Use of renewable primary energy resources used as raw material; **PERT:** Total use of renewable primary energy resources; **PENRE:** Use of non-renewable primary energy; **PENRM:** Use of non-renewable primary energy resources used as raw material; **PENRT:** Total use of non-renewable primary energy resources; **SM:** Use of secondary materials; **RSF:** Use of renewable secondary fuels; **NRSF:** Use of non-renewable secondary fuels; **FW:** Use of net fresh water; **BIOGCPRODUCT:** Biogenic carbon content of the Product; **BIOGCPACKAGING:** Biogenic carbon content of the Packaging

End-of-Life - Waste and output flows

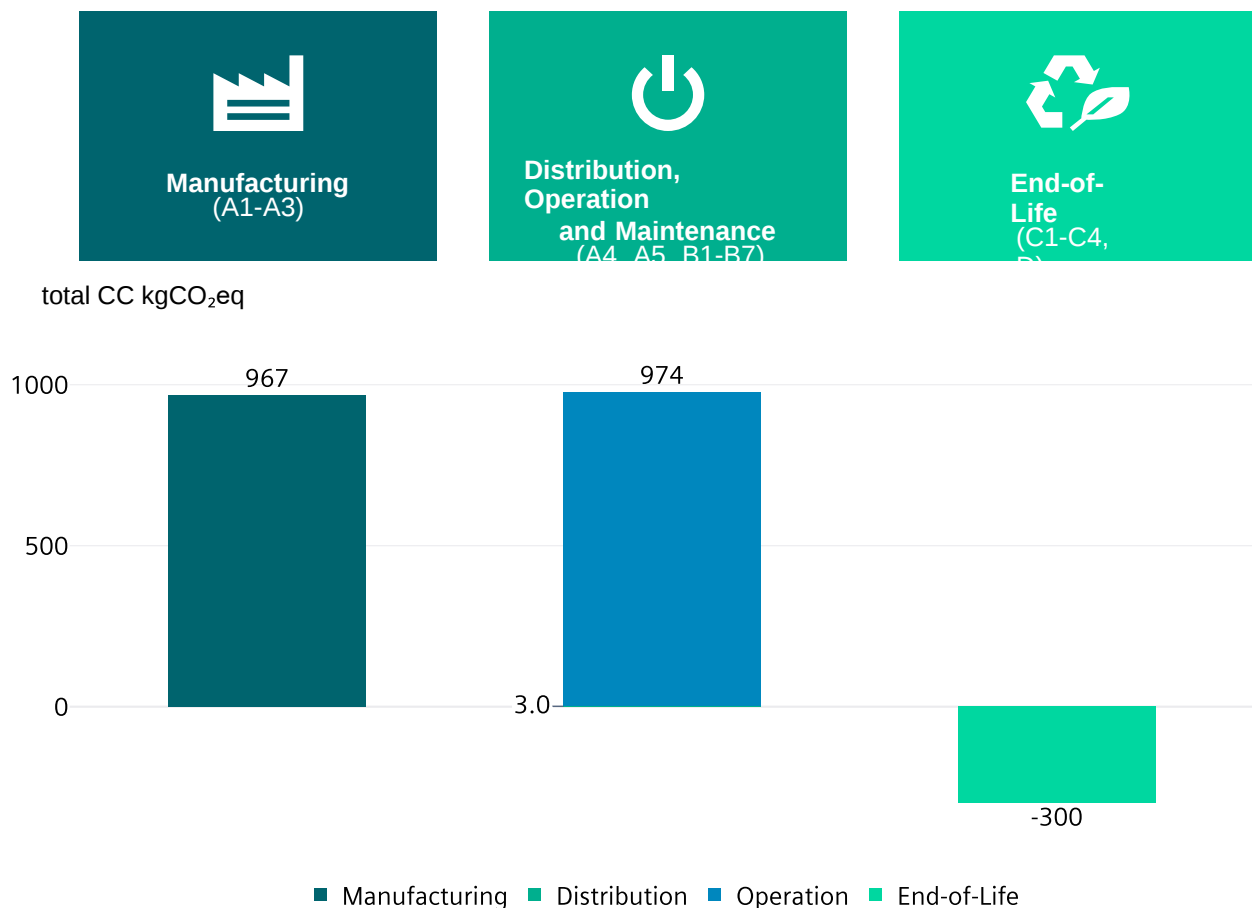
Indicators	Unit	Total - (w/o D)	A1-A3	A4	A5	B1-B7	C1-C4	D
			Manufacturing	Distribution	Installation	Use stage	End of life	Benefits & loads
HWD	kg	7.94E-4	3.56E-4	1.47E-9	0.00E+0	4.44E-4	4.54E-8	-6.10E-6
NHWD	kg	1.31E+2	7.04E+1	6.29E-3	0.00E+0	1.33E+2	1.44E+1	-8.67E+1
RWD	kg	2.63E-1	3.08E-1	7.01E-5	0.00E+0	1.76E-1	4.77E-3	-2.26E-1
MER	kg	1.22E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.22E+1	0.00E+0
MFR	kg	4.91E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.91E+1	0.00E+0
CRU	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
ETE	MJ	9.81E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.08E+1	1.73E+1
EEE	MJ	5.50E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.53E+1	9.72E+0

HWD: Hazardous waste disposed; **NHWD:** Non-hazardous waste disposed; **RWD:** Radioactive waste disposed; **MER:** Materials for energy recovery; **MFR:** Material for recycling; **CRU:** Components for reuse; **ETE:** Exported thermal energy; **EEE:** Exported electric energy.

Additional environmental information

Climate change

This chart shows the overall impact of the product on climate change – total. This chart shows the overall impact of the product on climate change – total. The operations phase is the lifecycle phase with the biggest overall impact of the maintenance free reference product. Different operating conditions can lead to deviations from the reference scenario.



End-of-Life results

The end-of-life stage was modelled by using state of the art processes, including sorting and material separation. The end-of-life parameters are calculated according to IEC TR 62635 and EN 45555.



It leads to:

- **an overall product recyclability of up to 75%** mainly due to metal content
- **an energy recoverability of up to 17%** from plastic materials
- **a minimum disposal rate of 8%**

The exact final values depend on the used recycling process and add up to 100%.

Note: The device should not be disposed of as unsorted municipal waste. Special treatment for specific components may be mandated by law or recommended for environmental reasons. Observe all local and applicable laws.

References

ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14040/44	Lifecycle Assessment – Principles and framework
EN 50693	Product category rules for life cycle assessments of electronic and electrical products and systems
EPDItaly007	Core PCR EN 50693 – ELECTRONIC AND ELECTRICAL PRODUCTS AND SYSTEMS, REV. 3
EPDItaly032	Sub PCR EN50693 – Power Inverters, REV.0 – 22/12/2022
EN15804	Sustainability of construction works – Environmental product declarations –Core rules for the product category of construction products; EN 15804:2012+A2:2019
GPI - EPDNorge	General Programme Instructions 2024.09.18 version 4
GPI EPDItaly	REGULATIONS OF THE EPDItaly PROGRAMME RED.6.0 - 30/10/2023

Verification of EPD

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNor- way's procedures and guidelines for verification and approval of EPD tools.

The declaration is created using the EPD tool GreenDigitalTwin developed by Siemens AG. The EPD tool is integrated in the company's management system and has been approved by EPD Norway.

Third party verifier:

Elisabet Amat, Greenize Projects, Spain



The GreenDigitalTwin is under regular surveillance by TÜV Rheinland®. In accordance with the standards ISO 14040:2006 + A1:2020 /ISO 14044:2006 + A1:2018 + A2:2020 the reviewer concludes that the LCA methodology developed by Siemens AG is scientifically based and reflects the state of the art.



Program operator and publisher

The Norwegian EPD foundation
P.O.Box 5250 Majorstuen
0303 Oslo, Norway



Owner of the Declaration

Fronius International GmbH
Froniusstrasse 1
4643 Pettenbach
Austria

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Froniusstrasse 1
4643 Pettenbach
Austria

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