



EPD

Environmental Product Declaration

Medium-voltage gas-insulated switchgear PrimeGear ZX0
Incoming/outgoing feeder IF 24 kV 1250 A



Reference production site: Brno, Czech Republic



DOCUMENT KIND Environmental Product Declaration	IN COMPLIANCE WITH ISO 14025 and EN 50693			
PROGRAM OPERATOR The Norwegian EPD Foundation	PUBLISHER The Norwegian EPD Foundation			
REGISTRATION NUMBER OF THE PROGRAM OPERATOR NEPD-4770-4018-EN	ISSUE DATE 2023-08-01			
VALID TO 2028-08-01	STATUS Approved	SECURITY LEVEL Public		
OWNING ORGANIZATION ABB Switzerland Ltd, Group Technology Management	ABB DOCUMENT ID 3XAA014789	REV. A	LANG. EN	PAGE 1/14

© Copyright 2023 ABB. All rights reserved.

ver-140823

EPD Owner	ABB Switzerland Ltd, Group Technology Management		
Organization No.	CHE-101.538.426		
Manufacturer name and address	ABB, s.r.o Václavská 100, Brno, Czech republic		
Company contact	Seila Rodriguez Vilches – seila.rodriguez-vilches@ch.abb.com Sustainability Product Manager		
Program operator	The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway phone: +47 23 08 80 00, email: post@epd-norge.no		
Declared product	PrimeGear ZX0 IF 24 kV 1250 A		
Product description	The PrimeGear ZX0 is a gas-insulated switchgear for the single busbar system which is used to distribute electric power in a variety of demanding applications such as energy supply for public utilities, steel work factories, automobile industry, airports, harbors, or railways.		
Functional unit	The functional unit of this study is to distribute, protect, and control the electricity in a power distribution network, with a nominal voltage of 24 kV, use rate of 100 %, and load rate of 35 %, during a service life of 20 years.		
Reference flow	The reference flow is a single SF6 gas-insulated switchgear device including related accessories and packaging.		
CPC code	46211 - Electrical apparatus for switching or protecting electrical circuits, or for making connexions to or in electrical circuits, for a voltage exceeding 1000 V		
Independent verification	Independent verification of the declaration and data, according to ISO 14025:2010 <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL Independent verifier approved by EPD-Norge: Elisabet Amat  Signature:		
Approved by	Håkon Hauan, CEO EPD-Norge  Signature:		
Reference PCR and PSR	EN 50693:2019 – Product Category Rules for Life Cycle Assessments of Electronic and Electrical Products and Systems. EPDItaly007 – Electronic and Electrical Products and Systems, Rev. 3.0, 2023/01/13. EPDItaly015 – Electronic and Electrical Products and Systems – Switchboards, Rev. 1.5, 2022/02/23.		
Program instructions	The Norwegian EPD Foundation/EPD-Norge, General Programme Instructions 2019, Version 3.0, 2019/04/24.		
LCA study	This EPD is based on the LCA study described in the LCA report 3XAA014788.		
EPD type	Specific product		
EPD scope	Cradle-to-grave		
Product RSL	20 years		
Geographical representativeness	Manufacturing (suppliers): Global	Manufacturing (ABB): Brno	Downstream: Europe
Reference year	2022		
LCA software	SimaPro 9.4.0.2 (2022)		
LCI database	Ecoinvent v3.8 (2021)		
Comparability	EPDs published within the same product category, though originating from different programs, may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible.		
Liability	The owner of the declaration shall be liable for the underlying information and evidence. EPD-Norge shall not be liable with respect to manufacturer, life cycle assessment data, and evidence.		

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	3XAA014789	A	EN	2/14

Contents

Sustainability at ABB4

General Information5

Constituent Materials6

LCA Background Information7

Inventory Analysis9

Environmental Indicators 11

Additional Environmental Information 13

References14

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	3XAA014789	A	EN	3/14



Sustainability at ABB

ABB is a leading global technology company that energizes the transformation of society and industry to achieve a more productive, sustainable future. By connecting software to its electrification, robotics, automation, and motion portfolio, ABB pushes the boundaries of technology to drive performance to new levels.

At ABB, we actively contribute to a more sustainable world, leading by example in our own operations and partnering with customers and suppliers to enable a low-carbon society, preserve resources, and promote social progress.

Learn more on our website global.abb/group/en/sustainability or scan the QR code.



STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	3XAA014789	A	EN	4/14



General Information

The product declared in this Environmental Product Declaration is the PrimeGear ZX0, including related accessories and packaging.

The PrimeGear ZX0 is a gas-insulated switchgear for the single busbar system which is used to distribute electric power in a variety of demanding applications such as energy supply for public utilities, steel work factories, automobile industry, airports, harbors, or railways. Each feeder panel consists of the gas-filled panel module, the solid insulated busbars, the cable termination compartment, the low voltage compartment and the mechanism bay. There are no gas connections between the two compartments in adjacent panels.

General technical specifications of the product are presented below.

Technical information	
	PrimeGear ZX0 Incoming/outgoing feeder IF 24kV 1250A
Rated voltage [kV]	24
Rated power frequency withstand voltage (Ud) [kV]	50
Rated lightning impulse withstand voltage (Up) [kV]	125
Rated current [A]	1250
Rated short-time withstand current (Ik) [kA]	25
Rated peak withstand current (Ip) [kA]	63
Rated duration of short-circuit (tk) [s]	3
Rated frequency (fr) [Hz]	50/60
Current sensor	KEVA_24_C22c
Voltage sensor	KECA 80 C85

The PrimeGear ZX0 is manufactured at the ABB manufacturing site in Brno, Czech. ABB Brno ELDS (Electrification Distribution Solutions) specializes in reliable, high quality technical solutions and services for medium voltage (MV). ABB ELDS Brno is a global focus feeder factory for instrument transformers, sensors and MV switchgear for primary applications.

The manufacturing site is certified according to the following standards:

- ISO 9001:2015 – Quality Management Systems
- ISO 14001:2015 – Environmental Management Systems
- ISO 45001:2018 – Occupational Health and Safety Management Systems

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	3XAA014789	A	EN	5/14

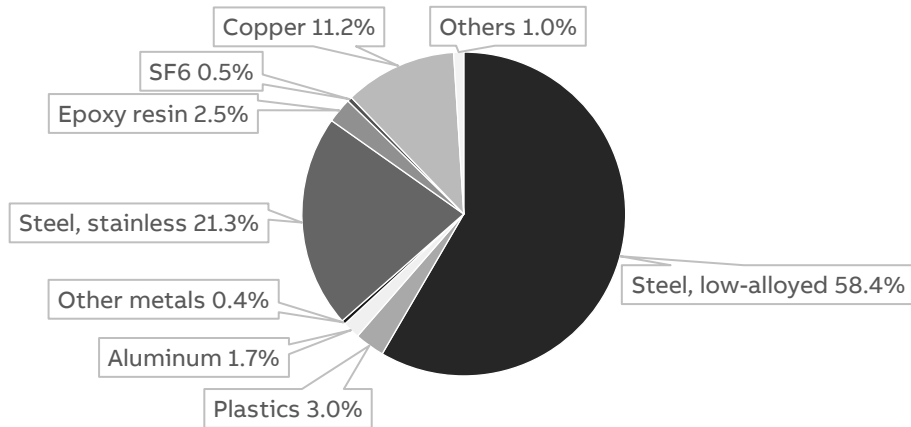


Constituent Materials

The PrimeGear ZX0 weighs 506,6 kg, and the constituent materials are presented below.

Materials	Name	Weight [kg]	Weight %
Plastics	Polycarbonate	1.9	0.4
	Polyamide	1.6	0.3
	PVC	2.0	0.4
	Other plastics	9.6	1.9
Metals	Steel, low-alloyed	295.8	58.4
	Steel, stainless	107.7	21.3
	Copper	56.8	11.2
	Aluminum	8.8	1.7
	Other metals	2.0	0.4
Other	Epoxy resin	12.8	2.5
	Ceramics	0.9	0.2
	Electronics	0.1	0.02
	SF6	2.4	0.47
	Others...	4.0	0.80
Total		506.6	100.0

PrimeGear IF 24kV 1250A



The packaging materials and accessories weighs 130,78 kg, and the constituent materials are presented below.

Description	Material	Weight [kg]	Weight %
Foil	LDPE	1.72	1.32%
Strips	PES	0.33	0.25%
Al foil + Al parts	Aluminium	0.22	0.17%
Cardboard	Paper	1.89	1.45%
Fasteners	Steel	0.76	0.58%
Wood + pallets	wood	125.86	96.24%
Total		130.78	100



LCA Background Information

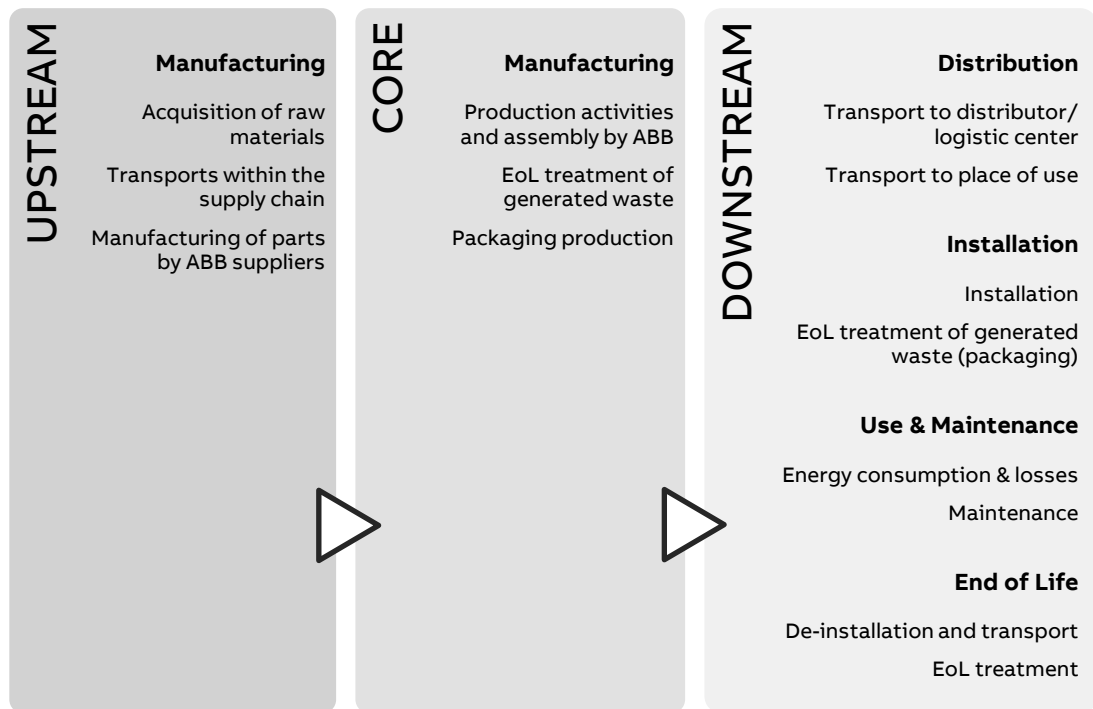
Functional Unit

The functional unit of this study is to distribute, protect, and control the electricity in a power distribution network, with a nominal voltage of 24 kV, use rate of 100 %, and load rate of 35 %, during a service life of 20 years in Europe. The reference flow is a single SF6 gas-insulated switchgear device including related accessories and packaging.

Note, the reference service life (RSL) of 20 years is a theoretical period selected for calculation purposes only – this is not representative for the minimum, average, nor actual service life of the product.

System Boundaries

The life cycle assessment of the PrimeGear ZX0, an EEPS (Electronic and Electrical Products and Systems), is a “cradle-to-grave” analysis. The figure below shows the product life cycle stages and the information considered in the LCA.



In terms of exclusions from the system boundary, according to Standard/PCR, capital goods such as machinery, tools, buildings, infrastructure, packaging for internal transports, and administrative activities, which cannot be allocated directly to the production of the reference product, are excluded.

Infrastructures, when present, such as in processes deriving from the ecoinvent database, have not been excluded. Scraps for metal working and plastic processes are also included when already defined in ecoinvent.

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	3XAA014789	A	EN	7/14

Temporal and geographical boundaries

In terms of temporal boundaries, all primary data collected from ABB are from 2022, which is considered a representative production year. Secondary data are provided by ecoinvent v3.8 which was released in 2021.

In terms of geographical boundaries, the materials and components used in the production of the PrimeGear ZX0 are globally sourced. The supply chains are often complex and can extend across multiple countries and continents. Therefore, materials and background processes with global representativeness are selected from ecoinvent. Thus, a conservative approach is adopted.

Data quality

Both primary and secondary data are used. The main sources for primary data are the bill of materials and technical drawings, while site specific foreground data are provided by ABB. Furthermore, information and data obtained from other LCA studies are also used.

For all processes for which primary data are not available, generic data originating from the ecoinvent v3.8 database, “allocation, cut-off by classification”, are used. The database Industry Data 2.0 is also used for chemical substance which is not available by ecoinvent. The LCA software used for the calculations is SimaPro 9.4.0.2.

Environmental impact indicators

The information obtained from the inventory analysis is aggregated according to the effects related to the various environmental issues. In accordance with the PCR EPDItaly015, the environmental impact indicators are determined by using the characterization factors and impact assessment methods specified in EN 15804:2012+A2:2019.

Allocation rules

The utility consumption and waste generation at the ABB manufacturing site is allocated to the production of one PrimeGear ZX0 by using allocation rules. For the final assembly of the switchgear in Brno, the factory waste and consumptions are allocated based on mass and production volume.

For the end-of-life allocation, the “Polluter Pays” principle is adopted according to what is defined in the CEN/TR 16970 standard, as required by the PCR EPDItaly015. This means, 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. However, the potential benefits and avoided loads from recovery and recycling processes are not considered because it is not required by EPDItaly015.

Cut-off criteria

According to PCR EPDItaly-015: “Materials making up the switchboard itself whose total mass does not exceed 2 % of the total weight of the device” , the cut-off criteria can be set to a maximum of 2 % of the total weight. In this LCA, stickers and grease have been excluded as their weights are negligible. Surface treatment of phosphating and mechanical plating have also been excluded due to the unavailability of data and complexity of modelling.

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	3XAA014789	A	EN	8/14



Inventory Analysis

Manufacturing stage

As presented in chapter Constituent Materials, low-alloyed steel is the most frequently used material, followed by stainless steel and copper.

Using the ecoinvent database, the steels are mainly modelled with ABB custom process: ABB_Magnelis_Metal sheet (EPD)_SMP_V3 and the Stainless steel is mainly modelled with Steel, chromium steel 18/8 [GLO] market for | Cut-off, S. To account for the production activities of metal and plastic parts, *Metal working, average* and *Injection molding* are the most frequently used processes.

Supply chain transports are added as far as data is available between ABB, the suppliers, and sub-suppliers. Only primary suppliers are considered. The rest of the transports are assumed to already be included in ecoinvent's "market for"-processes.

For the ABB manufacturing site, which is considered in the core manufacturing stage, utility consumption and waste generation are allocated to the production of one PrimeGear ZX0 according to the defined allocation rules. The packaging materials and accessories associated with the product are also considered in the core manufacturing stage.

Distribution

The transport distance from ABB's plant to the site of installation is assumed to be 300 km intracontinental transport by lorry, as suggested in EN 50693, and the scenario is representative for Europe.

Installation

The installation phase mainly implies manual activities, and negligible amounts of energy is consumed. Therefore, this phase only considers the end-of-life of the packaging materials used.

The end-of-life scenario for packaging materials is based on *Packaging waste by waste management operations* by Eurostat (2020), which is representative for Europe. A transport distance of 100 km by lorry is assumed as actual location of disposal is unknown.

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	3XAA014789	A	EN	9/14

Use

The use stage considers the power losses and SF₆ losses over the reference service life of 20 years as defined in the functional unit. This is calculated using the following formula, according to PCR EPDIItaly015:

$$E_{use}[kWh] = \frac{P_{use} * 8760 * RSL * \alpha}{1000} = \frac{30.2 \text{ W} * 8760 \text{ hours} * 20 \text{ years} * 100 \%}{1000} = 5291.7 \text{ kWh}$$

Where:

- E_{use} = Total energy use over the reference service life
- P_{use} = Reference power consumption in watts
- RSL = Reference Service Life in years
- α = Use time rate
- 8760 is the number of hours in a year
- 1000 is the conversion factor from W to kW

Because this product is sold globally and is not limited to any specific country, the latest energy mix of the European Union is adopted as suggested by the standard EN 50693. The emission factor of the energy mix is presented below.

Energy mix	Source	Amount	Unit
Electricity, medium voltage {Europe without Switzerland} market group for Cut-off, S	Ecoinvent v3.8	0.4	kg CO ₂ -eq/kWh

The SF₆ leakage over the reference service life are assumed to be 0.1% per year of the total gas masses according to IEC 62271-1, clause 6.16.4.

The maintenance happens during the use phase, from the environmental impacts point of view can be omitted from the analysis due to the fact, negligible energy is consumed.

End of life

Decommissioning of the product only implies manual activities, and no energy is consumed. Therefore, this phase only considers the end-of-life of the product.

The end-of-life scenario for the product is based on IEC/TR 62635 (Annex D.3), which is representative for Europe. A conservative approach is adopted by using the rates given for materials that go through a separation process, except for electronics for which selective treatment is assumed, and this includes the losses in the separation processes. A transport distance of 100 km by lorry is assumed as actual location of disposal is unknown.

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	3XAA014789	A	EN	10/14



Environmental Indicators

PrimeGear ZX0 Incoming/outgoing feeder IF 24kV 1250A

Impact category	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use and maintenance	End-of-life
GWP – total	kg CO ₂ eq.	7.18E+03	3.10E+03	5.18E+02	3.19E+01	6.52E+01	3.39E+03	6.91E+01
GWP – fossil	kg CO ₂ eq.	7.12E+03	3.05E+03	6.53E+02	3.19E+01	5.55E+00	3.32E+03	5.20E+01
GWP – bio-genic	kg CO ₂ eq.	-3.03E+01	4.60E+01	-2.21E+02	2.89E-02	5.97E+01	6.76E+01	1.70E+01
GWP – luluc	kg CO ₂ eq.	9.34E+01	2.96E+00	8.54E+01	1.26E-02	1.76E-03	4.89E+00	6.05E-02
ODP	kg CFC-11 eq.	3.96E-04	1.91E-04	8.95E-05	7.44E-06	7.19E-07	1.03E-04	4.39E-06
AP	mol H ⁺ eq.	6.55E+01	5.17E+01	2.19E+00	1.61E-01	2.25E-02	1.12E+01	2.58E-01
EP – freshwa-ter	kg P eq.	6.07E+00	3.93E+00	4.29E-02	2.07E-03	5.47E-04	2.07E+00	1.75E-02
EP – marine	kg N eq.	8.80E+00	4.09E+00	2.60E+00	5.56E-02	2.67E-02	1.93E+00	1.01E-01
EP – terres-trial	mol N eq.	8.13E+01	5.01E+01	1.30E+01	6.08E-01	9.20E-02	1.68E+01	6.59E-01
POCP	kg NMVOC eq.	2.54E+01	1.47E+01	5.72E+00	1.73E-01	2.64E-02	4.60E+00	1.80E-01
ADP – miner-als and metals	kg Sb eq.	1.08E+00	1.07E+00	1.55E-03	1.12E-04	1.25E-05	4.87E-03	7.51E-04
ADP – fossil	MJ, net calo-rific value	8.31E+04	2.90E+04	8.79E+03	4.86E+02	5.27E+01	4.41E+04	6.01E+02
WDP	m ³ eq.	1.77E+03	1.19E+03	8.56E+01	1.46E+00	2.73E-01	4.80E+02	7.12E+00

GWP-fossil: Global Warming Potential fossil; GWP-biogenic: Global Warming Potential biogenic; GWP-luluc: Global Warming Potential land use and land use change; ODP: Depletion potential of the stratospheric ozone layer; AP: Acidification potential; EP-freshwater: Eutrophication potential-freshwater compartment; EP-marine: Eutrophication potential-marine compartment; EP-terrestrial: Eutrophication potential-accumulated exceedance; POCP: Formation potential of tropospheric ozone; ADP-minerals & metals: Abiotic Depletion for non-fossil resources potential; ADP-fossil: Abiotic Depletion for fossil resources potential; WDP: Water deprivation potential.

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	3XAA014789	A	EN	11/14

ENVIRONMENTAL PRODUCT DECLARATION

Resource use parameters	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use and maintenance	End-of-life
PENRE	MJ, low cal. value	9.13E+04	3.21E+04	8.73E+03	5.67E+03	5.27E+01	4.41E+04	6.01E+02
PERE	MJ, low cal. value	1.81E+04	4.60E+03	5.70E+03	7.99E+01	9.51E-01	7.62E+03	5.67E+01
PENRM	MJ, low cal. value	6.40E+02	4.84E+02	1.56E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ, low cal. value	2.08E+03	0.00E+00	2.08E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ, low cal. value	8.68E+04	3.26E+04	8.88E+03	4.86E+02	5.27E+01	4.41E+04	6.01E+02
PERT	MJ, low cal. value	2.01E+04	4.60E+03	7.78E+03	6.85E+00	9.51E-01	7.62E+03	5.67E+01
FW	m ³	7.25E+01	3.21E+01	3.13E+00	5.42E-02	1.07E-02	3.68E+01	2.99E-01
MS	kg	1.39E+02	1.28E+02	1.13E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

PENRE: Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material; PERE: Use of renewable primary energy excluding renewable primary energy resources used as raw material; PENRM: Use of non-renewable primary energy resources used as raw material; PERM: Use of renewable primary energy resources used as raw material; PENRT: Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials); PERT: Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials); FW: Net use of fresh water; MS: Use of secondary materials; RFS: Use of renewable secondary fuels; NRSF: Use of non-renewable secondary fuels.

Waste production indicators	Unit	Total	UPSTREAM	CORE	DOWNSTREAM			
			Manufacturing		Distribution	Installation	Use and maintenance	End-of-life
HWD	kg	2.79E-01	2.46E-01	1.48E-02	1.27E-03	1.22E-04	1.57E-02	9.66E-04
NHWD	kg	1.63E+03	1.21E+03	1.09E+02	2.50E+01	5.13E+01	1.46E+02	8.66E+01
RWD	kg	4.66E-01	1.20E-01	1.65E-02	3.29E-03	3.14E-04	3.24E-01	2.79E-03
MER	kg	6.95E+01	0.00E+00	3.02E+01	0.00E+00	3.78E+01	0.00E+00	1.43E+00
MFR	kg	7.33E+02	5.20E+01	1.99E+02	0.00E+00	4.37E+01	0.00E+00	4.38E+02
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ETE	MJ	3.21E+02	0.00E+00	1.56E+02	0.00E+00	1.56E+02	0.00E+00	8.61E+00
EEE	MJ	1.71E+02	0.00E+00	7.90E+01	0.00E+00	8.69E+01	0.00E+00	4.79E+00

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 electricity energy.

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	3XAA014789	A	EN	12/14



Additional Environmental Information

Recyclability potential

The recyclability potential of the PrimeGear ZX0 is calculated by dividing “MFR: material for recycling” in the end-of-life stage by the total weight of the product. As a result, the recyclability potential of the product is 86%:

Greenhouse gas emissions from the use of electricity in the manufacturing phase

Production mix from import, medium voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process.

Electricity	Source	Amount	Unit
ABB_Electricity mix Brno factory {CZ}_Biomass100%(Crude Palm Oil)_2022 S_SMP_V1	Ecoinvent v3.8	0.51	kg CO ₂ -eq/kWh

Dangerous substances

The product contains no substances given by the REACH Candidate list.

Indoor environment

The product meets the requirements for low emissions.

Carbon footprint

Carbon footprint has not been worked out for the product.

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	3XAA014789	A	EN	13/14



References

- Huang, W. (2023). *PrimeGear ZX0 Incoming/outgoing feeder IF 24kV 1250A: Life Cycle Assessment* (Report No. 3XAA014788, rev. A). ABB Switzerland Ltd, Group Technology Management
- ecoinvent. ecoinvent v.3.8 (2021). <https://ecoinvent.org/the-ecoinvent-database/data-releases/ecoinvent-3-8/>
- European Committee for Standardization. (2019). *Product category rules for life cycle assessments of electronic and electrical products and systems* (EN 50693:2019).
- European Committee for Standardization. (2019). *Sustainability of constructions - Environmental product declarations* (EN 15804:2012+A2:2019).
- Eurostat. (2020). *Packaging waste by waste management operations*. https://ec.europa.eu/eurostat/data-browser/view/ENV_WASPAC/default/table?lang=en
- ICMQ S.p.A. (2023). *PCR EPDItaly007-Electronic and electrical products and systems*, rev. 3.0 (2023-01-13). EPDItaly. <https://www.epditaly.it/en/view-pcr/>
- ICMQ S.p.A. (2020a). *PCR EPDItaly015 - Electronic and electrical products and systems - switchboard*, rev.1.5 (2020-09-24). EPDItaly. <https://www.epditaly.it/en/view-pcr/>
- ICMQ S.p.A (2020b). *Regulations of the EPDItaly Programme Regulations*, rev. 5.2 (2020-02-16). EPDItaly. https://www.epditaly.it/en/wp-content/uploads/2016/12/EPDITALY-Regulament_rev-5.2_EN.pdf
- International Electrotechnical Commission. (2012). *Guidelines for end-of-life information provided by manufacturers and recyclers and for recyclability rate calculation of electrical and electronic equipment*, Edition 1.0 (2012-10-1) (IEC/TR 62635).
- International Organization for Standardisation. (2006). *Environmental management - Life cycle assessment - Principles and framework* (ISO Standard No. 14040:2006). <https://www.iso.org/standard/37456.html>
- International Organization for Standardisation. (2006). *Environmental management - Life cycle assessment - Requirements and guidelines* (ISO Standard No. 14044:2006). <https://www.iso.org/standard/38498.html>
- PRé Sustainability. (2022). SimaPro (version 9.3.0.3) [computer software]. <https://pre-sustainability.com/solutions/tools/simapro/>
- SeaRates. (2022). *Shipping Distances & Time Calculator*. <https://www.searates.com/services/distances-time>
- The Norwegian EPD Foundation/EPD-Norge. (2019). *General Programme Instructions 2019*, Version 3.0 (2019-04-24). <https://www.epd-norge.no/getfile.php/1340010-1685100696/Dokumenter/GPI%20Det%20norske%20EPD%20programmet%20approved%20240419%20-%20ver3%20updated%20250523.pdf>
- Environmental Product Declaration. (2019). Hot dip galvanized steel with Magnelis® coating – ArcelorMittal (EPD-ARM-20170140-IBD1-EN).
- A Akdag, C. (2022). *VG4_S: Environmental Product Declaration* (report No. 3XAA008728)
ABB Switzerland Ltd, Group Technology Management
- Energy mix for ABB Dalmine site production. (2022). Certificato di annullamento di garanzie di origine doc n° F81A7EC1C43800D2E0530AA0009100D2
- Energy mix for ABB Brno site production. (2022) Cancellation Statement of Guarantees of Origin of electricity produced from renewable energy source ID: 49682563



Program Operator and publisher

The Norwegian EPD Foundation	Ph.	+47 23 08 80 00
Post Box 5250 Majorstuen, 0303 Oslo, Norway	email	post@epd-norge.no
	web	www.epd-norge.no

Owner of the declaration



ABB Switzerland Ltd, Group Technology Management		
Brown Boveri Straße 6, 5400 Baden, Switzerland	web	www.abb.com

Author



Wade Huang	Ph.	+86 592 6026033
ABB (China) Ltd.	email	Wade-xiaobo.huang@cn.abb.com
No.885, FangShanXiEr Road, Xiang'an District, Xiamen, Fujian, 361001, P.R.China	web	www.abb.com

STATUS	SECURITY LEVEL	DOCUMENT ID.	REV.	LANG.	PAGE
Approved	Public	3XAA014789	A	EN	14/14