Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Copper conductors

from

ZFNM
ELECTRO CABLE GROUP

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
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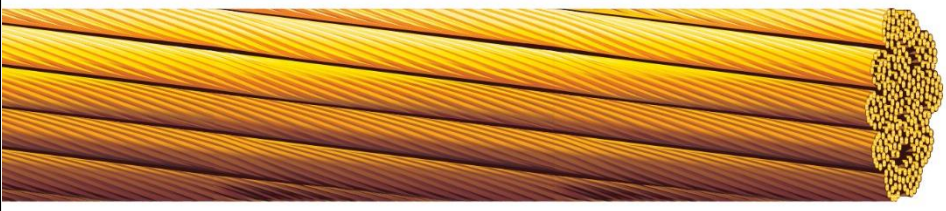
An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): *Construction Products, PCR 2019:14 Version 1.3.4 (2024-04-30)*
PCR review was conducted by: *The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact*
Life Cycle Assessment (LCA)
LCA accountability: *Bureau Veritas Latvia SIA, riga@bureauveritas.com*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: *Elisabet Amat Guasch, GREENIZE* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: Zaporozhye Factory of Non-Ferrous Metals LLC

Contact: Oleksii Skirdonov, Head of Quality Department
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Description of the organisation:
ZFNM has been in the cable and wire product market for over 30 years. During this short period, ZFNM plant has proven itself as a reliable partner and a professional in its field. Special attention is paid to the quality management - today, the quality management of ZFNM has become an enterprise management system in the full sense of the word. Customer orientation, leadership at all levels of management, involvement of personnel in the achievement of common tasks and goals, a process approach in the practical activities of the enterprise, aiming at constant improvements in the effectiveness of the quality management system, decision-making based on facts, their assessment and comprehensive analysis, and, also, the optimization of management decisions in relationships with suppliers are the principles that, in ZFNM conditions, transform the quality management system into an enterprise management system. Since 2018 ZFNM LLC has its quality management system certified in accordance to ISO 9001.

Product-related or management system-related certifications:

Company has following certified implemented Management systems and Product certificates:

- Quality management system according to ISO 9001:2015
- Copper conductor corresponds to the requirements of EN 60228:2004 - Conductors of insulated cables.
- Copper conductors are produced in accordance with DIN 48201 Part 1 “Leitungsseile. Seile aus Kupfer”

Name and location of production site(s): Ukraine, 69123, Zaporizhzhia, str. Novobudov, 9

Product information

Product name:
Copper conductors

Product description:
Copper conductors are produced in accordance with technical requirements TU U 28.7-13614181-004-2001, that are used as a proxy requirements of DIN 48201 Part 1 “Leitungsseile. Seile aus Kupfer”. Also, copper conductor corresponds to the requirements of EN 60228:2004 - Conductors of insulated cables. The cable conformed with the Low Voltage EU Directive 2014/35/EU.

Technical parameters

Resistance	According to IEC 60228, BS 7884 and DIN 48 201
Specific weight	4.2 – 8900 kg/km
Cross-section	0.5 – 1000 mm^2

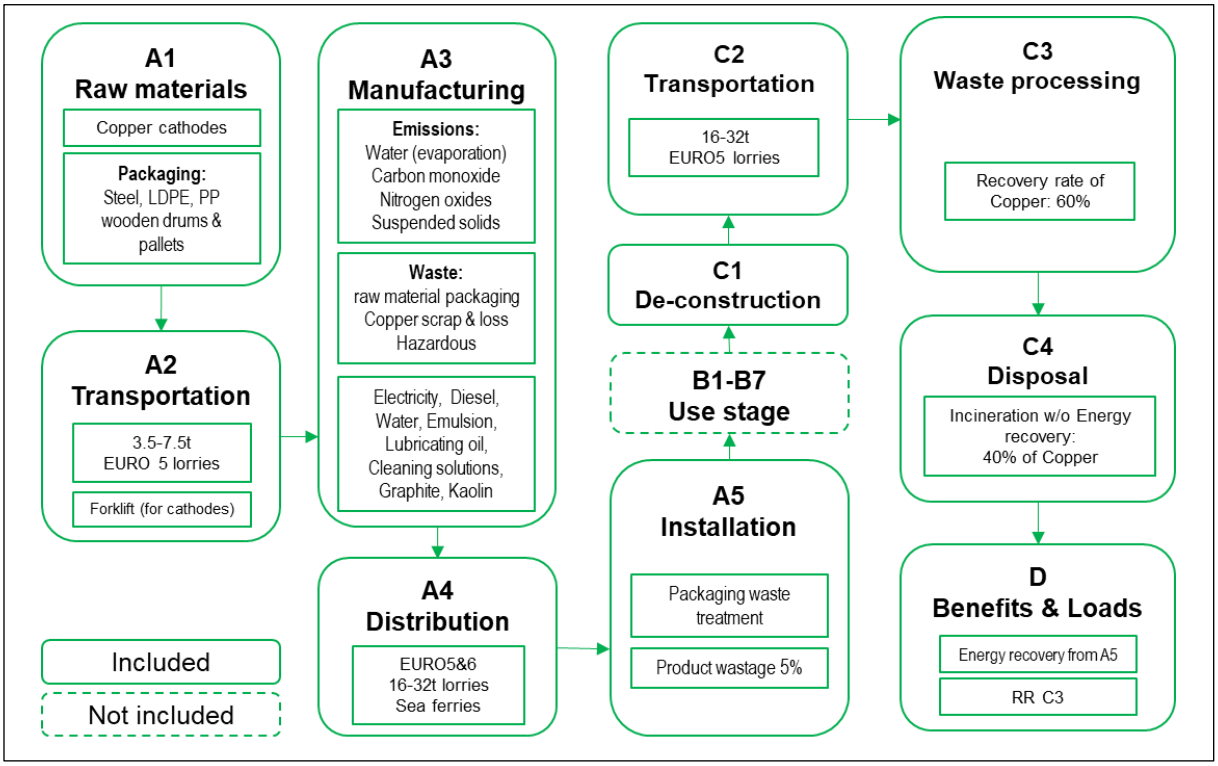
UN CPC code:
41513 – Wire of copper

Geographical scope: This EPD has European Scope.

LCA information

Declared unit: 1kg of Copper conductors
Reference service life: 30 years
Time representativeness: Data represents the manufacturing of the product in November 2022 – October 2023. The database used for proxy data is Ecoinvent v3.10. This database data is compiled in March 2024, i.e., no data is older than ten years.
Database(s) and LCA software used: Ecoinvent v3.10 has been used to conduct the quantitative evaluation in this study. This database provided the background system's life cycle inventory data for raw and processed materials. The LCA software used - SimaPro 9.6.
Description of system boundaries:
This LCA study has been performed as “Cradle to gate with options, modules C1–C4, module D and with optional modules”, also considering Transportation module A4 and Installation module A5.

System diagram:



Data quality: The foreground data has been collected internally, considering the latest available average production amounts and measurements during the time period of 2023. Data regarding waste processing has been taken from waste scenarios for closest locations in Ecoinvent v3.10. The quality level in this study is qualified as Good. Data quality rating procedure has been performed using a rating system where “1” means Excellent quality, and “5” means Poor quality.

Technological Representativeness, TeR	Geographic representativeness, GeR	Time Representativeness, TiR	Precision, P	**Average DQR**
1,4	2,6	2,0	2,3	**2,1**

Cut-off criteria:
All materials have been accounted for in the LCA according to the data provided by manufacturer. To LCA practitioner knowledge there is no missing data for processes within the system boundaries. The cut-off in LCA is according to PCR:" General cut-off criteria are given in standard EN 15804:2012+A2, clause 6.3.6. The processes related to infrastructure, construction, and production of equipment, as well as tools that are not directly consumed in the production process, have been excluded. Personnel-related activities, such as transportation to and from work, have also been excluded.

Allocation:
No allocation among products and co-products has been performed as recommended by EN 15804 and PCR 2019:14. The polluters pay, and modularity principles have been followed. Allocation of manufacturing data to the declared unit has been done by physical allocation (by means of production volumes).

Stages and Production description

Product Stage

In **module A1** extraction and processing of raw materials and generation of electricity and heat from primary energy resources, used to produce these raw materials, are included. Raw material considered for the product is Copper cathode.

For **module A2,** the transportation of raw materials and packaging to the manufacturing site, the following assumptions have been made (see Table below). For the purpose of this LCA study, due to the lack of data some packaging materials have been modelled with an assumed distance of 300km.

Vehicle	Fuel consumption, l/tkm
Tractor & trailer	0,0513
Lorry 3.5-7.5t, EURO5	0,1286

The manufacturing process (**module A3**) of the product considered in this study includes consumption of diesel for internal transportation, electricity for production and compressed air. The cleaning agent is used for equipment maintenance and emulsion is used for wire drawing, i.e., the process of acquiring smaller diameters of copper wire rod that afterwards is converted to copper conductor. In the process, lubricating oil, graphite, charcoal and kaolin is used as well. Waste treatment of product wastage and packaging of raw materials are included as well, following manufacturer declared scenarios. The list of packaging required for final products is as follows - LDPE shrink-film and stretch-film, wooden drums and pallets, PP straps and labels, steel straps, clamps and clips.

According to data provided by ZFNM, consumed Electricity is not backed up by Guarantees of Origin (GO). Therefore, GWP-GHG of electricity represents only national grid mix in Ukraine, resulting in 0.516 $kgCO_2eq$ per kWh.

Construction process Stage

Module A4 distribution represents Europe and United Kingdom. The process itself involves the use of 16-32t EURO5 and EURO6 Freight lorries, with some destinations requiring also the use of Sea ferries. Scenarios of module A4 for the considered product are described in the Table below. The transportation impacts cover fuel direct exhaust emissions, environmental impacts of fuel production and are also related to infrastructure emissions. Without knowledge on specific EURO emission standard, a fair 50/50 split has been considered for road transportation mode, representing EURO5 and EURO6 lorries.

Vehicle	Average weighted distance, km	Fuel consumption, l/tkm
Lorry 16-32t, EURO6	1374	0,0431
Lorry 16-32t, EURO5	1374	0,0441
Sea Ferry	64	0,0298

Module A5 in this type of LCA study is optional but for the purpose of declaring product wastage and waste treatment of product's packaging it has been declared as well.

Assumption on Waste treatment scenarios for product packaging and product wastage are made in accordance with EN 50693:2019 and activities considered in ecoinvent EU-27 municipal waste treatment dataset:

Material	Waste treatment	Shares of respective treatments
Metal straps, clamps, clips etc.	Recycling	78%
	Incineration (energy recovery)	(1-0,78)*52.8%
	Disposal (landfill)	(1-0,78)*47.2%
Plastic straps, labels and films	Recycling	41%
	Incineration (energy recovery)	(1-0,41)*52.8%
	Disposal (landfill)	(1-0,41)*47.2%
Wooden drums and pallets	Incineration (energy recovery)	100%
Copper (product wastage)	Recycling	60%
	Disposal (incineration)	40%

Product wastage at the construction site commonly should be estimated based on information from the manufacturer and information of relevance to the intended market. Since no estimate is available due to the lack of data, product wastage has been considered as **5%** of the product weight.

Consumption of electricity has not been considered in module A5 due to lack of data and various ways for the product to be applied.

Use Stage:

Modules B1-B7, that define use stage of the product, are not declared for this study – these are not mandatory for LCA "Cradle-to-gate with options" form and since the energy loss in the Use stage depends on the cross-section of the product, i.e., resistance per unit of length, no assumption can be made on cross-section with chosen definition of the declared unit.

End of Life Stage:

Modules C1-C4 and Module D are mandatory for LCA type considered, therefore, have also been considered for the purpose of this study.

For the purpose of declaring **module C1**, consumption of energy and resources as well as the impacts of demolition are assumed to be negligible.

Product is assumed to be sent (**module C2**) to the closest waste treatment facilities, assuming conservative distance between sites as 100km that is covered by 16-32t EURO5 Freight lorry.

Waste processing, **module C3**, considers end-of-waste state, therefore, assuming Waste electric and electronic equipment shredding activity, therefore, declaring additional burden of energy and resources consumed during this process. According to the Annex D of PEP-PCR–ed4-EN-2021 09 06 that represents Recovery, Energy recovery and Disposal rates to be applied in case of the lack of specific data, and that is based on End-of-Life scenarios from EN 50693:2019 "Product category rules for life cycle assessments of electronic and electrical products and systems", Copper recovery rate (R2) is 60%, considering remaining share of 40% to be disposed of in **module C4**.

Disposal, considering previously described scenarios, has been assumed to be conducted via municipal incineration **without** energy recovery, therefore, allocating impact of these activities in **module C4**.

Benefits and loads beyond the system boundaries:

Module D considers the benefit of recovered energy from incineration of plastic mixture and wood, i.e., respective shares of the product packaging waste flows declared in Installation module A5, and material recovery rate (R2) of Copper conductor share (60%) from module C3.

Net Energy generated from Incineration activities has been considered as follows – residual mix of "Europe without Switzerland" for Electric energy (3.93 MJ/kg for plastic, 1.74 MJ/kg for wood) and district/industrial heat from Natural gas for thermal energy (7.67 MJ/kg for plastic, 3.50 MJ/kg for wood).

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
Geography	EU	EU	UA	EU	EU	MND	MND	MND	MND	MND	MND	MND	EU	EU	EU	EU	EU
Specific data used	6%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Copper	1,00	19.71%	0,0% and 0 kg C/kg
TOTAL	**1,00**	**19.71%**	**0,0% and 0 kg C/kg**
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Steel straps and clips	<0,01	0,004%	0,00
Polypropylene straps and labels	<0,01	0,004%	0,00
LDPE film	<0,01	0,01%	0,00
Wooden pallets	<0,01	0,71%	0,50
Wooden drums	0,07	7,41%	0,50
TOTAL	**0,08**	**8,14%**	**0,499**

During the life cycle of the product any hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has not been used in a percentage higher than 0,1% of the weight of the product.

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.
Usage of results from A1-A3 without considering the results of module C is not encouraged.

Mandatory impact category indicators according to EN 15804 (EF 3.1 reference package)

Results per declared unit – 1 kg of Copper conductor									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	6,67E+00	4,61E-01	3,58E-01	0,00E+00	1,54E-02	1,07E-03	4,66E-03	-1,57E+00
GWP-biogenic	kg CO_2 eq.	2,27E-02	2,12E-05	1,14E-03	0,00E+00	6,93E-07	5,70E-07	5,53E-06	-3,49E-03
GWP-luluc	kg CO_2 eq.	9,64E-03	1,42E-05	4,83E-04	0,00E+00	4,52E-07	1,18E-06	1,38E-07	-2,84E-03
GWP-total	kg CO_2 eq.	6,70E+00	4,61E-01	3,59E-01	0,00E+00	1,54E-02	1,07E-03	4,67E-03	-1,57E+00
ODP	kg CFC 11 eq.	1,69E-07	6,43E-09	8,77E-09	0,00E+00	2,07E-10	6,07E-12	9,83E-11	-1,63E-08
AP	mol H^+ eq.	5,59E-01	1,17E-03	2,80E-02	0,00E+00	4,19E-05	5,32E-06	3,19E-05	-1,80E-01
EP-freshwater	kg P eq.	2,43E-03	1,11E-06	1,21E-04	0,00E+00	3,82E-08	4,58E-08	6,82E-09	-8,37E-04
EP-marine	kg N eq.	2,59E-02	3,51E-04	1,32E-03	0,00E+00	1,52E-05	1,10E-06	1,48E-05	-8,12E-03
EP-terrestrial	mol N eq.	3,79E-01	3,86E-03	1,92E-02	0,00E+00	1,67E-04	1,22E-05	1,63E-04	-1,23E-01
POCP	kg NMVOC eq.	1,07E-01	1,60E-03	5,44E-03	0,00E+00	6,25E-05	3,57E-06	4,94E-05	-3,38E-02
ADP-minerals&metals *	kg Sb eq.	7,24E-03	2,69E-08	3,62E-04	0,00E+00	9,16E-10	2,75E-11	1,92E-10	-2,38E-03
ADP-fossil*	MJ	8,83E+01	6,15E+00	4,73E+00	0,00E+00	2,06E-01	1,30E-02	6,25E-02	-2,11E+01
WDP*	m^3	8,21E+00	5,57E-03	4,11E-01	0,00E+00	1,90E-04	1,46E-04	9,88E-05	-2,63E+00
Acronyms		GWP-fossil = Global Warming Potential fossil fuels; 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, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption							

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Additional mandatory and voluntary impact category indicators

Results per declared unit – 1 kg of Copper conductor									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	6,70E+00	4,61E-01	3,59E-01	0,00E+00	1,54E-02	1,07E-03	4,67E-03	-1,57E+00
EP-freshwater	kg PO_4^{3-} eq.	7,35E-03	3,37E-06	3,68E-04	0,00E+00	1,16E-07	1,39E-07	2,07E-08	-2,54E-03
Additional voluntary indicators e.g., the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017									

Resource use indicators

Results per declared unit – 1 kg of Copper conductor									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2,06E+01	9,07E-03	1,03E+00	0,00E+00	3,04E-04	1,43E-03	2,01E-04	-6,80E+00
PERM	MJ	3,77E+00	8,24E-04	1,89E-01	0,00E+00	2,72E-05	8,49E-05	2,93E-05	-1,23E-01
PERT	MJ	2,44E+01	9,89E-03	1,22E+00	0,00E+00	3,31E-04	1,52E-03	2,30E-04	-6,92E+00
PENRE	MJ	8,83E+01	6,15E+00	4,73E+00	0,00E+00	2,06E-01	1,30E-02	6,25E-02	-2,11E+01
PENRM	MJ	4,66E-03	4,74E-06	2,34E-04	0,00E+00	5,97E-08	2,53E-08	4,07E-08	-1,23E-03
PENRT	MJ	8,83E+01	6,15E+00	4,73E+00	0,00E+00	2,06E-01	1,30E-02	6,25E-02	-2,11E+01
SM	kg	1,97E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,03E-01
RSF	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
NRSF	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
FW	m^3	2,01E-01	2,17E-04	1,01E-02	0,00E+00	6,93E-06	4,86E-06	3,82E-06	-6,45E-02
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Waste indicators

Results per declared unit – 1 kg of Copper conductor									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	5,26E-03	4,20E-05	2,65E-04	0,00E+00	1,41E-06	2,27E-08	4,02E-07	-9,54E-05
Non-hazardous waste disposed	kg	3,23E-01	2,51E-04	1,64E-02	0,00E+00	8,56E-06	5,32E-06	7,84E-06	-1,06E-01
Radioactive waste disposed	kg	2,57E-04	2,20E-07	1,29E-05	0,00E+00	7,42E-09	2,46E-08	5,87E-09	-5,70E-05

Output flow indicators

Results per declared unit – 1 kg of Copper conductor									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**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	0,00E+00
Material for recycling	kg	8,04E-04	0,00E+00	1,03E-04	0,00E+00	0,00E+00	6,00E-01	0,00E+00	0,00E+00
Materials for energy recovery	kg	3,16E-04	0,00E+00	8,13E-02	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
Exported energy, thermal	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

Other environmental performance indicators

Results per declared unit – 1 kg of Copper conductor									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PM Particulate matter emissions	Disease inc.	1,20E-06	2,89E-08	6,17E-08	0,00E+00	1,03E-09	5,74E-11	1,08E-09	-3,45E-07
IRP Ionising radiation, human health	kBq U-235 eq.	3,91E-01	4,24E-04	1,96E-02	0,00E+00	1,43E-05	4,07E-05	8,62E-06	-9,28E-02
ETP-fw Ecotoxicity, freshwater	CTUe	6,35E+02	3,99E-01	3,18E+01	0,00E+00	1,36E-02	2,05E-03	2,78E-03	-2,22E+02
HTP-c Human toxicity, cancer effects	CTUh	7,49E-08	3,79E-11	3,75E-09	0,00E+00	1,29E-12	2,15E-13	2,34E-12	-2,31E-08
HTP-nc Human toxicity, non-cancer effects	CTUh	5,86E-06	3,01E-09	2,93E-07	0,00E+00	1,02E-10	4,88E-12	2,89E-11	-1,82E-06
SQP Potential Soil quality index	dimensionless	1,69E+02	2,46E-02	8,44E+00	0,00E+00	8,43E-04	1,20E-03	5,51E-02	-4,80E+01

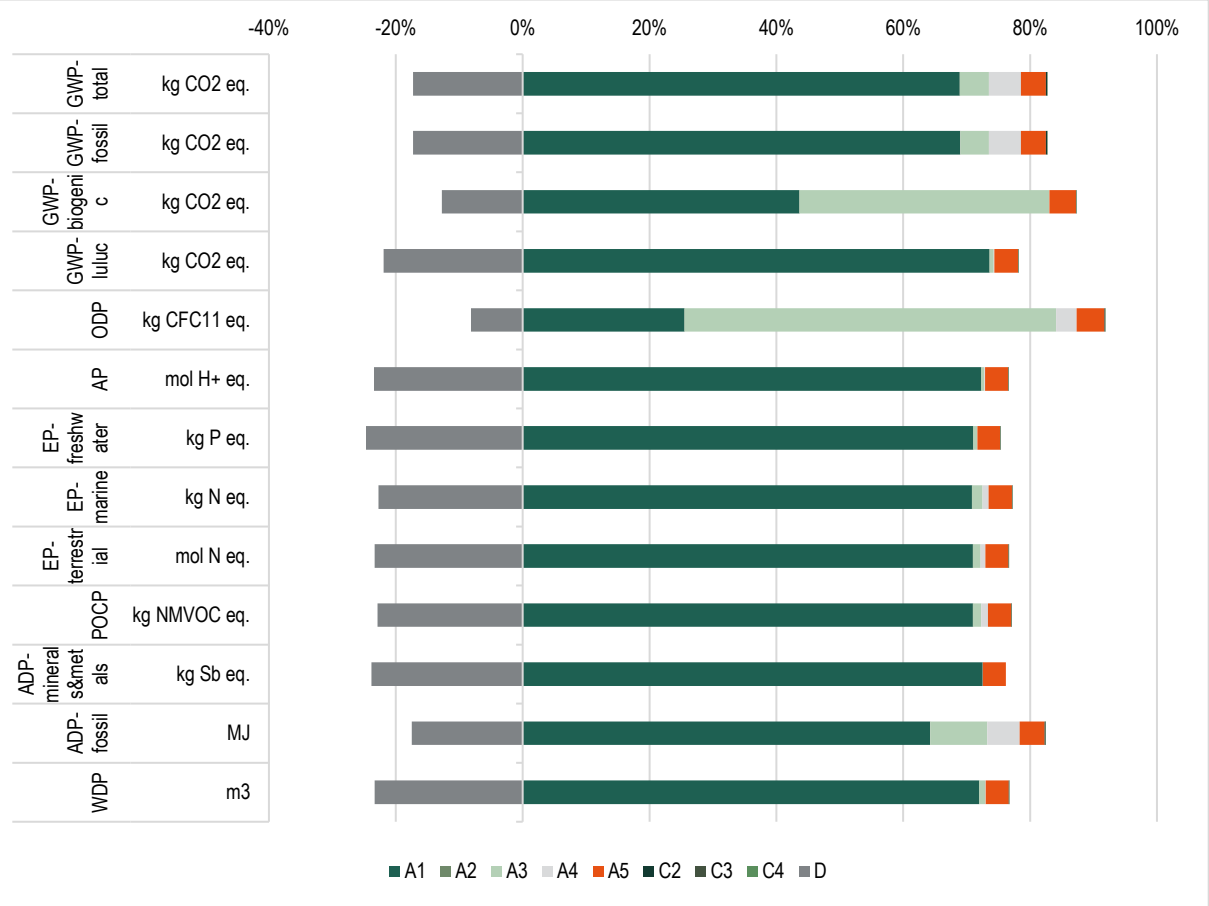
Biogenic carbon content

Results per declared unit – 1 kg of Copper conductor	
Biogenic carbon content	**Quantity**
Carbon content in product, kg C	0,00E-00
Carbon content in accompanying packaging, kg C	4,06E-02

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg CO_2

LCA Interpretation

The estimated impact assessment results are only relative statements that do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins, or risks.
Contribution to environmental impact per each module for the declared unit of **1 kg of Copper conductors** is displayed in following Figure:



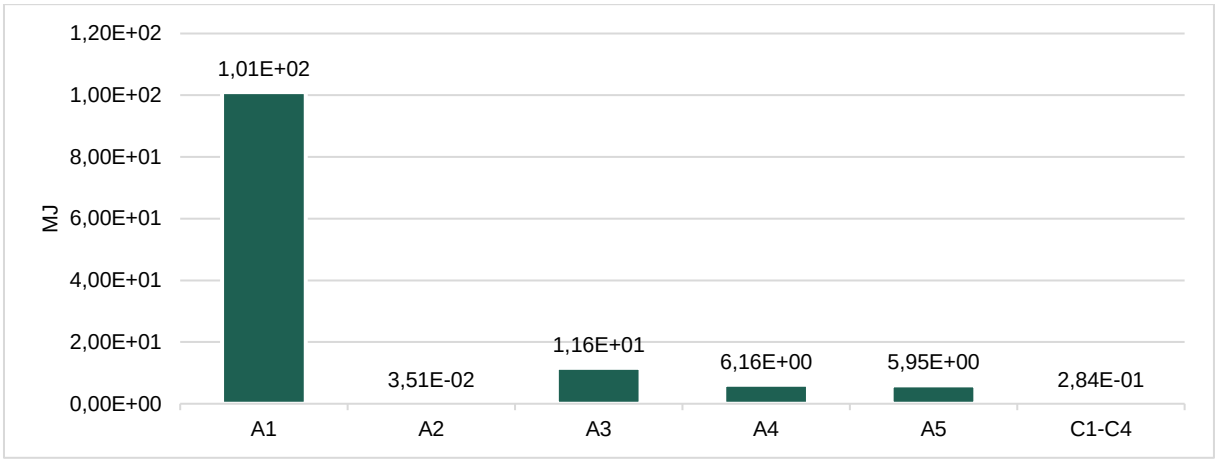
Contribution to environmental impact per each module for 1 kg of Copper conductors

With regard to Climate change, the highest global warming potential is generated in Raw material module A1, resulting in 83.3% share of the total impact, while whole Product stage A1-A3 is generating even more - 88.8% of the total impact. Distribution module A4 of Installation/Construction stage is also generating significant share, resulting in 6.1% of the total impact, while Installation activities itself (module A5) result in slightly lower (4.8%) share of total Global warming potential. Within End-of-Life stage only modules C2 and C4 together are generating some insignificant impact with 0.2% and 0.1% respective shares of the total GWP impact. Without any exclusions Product stage A1-A3 is the main driver for all considered impact categories. Nevertheless, it is necessary to note that the positive impact of module D is also a significant one. High, i.e., 60%, share of Copper from the product is considered as a material recovery rate with the remaining share considered for disposal. Module D also accounts for avoided impact of generated energy from incineration of packaging materials in module A5 of Installation/Construction stage.

The biggest global warming potential driver is the copper cathode itself, that is used as a raw material for copper conductor manufacturing. Other LCA modules, i.e., A3, A4 and A5 also contribute to the total

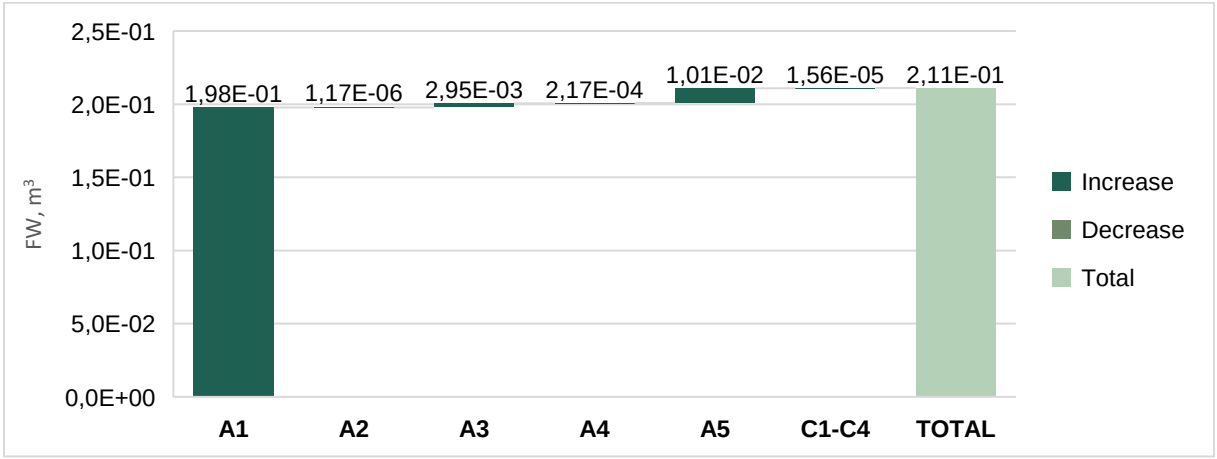
impact but with significantly lower shares and mainly represent Electricity consumption and Transportation.
Total demand of primary energy per declared unit is displayed in following Figure. With 90.1% resulting in Product stage (A1-A3), demand of primary energy for this product is distributed as follows:

- 80.8% for Raw material (A1)
- 0.03% for Transport (A2)
- 9.3% for Manufacturing (A3)
- 4.9% for Transport (A4)
- 4.8% for Installation module (A5)
- 0.2% for End-of-Life stage (C1-C4)



Primary energy demand per 1 kg of Copper conductors

Other key effect factor is Freshwater consumption, that is displayed in following Figure as a Waterfall chart. A waterfall chart shows a running total as values are added or subtracted. It's useful for understanding how an initial value of net Freshwater use is affected by a series of positive and negative values. In case of **Copper conductors**, no decrease has been observed in any considered module. Similarly to Primary energy demand, in terms of freshwater use level Product stage (A1-A3) is also responsible for most of its demand. Second biggest contributor is Installation module A5, with other declared modules generating insignificant impact.



Net freshwater use per 1 kg of Copper conductors

Additional environmental information

Environmental protection determines strategic goals of our company during manufacturing of copper conductors and copper products. Both quality management system according to ISO 9001:2015 and Environmental management system in accordance with DSTU ISO 14001:2015 (ISO 14001:2015, IDT) provides strict control and improvements of environmental protection policy.

Our main goal is constantly minimize negative impact by development and implementation of both technological and management solutions. To ensure that production process corresponds to environmental legislation, technical regulations and requirements of environmental protection acts. We are constantly monitoring wastes generation and handling.

Additional social and economic information

We are constantly in contact with public organizations and interested individuals regarding environmental protection and improvements.

Our company ensures the necessary level of awareness, knowledge, understanding and competence of personnel regarding environmental management systems. The Enterprise performs periodic analysis of performance results and creates development plans taking into account aspects related to environmental protection, health and safety of the Enterprise's personnel.

Information related to Sector EPD

This is an individual EPD.

Differences versus previous versions

This is the first version of EPD.

References

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