Environmental Product Declaration

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

REINFORCING BARS AND COILS AND WIRE ROD (100% RENEWABLE ELECTRICITY)

From:
CELSA HUTA OSTROWIEC

CELSA GROUP™ | CELSA HUTA OSTROWIEC

celsa circular steel
Clean energy

ECO PLATFORM EPD VERIFIED

Programme:
The International EPD® System,
www.environdec.com

Programme operator:
EPD International AB

Publication date:
2023-03-31

Revision date:
2023-07-04

EPD registration number:
S-P-08503

Valid until:
2028-03-28

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

EPD®

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1. Programme 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): PCR 2019:14 Construction products, version 1.11 Published on 2021.02.05. Based on CEN standard EN 15804. ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR). PCR review was conducted by: Claudia A. Peña.

Life Cycle Assessment (LCA)

LCA accountability: Anthesis-Lavola.

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

☑ EPD verification by accredited certification body

Third-party verifier: **TECNALIA R&I Certificación S.L.**
Auditor: **Cristina Gazulla Santos**
Accredited by: **ENAC. Accreditation no. 125/C-PR283**
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.

2.
Company information

Description of the organisation

CELSA has its origin in 1967 in Castellbisbal (Barcelona) with the start-up of its first rolling mill. Ten years later, and as a turning point, the company inaugurated the first electric furnace, a fact that would allow greater competitiveness. At the end of the 80s and during the 90s, CELSA began to establish itself as a national benchmark with the acquisitions of THC, Siderúrgica Besós, GSW or Nervacero. And not only that, but it would also become one of the most diversified groups with the integration of two important Spanish wire drawers: Tycsa PSC and Trefilerías Moreda in 1991 and Riviere in 1999.

All these years of perseverance and enthusiasm have made CELSA one of the most important steel groups in Europe. With more than 9,657 people in its companies, around 120 workplaces around the world, more than 10 languages spoken, 8 million tons of scrap recycled per year and several university chairs, the Group has become a benchmark for steel.

CELSA Huta Ostrowiec is a large scrap-recycling company. Our production process involves Electric Arc Furnaces (EAF), Ladle Furnaces (LF), continuous casting and hot rolling mills in order to provide various finished products. In autumn 2003 CELSA Group acquired Huta Ostrowiec - steel plant in Poland of almost 200 years of experience in steel products manufacturing. Today CELSA Huta Ostrowiec is an industrial enterprise consisting of two divisions:

- **Rolled Products Division** equipped with continuously casting melt shop, rolling mill of bars and rolling mill of steel section.
- **Forged Products Division** equipped with melt shop and modern machines producing completely finished products with mechanical and thermal treatment.

Celsa Group in figures

6,600,000
Steel produced in 2021

7,010,000
T recycled in 2021

120
Work centers distributed all over the world

5,280
Million euros turnover in 2021

11,929
Number of professionals (own and subcontractors emplyees)

3,758
Million euros total Investment in local suppliers

Location of production site(s)

Huta Ostrowiec Sp. z o.o.,
ul. Samsonowicza 2, 27-400
Ostrowiec Świętokrzyskie, Poland

Contact

Carlos Javier Abajo Fuentes.
Email: **cabajo@gcelsa.com**

Where we are

CELSA Group™ has a clear international vocation. It is currently present throughout the world with more than 120 work points. Each location allows us to operate and supply our customers with great strategic and competitive advantages.

3. Product information

Hot rolled reinforcing steel in bars and coils

Product identification

CELSA Poland plant has two melt shop facilities for the production of steel and two rolling mills for the hot forming of this steel, plus a forge with associated heat treatment and mechanical processes. The latter melt shop produces steel for the forging facility. The former melt shop, which has a larger capacity, produces steel for the two rolling mills. The first rolling mill produces products in the form of sections and merchant bars. The second rolling mill produces rebar and wire rod. This EPD covers the environmental impacts associated with rebar and wire rod, which account for 59.7% of the facility's total production for the year under study.

Product description

The product consists of 100 % recycled steel produced by the Electric Arc Furnace route from post- consumer and pre-consumer scrap.

Celsa produce hot rolled, ribbed steel reinforcement bar at the Rod & Bar Mill, for use in the reinforcement of concrete. This can also be supplied in spooled coils, known as High Yield Coil. The Rod & Bar Mill can also manufacture hot rolled flat bars for use in the automobile, naval and agricultural industries; mild steel coil (known as wire rod for mesh) used in the production of reinforcing mesh for concrete; low carbon steel coil known as 'other wire rod' which can be used for a variety of different applications including fencing, general wire, nails, and supermarket trolleys.

The mains characteristics and chemical composition of Rod & Bar Mill products are shown below.

Characteristic	Value, units	
Product features	**Diameter**	8, 10, 12, 14, 16, 20, 25, 28 & 32 mm
	Length	≤ 18 m
Length tolerance	-0 + 100 mm	
Yield strength	500 to 750 MPa	
Welding requirements	B500SP, B500C, B500SN, B500B, B600B	
Stress ratio: Ultimate tensile strength/Yield strength (Rm/Re)	1.15 to 1.35 for Class C & ≥ 1,10 for class B	
Uniform elongation (Agt)	≥ 7.5% for class C & ≥ 5% for class B	
Lineal density	0.395 kg (8 mm), 0.617 kg (10 mm), 0.888 kg (12 mm), 1.58 kg (16 mm), 2.47 kg (20 mm)	
	3.854 kg (25 mm), 6.313 kg (32 mm), 9.864 kg (40 mm) & 15.413 kg (50 mm)	

Chemical composition	%
Fe	98
Si, Mn, C	2
Material components	**%**
Post-consumer scrap	78.0
Pre-consumer scrap	22.0
Internal recycling	3.1
Renewable material	0
Biogenic carbon content	0
Packaging materials	**%**
Steel strap - packaging (versus product)	0.05

Geographical scope. Global. Products under study are produced in Poland but can be used at a global scale.

UN CPC code. 4124 - Bars and rods, hot-rolled, of iron or steel.

The products do not contain any of the substances listed in the "Candidate List of Substances of Very High Concern (SVHC) for Authorization".

Process description

Scrap as a raw input malarial is smelted in the smelting electric - arc furnace. Molten steel is then moved on to the refining furnace where it is given desired chemical composition and required temperature by continuous casting process. Molten steel is transported to the continuous casting machine which forms billets by steel-solidification process.

Later on, billets are reheated in a reheating furnace. Such billets are rolled in a hot-rolling train and shaped the required way. Afterwards bars are let at a cooling plate. Finally, they are cut and bundled what makes them be available for sales. Whole process is set-up the way not only to optimize cost/effect ratio but also to save energy significantly. On top of that it is done according to high demanding security standards in order to decrease its impact on our employees and not to harm natural environment.

Rolling Mill produces bars and coils of ribbed steel. The ingots are delivered on a roller track from the continuous casting and can be loaded directly as hot charging. The beginning of the process is the transport of the ingot to a furnace. After heating the charge in the furnace to the rolling temperature, the steel billet is transported to the group of rolling stands.

At the end of the process bars are cut to commercial size, bonding, and labeling. The products are straightened, weighed, packed, and labeled. In the production of ribbed wire rod, the coils are weighed, bundled, and labelled.

4. LCA information

Functional unit / declared unit:

1000 kg of hot rolled wire rod and reinforcing steel products produced with 100% renewable electricity mix with guarantee of origin.

Reference service life

Not applicable.

Time representativeness

This inventory data was compiled in July 2022 using questionnaires issued by Anthesis Lavola and completed by CELSA, which were iteratively refined. The inventory data refers to the 12-month period between January 2021 and December 2021, representing conventional operation conditions.

Database(s) and LCA software used

The LCA modelling of CELSA Barcelona steel products was carried out using SimaPro 9.3 LCA software which was the most up-to-date version available at the time of the LCA.

Unless otherwise indicated, all relevant background LCI datasets were sourced from the Ecoinvent database v3.8 (Ecoinvent, 2021; Wernet et al., 2016). In certain cases, the original Ecoinvent datasets were adapted to the specific requirements of the LCA analysis.

4.1. Description of system boundaries

Cradle to gate (A1-A3) with modules C1-C4, module D.

This EPD provides information on the production stage of steel products (raw material supply, transport to plants and manufacturing) and their end-of-life.

Recycling/reuse potential of steel with burden savings due to use in a second product systems is also reported. The information is presented in a modular way separated in the following stages.

A1-3

Cradle to gate

This module includes the provision of all materials, products, and energy, as well as waste processing up to the end-of-waste state (i.e., when the waste flow is no longer considered a waste material but a raw material for a subsequent cycle) or disposal of final residues during the product stage.

Processes relating to resource extraction e.g., raw materials used to produce the steel, are included in the system.

All energy used in factories and factory support offices is included but energy used in head offices and sales offices etc. are excluded.

Maintenance of equipment is also not included. The electricity consumed at the plant has been adapted to specific power mix supply.

C1

Dismantling

This module has been modelled assuming that 100% of products are used as concrete reinforcement, i.e., as integrated into other structures. For rebars has been used generic dataset from Ecoinvent for the treatment of waste reinforcement steel. Default data to estimate environmental burdens are shown in the table below.

C2

Transport to waste processing

Transport is calculated based on a scenario with the parameters described in the attached table.

C3

Waste processing for reuse, recovery and/or recycling

This module has been modelled using the generic datasets from Ecoinvent for the treatment of waste reinforcement steel and waste bulk iron.

C4

Final disposal

Environmental burdens associated with Module C4 have been calculated considering the default rates for landfilling described in prEN 17662 (see table below)

D

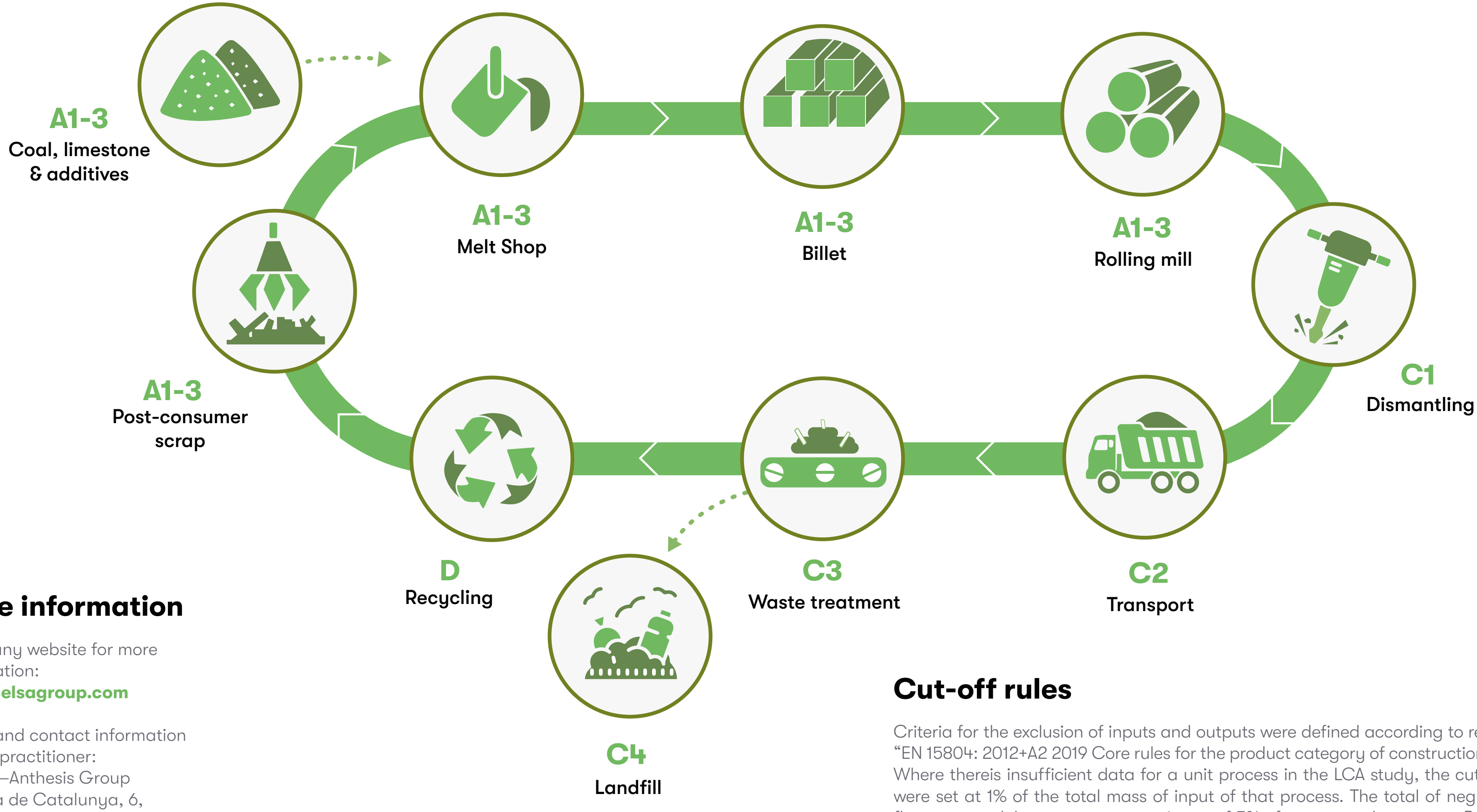
Benefits and loads beyond the product system

Module D has been calculated for the recycling and the reuse flows using the protocols stated in EN 15804:2012+A2: 2019 – Annex D with figures and formulae described in prEN 17662 (see table below).

Benefits are assessed at the point of functional equivalence, i.e., where the substitution of EAF steel (recycling route) or light structural steel (reuse route) take place. In the recycling process, melting yield for post-consumer scrap was considered.

4.2. System diagram

The stages of transport to site (A4), installation (A5) and use (B1-B7) are not included.



More information

Company website for more information:
www.celsagroup.com

Name and contact information of LCA practitioner:
Lavola –Anthesis Group
Rambla de Catalunya, 6,
planta 2, 08007 Barcelona
+34 938 515 055
www.anthesisgroup.com

Cut-off rules

Criteria for the exclusion of inputs and outputs were defined according to requirements "EN 15804: 2012+A2 2019 Core rules for the product category of construction products". Where thereis insufficient data for a unit process in the LCA study, the cut-off criteria were set at 1% of the total mass of input of that process. The total of neglected input flows per module was set at a maximum of 5% of energy and mass use. Based on this cut-off criteria, ancillary materials (such as expendable components, spare parts and chemicals for wastewater treatment, etc.) have been excluded from the analysis".

4.3. Assumptions and considerations applied

The main assumptions and assumptions made in this study are as follows:

- **Post-consumer steel scrap was modelled as burden free when entering the system although transport to the plant was included.** In module D only the burdens and benefits of the net output flow of post-consumer scrap or reused product are reported.
- **Direct CO2 emissions generated in the smelter due to the combustion of elemental carbon** and the calcination of carbonates present in the raw materials have been modelled on the basis of stoichiometric ratios. It was assumed to have complete oxidation of the elemental carbon and complete calcination of carbonates.
- **Metal scrap transport distances were calculated using a scrap purchasing database.** Entries to this database included: point of origin of the metal scrap, distance travelled, means of transport and load. Based on this information, a weighed transport distance of scrap transported by train and by road was calculated. A similar database was used to obtain the transport distances for the rest of the raw materials. Due to the wide range of products included in this database, and the large number of points of origin, a country base analysis was carried out to define the weighted contribution of each location for each product category.
- **Recovery rates for reuse and recycling, and landfilling rates** were calculated using the default data provided in Annex I of “prEN 17662 Product category rules complementary to EN 15804 for Steel, Iron and Aluminium structural products for use in construction works”. Recovery and landfilling rates for R&B mill products have been calculated considering the default values weighted for rebar. This standard draft was also consulted to obtain default values for distances for module C2.

C1 module parameters	
Diesel burned(1)	626 MJ/t
C2 module parameters	
Transport by road	Transport, freight, lorry 16-32 t
Diesel consumption(1)	0.037 kg/tkm
Distance to CDW treatment(2)	100 km
C3 module parameters	
Energy carrier	Electricity, low voltage
Consumption (kWh)(1)	3.7 kWh/t
C3 module parameters	
Recovery rate (recycling)(2)	90%
Landfill(2)	10%
Distance to recycling(2)	100 km
Distance to EoL(2)	200 km
Efficiency for steel recycling(2)	95%

(1) Ecoinvent database. (2) prEN 17662

4.4. Allocation

Total energy consumption was attributed entirely to total production. This is also the case for raw materials and waste generation.

The steel making process generates coproducts which have a commercial application. These include the EAF steelmaking slag and EAF steel dust (both produced only in Melt shop), and the mill scale (produced both in Melt shop and in R&B Mill). For Melt shop, a physical allocation method based on the calorific value of the coproducts has been used. This methodology is based on the procedures developed by the World Steel Association and EUROFER (see references). For the R&B Mill, an economic approach was applied to determine the allocation of environmental flows between the laminated products and the mill scale.

Additional information:

The 100% renewable electricity mix was modelled as reported in the energy guarantee of origin certificate. This electricity mix is shown below divided by technologies:

	%
Wind	56%
Solar	14%
Biomass	18%
Hydro	12%
Carbon footprint GWP-GHG (kg CO_2 eq./kWh)	0.127

4.5. Data quality requirements

The quality of the data used to calculate this LCA meets the following requirements:

- **The data used in the LCA were as up to date as possible** (updated within the last 10 years for generic data and within the last 5 years for manufacturer-specific data).
- **Used background data** are of recognised prestige and acceptance in the technical and scientific fields. In particular, the Ecoinvent database, in the most recent version existing at the time of the study, is considered to be of preferential use.
- **Regionally specific datasets were used to model the energy consumption** (electricity, natural gas or diesel). For the processes of transport, production of raw materials or end-of-life, datasets were chosen according to their technological and geographical representation of the actual process.

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

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	ND	ND	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x
Geography	EU	EU	EU	ND	ND	ND	ND	ND	ND	ND	ND	ND	EU	EU	EU	EU	EU
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-			-
Variation products	<10%			-	-	-	-	-	-	-	-	-	-	-			-
Variation sites	not relevant			-	-	-	-	-	-	-	-	-	-	-			-

5.
Environmental information

5.1. Potential environmental impact. Mandatory indicators according to EN 15804

Basic environmental impacts										
	Unit	A1	A2	A3	A1-3	C1	C2	C3	C4	D
GWP-GHG*	kg CO2 eq	1.83E+02	2.84E+01	1.34E+02	3.46E+02	5.67E+01	1.94E+01	1.49E+00	5.17E-01	-2.22E+02
GWP-total	kg CO2 eq	1.90E+02	2.87E+01	1.37E+02	3.56E+02	5.73E+01	1.96E+01	1.55E+00	5.28E-01	-2.33E+02
GWP-fossil	kg CO2 eq	1.86E+02	2.86E+01	1.36E+02	3.52E+02	5.73E+01	1.96E+01	1.50E+00	5.27E-01	-2.34E+02
GWP-biogenic	kg CO2 eq	3.33E+00	2.17E-02	4.24E-01	3.78E+00	1.59E-02	1.05E-02	4.29E-02	1.04E-03	8.02E-01
GWP-luluc	kg CO2 eq	3.60E-01	8.73E-03	7.84E-03	3.76E-01	4.52E-03	6.98E-03	3.30E-03	1.47E-04	-3.76E-02
ODP	kg CFC-11 eq	1.28E-05	7.03E-06	1.84E-05	3.82E-05	1.24E-05	4.46E-06	1.35E-07	2.17E-07	-7.36E-06
AP	mol H+ eq	1.37E+00	9.22E-02	1.51E-01	1.62E+00	6.00E-01	5.63E-02	9.07E-03	5.00E-03	-1.14E+00
EP-freshwater	kg P eq	1.87E-02	2.28E-04	6.09E-04	1.95E-02	2.09E-04	1.57E-04	1.52E-04	5.90E-06	-1.38E-02
EP-marine	kg N eq	2.42E-01	2.02E-02	3.13E-02	2.93E-01	2.65E-01	1.11E-02	1.37E-03	1.72E-03	-2.21E-01
EP-terrestrial	mol N eq	3.11E+00	2.25E-01	3.20E-01	3.65E+00	2.90E+00	1.25E-01	1.65E-02	1.90E-02	-2.50E+00
POCP	kg NMVOC eq	7.82E-01	8.85E-02	1.31E-01	1.00E+00	7.98E-01	4.78E-02	4.31E-03	5.51E-03	-1.22E+00
ADPE (1)	kg Sb eq	2.67E-03	5.10E-04	8.95E-05	3.27E-03	8.79E-05	5.41E-04	1.09E-05	4.82E-06	-3.96E-03
ADPF (1)	MJ	3.09E+03	4.65E+02	1.30E+03	4.86E+03	7.89E+02	2.96E+02	3.04E+01	1.47E+01	-1.95E+03
WDP (1)	m³ eq	1.65E+02	1.51E+00	-5.58E-01	1.66E+02	1.06E+00	8.39E-01	3.32E-01	6.60E-01	-2.01E+01

(1) The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

*The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Basic Environmental Impacts

- **GWP-GHG.** Global Warming Potential.
- **GWP-fossil.** Global Warming Potential - fossil fuels.
- **GWP-biogenic.** Global Warming Potential - biogenic.
- **GWP-luluc.** Global Warming Potential - land use and land use change.
- **GWP-total.** Global Warming Potential - total.
- **ODP.** Depletion potential of the stratospheric ozone layer.
- **AP.** Acidifcation potential, Accumulated Exceedance.
- **EP-freshwater.** Europhication potential - freshwater.
- **EP-marine.** Europhication potential - marine.
- **EP-terrestrial.** Europhication potential - terrestrial.
- **POCP.** Photochemical Ozone Creation Potential.
- **ADPE.** Abiotic depletion potential - non-fossil resources.
- **ADPF.** Abiotic depletion potential - fossil resources.
- **WDP.** Water (user) deprivation potential.

5.2. Potential environmental impact. Additional indicators according to EN 15804

Additional environmental impacts										
	Unit	A1	A2	A3	A1-3	C1	C2	C3	C4	D
PM (1)	disease inc.	2.23E-05	2.51E-06	7.70E-07	2.56E-05	1.59E-05	1.25E-06	4.16E-08	9.70E-08	-1.83E-05
IRP (2)	kBq U235 eq	1.76E+01	2.03E+00	3.31E-01	2.00E+01	3.38E+00	1.30E+00	2.60E-01	6.04E-02	3.60E-01
ETP-fw (1)	CTUe	5.94E+03	3.70E+02	5.64E+02	6.88E+03	4.76E+02	2.39E+02	2.16E+01	9.55E+00	-1.31E+04
HTP-c (1)	CTUh	1.37E-06	8.99E-09	7.31E-07	2.11E-06	1.66E-08	6.65E-09	7.57E-10	2.21E-10	-1.28E-06
HTP-nc (1)	CTUh	3.92E-06	4.06E-07	2.83E-05	3.27E-05	4.08E-07	2.51E-07	1.93E-08	6.79E-09	2.46E-05
SQP (1)	dimensionless	9.77E+03	5.33E+02	9.30E+01	1.04E+04	1.01E+02	2.07E+02	2.07E+01	3.09E+01	-6.36E+02

Additional Environmental Impacts

- **PM.** Particulate Matter emissions
- **IRP.** Ionizing radiation, human health.
- **HTP-c.** Human toxicity, cancer effect.
- **HTP-nc.** Human toxicity, non-cancer effects.
- **ETP-fw.** Eco-toxicity - freshwater.
- **SQP.** Land use related impacts/Soil quality.

(1) The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

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

5.3. Use of resources

Resource use										
	Unit	A1	A2	A3	A1-3	C1	C2	C3	C4	D
PERE	MJ	3.75E+03	5.85E+00	5.51E+00	3.76E+03	4.27E+00	4.24E+00	5.67E+00	1.19E-01	-1.77E+02
PERM	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
PERT	MJ	3.75E+03	5.86E+00	5.51E+00	3.76E+03	4.27E+00	4.25E+00	5.67E+00	1.19E-01	-1.77E+02
PENRE	MJ	3.27E+03	4.94E+02	1.43E+03	5.20E+03	8.38E+02	3.15E+02	3.19E+01	1.56E+01	-2.05E+03
PENRM	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
PENRT	MJ	3.27E+03	4.94E+02	1.43E+03	5.20E+03	8.38E+02	3.15E+02	3.19E+01	1.56E+01	-2.05E+03
SM	kg	7.80E+02	0.00E+00	0.00E+00	7.80E+02	0.00E+00	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	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	0.00E+00
FW	m^3	6.24E+00	5.30E-02	6.57E-01	6.95E+00	4.06E-02	3.17E-02	2.49E-02	1.57E-02	-4.49E-01

Resource use

- **PERE.** Renewable primary energy as energy carrier.
- **PERM.** Renewable primary energy resource as material utilization.
- **PERT.** Total use of renewable primary energy resources.
- **PENRE.** Non-renewable primary energy as energy carrier.
- **PENRM.** Non-renewable primary energy as material utilization.
- **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.** Net use of fresh water.

5.4. Waste production and output flows

Waste										
	Unit	A1	A2	A3	A1-3	C1	C2	C3	C4	D
HWD	kg	6.86E-03	1.13E-03	1.22E+00	1.23E+00	2.15E-03	7.76E-04	2.36E-05	2.20E-05	-2.00E-02
NHWD	kg	5.26E+01	4.05E+01	2.81E+01	1.21E+02	9.34E-01	1.44E+01	1.06E-01	1.00E+02	-9.04E+01
RWD	kg	1.49E-02	3.18E-03	4.18E-04	1.85E-02	5.48E-03	2.02E-03	2.15E-04	9.67E-05	-2.29E-04

Other output flows										
	Unit	A1	A2	A3	A1-3	C1	C2	C3	C4	D
CRU	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
MFR	kg	0.00E+00	0.00E+00	1.57E+02	1.57E+02	0.00E+00	0.00E+00	9.00E+02	0.00E+00	0.00E+00
MER	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
EEe	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
EEt	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

Waste

- **HWD.** Hazardous waste disposed.
- **NHWD.** Non-hazardous waste disposed.
- **RWD.** Radioactive waste disposed.

Other output flows

- **CRU.** Components for re-use.
- **MFR.** Materials for recycling.
- **MER.** Materials for energy recovery.
- **EEe.** Exported energy (electricity).
- **EEt.** Exported energy (thermal).

	Global Warming Potential (GWP)	Depletion of the ozone layer (ODP)	Depletion of abiotic resources - materials and metals (ADP-minerals & metals)	Depletion of abiotic resources - fossil fuels (ADP-fossil)
A1 Raw material suply	190.2	12.8	2,667.6	3,093.9
A2 Transport	28.7	7.0	510.0	465.4
A3 Manufacturing	136.8	18.4	89.5	1,296.7
C End of life stage	79.0	17.2	644.7	1,130.4
D Benefits and loads beyond the system boundary	-233.3	-7.4	-3,959.4	-1,947.4
Total life cycle	**434.7 kg CO_2 eq. / t**	**55.4 mg CFC-11 eq. / t**	**3,911.9 mg Sb eq. / t**	**5,986.4 MJ / t**

6. Differences versus previous versions

This document is the second version of the EPD. Editorial changes have been made versus the previous version

7. References

- Ecoinvent, 2021. Ecoinvent Database 3.8. http://www.ecoinvent.org/database/.
- EN 15804:2012+A2:2019 Sustainability of construction works - Environmental Product Declarations – Core rules for the product category of construction products. CEN/TC 350/WG 3 N 1439.
- General Programme Instructions of The International EPD® System. Version 3.01.
- ISO 14025/ DIN EN ISO 14025:2009-11: Environmental labels and declarations - Type III environmental.
- ISO 14040-44/ DIN EN ISO 14040:2006-10, Environmental management - Life cycle assessment-Principles.
- PCR 2019:14 v1.11 Construction products and construction services. International EPD System.
- prEN 17662 Product category rules complementary to EN 15804 for Steel, Iron and Aluminium structural products for use in construction works.
- Tackling recycling aspects in EN15804 - Christian Leroy, Jean-Sebastien Thomas, Nick Avery, Jan Bollen, and Ladji Tikana. International Symposium on Life Cycle Assessment and Construction, 2012.
- World Steel Association, EUROFER, 2014. A methodology to determine the LCI of steel industry co-products. 14 February 2014. **https://worldsteel.org/steel-topics/life-cycle- thinking/methodology-for-slag-lci-calculation/**
- Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., Weidema, B., 2016. The Ecoinvent database version 3 (part I): overview and methodology. Int. J. Life Cycle Assess. 21, 1218–1230.

VERIFICATION STATEMENT CERTIFICATE

CERTIFICADO DE DECLARACIÓN DE VERIFICACIÓN

Certificate No. / *Certificado nº: EPD08609*

TECNALIA R&I CERTIFICACION S.L., confirms that independent third-party verification has been conducted of the Environmental Product Declaration (EPD) on behalf of:
TECNALIA *R&I CERTIFICACION S.L., confirma que se ha realizado verificación de tercera parte independiente de la Declaración Ambiental de Producto (DAP) en nombre de:*

CELSA HUTA OSTROWIEC SP. Z O.O. (CELSA Group™)
Samsonowicza 2
27-400 OSTROWIEC ŚWIĘTOKRZYSKI - POLAND

for the following product(s):
para el siguiente(s) producto(s):

REINFORCING BARS AND COILS AND WIRE ROD (100% RENEWABLE ELECTRICITY)
ACERO CORRUGADO EN BARRAS Y ROLLOS Y ALAMBRÓN (100% ELECTRICIDAD RENOVABLE)

with registration number **S-P-08503** in the International EPD® System *(www.environdec.com).*
con *número de registro **S-P-08503** en el Sistema International EPD® (www.environdec.com).*

it´s in conformity with:
es conforme con:

- **ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations.**
- **General Programme Instructions for the International EPD® System v.3.01.**
- **PCR 2019:14 Construction products (EN 15804:A2) v.1.11.**
- **UN CPC 4124 Bars and rods, hot-rolled, of iron or steel.**

CERTIFICACION tecnalia CERTIFICACION

Carlos Nazabal Alsua
Manager

Issued date / *Fecha de emisión:*	31/03/2023
Update date / *Fecha de actualización:*	31/03/2023
Valid until / *Válido hasta:*	28/03/2028
Serial Nº / *Nº Serie:*	EPD0860900-E

ENAC
CERTIFICACIÓN ISO 17065 Nº125 / C-PR283

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