



ENVIRONMENTAL PRODUCT DECLARATION

HOT-DRAWN REINFORCING STEEL FOR CONCRETE IN BARS AND COILS



Based on:

PCR 2019:14
Construction products
v 1.11, 2021-02-05

EN:15804:2012+A2:2019

ISO 14025

PROGRAMME:

The International EPD System
www.environdec.com

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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

Valid until:

2026-01-22

Declaration N°:

FA_EPD_01

GENERAL INFORMATION

EPD REFERENCES

EPD OWNER: FERALPI SIDERURGICA SPA - FERALPI GROUP, VIA NICOLA PASINI 11, 25017 LONATO, BRESCIA - ITALY
MANUFACTURING PLANT IS LOCATED IN THE SAME SITE

PROGRAM OPERATOR: EPD INTERNATIONAL AB, BOX 21060, SE-100 31 STOCKHOLM, SWEDEN; INFO@ENVIRONDEC.COM

NEW VERSION: 2022-10-14 VERSION 3
NEW VERIFICATION: UPDATED BACKGROUND DATA FOR ECOINVENT 3.8, UPDATED DATA AND RESULTS ADDED TO EPD.
VALIDATION DATE HAS BEEN EXTENDED BY FIVE YEARS

INDEPENDENT VERIFICATION

This declaration has been developed referring to the International EPD System, following the General Programme Instructions v 3.01; further information and the document itself are available at: www.environdec.com. EPD document valid within the following geographical area: Italy and other countries worldwide according to sales market conditions.

ISO standard ISO 21930 and CEN standard EN 15804 served as the core PCR
PCR 2019:14 Construction products, Version 1.11
PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com/TC 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.

Independent verification of the declaration and data, according to EN ISO 14025 : 2010

Third party verifier: ICMQ SpA, via De Castilla, 10 20124 Milano (www.icmq.it) EPD process certification (Internal) EPD verification (External)

Accredited by: Accredia
Procedure for follow-up during EPD validity involves third party verifier: YES NO

Environmental declarations published within the same product category, but from different programmes may not be comparable. In particular, EPDs of construction products may not be comparable if they do not comply with EN 15804. EPD owner has the sole ownership, liability and responsibility of the EPD.

CONTACTS

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Technical support to Feralpi Group was provided by Life Cycle Engineering, Italy.
(info@lceengineering.eu, www.lceengineering.eu).



COMPANY PROFILE



The Feralpi Group is one of Europe's leading manufacturers of steels for use in building construction. The parent company Feralpi Siderurgica, which was set up in 1968 in Lonato del Garda, near Brescia, has developed steadily over the years to form a group of industries that currently more than two million tonnes of steel and rolled products a year, and has a workforce of 1500 permanent employees in Italy, Europe and North Africa.

In over fifty years of business, the company has branched out to foreign markets and have been able to face the challenge of an increasingly globalized steel industry. Starting from its lengthy tradition in steel manufacturing, the Group has developed according to a strategy of diversification into new products and markets, which has involved not only the internal organisation but also external transactions thanks to the acquisition of numerous enterprises operating in this industry. The Feralpi Group also operates in the field of special steels, cold working, structural steelwork, the environment and fish farming, not to mention financial activities and investments.

Since its very origins, Feralpi has focused not only on producing the best steel grades for building construction but also on doing it in the most sustainable possible way, which has involved reducing energy consumption and emissions by using the latest technology available or developing in-house new solutions covered by patents as a result of intensive innovation and research.

Feralpi, an international diversified group (2021)



2.62
million tons

Steel production



2.47
million tons

Hot rolled production



1.37
millions tons

Cold rolled products and derivatives



1 900
million euros

Turnover



59%

Turnover abroad



1749

Employees (2021)



58
million euros

Technical investments

SCOPE AND TYPE OF EPD

THE APPROACH USED IN THIS EPD IS “CRADLE TO GATE WITH OPTIONS” ONE

TABLE OF MODULES

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
	Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	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
Module declared	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
Geography	IT	IT	IT	WLD	-	-	-	-	-	-	-	-	WLD	WLD	WLD	WLD	WLD
Specific data used	> 90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-products	NOT RELEVANT			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-sites	NOT RELEVANT			-	-	-	-	-	-	-	-	-	-	-	-	-	-

SOFTWARE: SimaPro ver. 9.4.0.2

MAIN DATABASE: Ecoinvent 3.8

REPORT LCA: Life Cycle Assessment (LCA) applied to steel mill products and derivatives for EPD® purposes - final report

GEOGRAPHICAL SCOPE OF THE EPD: World according to sales market conditions

TYPE OF EPD: specific for hot rolled steel products

THE PRODUCT

Rebar is the core of reinforced steel structures. Ribs provide improved adherence to the concrete. Special chemical analysis and a monitored production process give the rebar excellent mechanical properties for use in severe or harsh applications, requiring a high standard of safety for private and industrial buildings and large motorway, railway and airport infrastructures.

Thanks to its ductility properties, Feralpi reinforcing steel in bar complies fully with anti-seismic requirements.

The main materials of the final product are: *iron > 96%; alloy elements* (e.g. manganese, silicon, carbon) *2% c.a.; other elements* (e.g.. copper, nickel, chromium), *complementary to 100%.*

Declared unit for the study is **one tonne of hot rolled products.**



INFORMATION	DESCRIPTION
PRODUCT IDENTIFICATION	Hot-drawn reinforcing steel for concrete in bars and coils
PRODUCT FEATURES	Bars: Diameters from 8 mm to 40 mm Length from 6 m to 24 m Weight up to 2 200 kg per bundle Coils: Diameters from 5.5 mm to 20 mm Weight from 1 800 to 5 000 kg
PRODUCT PROPERTIES (UNDER EN10080:2005)	Steel coming from post and pre consumer steel scraps produced in electric arc furnace route (EAF) and further hot rolling process. Adherence and surface geometry f_R or f_p : - for $5 \leq \varnothing \leq 6$ mm f_R or f_p 0.035 - for $6 < \varnothing \leq 12$ mm f_R or f_p 0.040 - for $\varnothing > 12$ mm f_R or f_p 0.056 Weldability: $C_{eq} < 0.52$ Typical yield stress: $Re > 400$ MPa and/or $Rp_{0.2} < 600$ MPa Elongation: $Agt > 5\%$ Successful in bend and rebend test Successful in strength test and oligocyclic strength test Total amount of products covered by this EPD, year 2021: 749 302 t Total production, for selling purpose, year 2021: 1 401 914 t On-site air emission control system On-site system to recycle process water On-site system to recycle water used in process In/out materials/products and melting process monitored to prevent nuclear radiation In house photovoltaic plant of 625 kW peak capacity operating since 2011
PLANT FEATURES	

ENVIRONMENTAL PERFORMANCE

The detailed environmental performance (in terms of use of resources, pollutant emissions and waste generation) is presented for the three phases, Upstream, Core and Downstream and related sub-phases (A1-A2-A3-A4-C1-C2-C3-C4-D). The numbers reported in the following tables are the outcome of rounding. For this reason total results could slightly differ from the sum of contributions of the different phases. The energy sources behind the electricity grid used in manufacturing is the Italian residual mix 0,457 kg CO₂ eq./kWh (AIB report May 2022) with Life Cycle Engineering post-elaborations.

ENVIRONMENTAL IMPACTS PER DECLARED UNIT

TABLE OF MODULES POTENTIAL ENVIRONMENTAL IMPACTS	UNITS / D.U.	UPSTREAM		CORE PROCESS				DOWNSTREAM				TOTAL	D
		A1	A2	A3	A4	C1	C2	C3	C4				
GWP	kg CO ₂ eq	3.48E+02	1.19E+02	1.20E+02	6.72E+01	3.82E+01	2.44E+01	1.93E+00	7.32E-01	7.19E+02	4.58E+02		
GWP,f	kg CO ₂ eq	3.48E+02	1.19E+02	1.20E+02	6.72E+01	3.82E+01	2.44E+01	1.92E+00	7.32E-01	7.18E+02	4.58E+02		
GWP,b	kg CO ₂ eq	1.84E-01	8.02E-02	2.07E-01	8.98E-03	2.69E-03	1.44E-03	5.78E-03	9.87E-05	4.90E-01	7.49E-02		
GWP,luluc	kg CO ₂ eq	7.77E-02	1.31E-03	5.91E-02	2.63E-03	9.43E-04	1.99E-04	3.98E-03	2.49E-05	1.46E-01	1.93E-02		
GWP,ghg	kg CO ₂ eq	3.48E+02	1.19E+02	1.20E+02	6.72E+01	3.82E+01	2.44E+01	1.93E+00	7.32E-01	7.19E+02	4.58E+02		
ODP	kg CFC11 eq	5.80E-05	2.80E-05	3.02E-06	1.58E-05	8.56E-06	5.84E-06	7.18E-08	1.52E-07	1.19E-04	1.35E-05		
AP	mol H ⁺ eq	1.38E+00	6.91E-01	2.92E-01	4.68E-01	4.12E-01	1.36E-01	9.62E-03	7.54E-03	3.40E+00	1.72E+00		
EP,f	kg P eq	6.35E-03	1.88E-04	3.09E-03	1.30E-04	2.69E-05	1.26E-05	9.79E-05	2.60E-06	9.90E-03	1.88E-02		
EP,m	kg N eq	2.63E-01	2.72E-01	8.97E-02	1.68E-01	1.85E-01	5.39E-02	1.77E-03	3.28E-03	1.04E+00	3.33E-01		
EP,t	mol N eq	2.96E+00	2.99E+00	9.93E-01	1.84E+00	2.03E+00	5.91E-01	1.96E-02	3.59E-02	1.15E+01	3.87E+00		
POCP	kg NMVOC eq	8.54E-01	7.79E-01	2.54E-01	4.79E-01	5.54E-01	1.54E-01	5.31E-03	1.00E-02	3.09E+00	2.05E+00		
ADPE*	kg Sb eq	5.53E-05	5.05E-06	7.86E-05	2.85E-06	1.97E-06	1.07E-06	5.75E-08	3.53E-08	1.45E-04	7.31E-03		
ADPF*	MJ	6.92E+03	1.68E+03	8.77E+02	9.43E+02	5.17E+02	3.40E+02	3.27E+01	9.73E+00	1.13E+04	5.62E+03		
WDP*	m ³	4.11E+01	3.10E+00	1.42E+02	4.55E-02	1.36E-01	-5.83E-02	2.93E-01	3.94E-03	1.87E+02	6.34E+01		

GWP Global warming potential, total

GWP,f Global warming potential, fossil

GWP,b Global warming potential, biogenic

GWP,luluc Global warming potential, land use & land use change

GWP,ghg Global warming potential, excluding biogenic uptake, emission and storage

ODP Ozone depletion potential

AP Acidification potential

EP,f Eutrophication potential, freshwater

EP,m Eutrophication potential, marine

EP,t Eutrophication potential, terrestrial

POCP Photochemical ozone creation potential

ADPE Abiotic depletion potential minerals & metals*

ADPF Abiotic depletion potential fossil fuels*

WDP Water use deprivation potential*

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

Additional environmental impact indicators are computed in the LCA report but not reported in the EPD.

*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 experience with the indicator.

RESOURCE USE PER DECLARED UNIT

USE OF RENEWABLE MATERIAL RESOURCES	UNITS / D.U.	UPSTREAM		CORE PROCESS				DOWNSTREAM				TOTAL	D
		A1 	A2 	A3 	A4 	C1 	C2 	C3 	C4 				
PERE	[MJ]	4.36E+02	2.24E+01	9.46E+01	4.69E+00	8.54E-01	5.35E-01	3.08E+00	4.08E-02	5.62E+02	3.26E+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	0.00E+00		
PERT	[MJ]	4.36E+02	2.24E+01	9.46E+01	4.69E+00	8.54E-01	5.35E-01	3.08E+00	4.08E-02	5.62E+02	3.26E+02		
PENRE	[MJ]	6.95E+03	1.73E+03	7.41E+02	9.71E+02	5.33E+02	3.51E+02	3.30E+01	1.00E+01	1.13E+04	5.65E+03		
PENRM	[MJ]	0.00E+00	0.00E+00	1.49E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.49E+02	0.00E+00		
PENRT	[MJ]	6.95E+03	1.73E+03	8.90E+02	9.71E+02	5.33E+02	3.51E+02	3.30E+01	1.00E+01	1.15E+04	5.65E+03		
SM	[kg]	1.10E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.10E+03	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	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	0.00E+00		
FW	[m ³]	1.18E+00	9.44E-02	3.52E+00	1.83E-02	8.93E-03	9.57E-04	1.41E-02	2.08E-04	4.84E+00	1.24E+00		

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 resources

SM Use of secondary raw materials

RSF Use of renewable secondary fuels

NRSF Use of non-renewable secondary fuels

FW Use of net fresh water

OUTPUT FLOWS AND WASTE CATEGORIES PER DECLARED UNIT

WASTE GENERATION AND TREATMENT	UNITS / D.U.	UPSTREAM	CORE PROCESS				DOWNSTREAM				TOTAL	D
		A1 	A2 	A3 	A4 	C1 	C2 	C3 	C4 			
HWD	[kg]	0.00E+00	0.00E+00	1.92E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.92E+00	0.00E+00	
NHWD	[kg]	0.00E+00	0.00E+00	1.56E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E+01	0.00E+00	
RWD	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
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	0.00E+00	
MFR	[kg]	0.00E+00	0.00E+00	1.78E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E+02	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	0.00E+00	
EE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

- HWD** Hazardous waste disposed
- NHWD** Non-hazardous waste disposed
- RWD** Radioactive waste disposed
- CRU** Components for re-use
- MFR** Materials for recycling
- MER** Materials for energy recovery
- EE** Exported energy



CALCULATION RULES



The environmental burden of the product has been calculated according to EN 15804:2012+A2:2019 and PCR 2019:14 v 1.11.

This declaration is a cradle to gate with options EPD type, based on the application of Life Cycle Assessment (LCA) methodology to the whole life-cycle system.

In the whole LCA model, infrastructures and production equipments are not taken into account.

Hot rolled steel bars at plant level were described by using specific data from manufacturing facility (Lonato del Garda, BS, Italy) for year 2021.

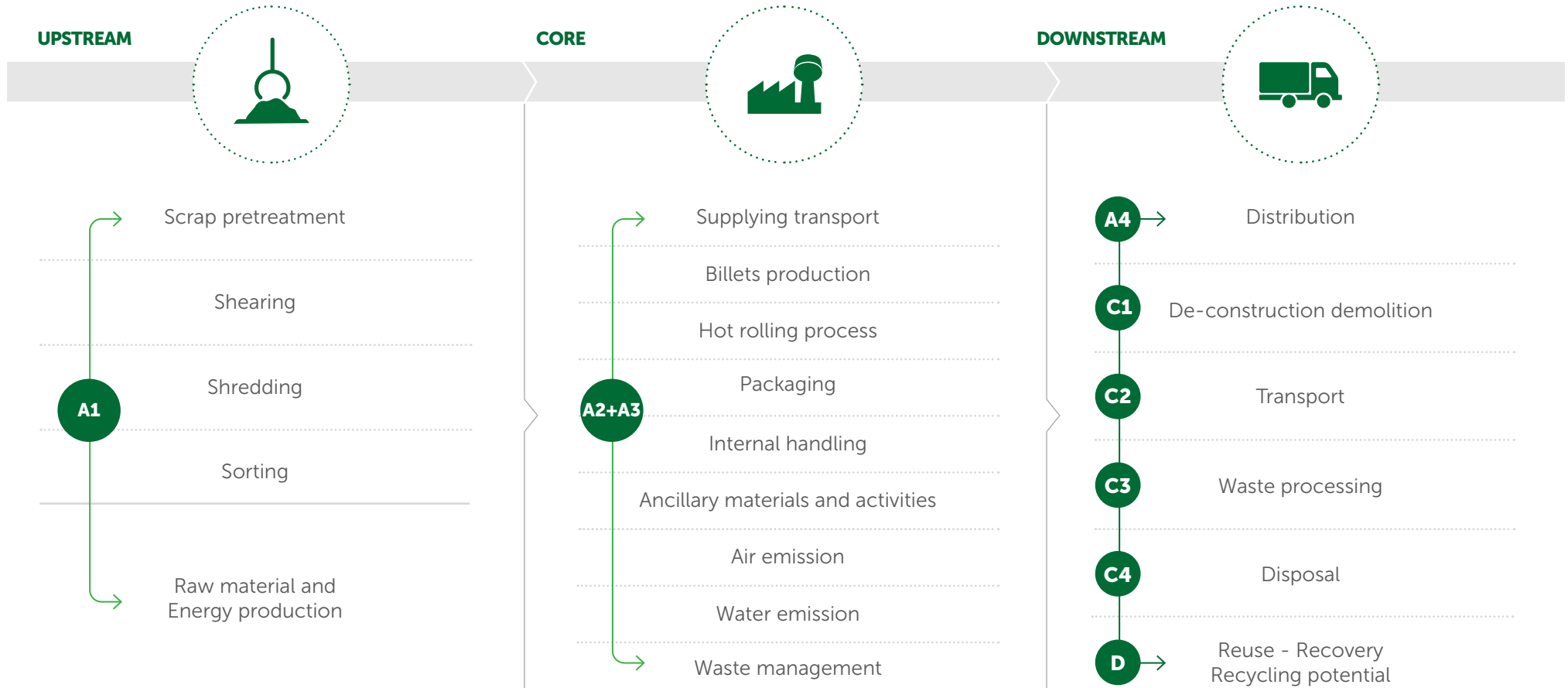
Customized LCA questionnaires were used to gather in-depth information about all aspects of the production system (for example, raw materials contents and specifications, pre treatments, process efficiencies, air and water emissions, waste management), in order to provide a complete picture of the environmental burden of the system from raw materials supply (A1) to Transport (A2) and Manufacturing (A3).

The use phase was not considered according to EN:15804 and PCR 2019:14 v 1.11, while transport to final destination (A4) and end of life (C1-C2-C3-C4-D) were considered. Therefore, in nominal installation and operating conditions, no emissions to air nor to water shall occur.

According to ISO 14040 and 14044, allocation is avoided whenever possible by dividing the system into sub-systems. When allocation cannot be avoided physical properties are used to drive flow analysis.

Data quality has been assessed and validated during data collection process. According to EN:15804 the applied cut-off criterion for mass and energy flows is 1%.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION



Broad scheme of hot rolled steel production, in which the main activities included in the system boundaries are listed and divided in the three subsystems: **UPSTREAM Process, CORE Module and DOWNSTREAM Process.**

UPSTREAM PROCESS



CORE PROCESS



A2 - Transportation



Raw materials transportation from production or collection facilities to the production plant



Rolling mill, production, including utilities

Scheme of the considered system boundaries (core processes)



Packaging materials internal transportation

Steel mill production, including utilities

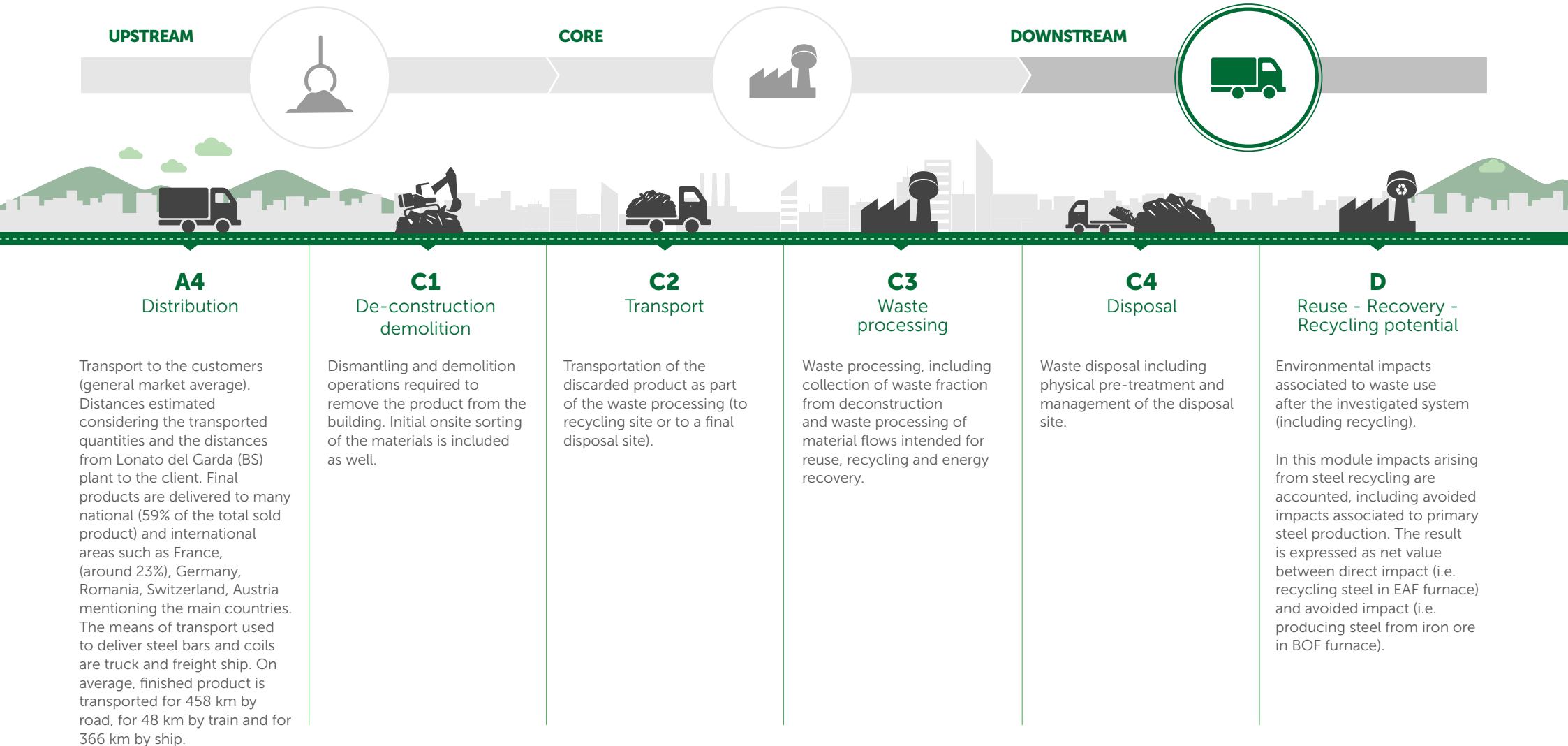


A3 - Manufacturing



Treatment of waste generated from the manufacturing processes

DOWNSTREAM PROCESS



OTHER OPTIONAL ADDITIONAL ENVIRONMENTAL INFORMATION

Feralpi plant in Lonato del Garda (BS) is equipped with prevention and reduction systems for air emissions, a recirculating loop cooling to minimize water consumption and a waste management plan to prevent and reduce waste generation,

In accordance with general EPD® requirements the LCA study used specific, generic and proxy data. These last data are contributing to the environmental indicators less than 10%.

OTHER ENVIRONMENTAL INDICATORS		UNIT	UP	CORE	DOWN	TOTAL
AIR EMISSIONS	Dust from electric-arc furnace	[g]	-	1.67	-	1.67
	CO ₂ from electric-arc furnace	[kg]	-	25.51	-	25.51
	NOx from hot rolling process	[g]	-	39.55	-	39.55
	SOx from hot rolling process	[g]	-	2.17	-	2.17
WATER EMISSIONS	Total Suspended Solids	[g]	-	1.41	-	1.41

Other environmental indicators per 1 t of hot-rolled reinforcing steel

Recycled content of hot rolled products = 98% (calculated according to ICMQ verified internal procedure)



REFERENCES

- EN 15804:2012+A2:2019
- ISO 14040
- ISO 14044
- Life Cycle Assessment (LCA) applied to steel mill products and derivatives for EPD® purposes - final report
- General Programme Instructions, v3.01
- PCR 2019:14 - Construction products - v 1.11

