

Environmental Product Declaration

REINFORCING STEEL IN BARS

EPD OF MULTIPLE PRODUCTS, BASED ON THE AVERAGE RESULTS OF THE PRODUCT GROUP

Based on:

PCR 2019:14
Construction products
v1.3.4
EN:15804:2012+A2:2019
ISO 14025:2006

Registration N°:

EPD-IES-0018167

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CPC code:

412

Programme:

The International EPD
System
www.environdec.com

Programme operator:

EPD International AB

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

EPD REFERENCES

EPD OWNER: ESF ELBE-STÄHLWERKE FERALPI GMBH, GRÖBAER STRASSE 3, 01591 RIESA
 Manufacturing plant is located in the same site

PROGRAMME OPERATOR: EPD International AB, box 21060, SE-100 31 Stockholm, Sweden; info@environdec.com

NEW EPD

INDEPENDENT VERIFICATION

This declaration has been developed referring to the International EPD System, following the General Programme Instructions v 4.0; further information and the document itself are available at: www.environdec.com.
 EPD document valid within the following geographical area: Germany 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 1.3.4
 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 Castillia, 10 20124 Milano (www.icmq.it)	<input type="checkbox"/> EPD process certification (Internal)	<input checked="" type="checkbox"/> EPD verification (External)
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Accredited by: Accredia n. 0004VV
 Procedure for follow-up during EPD validity involves third party verifier:


<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
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EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same version number up to the first two digits20) 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.


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

CONTACTS

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





Company profile

THE FERALPI GROUP is one of Europe's leading manufacturers of steels for use in infrastructure and construction.

The German site of the Feralpi Group, **ESF ELBE-STAHLWERKE FERALPI GMBH** (ESF), has developed into a company with a wide range of products in the field of reinforcement steel since it was founded in 1992. Through constant modernisation of our facilities, our products guarantee a high standard of quality parameters so that we can meet the requirements of our customers. ESF is continuously monitoring developments in the reinforcement steel sector in the future and incorporate them into innovative technologies and production processes. This serves not least to strive for and fulfill the goal of continuously improving our efficiency in terms of processes and resources - and thus the environmental performance of our business activities. In addition to the production areas of steelworks, rolling mill and wire processing, there is also the plant logistics department (including the connecting railway), which is responsible for all internal and external loading processes.

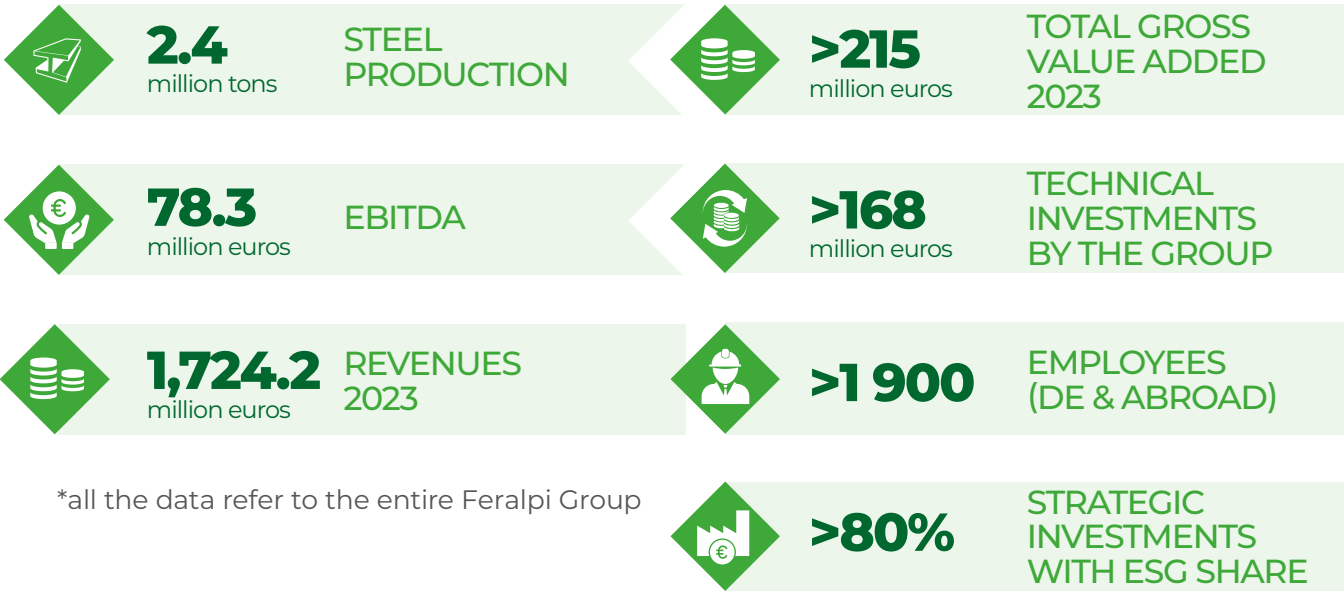
The steel produced by ESF Elbe-Stahlwerke Feralpi GmbH is made exclusively from scrap with the EAF route. Utilising scrap as a raw material for steel production makes an important contribution to conserving natural resources.

The management systems implemented at the entire company site have been merged into an Integrated Management System (IMS) since 2015. The IMS includes the requirements of the standards DIN EN ISO 9001, DIN EN ISO 14001, EMAS III, and DIN EN ISO 50001 as well as the monitoring of the specialised waste management company in accordance with Sections 56 and 57 KrWG and, in addition to ESF, also includes Feralpi Stahlhandel GmbH and Feralpi-Logistik GmbH.

Environmental protection, energy efficiency and the circular economy determine the production processes. New technologies, environmental protection and energy efficiency measures are consistently implemented. The basis for the continuous improvement of environmental performance is a functioning environmental and energy management system that integrates all processes and stakeholders: from waste avoidance to reducing energy consumption.

For EPD purposes: ISO standard ISO 21930 compliance has been included in order to allow the selling outside Europe.

FERALPI GROUP | KEY FIGURES 2023*



Riesa

ESF Elbe-Stahlwerke
Feralpi GmbH
established in
1992

Scope and Type of EPD

THE APPROACH USED IN THIS EPD IS “**CRADLE-TO-GATE WITH OPTIONS**”, MODULES C1-C4, MODULE D AND WITH OPTIONAL MODULES (A4)

Table of modules

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		UTILISATION STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
	Raw material supply	Transport	Manufacturing	Transport to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction 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	✓	✓	✓	✓	MND	MND	MND	MND	MND	MND	MND	MND	✓	✓	✓	✓	✓
geography	DE	DE	DE	EU	-	-	-	-	-	-	-	-	EU	EU	EU	EU	EU
specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
variations - products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
variations - sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

SOFTWARE: SimaPro ver. 9.6
MAIN DATABASE: Ecoinvent 3.10
REPORT LCA: Life cycle assessment applied to billet, wire rod, reinforcing steel bars, reinforcing steel in coils and electrowelded mesh
GEOGRAPHICAL SCOPE OF THE EPD: Europe according to sales market conditions
TYPE OF EPD: EPD of multiple products, based on the average results of the product group

The product

The Reinforcing steel in bars from ESF Elbe-Stahlwerke Feralpi GmbH are supplied in the form of straight bars and are used for the reinforcement of reinforced concrete components. Reinforcing steel bars are hot-rolled and heat-treated from the rolling heat. The product is supplied in different lengths as technically straight ribbed bars and is available in various diameters. The bars are used for the reinforcement of houses or bridges, among other things.

The main materials of the final product are: iron > 96%; alloy elements 2% c.a.; other elements complementary to 100%; for (post-consumer) recycled content see section Other optional additional environmental information.

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

SVHC Information: The product does not contain any hazardous substance according to REACH Regulation.

INFORMATION	DESCRIPTION
PRODUCT DESCRIPTION	Reinforcing steel in bars (finished products for the reinforcement of reinforcing steel structures)
STEEL GRADE	Reinforcing steel bars in ductility classes B500A, B500B and B500SP/ B500C
RATIO RM/RE	min. 1,08 (B500B)
PRODUCTION ROUTE	EAF
STANDARD	DIN 488 and other international standards, e.g.: PN-H-93220, PTV 302, NF A 35-080, NEN 6008, SS212540, SIA 262, CSN 420139, MSZT/T 339
DIAMETER RANGE	6 mm - 40 mm
PRODUCTIONS	Total amount of products covered by this EPD, year 2023: 373 821 t
	Total production, for selling purpose, year 2023: 373 821 t

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 a mix between German Supplier mix 2023 and renewable energy with Guarantees of Origin related network losses and transformation. Final emission factor is 0,22 kg CO₂ eq./kWh. The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

Environmental impacts per declared unit

	UNITS	UPSTREAM - CORE PROCESS	DOWNSTREAM					
		A1:A3	A4	C1	C2	C3	C4	D
GWP	kg CO ₂ eq	3.68E+02	3.42E+01	5.88E+01	1.73E+01	2.16E+00	4.07E-01	1.96E+02
GWP,f	kg CO ₂ eq	3.68E+02	3.42E+01	5.88E+01	1.73E+01	2.16E+00	4.07E-01	1.96E+02
GWP,b	kg CO ₂ eq	1.85E-01	7.02E-03	2.29E-03	5.97E-04	1.81E-03	3.02E-05	2.93E-02
GWP,luluc	kg CO ₂ eq	1.65E-01	3.14E-03	2.03E-03	4.29E-04	3.51E-03	1.67E-05	2.05E-03
GWP,ghg	kg CO ₂ eq	3.68E+02	3.42E+01	5.88E+01	1.73E+01	2.16E+00	4.07E-01	1.96E+02
ODP	kg CFC-11 eq	4.73E-06	7.01E-07	9.25E-07	3.57E-07	1.45E-08	6.04E-09	3.92E-07
AP	mol H+ eq	1.26E+00	5.73E-02	5.49E-01	3.31E-02	1.05E-02	3.70E-03	7.11E-01
EP,f	kg P eq	1.32E-02	1.92E-04	5.55E-05	1.47E-05	1.04E-04	1.46E-06	8.33E-03
EP,m	kg N eq	3.30E-01	1.75E-02	2.58E-01	1.12E-02	2.02E-03	1.68E-03	1.39E-01
EP,t	mol N eq	3.68E+00	1.91E-01	2.83E+00	1.23E-01	2.23E-02	1.84E-02	1.64E+00
POCP	kgNMVOCeq	1.15E+00	1.09E-01	8.42E-01	6.16E-02	6.79E-03	5.57E-03	5.52E-01
ADP,e*	kg Sb eq	2.05E-04	1.18E-06	2.46E-06	5.77E-07	6.05E-08	1.61E-08	1.60E-03
ADP,f*	MJ	4.48E+03	4.65E+02	7.74E+02	2.31E+02	2.92E+01	5.23E+00	1.68E+03
WDP*	m³	5.41E+01	2.25E-01	6.11E-01	9.81E-02	3.61E-01	4.74E-03	1.99E+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
ADP,e Abiotic depletion potential minerals

& metals*
ADP,f 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

Environmental performance

>>*Produce and grow with respect for the people and the environment.*<<

Carlo N. Pasini | Founder of the Feralpi Group

Resource use per declared unit

	UNITS	UPSTREAM - CORE PROCESS	DOWNSTREAM					
		A1:A3	A4	C1	C2	C3	C4	D
PERE	MJ	1.28E+03	5.83E+00	1.70E+00	8.02E-01	4.25E+00	2.30E-02	1.21E+02
PERM	MJ	2.35E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.28E+03	5.83E+00	1.70E+00	8.02E-01	4.25E+00	2.30E-02	1.21E+02
PENRE	MJ	4.48E+03	4.65E+02	7.74E+02	2.31E+02	2.95E+01	5.27E+00	1.68E+03
PENRM	MJ	3.30E-01	0.00E+00	0.00E+00	0.00E+00	-2.95E-01	-3.28E-02	0.00E+00
PENRT	MJ	4.48E+03	4.65E+02	7.74E+02	2.31E+02	2.92E+01	5.23E+00	1.68E+03
SM	kg	1.09E+03	0.00E+00	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
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m³	6.43E+00	1.90E-02	2.42E-02	5.92E-03	1.52E-02	1.81E-04	5.49E-01

Additional environmental impact indicators are computed in the LCA report but not reported in the EPD.
*The results of this enviromental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

It is not recommended to use results of modules A1-A3 without considering also module C.

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

Environmental performance

Output flows and waste categories per declared unit

	UNITS	UPSTREAM - CORE PROCESS	DOWNSTREAM					
		A1:A3	A4	C1	C2	C3	C4	D
HWD	kg	1.22E-02	2.98E-03	5.31E-03	1.53E-03	5.22E-05	3.46E-05	1.85E-02
NHWD	kg	1.87E+02	4.09E-02	2.26E-02	7.03E-03	8.50E+02	1.50E+02	5.21E-01
RWD	kg	4.49E-03	1.24E-04	3.95E-05	2.17E-05	8.25E-05	3.20E-07	-1.15E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	1.74E+02	0.00E+00	0.00E+00	0.00E+00	8.50E+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
EE	MJ	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 1.3.4.

This declaration is a Cradle-to-Gate with options, modules C1–C4, module D and with optional modules (A4) 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 is described by using specific data from manufacturing facility (Elbe-Stahlwerke Feralpi GmbH, Gröbaer Straße 3, 01591 Riesa) for year 2023.

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 1.3.4, 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. No allocation were used in that phase.

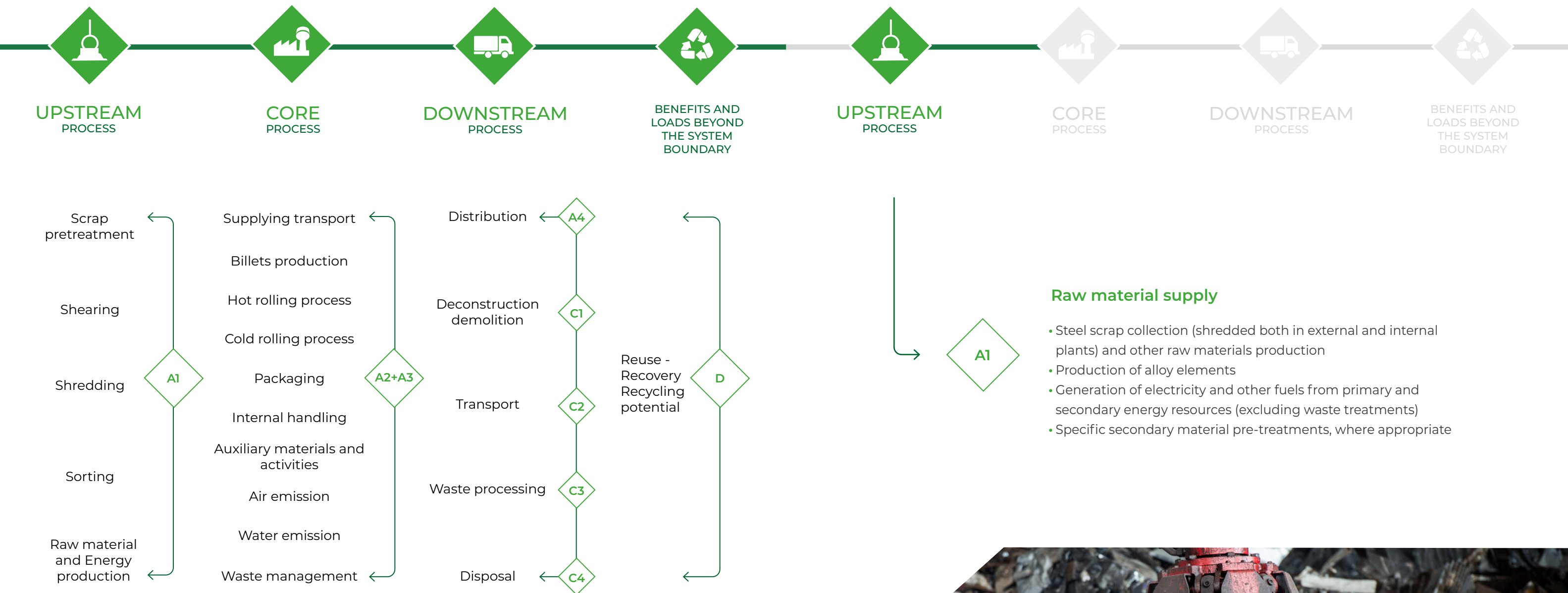
Scrap pre and post consumer has been modeled following new PCR 2019:14 v1.3.4 rules by adding environmental loads on pre-consumer with an economic allocation method.

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

Upstream process

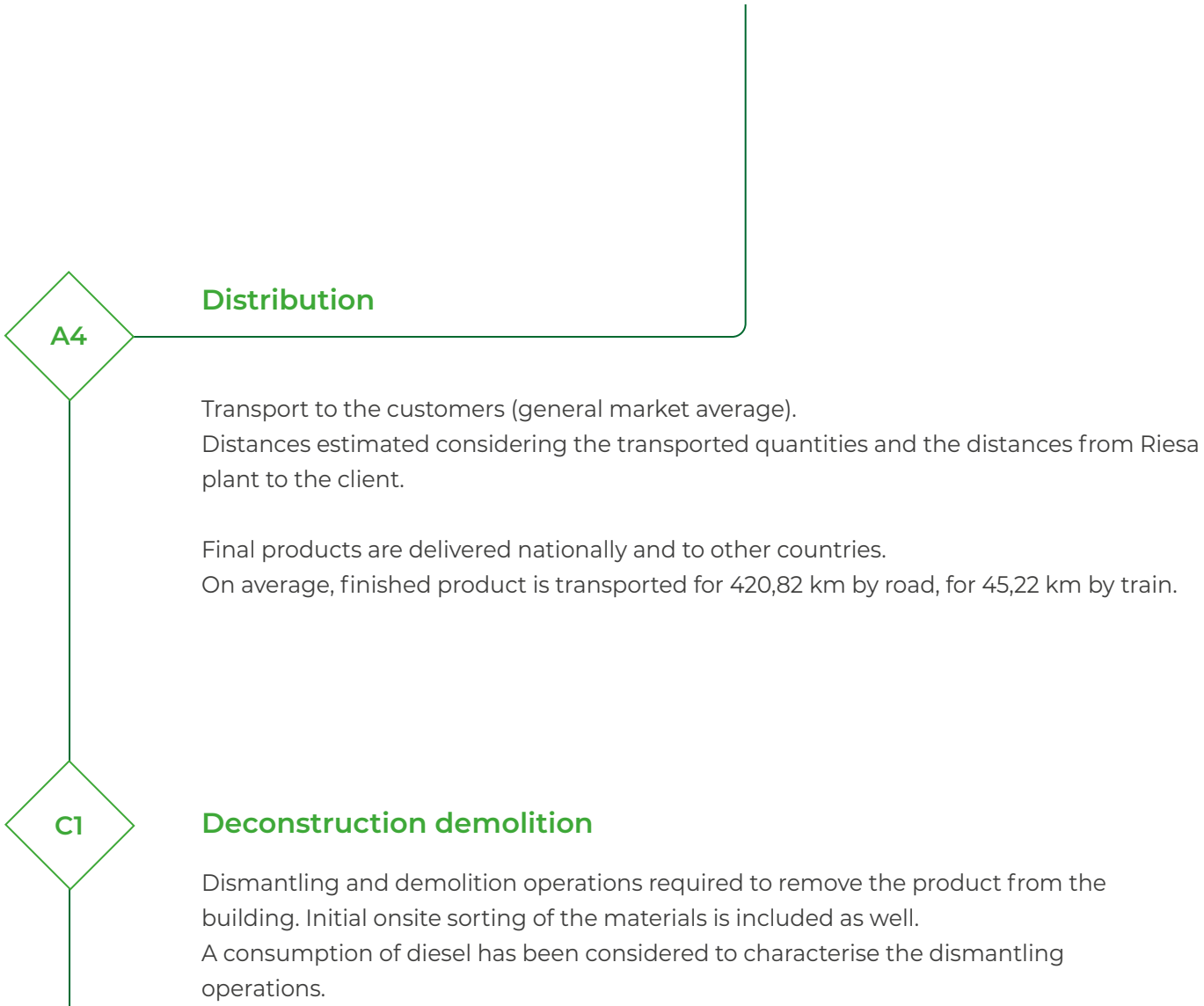
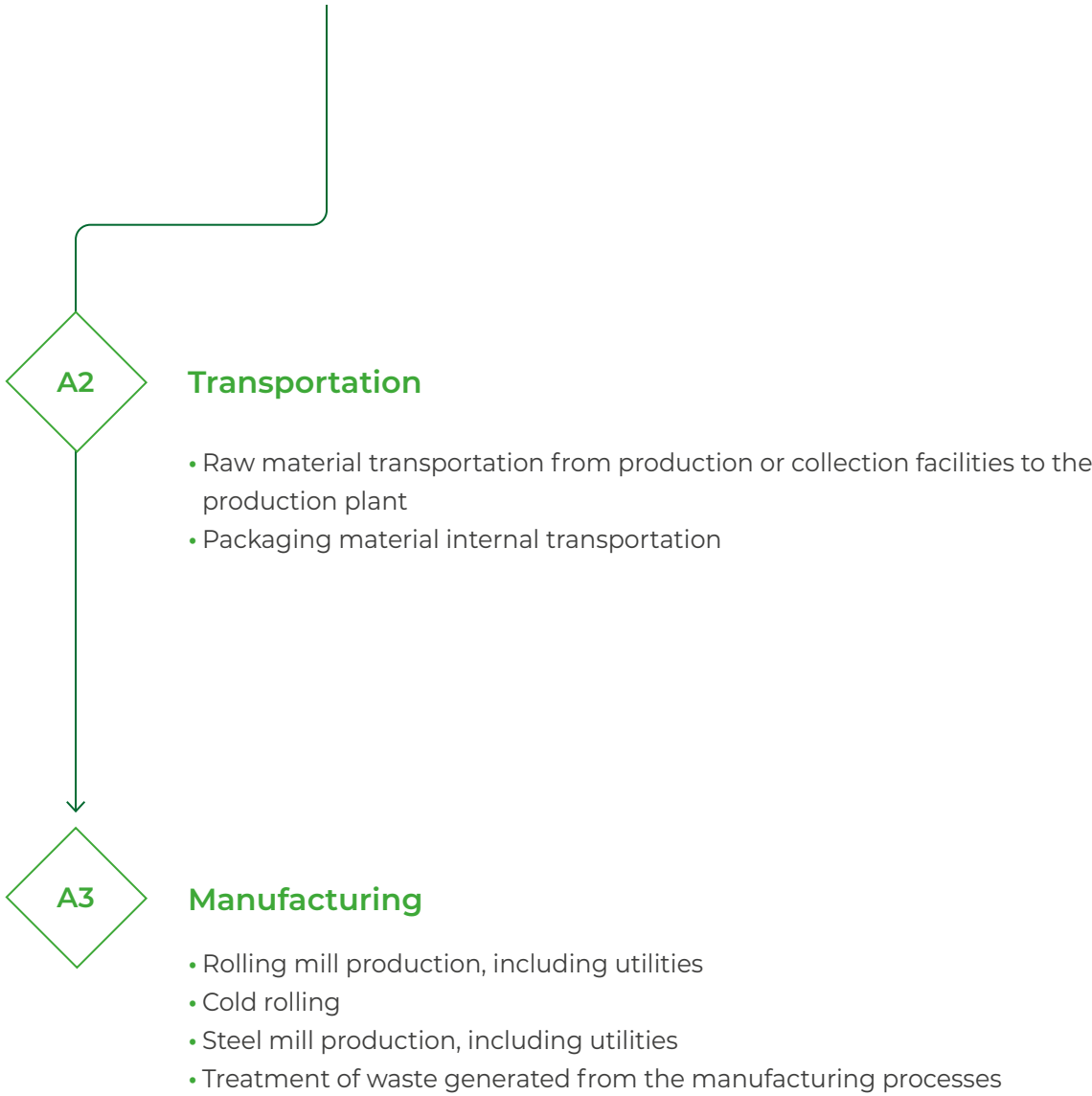
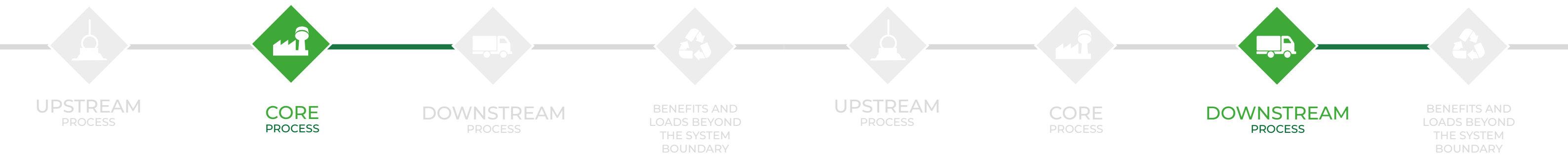


Broad scheme of hot rolled steel production, in which the main activities included in the system boundaries are listed and divided in the three subsystems: **UPSTREAM Process**, **CORE Module** and **DOWNSTREAM Process**.

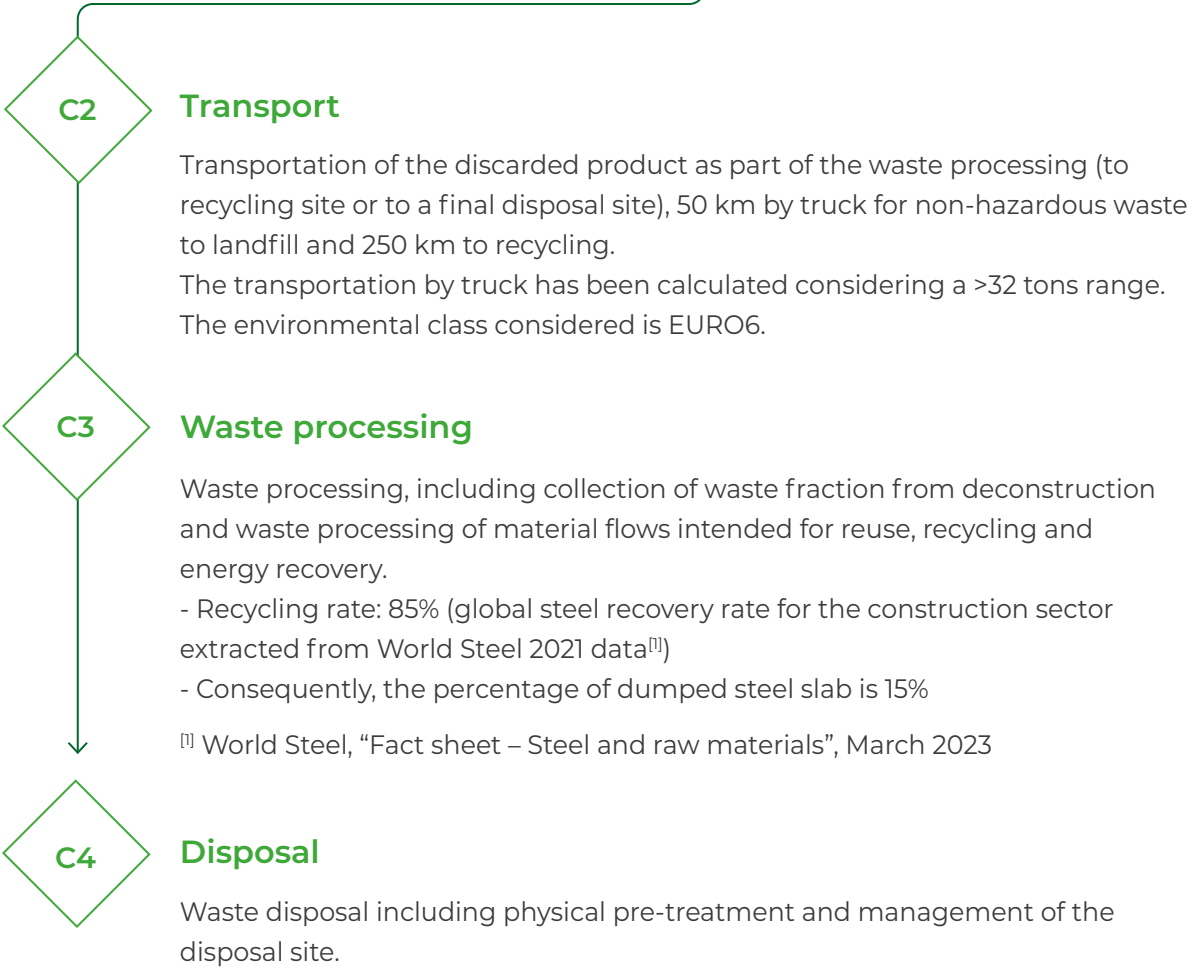


Core process

Downstream process



Downstream process



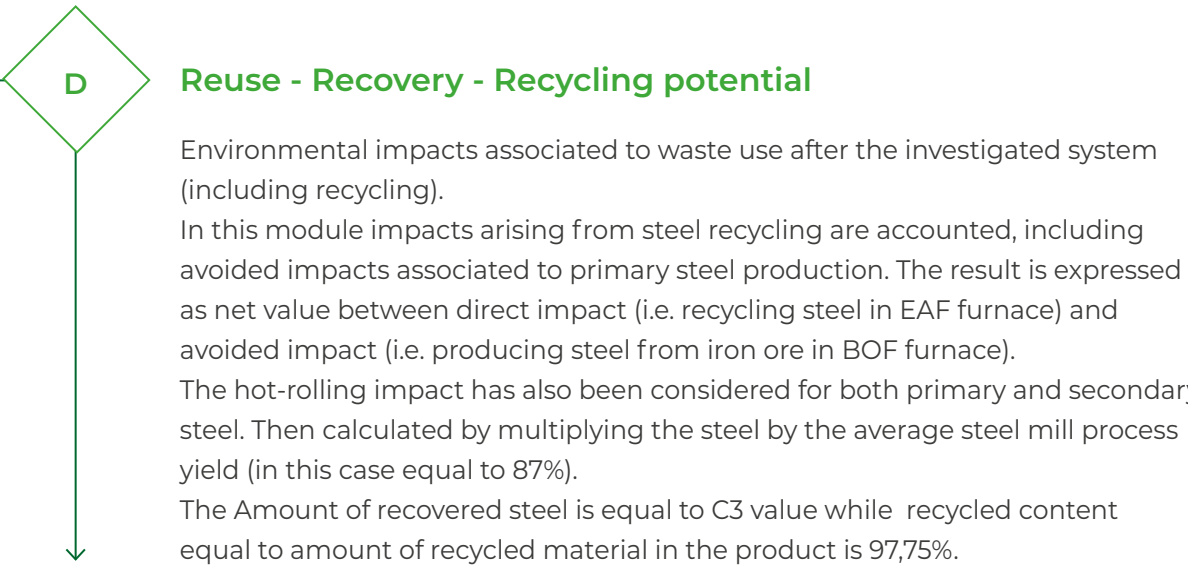
Other optional additional environmental information

Strategic projects to improve process efficiency and environmental performance: New **resource-saving hot rolling mill** (rolling mill B) with inductive billet heating furnace, new **scrap processing** for more efficient scrap utilisation and production process, new **transformer station** in which the use of the usual sulphur hexafluoride (SF 6) can be completely dispensed, new **logistics concept** for faster and more efficient processing of logistics orders.

MINIMUM CONTENT OF RECYCLED, RECOVERED, BY-PRODUCT MATERIALS								
PRODUCT TYPE	PRODUCT NAME	RECYCLED MATERIAL			RECOVERED MATERIAL	BY-PRODUCT MATERIAL		TOTAL CONTENT OF RECYCLED, RECOVERED, BY-PRODUCT MATERIAL
		Total	Pre-consumer	Post-consumer		Internal	External	
		[%]	[%]	[%]	[%]	[%]	[%]	[%]
HOT-ROLLED STEEL	Steel Bars	97,75	7,72	90,03	0	1,0	0	98,75

Recycled content verified according to ICMQ CP DOC 262 regulation, certification n. P605 rev. 2.2 and calculated according to UNI EN ISO 14021, publication date 14/06/2024, referred to 2023 year.

Benefits and loads beyond the system boundary



**»Produce and grow with respect
for the people and the environment.«**

Carlo N. Pasini | Founder of the Feralpi Group

References

- EN 15804:2012+A2:2019
- ISO 14040 and 14044:2006
- UNI EN ISO 14021:2021
- Life cycle assessment applied to billet, wire rod, reinforcing steel bars, reinforcing steel in coils and electrowelded mesh v2.0
- General Programme Instructions, v4.0
- PCR 2019:14 - Construction products - v 1.3.4
- JRC EF package v3.1

