

# ENVIRONMENTAL PRODUCT DECLARATION

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## MERCHANT BARS ITALIAN PLANTS AVERAGE

**AFV ACCIAIERIE BELTRAME S.P.A.**  
AFV BELTRAME GROUP

 **EPD**<sup>®</sup>  
ENVIRONMENTAL PRODUCT DECLARATION

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**Based on PCR**

PCR 2012:01, Version 2.3,  
Construction products  
and construction  
services (2018-11-15)

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**Certification N°**

S-P-01558

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**Issue date**

2019-10-20

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**Valid until**

2024-10-19

**Revision**

v.2

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**CPC Code**

41

# GENERAL INFORMATION

## EPD REFERENCES

**EPD OWNER:** AFV ACCIAIERIE BELTRAME SPA, VIALE DELLA SCIENZA 81, 36100, VICENZA – ITALY  
 PIAZZA GIACOMO MATTEOTTI, 13, 52027 SAN GIOVANNI VALDARNO AREZZO – ITALY  
 VIA PRAMOLLE, 1, 10050 SAN DIDERO TORINO – ITALY

**PROGRAM OPERATOR:** EPD INTERNATIONAL AB, VALHALLAVÄGEN 81, 114 27 STOCKHOLM, SWEDEN

## INDEPENDENT VERIFICATION

This declaration has been developed referring to the International EPD System, following the General Programme Instructions; further information and the document itself are available at: [www.environdec.com](http://www.environdec.com). EPD document valid within the following geographical area: Italy and other countries according to sales market conditions (North Africa and Europe).

CEN standard EN 15804 served as the core PCR (PCR 2012:01 Construction products and Construction services, version 2.3, valid until 2020-03-03)  
 PCR review was conducted by: The Technical Committee of the International EPD® System. Chair: Filippo Sessa.  
 Contact via [info@environdec.com](mailto:info@environdec.com)

Independent verification of the declaration and data, according to EN ISO 14025 : 2010  EPD process certification (Internal)  EPD verification (External)

Third party verifier: ICMQ SpA, via De Castilia, 10 20124 Milano ([www.icmq.it](http://www.icmq.it))

Accredited by: Accredia

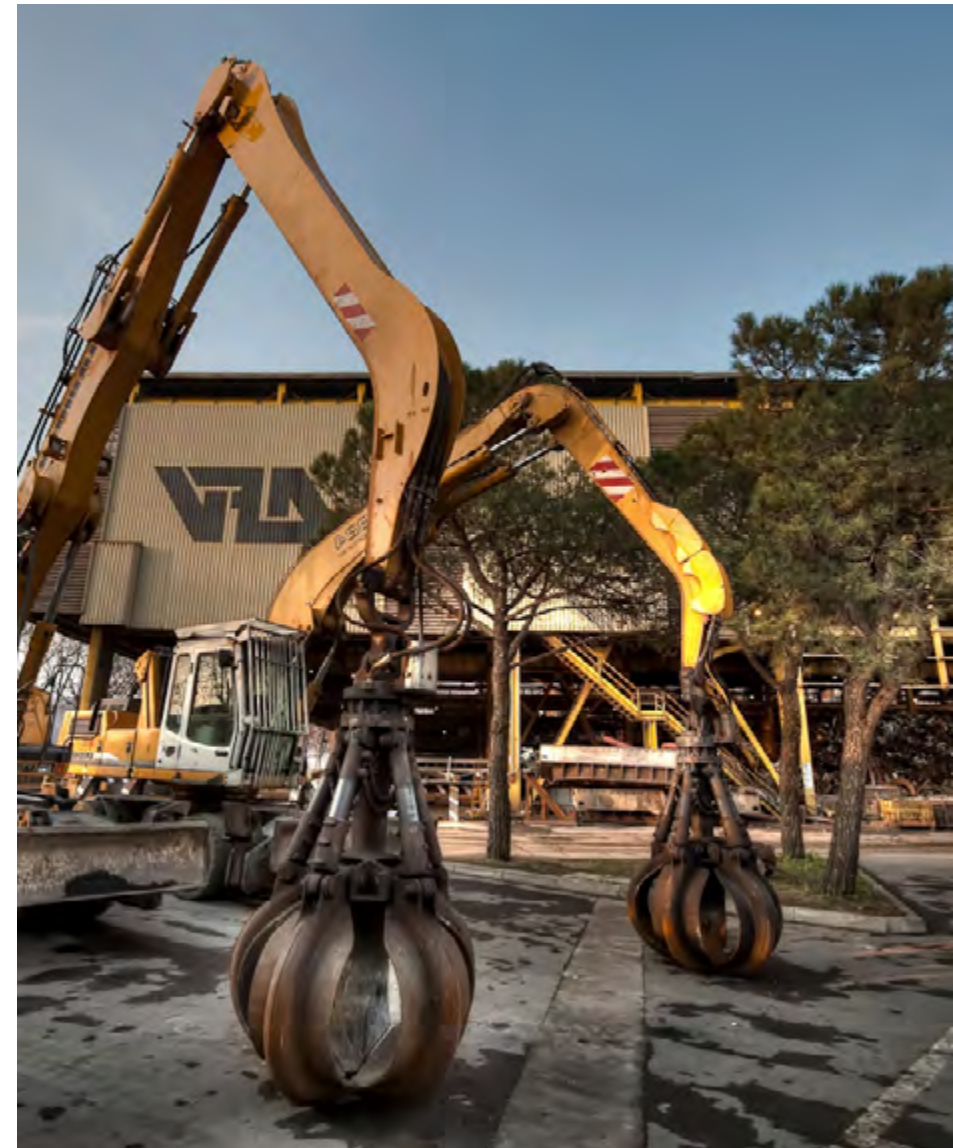
Environmental declarations published within the same product category, though originating from different programs, may not be comparable. In particular, EPDs of construction products may not be comparable if they do not comply with EN 15804.

## CONTACTS

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Technical support to Beltrame Group was provided by Life Cycle Engineering, Italy.  
 ([info@studiolce.it](mailto:info@studiolce.it), [www.lceengineering.eu](http://www.lceengineering.eu)).



# THE COMPANY

The AFV Beltrame Group has operated in the steel industry for over a century, producing rolled sections for use in construction, shipyards, and excavators.

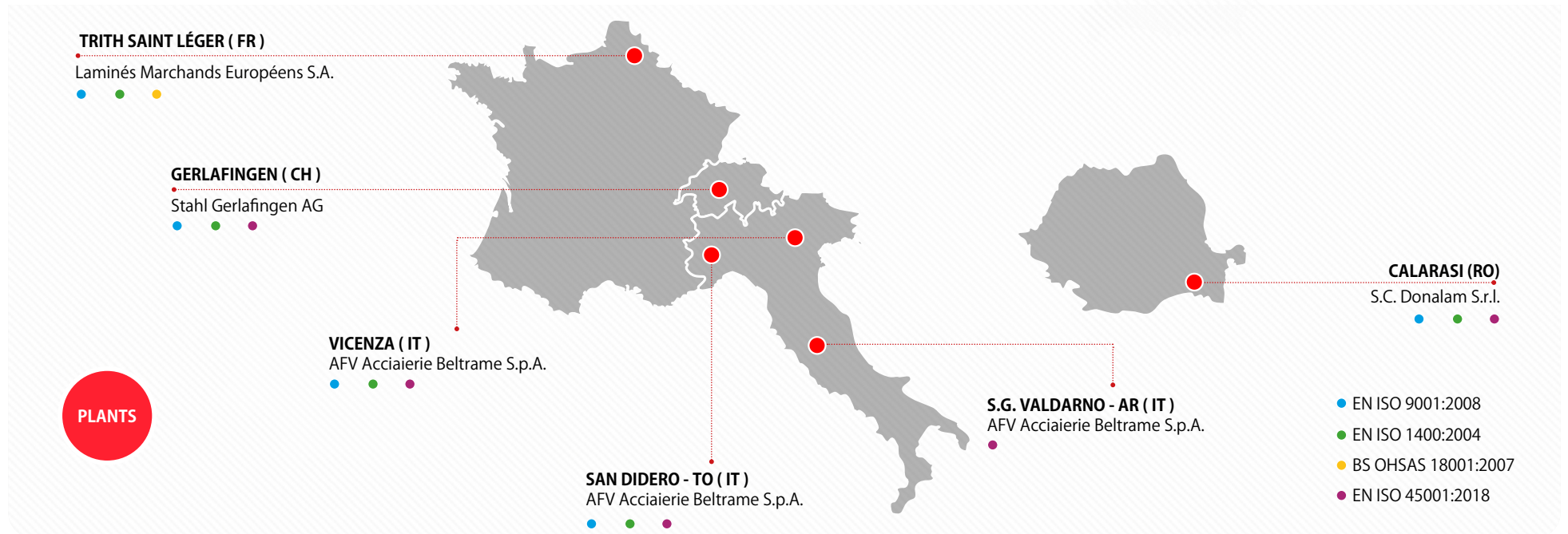
The facilities, which have a production capacity of approximately **3,2 million tons**, include three electric furnaces and ten rolling mills. These are scattered in six plants located in **Italy, France, Switzerland, and Romania.**

Their geographical distribution is very advantageous given the areas where the products are consumed and those where raw materials are purchased.

The AFV Beltrame Group is commercially present in all European markets as well as in the Mediterranean region through shares in local companies, agents, or the internal sales force. All employees, amounting to approximately **2,000 people**, are strongly committed

and motivated to satisfy the customers' needs through constant improvements in production, organization and level of service.

In order to support the principles in the code of ethics and the policy regarding **Quality, Health and Safety**, and the **Environment** (QHSE), all production plants have adopted an Integrated Management System.



# 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
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

**TYPE OF EPD®:** Product EPD®

**REPORT LCA:** Life Cycle Assessment (LCA) of hot rolled bars via EAF process.

**REFERENCE PERIOD:** 2018

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

**AVERAGING:** Weighted on the plant production.

**SOFTWARE:** SimaPro ver. 9.0.0.47 (www.pre.nl)

**MAIN DATABASE:** Ecoinvent 2.2

Environmental declarations published within the same product category, though originating from different programs, may not be comparable.

# DETAILED PRODUCT DESCRIPTION

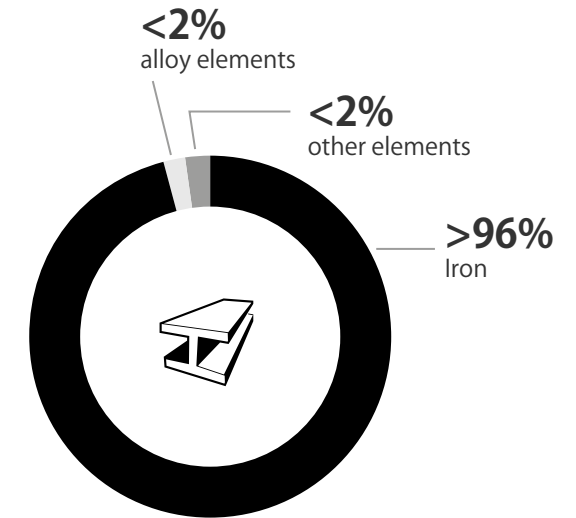
This EPD refers to construction products hot rolled structural profiles and merchant bars produced at **Vicenza, San Didero (TO)** and **San Giovanni Valdarno (AR)** plants, with electric arc furnace route, starting from post and pre consumer steel scraps, varying steel grades, e.g. S235, S275, S355, etc..

## PRODUCT DIMENSIONS AND SPECIFIC STANDARDS:

- » EN 10025-1:2004    » EN 10025-5:2004,
- » EN 10025-2:2004    » Attestation of conformity system 2+ (CE marking)

## CONTENT DECLARATION

*The product here considered has the following composition:*



PRODUCT	STANDARD	DIMENSIONS (mm)		THICKNESS (mm)	
		from	to	from	to
I sections	EN 10034:1993	80	160	5,2	7,4
Tees	EN 10055:1995	20	100	3	11
Angles	EN 10056-1:1998 EN 10056-2:1993	15	160	3	16
Angles sharp edges	DIN 1022:2004	20	100	3	11
Flats	EN 10058:2003	10	150	3	50
Wide flats	DIN 59200:2001	151	250	5	30
Squares	EN 10059:2003	-	-	10	50
Rounds	EN 10060:2003	-	-	6	30
U channels	EN 10279:2000	30	160	4	7,5



# ENVIRONMENTAL PERFORMANCE

The detailed environmental performance (in terms of potential environmental impacts, use of resources and waste generation) is presented for the three phases Upstream, Core and Downstream and related sub-phases (A1-A2-A3-A4). Construction installation (A5), use phase (B1 - B7) and end of life (C1 - C4) are modules not declared (MND).

**DECLARED UNIT (D.U.)** The declared unit is 1 tonne (1 000 kg) of hot rolled merchant bar.

	VICENZA	SAN DIDERO	SAN GIOVANNI VALDARNO	TOTAL
PRODUCTION [ t ]	633 012	120 589	45 360	798 960
SHARING	79%	15%	6%	100%





VICENZA, SAN DIDERO AND SAN GIOVANNI VALDARNO'S DATA HAVE BEEN ELABORATED TO GENERATE SINGLE RESULTS THAT REPRESENT A WEIGHTED AVERAGE OF THE THREE PLANTS. THE WEIGHT OF EVERY PLANT IS GIVEN ACCORDING TO THEIR PRODUCTION

# AFV BELTRAME ITALIAN PLANTS

- GWP** Global warming potential
- ODP** Depletion potential of the stratospheric ozone layer
- AP** Acidification potential of land and water
- EP** Eutrophication potential
- POCP** Formation potential of tropospheric ozone photochemical oxidants
- ADPE** Abiotic depletion potential for non-fossil resources
- ADPF** Abiotic depletion potential for fossil resources

**SCIENTIFIC NOTATION**  
 Reading guide  
 GWP: 4.7E+02 is equal to  
 $4.7 \times 10^{+2} = 4.7 \times 100 = 470$

## ENVIRONMENTAL IMPACTS PER DECLARED UNIT





POTENTIAL ENVIRONMENTAL IMPACTS	UNITS / D.U.	UPSTREAM PROCESS	CORE PROCESS			DOWNSTREAM PROCESS	TOTAL*
		A1 	A2 	A3 	A4 		
GWP	kg CO <sub>2</sub> eq	4.7E+02	2.6E+01	2.3E+02	5.6E+01	<b>7.8E+02</b>	
ODP	kg CFC-11 eq	5.5E-05	3.8E-06	7.7E-06	8.4E-06	<b>7.5E-05</b>	
AP	kg SO <sub>2</sub> eq	1.6E+00	1.7E-01	3.7E-01	2.1E-01	<b>2.4E+00</b>	
EP	kg PO <sub>4</sub> <sup>3-</sup> eq	2.2E-01	3.0E-02	8.0E-02	4.5E-02	<b>3.7E-01</b>	
POCP	kg C <sub>2</sub> H <sub>4</sub> eq	7.3E-02	4.4E-03	5.8E-02	4.5E-03	<b>1.4E-01</b>	
ADPE	kg Sb eq	4.9E-05	6.2E-08	1.5E-04	6.9E-08	<b>2.0E-04</b>	
ADPF	MJ	1.0E+04	3.5E+02	9.4E+02	7.3E+02	<b>1.2E+04</b>	

\*Totals may not correspond to the sum of the individual contributes due to approximations.

# AFV BELTRAME ITALIAN PLANTS

- 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

## RESOURCE USE PER DECLARED UNIT

USE OF RESOURCES	UNITS / D.U.	UPSTREAM PROCESS	CORE PROCESS			DOWNSTREAM PROCESS	TOTAL*
		A1 	A2 	A3 	A4 		
PERE	MJ	3.2E+02	2.2E+00	6.2E+01	1.1E+00	<b>3.9E+02</b>	
PERM	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	<b>0.0E+00</b>	
PERT	MJ	3.2E+02	2.2E+00	6.2E+01	1.1E+00	<b>3.9E+02</b>	
PENRE	MJ	1.1E+04	3.6E+02	1.2E+03	7.4E+02	<b>1.4E+04</b>	
PENRM	MJ	0.0E+00	0.0E+00	1.4E+01	0.0E+00	<b>1.4E+01</b>	
PENRT	MJ	1.1E+04	3.6E+02	1.2E+03	7.4E+02	<b>1.4E+04</b>	
SM	kg	1.2E+03	0.0E+00	0.0E+00	0.0E+00	<b>1.2E+03</b>	
RSF	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	<b>0.0E+00</b>	
NRSF	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	<b>0.0E+00</b>	
FW	m <sup>3</sup>	2.5E+00	4.1E-02	1.6E+00	6.5E-02	<b>4.2E+00</b>	





\*Totals may not correspond to the sum of the individual contributes due to approximations.



# AFV BELTRAME ITALIAN PLANTS

- 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
- EEE** Exported electrical energy
- EET** Exported thermal energy

## OUTPUT FLOWS AND WASTE CATEGORIES PER DECLARED UNIT

WASTE GENERATION AND TREATMENT	UNITS / D.U.	UPSTREAM PROCESS	CORE PROCESS		DOWNSTREAM PROCESS	TOTAL*
		A1 	A2 	A3 	A4 	
HWD	kg	0.0E+00	0.0E+00	1.2E-01	0.0E+00	<b>1.2E-01</b>
NHWD	kg	9.3E-02	0.0E+00	9.0E+01	0.0E+00	<b>9.0E+01</b>
RWD	kg	1.1E-03	0.0E+00	0.0E+00	0.0E+00	<b>1.1E-03</b>
CRU	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	<b>0.0E+00</b>
MFR	kg	0.0E+00	0.0E+00	1.9E+02	0.0E+00	<b>1.9E+02</b>
MER	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	<b>0.0E+00</b>
EEE	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	<b>0.0E+00</b>
EET	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	<b>0.0E+00</b>

\*Totals may not correspond to the sum of the individual contributes due to approximations.

# CALCULATION RULES

## METHODOLOGY

The environmental burden of the product has been calculated according to the GPI v. 2.5 (2015/05/11) issued by the International EPD System<sup>1</sup> (Cradle to gate with options).

This declaration is based on the application of Life Cycle Assessment (LCA) methodology to the whole life-cycle system.

Merchant bars at plant level, was described by using specific data from manufacturing facilities (Vicenza, San Didero and San Giovanni Valdarno) for year 2018.

Customized LCA<sup>2</sup> questionnaires were used to gather in-depth information about all aspects of the production system (for example, raw materials specifications, pre treatments, process efficiencies, air emissions, waste management), ultimately providing a complete picture of the environmental burden of the system from raw materials supply (A1) to Transport (A2) and Manufacturing (A3).

The use phase and end of life were not considered according to PCR, while transport to final destination was considered (A4).

<sup>1</sup>International EPD System is managed by EPD International AB ([www.environdec.com](http://www.environdec.com)).

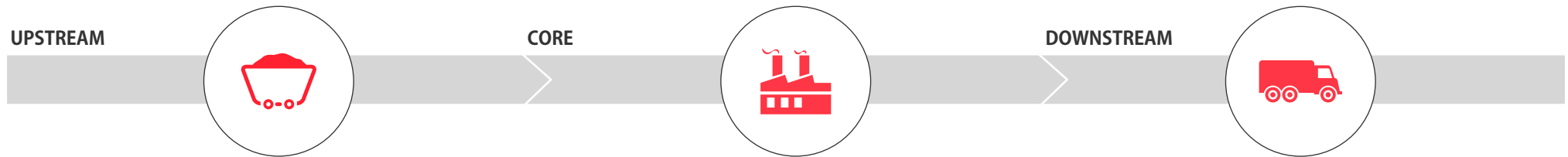
<sup>2</sup>The LCA methodology is standardized at international level by ISO 14040 and ISO 14044.

## DECLARED UNIT

Bars are usually traded in mass so that the declared unit is **1 ton of merchant bars.**



# CALCULATION RULES

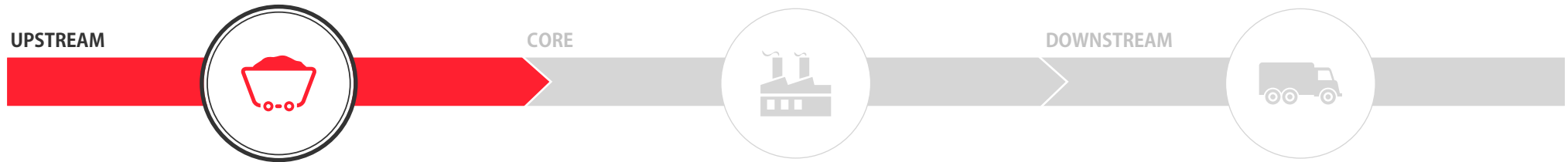


According to the PCR 2012:01 v. 2.3 the main activities are listed and divided in three subsystems: **UPSTREAM Process**, **CORE Module**, **DOWNSTREAM Process**

UPSTREAM PROCESS	CORE MODULE	DOWNSTREAM PROCESS
<p><b>Scrap pretreatment</b></p> <p>Demolition</p> <p>Shearing</p> <p><b>A1</b> Crushing</p> <p><b>Material and energy ware production</b></p> <p>Other raw materials</p> <p>Energy</p>	<p>Supplying transport</p> <p>Billets production</p> <p>Hot rolling process</p> <p>Packaging</p> <p><b>A2+A3</b> Internal handing</p> <p>Ancillary activities</p> <p>Air emission</p> <p>Water emission</p> <p>Wastes</p>	<p><b>A4</b> Transport to customers</p>

Figure 1. Scheme of the considered system boundaries (including upstream, core and downstream main processes).

# UPSTREAM PROCESS



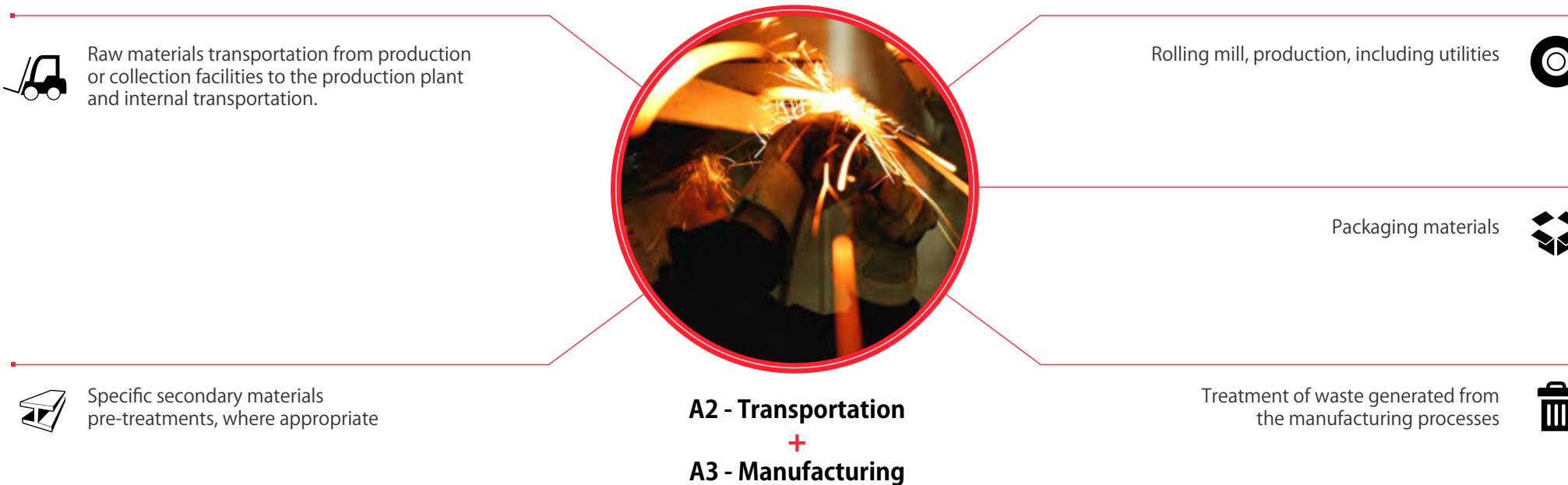
Scheme of the considered system boundaries (upstream processes).



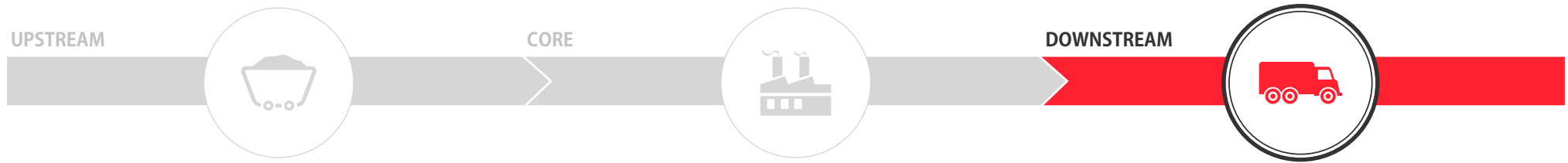
# CORE PROCESS



*Scheme of the considered system boundaries (core processes).*

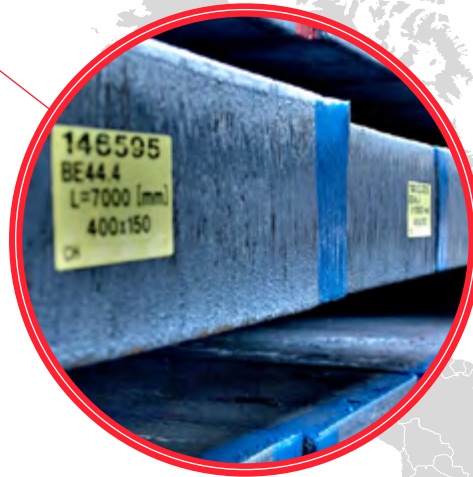


# DOWNSTREAM PROCESS



Transport to customers (general market average).

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



A4 - Distribution





## ADDITIONAL INFORMATION

Main environmental characteristics of the considered plants are:

1. EAF primary and secondary dedusting achieve an efficient extraction of all emission sources by using direct off-gas extraction (shaft) and total building evacuation, with subsequent dedusting by means of a bag filter
2. Prevention and reduction of (PCDD/F) and (PCB) emissions by using the combination of the following techniques,
  - appropriate rapid quenching of the EAF off-gas
  - injection of adsorption agents into the duct
  - final dedusting with a bag filter.
3. Minimisation of water consumption by using a recirculating loop cooling system with purge recovery. Removal of solids by sedimentation or filtration, removal of oil with skimming devices.
4. Prevention and reduction of waste generation by using the following techniques:
  - I. appropriate collection and storage to facilitate specific treatments;
  - II. on-site recovery and recycling of specific by-products from the different processes;
  - III. external recovery of filter dusts in the non-ferrous metal industry (zinc, lead);
  - IV. separation of scale in the water treatment process and external recovery in the cement and blast-furnace industry;
  - V. recovery of EAF slag as a secondary raw material (inert aggregates) in the construction industry.

5. Radiation monitoring of scraps and raw materials by means of detection equipment installed at the weighing post.

In accordance with general EPD<sup>®</sup> requirements the LCA study used specific, generic and other generic data. This last data contributes to the environmental indicators less than 10%.

