ENVIRONMENTAL PRODUCT DECLARATION
in accordance with ISO 14025 and EN 15804:2012+A2:2019

Steel products by SIDENOR
SOVEL plant

Programme

The International EPD® System,
www.environdec.com

Programme operator

EPD International AB

EPD registration number

S-P-03583

Publication date

2021-07-15

Valid until

2026-07-09

SIDENOR STEEL INDUSTRY S.A.

SOVEL HELLENIC STEEL PROCESSING COMPANY S.A.

ECO PLATFORM EPD EN 15804 VERIFIED

EPD® ENVIRONMENTAL PRODUCT DECLARATION

SIDENOR STEEL GROUP

The companies of SIDENOR Steel Group are leading producers of steel products in Southeastern Europe.
They have more than 55 years of manufacturing experience and expertise in steel production and distribution, and an extensive product portfolio which includes long, flat and downstream steel products.

The SIDENOR Steel Group offers a broad range of value-added products and solutions for applications in building and construction (including buildings, roadworks, metro stations, bridges, shopping malls and hydroelectric dam projects), in mechanical engineering, shipbuilding, road and rail, automotive, and in mining & tunneling and delivers products in more than 50 countries worldwide.

SIDENOR

STOMANA INDUSTRY

DOJRAN STEEL

SOVEL
HELLENIC STEEL PROCESSING COMPANY S.A.

Capacities:

Meltshop
1.350.000 tn/year

Rolling mill
1.200.000 tn/year

Sovel's plant in Almyros, Central Greece, is a member of the SIDENOR Steel Group.

Sovel produces steel from recycled scrap using the EAF steel-making route, being the biggest steel recycler in Greece and one of the biggest in Southeastern Europe. In addition, all by-products of the production process, such as EAF slag, LF slag and mill scales are 100% treated for valorization and use, promoting the circular economy. The plant operates a digital steel scrap reception & monitoring system.

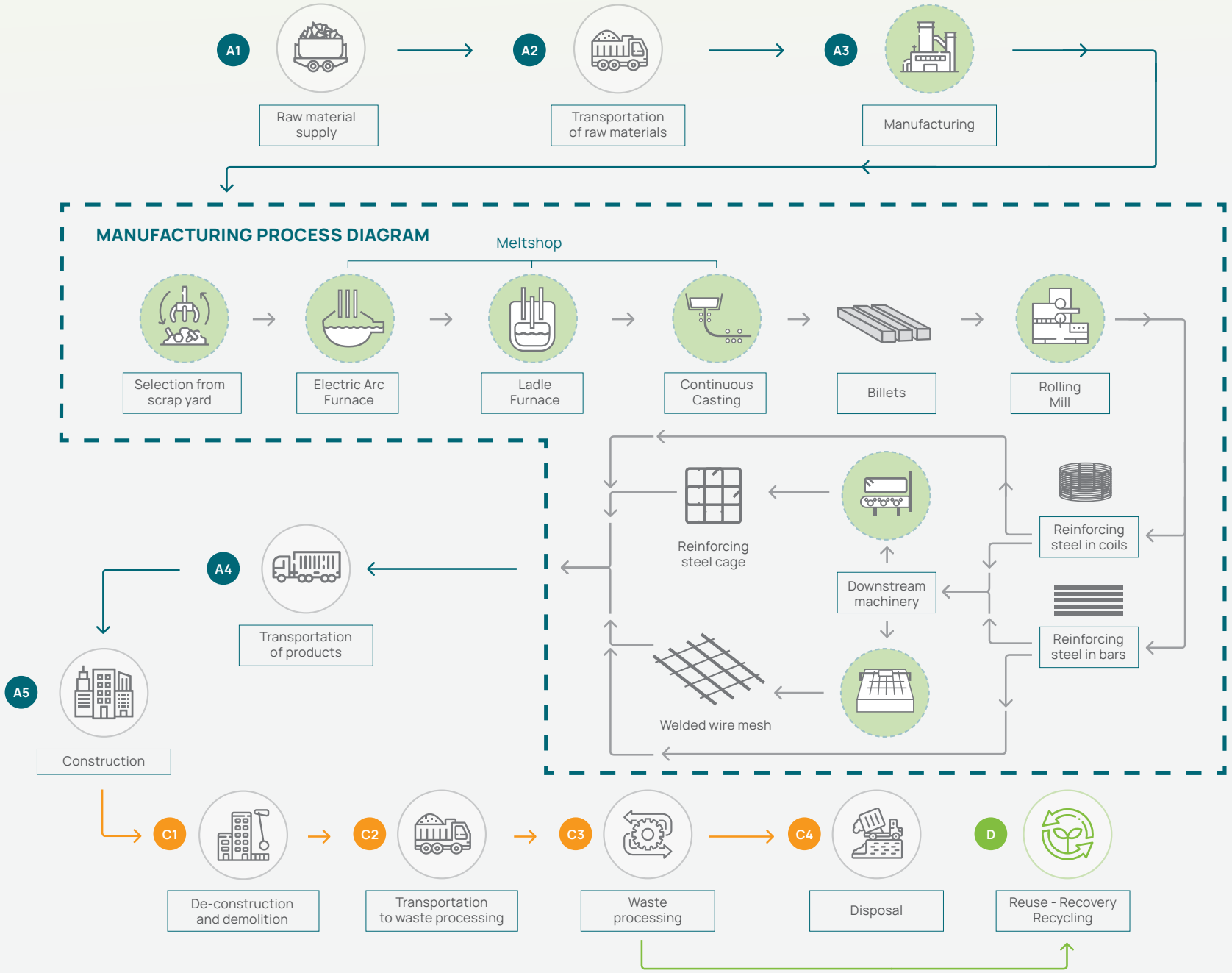
The use of consteel technology in EAF charging contributes to significant reduction of indirect CO_2 as well as atmospheric emissions.

Sovel manufactures long steel products with hot rolling and subsequent in-line quenching and self-tempering.
Billet reheating equipment including both natural gas furnace and induction furnace enables cold, warm and hot charging, providing the reheating operation with great flexibility.

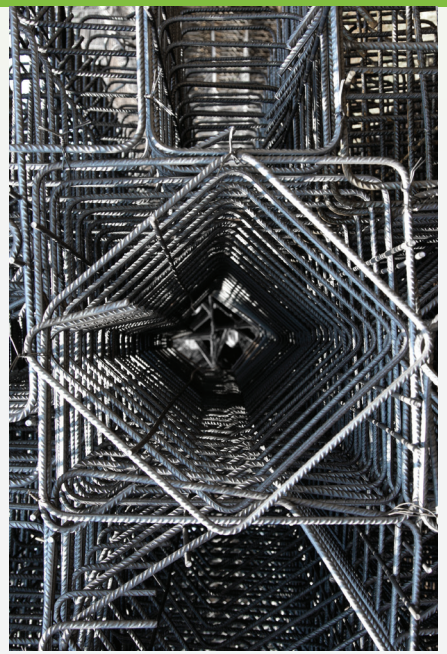
The use of induction furnace in hot charging mode leads to a significant reduction of direct CO_2 emissions.

The plant is specialized in the production of SD concrete reinforcing steel bars, standard or tailored-to-length, and SD spooled coils.
SD Stirrup reinforcing mesh, SD wire mesh, SIDEFIT special mesh and SIDEFOR prefabricated stirrup cages are the downstream products used in many applications.
All products meet the high quality standards required by the infrastructure and construction projects internationally.
The privately owned port facilities in Tsigeli, Central Greece guarantee the uninterrupted flow of both raw materials to the plant and products to the customers.

FLOW CHART


A1
Raw material supply
A2
Transportation of raw materials
A3
Manufacturing
MANUFACTURING PROCESS DIAGRAM
Meltshop
Selection from scrap yard
Electric Arc Furnace
Ladle Furnace
Continuous Casting
Billets
Rolling Mill
Reinforcing steel cage
Reinforcing steel in coils
Downstream machinery
Reinforcing steel in bars
Welded wire mesh
A4
Transportation of products
A5
Construction
C1
De-construction and demolition
C2
Transportation to waste processing
C3
Waste processing
C4
Disposal
D
Reuse - Recovery Recycling






INDICATIVE GRADES AND STANDARDS	COUNTRY
B500A acc. ELOT 1421-2 and B500C acc. ELOT 1421-3	GREECE
B500B acc. DIN 488	GERMANY
B500C acc. BS 4449:2005	UK
B500B and B500C acc. BDS 9252	BULGARIA
B500B acc. HRN 1130-2	CROATIA
B500C acc. to Technical Agreement	ROMANIA
PC52 acc. SR 438-1/2012	ROMANIA
B500C acc. SRPS EN 10080:2008	SERBIA
B450C acc. D.M 14.01.2008	ITALY
B500C acc. CYS 302	CYPRUS
S400W and S500W-C acc. SI 4466-3	ISRAEL
500N acc. AS/NZS 4671	AUSTRALIA
Grade 40, 60 and 80 acc. ASTM A615	USA
Grade 60 and 80 acc. to ASTM A706	USA
Grade 42 and 52 acc. NMX-B-506-CANACERO-2011	MEXICO
Grades 400 and 500 R and W acc. G30.18-19	CANADA
Grade B500C acc. NEN 6008	NETHERLANDS
B500C acc. DS/INF 165	DENMARK

INFORMATION	SOVEL PLANT CHARACTERISTICS
Plant features	Steel produced with Electric Arc Furnace (EAF) route by recycling post-consumer and pre-consumer steel scrap.
	Production process route: Electric Arc Furnace - Ladle Furnace - Continuous Casting - Hot Rolling - Quenching and Self Tempering
	On-site air emission treatment and control system
	On-site waste water treatment and control system
	On-site system to recycle water used in process
	By-products treatment and preparation for valorization at neighboring plant
	In/out materials/products and melting process monitored to prevent ionizing radiation contamination
	Plant carbon emissions accounted under ETS (Emission Trading System)
	Content of recycled materials ≥ 97%
Plant Management Systems	ISO 9001:2015
	ISO 14001:2015
	OHSAS 18001:2007 (transition to ISO 45001:2018)
	ISO 50001:2011
	Sustainability for Steel Construction Products Mark (SustSteel)

Sidenor's **HOT-ROLLED WELDABLE REINFORCING BARS AND COILS** are marketed under the name SD Concrete Reinforcing Steel and are used in the reinforcing of concrete, for both in-situ and precast applications. They are finished products that are used as tension devices in reinforced concrete structures, strengthening and holding the concrete in tension. The reinforcing steel surface incorporates deformed patterns (ribs) in order to enhance the mechanical bond with the concrete. Chemical composition, mechanical properties, sizes and ribs dimensions of Sovel reinforcing steel in bars and coils are manufactured to comply with national standards of destination countries.

Reinforcing steel in coils provide many techno-economic advantages such as reduction of labor costs, minimization of processing wastage, better inventory management and enhanced storage efficiency. Sidenor offers a big range of diameters in the form of reinforcing steel in coil, all compatible with the shaping machines and straightening systems that are utilized by its customers in Greece and worldwide. Particularly for the spooled coils produced by Sovel plant, additional benefits include:

- No residual internal stress on the material or axial torsion
- Safe coil feeding / uncoiling
- Constant and consistent material quality
- Higher efficiency, productivity and material yield of the downstream cold processing lines
- Substantial reduction in coil handling, transportation and storage needs

TECHNICAL CHARACTERISTICS

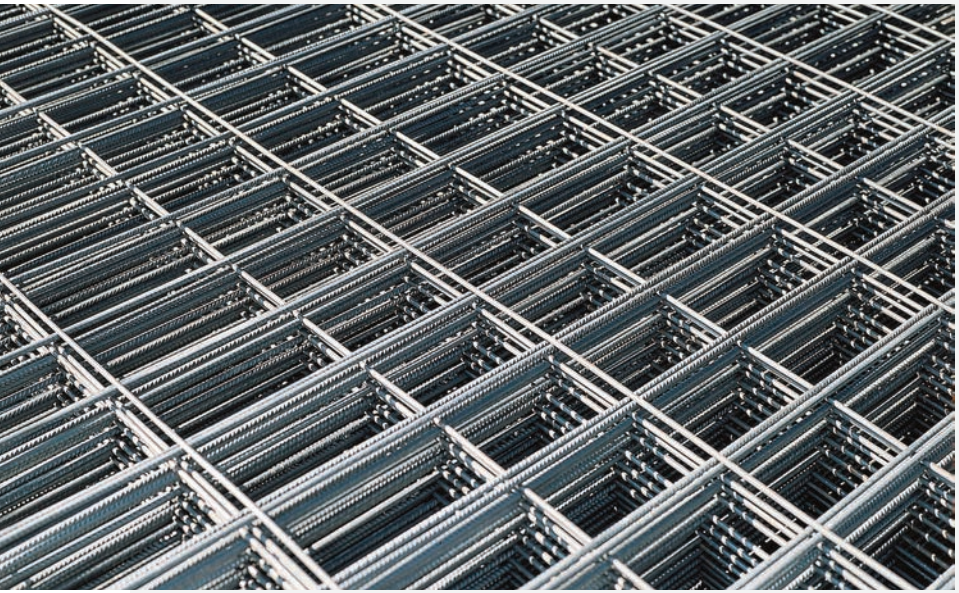
INFORMATION	DESCRIPTION	
Product Identification	Hot-rolled weldable ribbed reinforcing steel for concrete in bars and coils	
Product features (Indicative values)	Bars	Diameters from 8 mm to 40 mm Cut lengths up to 14,6 m Bundle weight: 2.000 kg
	Coils	Diameters from 8 mm to 20 mm Coil weight from 2.000 kg to 3.500 kg
Product properties (acc. EN 10080:2005)	Weldability	Ceq ≤ 0,52%
	Typical nominal yield stress (Re)	400 MPa ≤ Cv ≤ 600 MPa
	Bendability	Successful in bend and rebend test
	Elongation	Agt > 5% (ductility class B)
		Agt > 7,5 % (ductility class C)
	Adherence (surface geometry fR)	- for 8 ≤ Ø fR > 0,045
		- for 8 < Ø ≤ 10 mm fR > 0,052
		- for Ø >10 mm fR > 0,056
	Fatigue strength	Successful in fatigue test

SIDENOR STEEL INDUSTRY S.A. SOVEL HELLENIC STEEL PROCESSING COMPANY S.A.

EPD ENVIRONMENTAL PRODUCT DECLARATION

Sidenor's **ELECTRO-WELDED WIRE MESH (FABRIC)** are marketed under the names SD Stirrup Reinforcement Mesh, Sidefit Special Mesh and SD Wire Mesh. They are produced by welding of steel straight wires at right angles, creating a mesh "sheet". The straight wires may have originated from either straight bars or coils. In 2-Directional meshes hot rolled or cold rolled reinforcing ribbed wires of the same grade are used in both directions. Particularly for 1-Directional meshes, i.e. meshes that incorporate reinforcing ribbed wires in the main direction and sacrificial holding plain bars in the secondary direction, these sacrificial bars are made from low-carbon wire rod. Sovel-produced meshes have a vast range of wire diameters and spacing arrangement in both directions of reinforcement. The size of the sheets is customized. The chemical composition, the mechanical properties, the diameters of wires, the sheet configuration and sizes comply with national standards of destination countries.

Reinforcing mesh is used to substitute plain bars in construction projects and is associated with numerous advantages. The industrial-scale production and quality control guarantees perfect geometrical characteristics and very high welding point strength, enhancing the overall quality of a project. Incorporating mesh can greatly improve construction schedules by shortening the construction cycles. Site efficiency and productivity is improved, while reliance on skilled manpower on-site is reduced.



TECHNICAL CHARACTERISTICS

INFORMATION	DESCRIPTION	
Product Identification	Welded wire mesh for the reinforcement of concrete structures	
Product features (Indicative values)	Longitudinal Wire (LW) length range	From 800 mm to 12000 mm
	Cross Wire (CW) length range	From 1000 mm to 3600 mm
	LW diameter range	From 4 mm to 25 mm
	CW diameter range	From 4 mm to 16 mm
	LW spacing range	Minimum of 75 mm, with increasing step of 25 mm
	CW spacing range	Minimum of 50 mm, with increasing step of 1 mm
Product properties (acc. EN 10080:2005)	Weldability	Ceq ≤ 0,52%
	Typical nominal yield stress (Re)	400 MPa ≤ Cv ≤ 600 MPa
	Elongation	Agt > 2,5% (ductility class A)
		Agt > 5% (ductility class B)
		Agt > 7,5% (ductility class C)
	Bendability	Successful in bend and rebend test
	Adherence (surface geometry fR)	for 4 ≤ Ø ≤ 4,5 mm fR > 0,036
		for 5 ≤ Ø ≤ 6 mm fR > 0,039
		for 6,5 ≤ Ø ≤ 8 mm fR > 0,045
		for 8 < Ø ≤ 10 mm fR > 0,052
		for Ø >10 mm fR > 0,056
	Fatigue strength	Successful in fatigue test

Sidenor's **REINFORCING STEEL CAGES** are marketed under the name SIDEFOR. They are produced in Sovel plant with the Synthesis technology, co-developed by Sidenor and its Italian technological partner AWM. Synthesis is a patented technology that has been successfully implemented at a global level, consisting of machinery and a sophisticated Design and Planning Software also developed by Sidenor. A Synthesis plant constructs a vast range of 3-D reinforcing steel elements found in all types of building and infrastructure projects. These include:

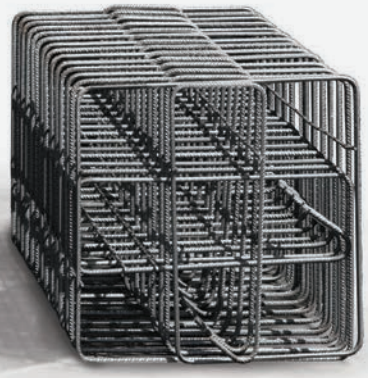
- Stirrup cages of all complexities for columns, beams, diaphragms etc.
- Bent meshes of various shapes and for various applications (e.g walls, slabs, drains, precast elements etc)

Synthesis products originate from reinforcing steel in coils and from low-carbon wire rod (when the secondary direction reinforcement is used solely for holding purposes). They are fully-industrial and are designed to adhere to the most stringent regulations imposed by each country. The tolerances achieved by Synthesis are tighter than the ones required by the various Building Codes (e.g. Greek, Israeli, Singaporean and Australian) and the products are in full compliance with anti-seismic detailing practices. Synthesis products eliminate human intervention and are, thus, characterized by a reliability and accuracy that cannot be matched in practice by the conventional methods of reinforcement construction, where the human factor plays a crucial role. The state-of-the-art industrial method of production achieves the highest possible precision in the products' geometrical characteristics (sides, angles, spacing, guaranteed contact of main bars with stirrups etc.) Finally, as welded products they have the necessary sturdiness to maintain their excellent quality during their transport, placement and concrete pouring stages.

Substantial savings are achieved by using Synthesis cages in lieu of manually-tied steel, because they have embedded highly laborious and unproductive processes (3-D setup of stirrups and bent bars, steel tying of almost all stirrup and main bar nodes, etc). For bent meshes, great productivity boosts may be realized for cases of small diameter reinforcement that needs to maintain specific orientation when placed in its final position inside the formwork. Traditionally-made stirrup cages or other forms of prefabricated reinforcement often require highly skilled personnel and yield lower productivity. Utilizing finished industrial products compensates for the potentially low skill index and experience of the construction site labor force. Steel fixing personnel is managed better, increasing its average productivity and speeding-up the installation process while maintaining the high quality demanded by a project.

TECHNICAL CHARACTERISTICS

INFORMATION	DESCRIPTION	
Product Identification	Steel cages for the reinforcement of concrete structures	
Product features (Indicative values)	Longitudinal Wire (LW) length range (stirrup circumference)	From 920 mm to 8.000 mm
	Cross Wire (CW) length range	From 400 mm to 3.400 mm
	LW diameter range	From 5 mm to 16 mm
	CW diameter range	From 5 mm to 12mm
	LW spacing range	Minimum of 75 mm, with increasing step of 25 mm
	CW spacing range	Minimum of 50 mm, with increasing step of 1 mm
Product properties (acc.EN 10080:2005)	Weldability	Ceq ≤ 0,52%
	Typical nominal yield stress (Re)	400 MPa ≤ Cv ≤ 600 MPa
	Elongation	Agt > 2,5% (ductility class A)
		Agt > 5% (ductility class B)
		Agt > 7,5% (ductility class C)
	Bendability:	Successful in bend and rebend test
	Adherence (surface geometry fR)	for 5 ≤ Ø ≤ 6 mm fR > 0,039
		for 6,5 ≤ Ø ≤ 8 mm fR > 0,045
		for 8 < Ø ≤ 10 mm fR > 0,052
		for Ø >10 mm fR > 0,056
	Fatigue strength	Successful in fatigue test



DECLARED UNIT
The declared unit is 1 tonne of steel product.

GOAL AND SCOPE
This EPD evaluates the environmental impacts of the production of 1 tonne of three different steel products from Cradle-to-gate with optional modules A4 + C + D.

CUT-OFF RULES
Where there is insufficient data for a unit process, the cut-off criteria are 1% of the total mass of input of that process. The total of neglected input flows per module is a maximum of 5% of energy usage and mass.

BACKGROUND DATA
The most recent version of Ecoinvent database (V3.7.1) was used as a source of background data.

SOFTWARE
The software used for this study is OpenLCA 1.10.3.

DATA QUALITY
Data on raw materials, transportation of raw materials and products, emissions, waste along with energy and water consumption in manufacturing stage was collected by Sidenor.

TIME REPRESENTIVENESS
All primary data used in this study is for the entire year 2020.

GEOGRAPHICAL SCOPE
Worldwide

ALLOCATIONS
Allocations in the LCA datasets used are documented accordingly in the datasets by Ecoinvent. Concerning the manufacturing stage, when needed, an allocation based on the mass of the finished products from the site has been applied.

CPC CODE
412 Products of Iron and Steel

SUBSTANCES OF VERY HIGH CONCERN
The product does not contain any substances listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorization" exceeding 0.1 % of the weight of the product.

NUMBERS
0,1

Numbers are expressed using the French style (comma as the decimal separator).

Product stage			Construction stage		Use stage							End of life stage				Resource recovery stage
Raw Materials Supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction and demolition	Transport	Waste processing for reuse, recovery and/or recycling	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	X	X	X	X	X

A1: Raw Material Supply

Production starts with raw materials supply including procured electricity. This stage includes the mining and processing of raw materials, the generation of fuels required for the manufacturing and the recycling process of secondary materials. In the manufacturing of the products more than 97% of the raw materials are recycled.

A2: Transportation of raw materials to manufacturer

Transport is relevant for delivery of raw materials from the supplier to the gate of manufacturing plant. The raw materials are transported by truck and vessels from different countries all over the world.

A3: Manufacturing

Manufacturing of the products includes all the processes presented in the flow chart.

A4: Transportation of product

The product is transported to customers and/or construction sites by trucks and vessels in Greece and worldwide.

C1: De-construction and demolition

Construction and demolition wastes are generated during construction and the demolition of the structures after the end of their useful life. Due to the lack of information concerning how the environmental impacts of the demolition of the whole building are allocated to the steel parts, they are assumed to be zero.

C2: Transport to waste processing

As a conservative assumption, a distance of 100 km by lorry 16-32 tonnes from construction/demolition sites to scrap dealers and disposal sites has been chosen.

C3: Waste processing for reuse, recovery and/or recycling

According to Worldsteel Association, global steel recycle rates are estimated at 85% for construction applications.

C4: Disposal

According to Worldsteel Association, 15% of the product will be landfilled.

D: Reuse-Recovery-Recycling-potential

Module D consists of avoided burdens related to the potential reuse and/or recycling of the product after its end-of-life stage.

REINFORCING STEEL IN BARS AND COILS

ENVIRONMENTAL IMPACTS	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential - total	kg CO_2 eq	4,81E+02	5,15E+01	8,07E+01	6,13E+02	5,88E+01	0,00E+00	1,65E+01	2,51E+01	7,88E-01	1,58E+01
Global warming potential - fossil	kg CO_2 eq	4,78E+02	5,15E+01	8,07E+01	6,10E+02	5,88E+01	0,00E+00	1,65E+01	2,50E+01	7,87E-01	1,57E+01
Global warming potential - biogenic	kg CO_2 eq	1,75E+00	1,62E-02	7,97E-03	1,78E+00	1,94E-02	0,00E+00	5,55E-03	8,74E-02	4,42E-04	5,94E-02
Global warming potential -luluc	kg CO_2 eq	6,63E-01	3,23E-02	2,11E-03	6,98E-01	2,22E-02	0,00E+00	5,58E-03	2,67E-02	2,14E-04	2,25E-02
Global warming potential - GHG	kg CO_2 eq	4,71E+02	5,11E+01	8,07E+01	6,02E+02	5,83E+01	0,00E+00	1,63E+01	2,46E+01	7,71E-01	1,53E+01
Ozone Depletion Potential	kg CFC-11 eq	3,70E-05	1,09E-05	4,23E-07	4,83E-05	1,32E-05	0,00E+00	3,77E-06	3,38E-06	3,24E-07	1,43E-06
Acidification Potential	mol H+ eq	2,87E+00	9,27E-01	2,15E-02	3,82E+00	3,53E-01	0,00E+00	8,25E-02	2,14E-01	7,43E-03	1,92E-01
Eutrophication potential -freshwater	kg $PO4^{-3}$ eq	1,95E+00	8,59E-03	1,06E-02	1,96E+00	1,17E-02	0,00E+00	3,42E-03	4,99E-02	2,25E-04	2,38E-02
Eutrophication potential -freshwater	kg P eq	6,35E-01	2,80E-03	3,44E-03	6,41E-01	3,81E-03	0,00E+00	1,11E-03	1,63E-02	7,35E-05	7,77E-03
Eutrophication potential -marine	kg N eq	5,12E-01	2,24E-01	6,41E-03	7,43E-01	9,71E-02	0,00E+00	2,88E-02	6,81E-02	2,59E-03	7,11E-02
Eutrophication potential -terrestrial	mol N eq	4,47E+00	2,49E+00	7,18E-02	7,03E+00	1,07E+00	0,00E+00	3,14E-01	7,62E-01	2,84E-02	6,05E-01
Photochemical oxidant formation Potential	kg NMVOC eq	1,28E+00	6,65E-01	1,88E-02	1,96E+00	3,11E-01	0,00E+00	8,95E-02	2,04E-01	8,24E-03	1,46E-01
Abiotic depletion potential – Elements *	kg Sb eq	1,46E-02	1,32E-04	1,97E-05	1,47E-02	2,03E-04	0,00E+00	5,98E-05	3,12E-03	1,76E-06	1,11E-04
Abiotic depletion potential – Fossil resources *	MJ	8,85E+03	7,17E+02	4,21E+01	9,61E+03	8,78E+02	0,00E+00	2,51E+02	3,47E+02	2,20E+01	2,24E+02
Water scarcity potential *	m^3 eq	3,06E+02	2,81E+00	9,73E-01	3,10E+02	3,97E+00	0,00E+00	1,17E+00	7,91E+00	1,01E+00	-3,34E+01

(*) 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.

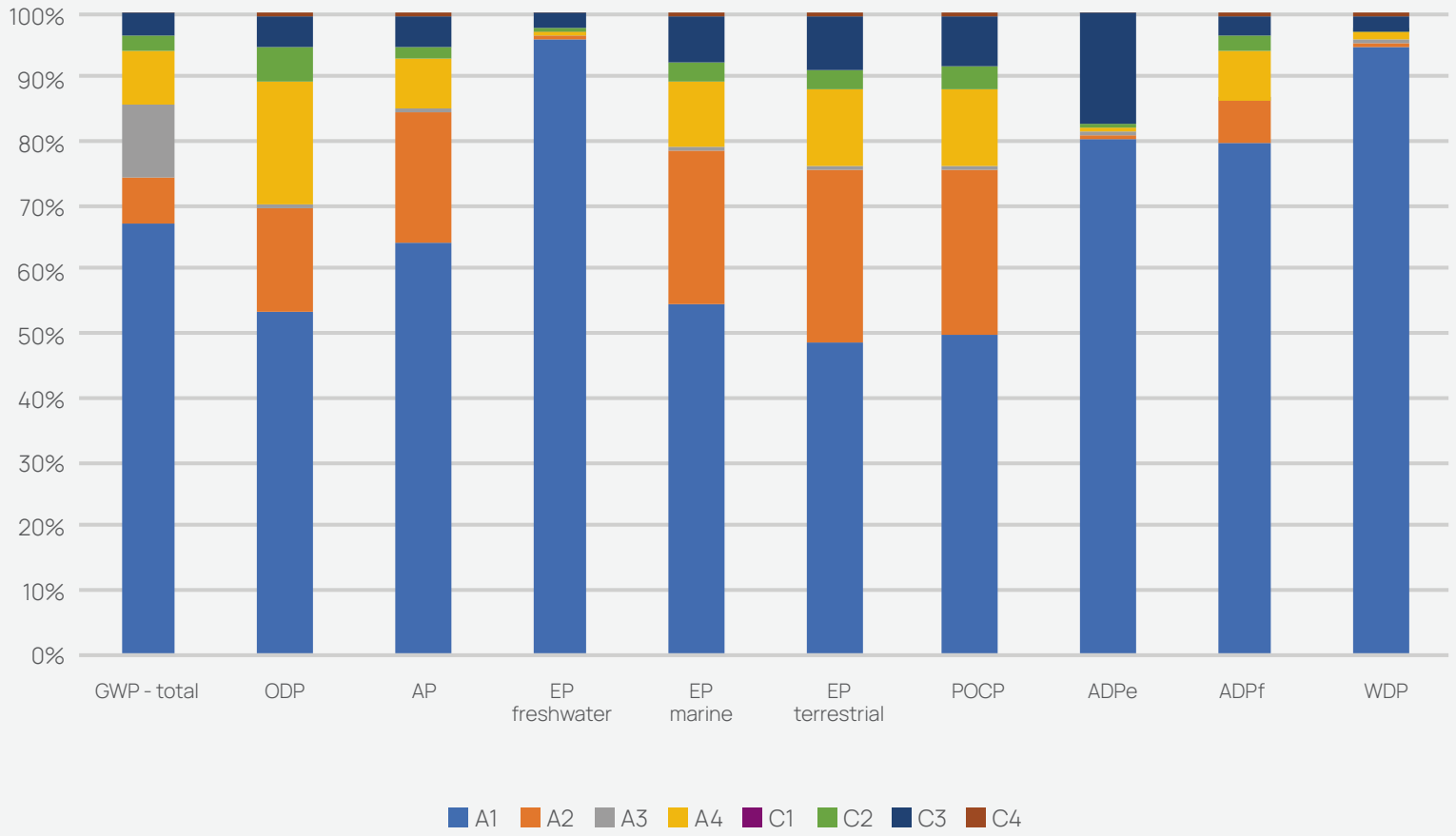
REINFORCING STEEL IN BARS AND COILS

RESOURCE USE	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	1,13E+03	7,96E+00	1,78E+00	1,14E+03	1,15E+01	0,00E+00	3,38E+00	5,65E+01	1,78E-01	1,52E+01
Use of renewable primary energy resources used as raw materials	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
Total use of renewable primary energy resources	MJ	1,13E+03	7,96E+00	1,78E+00	1,14E+03	1,15E+01	0,00E+00	3,38E+00	5,65E+01	1,78E-01	1,52E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	8,85E+03	7,17E+02	4,21E+01	9,61E+03	8,79E+02	0,00E+00	2,51E+02	3,47E+02	2,20E+01	2,24E+02
Use of non-renewable primary energy resources used as raw materials	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
Total use of non-renewable primary energy resources	MJ	8,85E+03	7,17E+02	4,21E+01	9,61E+03	8,79E+02	0,00E+00	2,51E+02	3,47E+02	2,20E+01	2,24E+02
Use of secondary material	kg	1,20E+03	0,00E+00	0,00E+00	1,20E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,44E+02
Use of renewable secondary fuels	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
Use of non-renewable secondary fuels	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
Use of net fresh water	m^3	7,13E+00	6,55E-02	2,27E-02	7,22E+00	8,64E-02	0,00E+00	2,71E-02	1,80E-04	3,09E-02	-7,79E-01

OUTPUT FLOWS AND WASTE CATEGORIES	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,84E-02	1,27E-03	4,75E-05	1,97E-02	2,19E-03	0,00E+00	6,54E-04	9,57E-04	3,26E-05	6,53E-02
Non-hazardous waste disposed	kg	7,49E+01	1,82E+01	3,86E+01	1,32E+02	3,94E+01	0,00E+00	1,20E+01	1,05E+01	1,50E+02	6,63E+00
Radioactive waste disposed	kg	4,35E-02	4,94E-03	2,05E-04	4,86E-02	6,02E-03	0,00E+00	1,72E-03	2,05E-03	1,45E-04	7,07E-04
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	0,00E+00	0,00E+00
Materials for recycling	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
Materials for energy recovery	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
Exported energy	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

REINFORCING STEEL IN BARS AND COILS

Relative contribution of each assessed stage to the main environmental impacts



WELDED WIRE MESH

ENVIRONMENTAL IMPACTS	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential - total	kg CO_2 eq	4,76E+02	4,75E+01	5,65E+01	5,80E+02	4,98E+01	0,00E+00	1,65E+01	2,51E+01	7,88E-01	1,10E+01
Global warming potential - fossil	kg CO_2 eq	4,71E+02	4,74E+01	5,65E+01	5,75E+02	4,98E+01	0,00E+00	1,65E+01	2,50E+01	7,87E-01	1,10E+01
Global warming potential - biogenic	kg CO_2 eq	1,79E+00	1,52E-02	5,58E-03	1,81E+00	1,66E-02	0,00E+00	5,55E-03	8,74E-02	4,42E-04	4,15E-02
Global warming potential -luluc	kg CO_2 eq	3,07E+00	2,64E-02	1,48E-03	3,10E+00	1,69E-02	0,00E+00	5,58E-03	2,67E-02	2,14E-04	1,57E-02
Global warming potential - GHG	kg CO_2 eq	4,67E+02	4,71E+01	5,64E+01	5,70E+02	4,93E+01	0,00E+00	1,63E+01	2,46E+01	7,71E-01	1,07E+01
Ozone Depletion Potential	kg CFC-11 eq	3,46E-05	1,03E-05	2,96E-07	4,52E-05	1,13E-05	0,00E+00	3,77E-06	3,38E-06	3,24E-07	1,00E-06
Acidification Potential	mol H+ eq	2,50E+00	7,06E-01	1,50E-02	3,22E+00	2,07E-01	0,00E+00	8,25E-02	2,14E-01	7,43E-03	1,34E-01
Eutrophication potential -freshwater	kg $PO4^{-3}$ eq	1,67E+00	8,38E-03	7,39E-03	1,69E+00	1,02E-02	0,00E+00	3,42E-03	4,99E-02	2,25E-04	1,67E-02
Eutrophication potential -freshwater	kg P eq	5,46E-01	2,73E-03	2,41E-03	5,51E-01	3,33E-03	0,00E+00	1,11E-03	1,63E-02	7,35E-05	5,44E-03
Eutrophication potential -marine	kg N eq	4,63E-01	1,77E-01	4,48E-03	6,44E-01	6,26E-02	0,00E+00	2,88E-02	6,81E-02	2,59E-03	4,98E-02
Eutrophication potential -terrestrial	mol N eq	3,96E+00	1,96E+00	5,02E-02	5,97E+00	6,84E-01	0,00E+00	3,14E-01	7,62E-01	2,84E-02	4,23E-01
Photochemical oxidant formation Potential	kg NMVOC eq	1,19E+00	5,27E-01	1,31E-02	1,73E+00	2,08E-01	0,00E+00	8,95E-02	2,04E-01	8,24E-03	1,02E-01
Abiotic depletion potential – Elements *	kg Sb eq	1,11E-02	1,34E-04	1,38E-05	1,12E-02	1,79E-04	0,00E+00	5,98E-05	3,12E-03	1,76E-06	7,79E-05
Abiotic depletion potential – Fossil resources *	MJ	7,68E+03	6,76E+02	2,94E+01	8,39E+03	7,52E+02	0,00E+00	2,51E+02	3,47E+02	2,20E+01	1,57E+02
Water scarcity potential *	m^3 eq	4,53E+02	2,78E+00	6,81E-01	4,56E+02	3,48E+00	0,00E+00	1,17E+00	7,91E+00	1,01E+00	-2,34E+01

(*) 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.

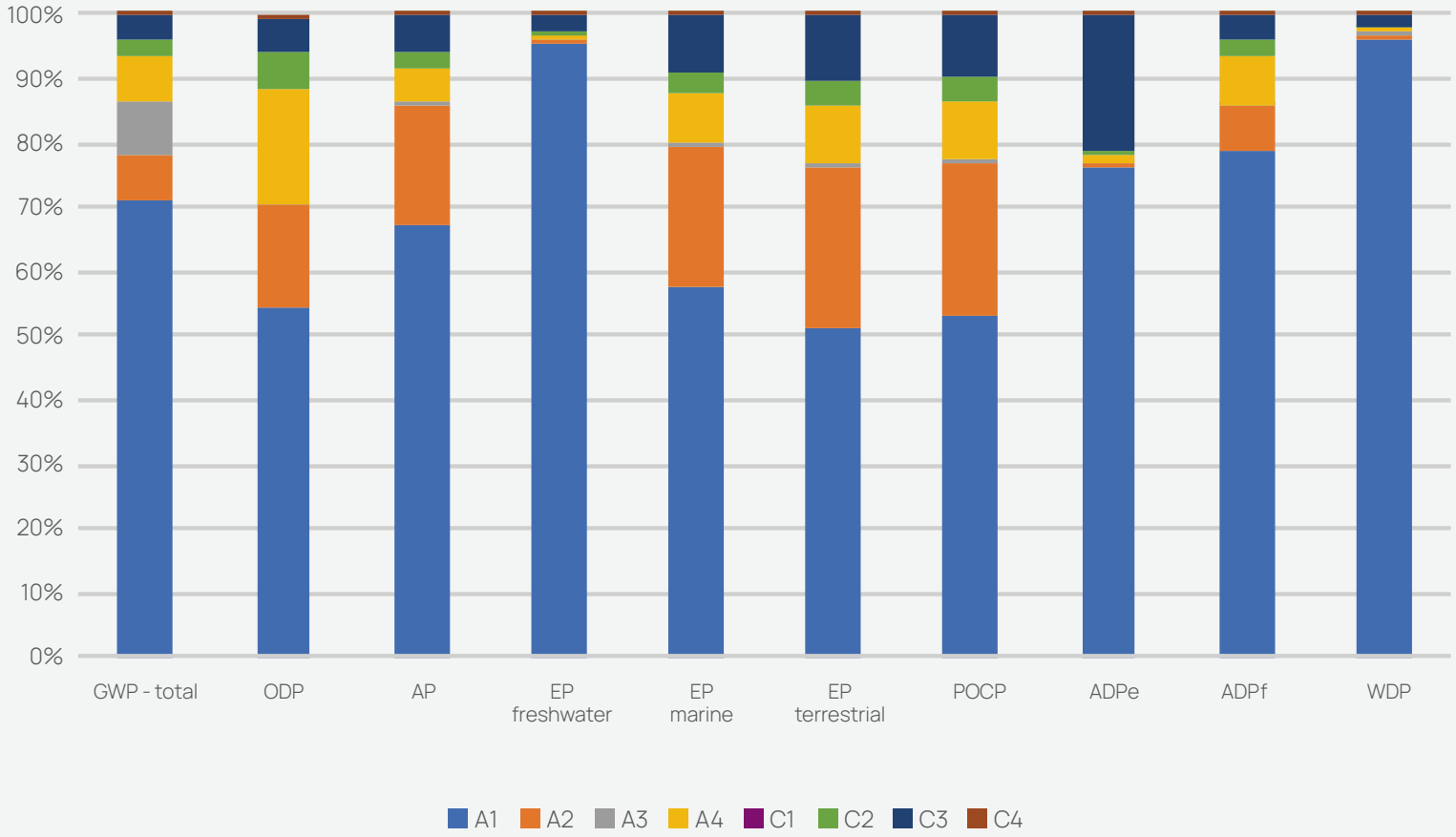
WELDED WIRE MESH

RESOURCE USE	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	9,76E+02	7,92E+00	1,24E+00	9,85E+02	1,01E+01	0,00E+00	3,38E+00	5,65E+01	1,78E-01	1,06E+01
Use of renewable primary energy resources used as raw materials	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
Total use of renewable primary energy resources	MJ	9,76E+02	7,92E+00	1,24E+00	9,85E+02	1,01E+01	0,00E+00	3,38E+00	5,65E+01	1,78E-01	1,33E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	7,68E+03	6,76E+02	2,94E+01	8,39E+03	7,52E+02	0,00E+00	2,51E+02	3,47E+02	2,20E+01	1,96E+02
Use of non-renewable primary energy resources used as raw materials	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
Total use of non-renewable primary energy resources	MJ	7,68E+03	6,76E+02	2,94E+01	8,39E+03	7,52E+02	0,00E+00	2,51E+02	3,47E+02	2,20E+01	1,96E+02
Use of secondary material	kg	8,37E+02	0,00E+00	0,00E+00	8,37E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,26E+02
Use of renewable secondary fuels	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
Use of non-renewable secondary fuels	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
Use of net fresh water	m^3	1,05E+01	6,47E-02	1,59E-02	1,06E+01	8,11E-02	0,00E+00	2,71E-02	1,80E-04	3,09E-02	-6,81E-01

OUTPUT FLOWS AND WASTE CATEGORIES	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,79E-02	1,34E-03	3,32E-05	1,92E-02	1,95E-03	0,00E+00	6,54E-04	9,57E-04	3,26E-05	4,57E-02
Non-hazardous waste disposed	kg	8,76E+01	2,11E+01	2,70E+01	1,36E+02	3,59E+01	0,00E+00	1,20E+01	1,05E+01	1,50E+02	5,80E+00
Radioactive waste disposed	kg	3,78E-02	4,65E-03	1,43E-04	4,25E-02	5,15E-03	0,00E+00	1,72E-03	2,05E-03	1,45E-04	6,19E-04
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	0,00E+00	0,00E+00
Materials for recycling	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
Materials for energy recovery	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
Exported energy	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

WELDED WIRE MESH

Relative contribution of each assessed stage to the main environmental impacts



REINFORCING STEEL CAGES

ENVIRONMENTAL IMPACTS	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential - total	kg CO_2 eq	5,27E+02	4,79E+01	7,50E+01	6,50E+02	5,07E+01	0,00E+00	1,65E+01	2,51E+01	7,88E-01	1,47E+01
Global warming potential - fossil	kg CO_2 eq	5,24E+02	4,78E+01	7,50E+01	6,46E+02	5,06E+01	0,00E+00	1,65E+01	2,50E+01	7,87E-01	1,46E+01
Global warming potential - biogenic	kg CO_2 eq	1,94E+00	1,51E-02	7,41E-03	1,97E+00	1,69E-02	0,00E+00	5,55E-03	8,74E-02	4,42E-04	5,52E-02
Global warming potential -luluc	kg CO_2 eq	1,34E+00	3,00E-02	1,96E-03	1,37E+00	1,71E-02	0,00E+00	5,58E-03	2,67E-02	2,14E-04	2,09E-02
Global warming potential - GHG	kg CO_2 eq	5,16E+02	4,75E+01	7,50E+01	6,39E+02	5,02E+01	0,00E+00	1,63E+01	2,46E+01	7,71E-01	1,42E+01
Ozone Depletion Potential	kg CFC-11 eq	3,95E-05	1,02E-05	3,93E-07	5,01E-05	1,15E-05	0,00E+00	3,77E-06	3,38E-06	3,24E-07	1,33E-06
Acidification Potential	mol H+ eq	3,04E+00	8,62E-01	2,00E-02	3,92E+00	2,03E-01	0,00E+00	8,25E-02	2,14E-01	7,43E-03	1,78E-01
Eutrophication potential -freshwater	kg $PO4^{-3}$ eq	2,08E+00	7,98E-03	9,82E-03	2,09E+00	1,04E-02	0,00E+00	3,42E-03	4,99E-02	2,25E-04	2,22E-02
Eutrophication potential -freshwater	kg P eq	6,77E-01	2,60E-03	3,20E-03	6,83E-01	3,40E-03	0,00E+00	1,11E-03	1,63E-02	7,35E-05	7,23E-03
Eutrophication potential -marine	kg N eq	5,44E-01	2,08E-01	5,96E-03	7,58E-01	6,22E-02	0,00E+00	2,88E-02	6,81E-02	2,59E-03	6,61E-02
Eutrophication potential -terrestrial	mol N eq	4,68E+00	2,31E+00	6,67E-02	7,06E+00	6,79E-01	0,00E+00	3,14E-01	7,62E-01	2,84E-02	5,62E-01
Photochemical oxidant formation Potential	kg NMVOC eq	1,35E+00	6,18E-01	1,74E-02	1,99E+00	2,07E-01	0,00E+00	8,95E-02	2,04E-01	8,24E-03	1,36E-01
Abiotic depletion potential – Elements *	kg Sb eq	1,38E-02	1,23E-04	1,83E-05	1,40E-02	1,82E-04	0,00E+00	5,98E-05	3,12E-03	1,76E-06	1,04E-04
Abiotic depletion potential – Fossil resources *	MJ	9,42E+03	6,66E+02	3,91E+01	1,01E+04	7,66E+02	0,00E+00	2,51E+02	3,47E+02	2,20E+01	2,08E+02
Water scarcity potential *	m^3 eq	3,69E+02	2,61E+00	9,04E-01	3,73E+02	3,56E+00	0,00E+00	1,17E+00	7,91E+00	1,01E+00	-3,11E+01

(*) 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.

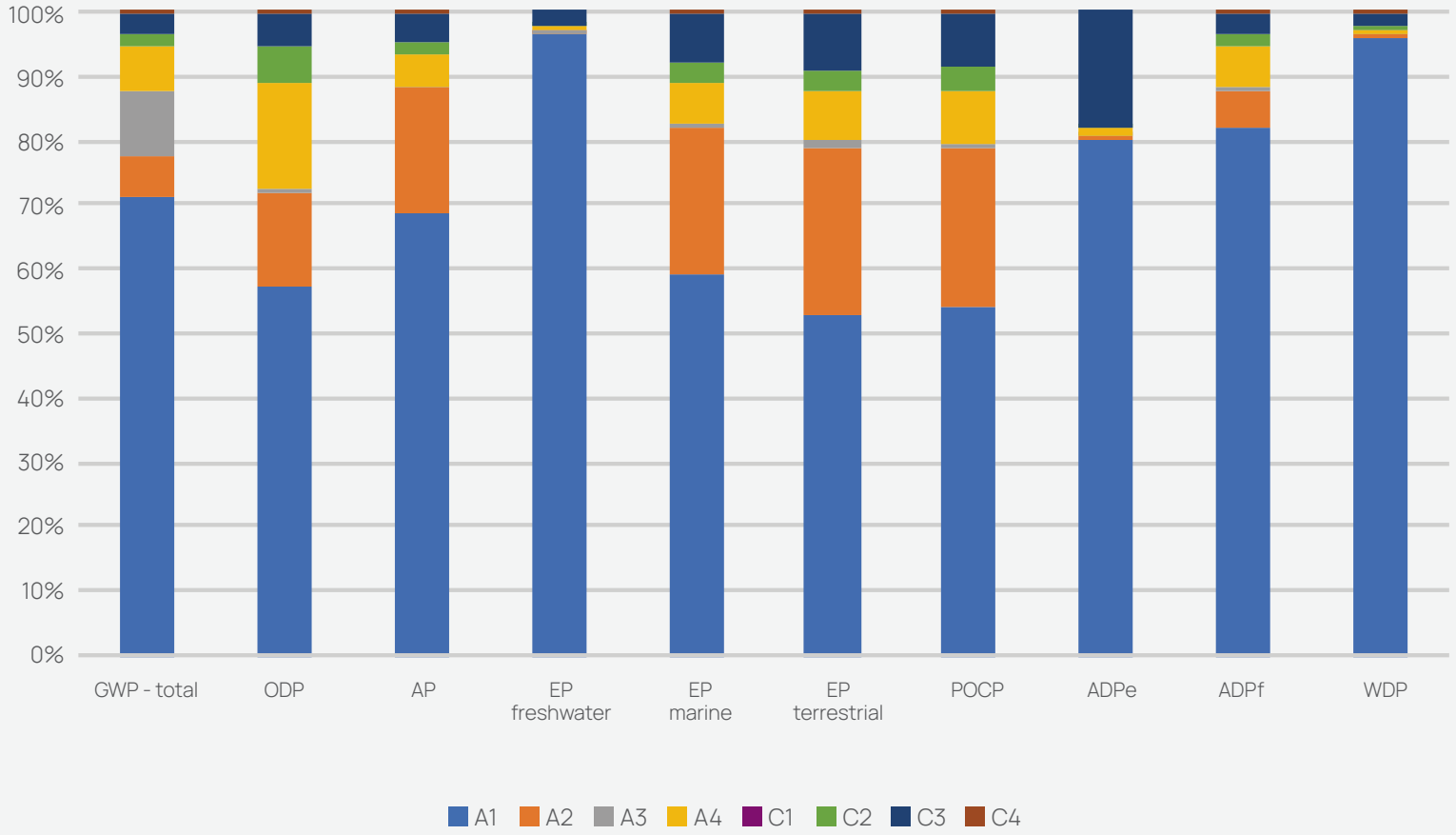
REINFORCING STEEL CAGES

RESOURCE USE	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	1,21E+03	7,40E+00	1,65E+00	1,22E+03	1,03E+01	0,00E+00	3,38E+00	5,65E+01	1,78E-01	1,41E+01
Use of renewable primary energy resources used as raw materials	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
Total use of renewable primary energy resources	MJ	1,21E+03	7,40E+00	1,65E+00	1,22E+03	1,03E+01	0,00E+00	3,38E+00	5,65E+01	1,78E-01	1,41E+01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	9,42E+03	6,66E+02	3,91E+01	1,01E+04	7,66E+02	0,00E+00	2,51E+02	3,47E+02	2,20E+01	2,08E+02
Use of non-renewable primary energy resources used as raw materials	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
Total use of non-renewable primary energy resources	MJ	9,42E+03	6,66E+02	3,91E+01	1,01E+04	7,66E+02	0,00E+00	2,51E+02	3,47E+02	2,20E+01	2,08E+02
Use of secondary material	kg	1,11E+03	0,00E+00	0,00E+00	1,11E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,33E+02
Use of renewable secondary fuels	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
Use of non-renewable secondary fuels	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
Use of net fresh water	m^3	8,59E+00	6,09E-02	2,11E-02	8,67E+00	8,28E-02	0,00E+00	2,71E-02	1,80E-04	3,09E-02	-7,24E-01

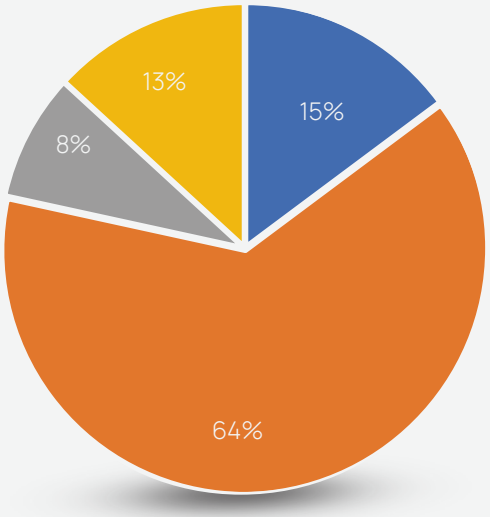
OUTPUT FLOWS AND WASTE CATEGORIES	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,87E-02	1,18E-03	4,41E-05	1,99E-02	1,99E-03	0,00E+00	6,54E-04	9,57E-04	3,26E-05	6,07E-02
Non-hazardous waste disposed	kg	8,10E+01	1,69E+01	3,59E+01	1,34E+02	3,67E+01	0,00E+00	1,20E+01	1,05E+01	1,50E+02	6,16E+00
Radioactive waste disposed	kg	4,69E-02	4,59E-03	1,90E-04	5,16E-02	5,24E-03	0,00E+00	1,72E-03	2,05E-03	1,45E-04	6,57E-04
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	0,00E+00	0,00E+00
Materials for recycling	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
Materials for energy recovery	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
Exported energy	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

REINFORCING STEEL CAGES

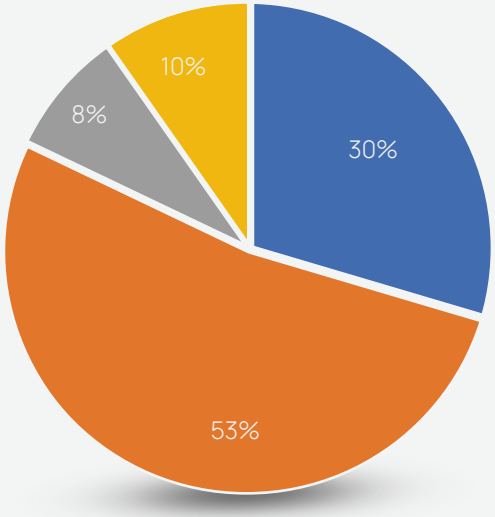
Relative contribution of each assessed stage to the main environmental impacts



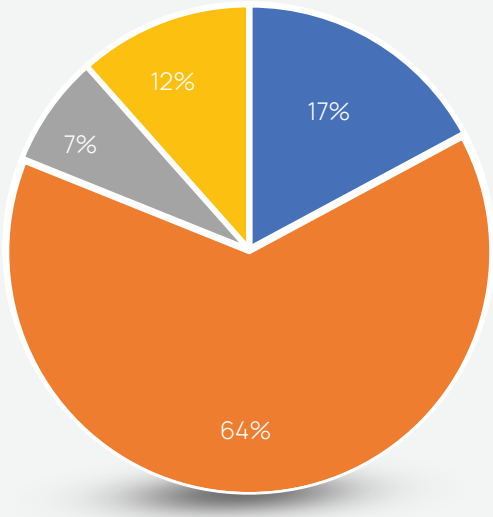
REINFORCING STEEL IN BARS AND COILS



WELDED WIRE MESH



REINFORCING STEEL CAGES



Materials production | Electricity generation | Transportation of materials | Manufacturing stage

General Programme Instructions of the International EPD® System. Version 3.01, 2019-09-18

PCR 2019:14 v.1.11. Construction products. EPD System. Date 2021-2-5. Valid until 2024-12-20

EN 15804:2012+A2:2019, Sustainability of construction works - Environmental Product Declarations - Core rules for the product category of construction products

ISO 14020:2000 Environmental labels and declarations — General principles

ISO 14025:2006 Environmental labels and declarations - Type III environmental declarations - Principles and procedures

ISO 14040:2006 Environmental management - Life cycle assessment-Principles and framework

ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines

Ecoinvent / Ecoinvent Centre, www.Eco-invent.com

Residual Energy Mix 2020 from Renewable Energy Sources Operator & Guarantees of Origin (DAPEEP SA)

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

The CEN standard EN 15804 serves as the core Product Category Rules
PCR 2019:14 Construction products (EN 15804:A2); Version 1.11; 2021-02-5
PCR review was conducted by The Technical Committee of the International EPD® System.

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

☐ EPD process certification ☒ EPD verification

EPD owner:

SIDENOR STEEL INDUSTRY S.A.

www.sidenor.gr/en

EPD Prepared by:

ENVIROMETRICS Business Consultants & Engineers

www.environmetrics.gr

Verification by:

Vladimír Kočí

LCA studio

Approved by:

The International EPD® System Technical Committee, supported by the Secretariat

Procedure for follow-up during EPD validity involves third party verifier

☐ Yes ☒ No

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