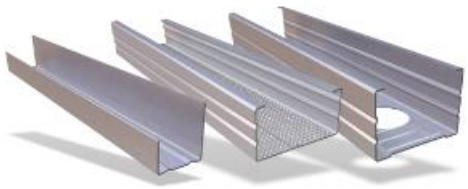
Environmental Product Declaration

of Drywall steel profiles by Security Aluminum Hellas S.A.

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



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Program related information

Program: The International EPD® System
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Accountabilities for PCR, LCA and independent, third-party verification
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (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 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

Life Cycle Assessment (LCA)

LCA accountability:	ENVIROMETRICS Climate | Environment | Energy	ENVIROMETRICS S.A Kodrou 3 str., 152 32, Chalandri, Greece info@envirometrics.gr www.envirometrics.gr

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third party verification: **Charalambos Galatsanos, EQA HELLAS S.A.**
Procedure for follow-up of data during EPD validity involves third party verifier: ☐Yes ☒ 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 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 characterization factors); have equivalent content declarations; and be valid at the time of comparison.

Company Information

Security Aluminum Hellas S.A started operations in 1963 in the industrial area of Egaleo, Athens, as an aluminum and steel forming industry. The company's main activity is production of galvanized steel and aluminum products used in the construction of various types of false ceilings and dry construction partitions (drywall, etc.). The combination of products manufactured in our vertical production plant, the quality (ISO 9001, DIN 18182, EN 14195, EN 13964) and innovation of our products (patents, industrial designs, trademarks) and the economies of scale used make Security Aluminum Hellas S.A the leader in the Greek market, especially in the 'private label' production market. Additionally, Security Aluminum Hellas S.A is intensely active abroad and an important percentage of its turnover comes from sales to our associates abroad. At our company's plant in Egaleo of Athens, our vertical production is composed of separate sections with many modern production lines, electronic systems of cutting-edge technology operated by specialized operators and controlled by experienced technicians. The quality assurance system ISO 9001 and the advanced quality control of our organized and controlled production procedure, result in products of high quality and specifications that fully satisfy market requirements.

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Product Information

Drywall steel profiles are lightweight, durable, and precision-engineered metal framing components designed for use in partition walls, ceilings, and lining systems in interior construction projects. These profiles provide structural support and stability for gypsum boards, drywall panels, and other wall systems. They are manufactured in compliance with relevant building standards such as **EN 14195** for metal profiles in gypsum board systems.

Applications:

- Internal non-loadbearing walls and partitions.
- Suspended ceilings.
- Wall cladding systems.
- Decorative ceiling and drywall framing.

Benefits:

- Easy installation with precise dimensions for accurate alignment.
- Lightweight for easy handling and transportation.
- Fire-resistant and moisture-resistant when combined with gypsum boards.
- Compatible with various drywall systems for flexible design options.

Property	Value
Yield Strength (Re)	280–350 MPa
Tensile Strength (Rm)	≥ 330 MPa
Modulus of Elasticity	210 GPa
Fire Resistance Classification	Non-combustible (A1)

		kg per kg of product	Biogenic carbon content (kg C) per kg of product*
Raw materials	Steel coils	1,00	-
Packaging	Wood	1,38E-02	6,90E-03
	Steel straps	1,85E-04	-
	Cardboard	9,91E-04	4,96E-04

*Biogenic carbon content of wood and wood-based materials is assumed as 50% of the mass of the material, adopted from EN 16449.

According to the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) Regulation, the product does not contain any substance included in the Candidate List of Substances of Very High Concern (SVHCs) for authorization with concentrations higher than 0.1% weight by weight (w/w).

System Boundaries

X= Included, ND= Module Not Declared																	
	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**
Module	**A1**	**A2**	**A3**	A4	**A5**	B1	B2	B3	B4	B5	B6	B7	**C1**	**C2**	**C3**	**C4**	**D**
Module Declared	**X**	**X**	**X**	ND	**X**	ND	ND	ND	ND	ND	ND	ND	**X**	**X**	**X**	**X**	**X**
Geography	**EU**	**EU**	**GR**	-									**EU**	**EU**	**EU**	**EU**	**EU**
GWP-GHG share of Specific data used	**1,36%**			-									-	-	-	-	-
Variation-products (GWP-GHG)	**0%**			-									-	-	-	-	-
Variation-sites	**0%**			-									-	-	-	-	-

Product stage (A1-A3)

Product stage (modules A1-A3) includes raw material supply, transportation, and manufacturing.

A1: Raw Material Supply

Production starts with the material supply. This module includes the mining and pretreatment processes before production (processing of raw materials, generation of electricity and fuels required for the manufacturing, recycling process of secondary materials). Steel coils are the main raw materials used for profiles production.

A2: Transportation of raw materials to manufacturer

Transportation module includes the delivery of raw, auxiliary and packaging materials from suppliers to the gate of manufacturing plant in Egaleo, Greece. All raw materials (steel coils), auxiliary materials and packaging materials are imported from suppliers located in Greece and Eastern Europe.

A3: Manufacturing

This module includes all emissions that may occur during the manufacturing process (direct emissions in water/air from fuels combustion and water treatment, manufacturing waste treatment). Personnel-related activities, such as transportation of employees to and from work, and production of infrastructure and capital goods are not included in the scope of this study.

The manufacturing process for profiles starts with decoiling, where steel coils are fed into a decoiler machine that unwinds the coil, making it ready for processing. The uncoiled steel is fed into a roll-forming machine, where the metal passes through a series of rollers. Each set of rollers progressively bends and shapes the steel into the desired profile (e.g., C, U, or L shapes). The number of rollers depends on the complexity of the profile. After shaping, the continuous steel profile is cut into specific lengths using a hydraulic or mechanical cutter. Finally, drywall profiles are packaged with plastic or metallic straps, wood and cardboards.

Installation stage (A5)

This module includes impacts related to the installation of drywall profiles into customer's place. Electricity and water required during the installation process is negligible. Impacts from screws required for profiles fastening are negligible and excluded from the scope of the study. So, in this module, only impacts from the treatment of waste packaging materials and the compensation of biogenic emissions from wood and paper packaging are taken into account.

For all packaging materials, data from European Statistical Authority have been acquired. Based on the most recent data of 2022 (Packaging materials waste end-of-life), in Greece, 43,4% of packaging materials are recycled, 43,4% are incinerated with energy recovery and 13,2% are landfilled. Since the installation takes place in Greece, the rates that correspond to this country have been used.

Scenario Information (module A5)	Unit
Ancillary materials for installation (specified by material)	None
Water use	None
Quantitative description of energy type kWh or MJ (regional mix) and consumption during the installation process	None
Waste materials on the building site before waste processing, generated by the product's installation (specified by type)	Packaging waste: **Wood:** 1,38E-02 kg per kg of profile **Steel straps:** 1,85E-04 kg per kg of profile **Cardboard:** 9,91E-04 kg per kg of profile

End of life stage (C1-C4)

The end-of-life stages begin with the deconstruction and demolition from the installation site and then the waste is transferred for recycling and disposal of the product.

C1: De-construction and demolition

This module refers to the impact arising from the diesel consumption of the heavy vehicles during demolition process. The end-of-life stages begin with the deconstruction and demolition from the installation site and then they transferred for recycling and disposal. Usually, this phase results in little impact because the product is generally part of a larger system (e.g., machine or building) and for that reason, impacts from dismantling should be allocated to all components of that system. For this reason, the impact of the dismantling phase was considered negligible.

C2: Transportation to waste processing

This module includes the transportation of the discarded product either to the recycling site or to landfills for final disposal. A distance of 50 km by lorry 16-32 tonnes from construction/demolition sites to scrap dealers and disposal sites has been chosen as a conservative assumption.

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

This module includes impacts related to the reuse/recycling of products after their life cycle. For steel, data from World Steel Association are used. According to World Steel Association (Life cycle inventory (LCI) study, 2020 data release, May 2021, -Steel end of life treatment-), the average recycling rate of steel after its life cycle is 85%. The rest is assumed to be landfilled.

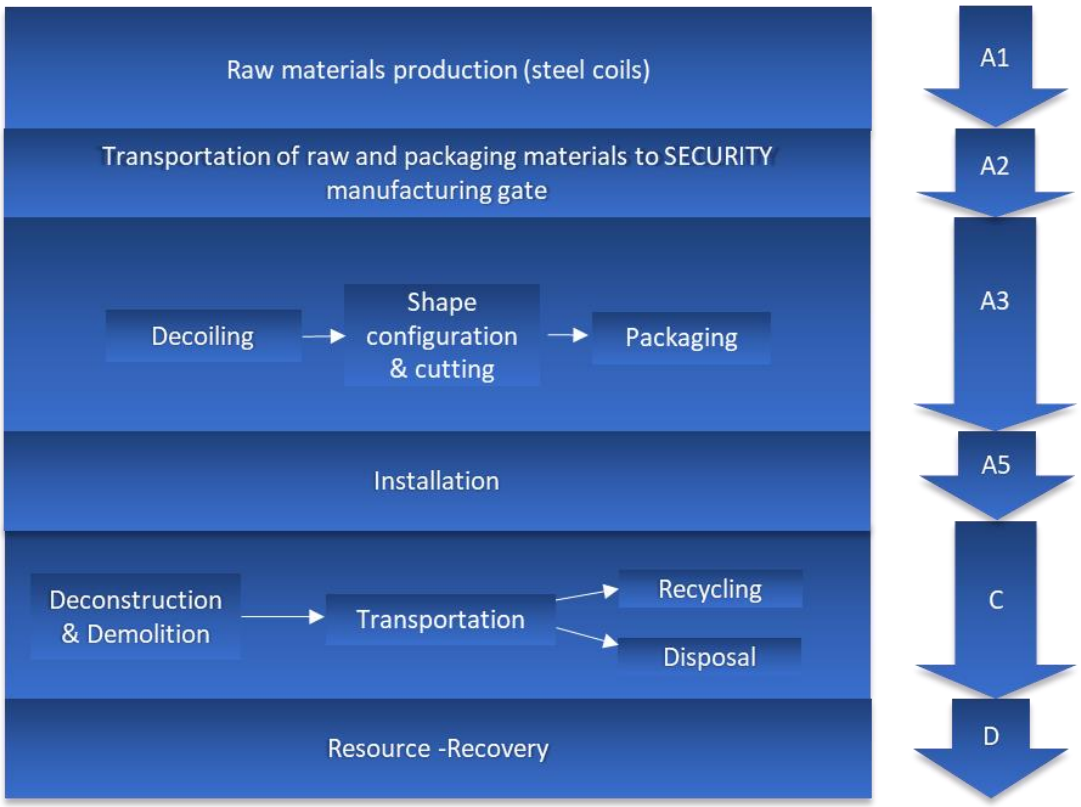
C4: Disposal

This module includes impacts related to the reuse/recycling of products after their life cycle. As said above, 15% of steel scrap will be landfilled.

Resource and recovery stage (D)

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. The scenario adopted in this module is that, the part of steel scrap that is recycled enters an electric arc furnace for the production of steel product.



LCA Information

Declared unit

The declared unit of the study is 1 kg of drywall steel profiles manufactured in Security Aluminum Hellas S.A. plant located at Egaleo, Greece. Impact assessment results in this report are expressed on the basis of the declared unit.

Goal and Scope

This EPD evaluates the environmental impacts of the production of 1 kg of steel profiles, from cradle to gate (modules A1-A3), along with construction/installation stage (module A5) end-of-life modules (C1-C4) end module D.

Cut-off rules

The cut-off criteria adopted is as stated in ‘’EN 15804:2012+A2:2019’’. Where there are insufficient data or data gaps 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. In this case, cut-off was applied only in PVC straps used for packaging. The percentage of cut-off streams compared to the produced quantities is 0,01%.

Allocations

Allocation rules have been performed in accordance with the requirements of ISO 14044:2006. Wherever possible, allocation was avoided by dividing the unit process to be allocated into two or more sub-processes and collecting the input and output data related to these sub-processes. Where allocation cannot be avoided, the inputs and outputs of the system were partitioned between its different products or functions in a way

that reflects the underlying physical or economic relationships between them. In this case, a co-product allocation between the good'' manufactured product (drywall profiles) and steel scrap is conducted. Steel scrap generated from the manufacturing process is sold, so since it has a positive economic value, it is considered a co-product.

The allocation of waste shall follow the polluter-pays principle that is made operational according to the following rules. Processes of waste processing shall be assigned to the product system that generates the waste until the end-of-waste state is reached. The end-of-waste state is reached when all the following criteria are fulfilled:

- the recovered material or product (including, e.g., energyware such as fuel, electricity and heat) is commonly used for specific purposes
- a market or demand, identified for example by a positive economic value, exists for such a recovered material or product
- the recovered material or product fulfils the technical requirements for the specific purposes for which it is used and meets the existing legislation and standards applicable to its use
- the use of the recovered material or product will not lead to overall adverse environmental or human health impacts, which shall be understood as content of hazardous substances below limit values in applicable legislation

The following rules indicate that for all waste that require disposal in modules A5 and C4 (part of packaging and part of steel), impacts from the whole disposal activity will be assigned in this product system. For waste (or parts thereof) that require recycling in modules A5 & C3, only the sorting and transportation of waste will be assigned to this product system. Impacts from incineration of packaging materials in A5 module with energy recovery are not taken into account, based on the assumption that the incinerator pays for the material or receives it or picks it up for free, so environmental burden is assigned to the product system using the energy. Only manually added as *Materials for Energy Recovery (MER)* in A5 & C3 module.

Data quality

ISO 14044 was applied in terms of data collection and quality requirements. The impact of the production of raw materials recovered from *Ecoinvent database v.3.10.1+EN 15804 add-on*. The data concerning the modules A2 (Transportation) and A3 (Product manufacturing) were provided by Security Aluminum Hellas S.A. and concerns the full year 2024. These data were the quantities of all input and output materials extracted from the company's SAP system and predetermined recipes, the consumed utilities (energy and diesel) from bills and invoices. Regarding electricity mix, the latest (2023) national residual electricity mix as published in DAPEEP S.A. was utilized. The climate impact (GWP-GHG) of this electricity, as calculated from a manually created dataset in openLCA is 0,7068 kg CO_2 eq./kWh. The CO_2 emissions from diesel and LPG combustion data were calculated from the National Inventory Report (NIR) of Greece (NIR Greece) The end-of-life are based on the most representative scenarios for this product. Background data for this stage are retrieved from *Ecoinvent v.3.10.1+EN 15804 add-on.*

Time representativeness

Data obtained refer to the year 2024

Software used

OpenLCA v.2.3

Characterization factors (JRC)

Based on Reference package EF 3.1

Environmental Performance

The results of 1 kg drywall steel profiles are presented below. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The use of the results of modules A1-A3 is discouraged without considering the results of module C. For Primary Energy Use indicators, option B of PCR 2019:14 v.1.3.4 has been followed.

IMPACTS	Unit	A1-A3	A5	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	2,39E+00	2,14E-02	0,00E+00	7,11E-03	2,22E-02	9,39E-04	-1,42E+00
GWP-fossil	kg CO2 eq	2,41E+00	3,48E-04	0,00E+00	6,75E-03	2,22E-02	9,38E-04	-1,42E+00
GWP-biogenic	kg CO2 eq	-2,10E-02	2,10E-02	0,00E+00	9,82E-05	0,00E+00	1,29E-07	0,00E+00
GWP-luluc	kg CO2 eq	1,31E-03	8,04E-07	0,00E+00	2,59E-04	3,14E-05	4,83E-07	-4,46E-05
GWP-GHG[1]	kg CO2 eq	2,41E+00	6,54E-04	0,00E+00	7,01E-03	2,23E-02	9,39E-04	-1,42E+00
ODP	kg CFC-11 eq	1,47E-08	4,84E-12	0,00E+00	2,57E-10	3,05E-10	2,71E-11	-4,43E-09
AP	mol H+ eq	1,02E-02	1,84E-06	0,00E+00	2,19E-05	2,44E-04	6,65E-06	-5,46E-03
EP-freshwater	kg P eq	9,90E-04	8,03E-08	0,00E+00	5,30E-07	1,27E-05	7,79E-08	-6,04E-04
EP-marine	kg N eq	2,33E-03	1,42E-06	0,00E+00	9,62E-06	5,67E-05	2,53E-06	-1,21E-03
EP-terrestrial	mol N eq	2,39E-02	6,68E-06	0,00E+00	8,12E-05	6,37E-04	2,77E-05	-1,33E-02
POCP	kg NMVOC eq	8,38E-03	2,29E-06	0,00E+00	3,11E-05	1,91E-04	9,91E-06	-4,53E-03
ADPe[2]	kg Sb eq	1,51E-05	1,01E-09	0,00E+00	2,53E-08	1,37E-06	1,50E-09	-1,26E-05
ADPf[2]	MJ	2,57E+01	4,89E-03	0,00E+00	9,69E-02	2,99E-01	2,30E-02	-1,28E+01
WDP[2]	m^3 eq	1,04E+00	4,43E-05	0,00E+00	6,33E-04	4,82E-03	6,43E-05	-2,31E-01

[1] GWP-GHG indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide emissions and uptake and biogenic carbon stored in the product, with characterization factors (CFs) based on IPCC (2013).

[2] The results of this environmental impact indicators of ADPf, ADPe and WDP shall be used with care as the uncertainties of these results are high or as there is limited experienced with the indicator.

RESOURCE USE	Unit	A1-A3	A5	C1	C2	C3	C4	D
PERE	MJ	2,29E+00	2,18E-04	0,00E+00	1,75E-03	2,45E-02	1,81E-04	-6,58E-01
PERM	MJ	3,15E-01	-3,15E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,60E+00	-3,15E-01	0,00E+00	1,75E-03	2,45E-02	1,81E-04	-6,58E-01
PENRE	MJ	2,50E+01	4,54E-03	0,00E+00	8,97E-02	2,80E-01	2,08E-02	-1,26E+01
PENRM	MJ	7,05E-01	-7,05E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,57E+01	-7,00E-01	0,00E+00	8,97E-02	2,80E-01	2,08E-02	-1,26E+01
SM	kg	4,55E-01	6,60E-03	0,00E+00	1,11E-04	8,52E-01	1,07E-05	0,00E+00
RSF	MJ	2,03E-02	4,13E-06	0,00E+00	1,09E-05	6,35E-04	2,21E-06	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	m^3	1,47E-02	-6,09E-06	0,00E+00	2,53E-05	1,43E-04	2,39E-05	-2,94E-03

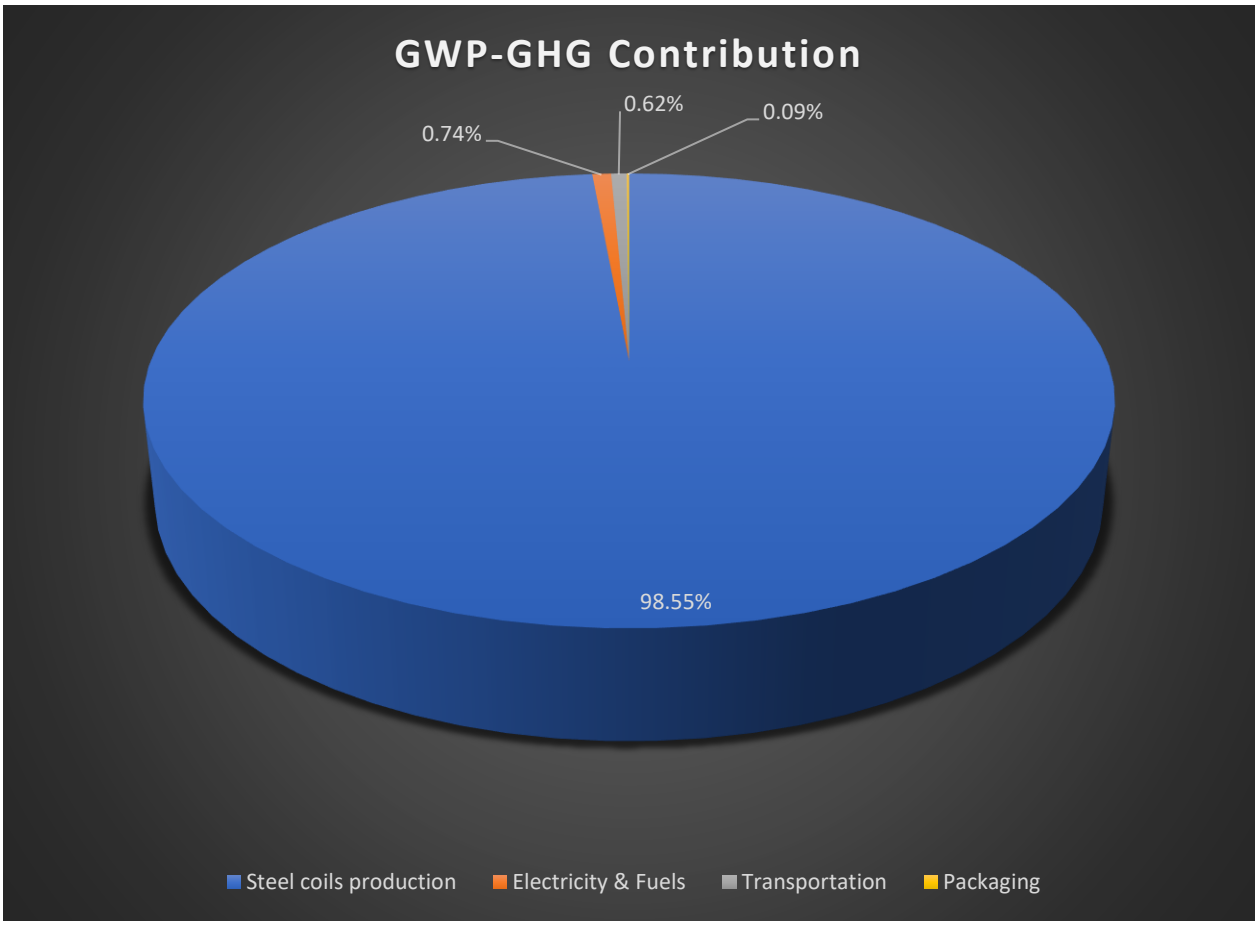
WASTE CATEGORIES	Unit	A1-A3	A5	C1	C2	C3	C4	D
HWD	kg	7,60E-01	1,07E-05	0,00E+00	1,56E-04	1,37E-03	1,72E-05	-3,60E-01
NHWD	kg	6,38E+00	1,19E-02	0,00E+00	9,85E-04	1,30E-02	1,50E-01	-1,25E+00
RWD	kg	2,52E-05	5,02E-09	0,00E+00	2,14E-08	5,73E-07	3,58E-09	1,44E-05

CRU	**kg**	-3,38E-20	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-4,98E-20
MFR	**kg**	2,98E-01	6,59E-03	0,00E+00	0,00E+00	8,50E-01	0,00E+00	0,00E+00
MER	**kg**	9,10E-06	6,42E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE,e	**MJ**	1,09E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE,t	**MJ**	1,26E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ADDITIONAL	**Unit**	**A1-A3**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PM	**Disease incidence**	2,13E-07	3,24E-11	0,00E+00	6,41E-10	3,42E-09	1,51E-10	-9,17E-08
IR[3]	**kBq U235 eq**	1,00E-01	2,01E-05	0,00E+00	8,83E-05	2,24E-03	1,47E-05	5,54E-02
EF	**CTUe**	7,64E+01	7,82E-03	0,00E+00	2,80E-01	2,16E-01	3,14E-03	-1,10E+02
HT-c	**CTUh**	2,32E-07	2,17E-12	0,00E+00	8,83E-05	2,24E-03	1,47E-05	5,54E-02
HT-nc	**CTUh**	5,05E-08	4,36E-12	0,00E+00	9,29E-11	1,20E-09	4,14E-12	-1,70E-08
LU	**Dimensionless**	8,47E+00	4,01E-03	0,00E+00	8,39E-02	5,34E-01	4,53E-02	-3,64E+00

[3]Ionizing radiation potential (IRP) 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.

Interpretation



As presented above, production of steel coils is the vast majority of contributors accounting for 98,55%. Next most significant stream is electricity and fuels required for the manufacturing process, contributing 0,74%. Transportation of raw and packaging materials contribute 0,62% of the total GWP-GHG impact. Finally, production of packaging materials is of minor importance, with a contribution reaching 0,09%.

Additional information

The EPD does not give information on release of dangerous substances to soil, water and indoor air because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonized test methods according to the provisions of the respective technical committees for European product standards are not available.

Abbreviations

LCA	Life Cycle assessment
EPD	Environmental Product Declaration
PCR	Product category rules
GWP-total	Global Warming Potential total
GWP-fossil	Global Warming Potential fossil
GWP-biogenic	Global Warming Potential biogenic
GWP-luluc	Global Warming Potential land use and land use change
ODP	Ozone Depletion Potential
AP	Acidification Potential
EP-freshwater	Eutrophication potential, fraction of nutrients reaching freshwater end compartment
EP-marine	Eutrophication Potential fraction of nutrients reaching marine end compartment
EP- terrestrial	Eutrophication potential, Accumulated Exceedance
POCP	Formation potential of tropospheric ozone photochemical oxidants
ADPe	Abiotic depletion potential for non-fossil resources
ADPf	Abiotic depletion potential for fossil resources
WDP	Water use
PERE	Use of renewable primary energy excluding 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 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 material
RSF	Use of renewable secondary fuels
NRSF	Use of non-renewable secondary fuels
FW	Use of net fresh water
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
PM	Particulate matter emissions
IR	Ionizing radiation, human health
ETP-FW	Ecotoxicity, freshwater
HTP-c	Human toxicity, cancer
HTP-nc	Human toxicity, non-cancer
SQP	Land use related impacts/Soil quality

References

- ***General Programme Instructions*** *for the International EPD® System. Version 4.0*
- ***PCR 2019:14*** *v.1.3.4 Construction products. EPD System.*
- ***EN 15804:2012+A2:2019/AC,*** *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.org*
- ***TACKLING RECYCLING ASPECTS IN EN15804*** *- Christian Leroy, Jean-Sebastien Thomas, Nick Avery, Jan Bollen, Ladji Tikana*
- ***National Inventory Report for Greece***
- ***Residual Energy Mix 2023, DAPEEP***