Ternium

EPD INTERNATIONAL EPD SYSTEM

LATAM EPD INTERNATIONAL EPD SYSTEM

Steel Building Structure manufactured by Ternium México S.A. de C.V.

Environmental Product Declaration
In accordance with ISO 14025:2006 and EN15804:2012+A2:2019/AC:2021

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
Licensee:	EPD® Latin América
Type of EPD:	EPD of a single product, Steel Building Structure, from a single manufacturer, Ternium México S.A. de C.V. The results are based on an average product configuration composed of Frames (40.31%), TMBT (15.17%), TMSR (11.11%), Purlins (22.72%), Bracing (6.06%), TMRW (2.83%), and Trim (1.81%). These percentages were used as weighting factors to represent the average configuration of the declared product.
EPD registration number:	EPD-IES-0033208:001
Version date:	2026-07-22
Validity date:	2031-07-22

ECO PLATFORM EPD VERIFIED

An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com

Content

1. General information

Programme Information	
Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
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Product Category Rules (PCR)

CEN standard EN 15804:2012+A2:2019/AC:2021 serves as the core Product Category Rules (PCR)

Product category rules (PCR): Construction products. 2019:14, version 2.0.1 UN CPC 421, Structural metal products and parts thereof.

PCR review was conducted by: The Technical Committee of the International EPD System. A full list of members is available on www.environdec.com. The review panel may be contacted via support@environdec.com. Review chair: Rob Rouwette (chair), Noa Meron (co-chair).

Verification

External and independent ('third-party') verification of the declaration and data, according to ISO 14025:2006, via EPD verification through:
☒ Individual EPD verification without a pre-verified LCA/EPD tool.
Third-party verifier: Itxaso Trabudua, IK ingenieria
Approved by: The International EPD System
Observers: Iñaki Tellería (IK ingeniería) and Patricia López Cacheiro (FINSA)
Pre-verified LCA tool or Pre-verified EPD tool: N/A

Procedure for follow-up of data during EPD validity involves third-party verifier.
☒ Yes ☐ No

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

EPDs within the same product category but published 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 first-digit 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 identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.
For further information about comparability, see EN 15804 and ISO 14025.

2. Information about EPD owner

Owner of the EPD:	Ternium Mexico S.A. de C.V.
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Product-related or management system-related certifications:	Product Certifications: IAS AC472 and AWS welder certification Manufacturer Certifications: ISO 14001:2015, ISO 45001:2018, ISO 9001:2015 and ISO 50001:2018

Description of the organisation

Ternium is a leading company in Latin America that manufactures and processes a wide range of steel products using the most advanced technology. The company supplies customers operating in diverse and essential steel-consuming industries, such as construction, automotive, and energy, as well as manufacturers of heavy and agricultural machinery, household appliances, and packaging, among others.

Ternium and its subsidiaries have 21 production facilities in Argentina, Brazil, Colombia, Guatemala, Mexico, and the United States. It is also part of the controlling group of Usiminas, a leading steel producer in the Brazilian market.

Ternium supplies high-quality steel to all major regional markets and promotes the development of its customers in the metallurgical industry.

The company's distinctive position is the result of its highly integrated production process. Its facilities cover the entire steel manufacturing process, from iron ore mining to the production of high value-added products.

With an achievable annual production capacity of 15.4 million tons, Ternium's shares are listed and traded on the New York Stock Exchange (NYSE).

3. Product information

Product name:	Steel Building Structure manufactured by Ternium México S.A. de C.V.
UN CPC code:	UN CPC 421, Structural metal products and parts thereof.
Name and location of production site:	Steel Buildings Plant: Highway Monterrey – Laredo km 22.5, Ciénega de Flores, Nuevo León (65550)
References to any relevant websites for more information or explanatory materials:	https://mx.ternium.com/es

Product description

The Steel Building Structure manufactured by Ternium México constitutes a system that provides structural components including roofing, cladding, and accessories for the construction of Ternium Steel Building Structure tailored to each client's specific requirements. These structures are composed of several elements, which can include:

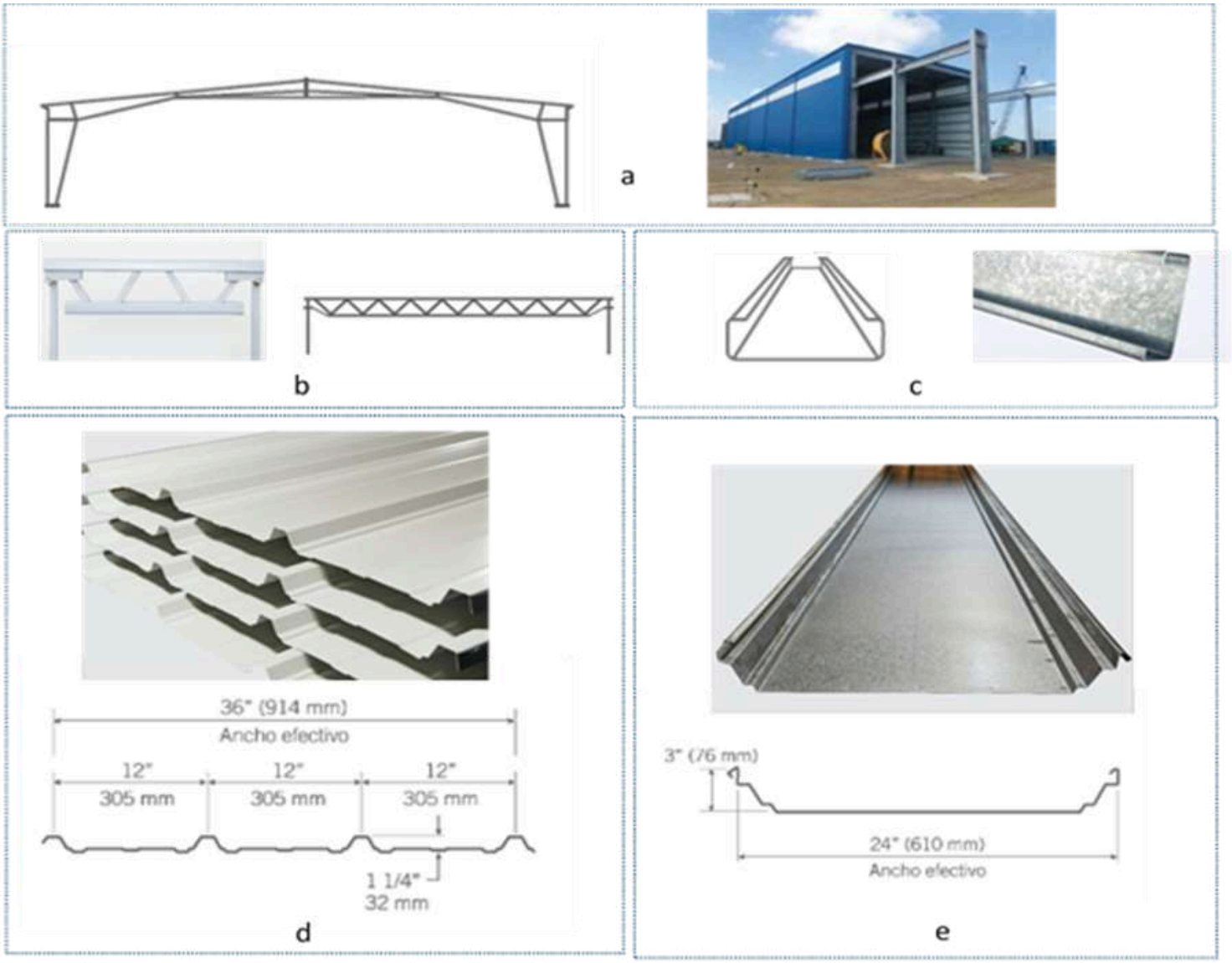
- Frames- Beams and Columns
- TMBT- Ternium Bay Truss
- Purlins
- TMSR-Ternium Metal Seam Roof
- TMRW-Ternium Metal Rib Wall
- Ternium Trim
- Bracing -Angles and Bars

Figure 1. Ternium Steel Building Structure assembled from structural components.

Table 1. Summarizes the general characteristics of the structural components used for assembling the Ternium Steel Building Structure.

Components	Raw materials	Thickness/gauge	Category	Standard
Frames – Beams and columns	Hot Rolled Steel (plate) and hot rolled steel (Sheet and Coils)	Standard of 5 mm (3/16") to 2.5 mm (1") Special of 32 mm (1 1/4") to 76 mm (3")	SS Grade 55 HSLA class 1 Grade 55 Fy=380 MPa (55 KSI)	ASTM A-529, A-572, A-1011
Purlin	Hot Rolled Steel (plate) and galvanized steel Coils	1.9 mm (0.075") and 2.67 mm (0.105")	SS Grade 55 HSLA class 1 Grade 55 Fy=380 MPa (55 KSI)	ASTM A-1011, A653 (galvanized)
Ternium Metal Seam Roof - TMSR	Ternium Zintro Alum and Ternium Zintro	Standard 24, special 22	SS Grade 50 HSLA class 1 Grade 50 Fy=340 MPa (50 KSI) Grade 50	ASTM A-792
Facade – Ternium Metal Rib Wall + Trim	Ternium Pintro	Standard 26, Special 24	SS Grade 50 HSLA class 1 Grade 50 Fy=340 MPa (50 KSI)	CONST001
Bracing	Steel bar	Diameter 3/8” to 1 ¼”	SS Grade 50 Grade 50 Fy=340 MPa (50 KSI)	ASTM A-572
Angle bracing	Angle	1”x 1/8” to 6” x ½”	SS Grade 50 HSLA Class l Fy=340 MPa (50 KSI)	ASTM A-572
Ternium Bay Truss - TMBT-Chord	Hot Rolled Steel (non-pickled)	1.85 mm (0.073") to 2.67 mm (0.105")	SS Grade 55 HSLA class 1 Grade 55 Fy=380 MPa (55 KSI)	ASTM A-1011
Ternium Bay Truss - TMBT- Brace (Lattice)	Structural square pipe 38.1 mm x 38.1 mm (1.5" x 1.5")	1.65 mm (0.065") to 3.05 mm (0.120")	Fy=317 MPa (46 KSI)	ASTM A-500

Figure 2. General schematic representation of structural components for Steel Building Structure manufactured by Ternium México: a) Frames, b) Ternium Bay Truss (TMBT), c) Purlin, d) Ternium Metal Rib Wall (TMRW), e) Ternium Metal Seam Roof (TMSR).



Ternium Steel Building Structure is manufactured from the previously described structural products, which serve as the basic inputs for their assembly. The final configuration of each structure depends on the specific requirements of the client and the project design, resulting in a high degree of variability in possible combinations.

In accordance with the modular approach established in ISO 14025:2006 and ISO 21930:2017, as well as the applicable Product Category Rules (PCR) for the construction sector, this study considers the total production of the declared product, without disaggregating or modelling specific design configurations, to maintain the representativeness and consistency of the life cycle inventory.

4. Content declaration

This section presents the content declaration of the declared product, corresponding to 1,000 kg of Ternium Steel Building Structure. The reported composition represents a production-weighted average configuration, calculated based on each structural component's contribution to annual production.

The post-consumer recycled material content corresponds to the complete declared unit. The value of 40.80% represents 408.01 kg of post-consumer recycled steel per 1,000 kg of Ternium Steel Building Structure. This value refers only to post-consumer recycled material and should not be interpreted as the total recycled steel input used in the product system.

Table 2. Content declaration.

Product content	Mass, kg	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product or declared unit
Steel	9.93E+02	41.08%	0.00%	0.00E+00
Primer paint	3.15E+00	0.00%	0.00%	0.00E+00
Water base paint	3.68E+00	0.00%	0.00%	0.00E+00
Galvalite paint	6.47E-03	0.00%	0.00%	0.00E+00
Total	**1.00E+03**	**40.80%**	**0.00%**	**0.00E+00**
Packaging materials	**Mass, kg**	**Mass-% (versus the product)**	**Biogenic material, kg C/product or declared unit**	
Steel strip	5.25E-01	<1%	0.00E+00	
Plastic film	1.12E-01	<1%	0.00E+00	
Paper packaging	4.01E-01	<1%	<1	
Total	**1.04E+00**	**<1%**	**<1**	

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO2.

No substances included in the Candidate List of Substances of Very High Concern under REACH are present in the analysed product manufactured by Ternium México, either above the limit for registration with the European Chemicals Agency or above 0.1% (weight/weight).

Biogenic Carbon Content Information

Ternium Steel Building Structure does not contain biogenic carbon. Biogenic carbon content in packaging materials is below the reporting threshold established in PCR 2019:14, Construction Products, version 2.0.1.

5. LCA information

5.1 Declared unit

1000 kilograms of Steel Building Structure manufactured in 2024 at the Ternium Steel Buildings Plant located in Cienega de Flores, Nuevo Leon, Mexico.

5.2 Time representativeness

Specific data is from 2024

5.3 Geographical scope

Mexico

5.4 Database and LCA software used

Ecoinvent 3.10, implemented in the SimaPro 9.6.0.1 software.

5.5 Description of system boundaries

The potential environmental impacts of the Ternium Steel Building Structure were calculated using Life Cycle Assessment (LCA) methodology, in accordance with ISO 14040:2006 and ISO 14044:2006. According to EN 15804:2012+A2:2019/AC:2021, Section 5.2, this EPD is classified as a cradle-to-gate declaration with modules C1–C4 and module D (A1–A3 + C + D). The EPD includes upstream and core processes for modules A1–A3, as well as scenarios for modules C1, C2, C3, C4, and D. Modules A4–A5 and B1–B7 are not declared.

Table 3. System boundary

Life cycle stages	Information modules	Type of EPD			
		a) Cradle-to-gate with modules C1-C4 and module D1	b) Cradle-to-gate with modules C1-C4, module D and optional modules	c) Cradle to grave and module D	d) Construction service EPD: Cradle to door with modules A1-A5 and optional modules
A1-A3 products stage	A1) Raw material supply A2) Transport A3) Manufacturing	Mandatory	Mandatory	Mandatory	Mandatory
A4-A5 Construction stage	A4) Transport A5) Construction installation	Not applicable	Optional for goods Mandatory for services recommended if a default scenario can be defined	Mandatory	Mandatory
B Usage stage	B1) Use B2) Maintenance B3) Repair B4) Replacement B5) Refurbishment B6) Operational energy use B7) Operational water use	Not applicable	Optional	Mandatory	Mandatory/ Not applicable
C End of life stage	C1) Deconstruction, demolition C2) Transport C3) Waste processing C4) Disposal	Mandatory	Mandatory	Mandatory	Mandatory/ Not applicable
D Benefits and loads beyond the system boundary	D) Reuse, recovery, recycling, potential.	Mandatory	Mandatory	Mandatory	Mandatory/ Not applicable

Table 4. Description of the modules included in this EPD

				
A1) Raw materials supply	**A2) Transport**	**A3) Manufacturing**	**C) End of life**	**D) Beyond product life cycle**
• Raw material consumption and production. • Electricity consumption and production. • Fuel consumption. • Raw material packaging.	• Transport distance of raw materials and inputs to the manufacturing site and their packaging associated.	• Consumption of auxiliary inputs. • Water consumption and production. • Air emissions. • Waste generation. • Waste treatment processes.	• Demolition. • Transport to destination. • Material recycled. • Material sent to landfill, wasted, or not recycled.	• Avoided loads and benefits.

5.6 Description of the manufacturing process

The Ternium Steel Building Plant fabricates the structural components that constitute the declared product, including Frames, TMBT, Purlins, TMSR roofing, TMRW wall systems, Trim, and Bracing elements. Frames are produced from Hot-Rolled Steel through plasma cutting, CNC drilling, assembly, and submerged arc welding; structural accessories are then incorporated, and paint is applied using an airless spray system. TMBT is manufactured from Hot-Rolled Steel and square tube through chord rolling, lattice preparation, pre-assembly, welding, accessory installation, and the application of a water-based primer by dip coating.

Purlins are produced by cold forming black or galvanized steel, followed by cutting to length, painting, oven curing, cooling, and packaging. TMSR, TMRW, and Trim are manufactured from galvanized and painted coils through corrugation or cold forming, synchronized cutting, stacking, and packaging. Finally, Bracing elements are fabricated from structural angles and round bars through cutting, drilling, end preparation, threading when applicable, dimensional verification, identification, and transfer to finished goods for shipment.

End of Life stage (modules C1, C2, C3, C4)

C1) Deconstruction: fuel consumption for the demolition or deconstruction of 1000 kg of Steel was considered. For scenario C1, default fuel consumption data were used, based on reference PCR.

C2) Waste transport: Transport of waste to landfill and recycling is modeled using default distances from the PCR.

C3) Waste treatment: In Mexico, approximately 98% of structural steel is recycled, according to the Mexican Institute of Steel Construction (IMCA, n.d). Module C3 covers the recycling of the product, which includes loading and unloading at the sorting facility, mechanical sorting, and fragging of steel.

C4) Disposal: Module C4 addresses the environmental impacts associated with the landfill disposal of the unrecovered material. It was assumed that 0.02 tonnes of demolition steel per tonne are sent to landfills.

Benefits and loads beyond the system boundary (Module D): Module D was calculated according to EN 15804:2012+A2:2019/AC:2021 using the net scrap flow approach. For 1,000 kg of Ternium Steel Building Structure, the amount of steel leaving the system for recycling was MMR out = 0.98 t, while the total recycled steel entering the product system was MMR in = 0.43 t. The MMR in value refers to the total recycled input and is different from the post-consumer recycled content reported in the content declaration. The net scrap flow was calculated as: MMR out – MMR in = 0.98 t – 0.43 t = 0.55 t
The recovery process was modelled as Iron scrap, sorted, pressed {RoW}| sorting and pressing of iron scrap |Cut-off, U, and the substituted virgin material as Pig iron {RoW}| pig iron production|Cut-off, U. For each impact category, Module D was calculated as: Module D = 0.55×(EMR after EoW out – EVM Sub out) × 1

Table 5. Default data for modelling modules C1, C2, C3 and C4.

Module	Process	Consideration
C1	Demolition/deconstruction of steel.	1.1 kWh of diesel consumption per tonne of demolition.
C2	Transport (for products/materials not to be incinerated).	80 km distance of transportation to waste processing site.
C3	Loading and unloading at sorting facility, Mechanical sorting and fragging of steel.	• 1.8 kWh of diesel for loading and unloading at sorting facility. • 2.2 kWh/tonne for Mechanical sorting. • 7.4 kWh/tonne for fragging steel.
C4	Compacting inert construction waste for landfills.	1.6 kWh/tonne of diesel for Compacting of inert construction waste for landfills.

Figure 3. Process flow diagram

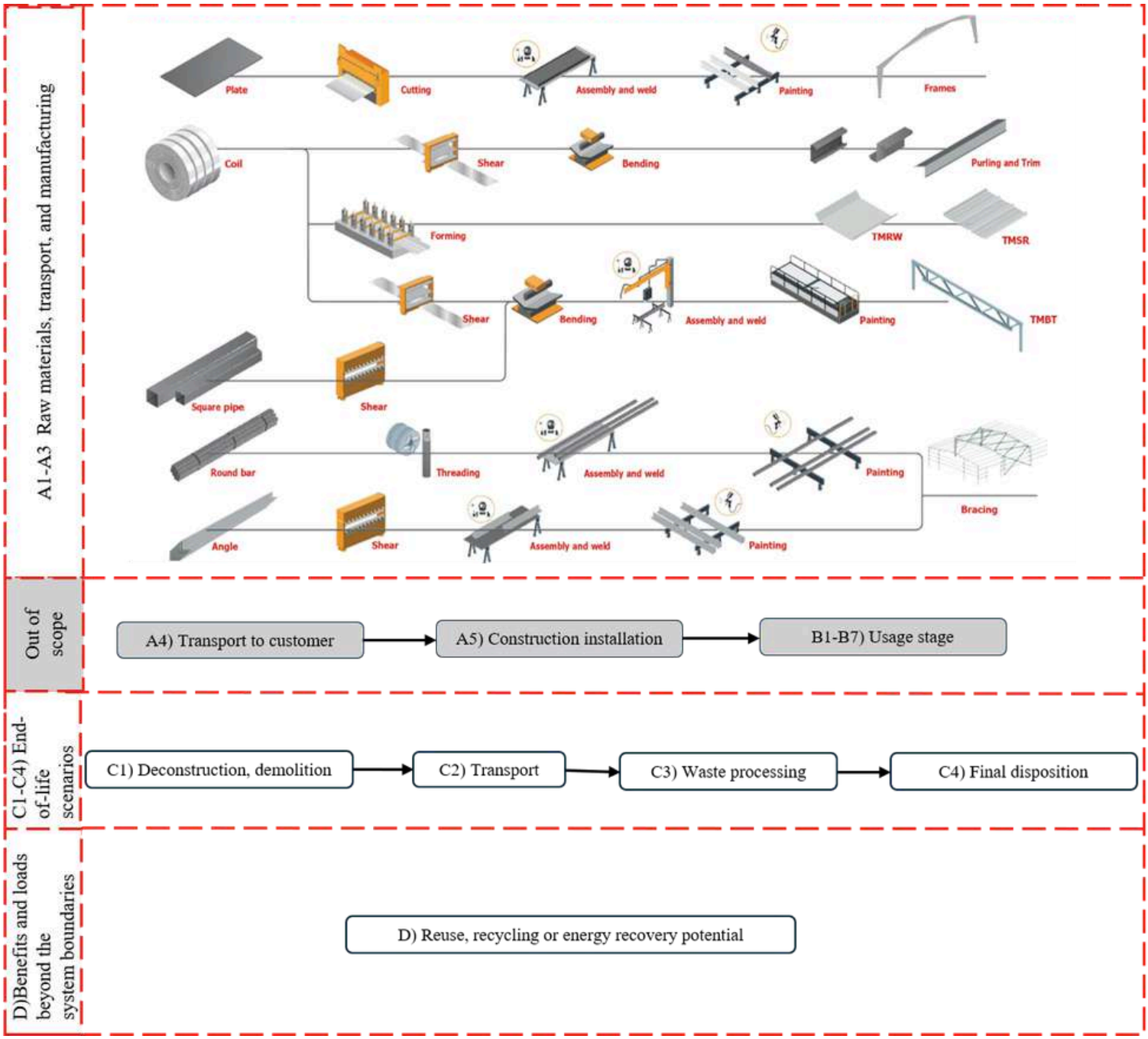


Table 6. Modules declared, geography, share of primary data (in GWP-GHG results) and data variation.

	Product stage			Distribution / installation stage		Use stage							End of life stage				Beyond product life cycle
	Raw material supply	Transport	Manufacturing	Transport	Distribution/ installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	MX USA BR	MX USA BR	MX	ND	ND	ND	ND	ND	ND	ND	ND	ND	MX	MX	MX	MX	MX
Share of primary data	90.20%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation products*	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Modules declared = "X"; Modules not declared = "ND"; MX=Mexico; USA= United States of America and BR=Brazil

**Variation among products is reported as 0% because this EPD declares one single product, Ternium Steel Building Structure. The listed components are constituent parts used to represent the production-weighted average configuration of the declared product.*

5.7 Data quality assessment

Table 7. Summary of data quality.

Data	Source type	Source	Reference year	Data category	Geographical representativeness	Precision	Completeness	Consistency	Technical representativeness	Percentage of Primary Data for GWP-GHG
A1-A3) Raw materials, transport and manufacturing										
Extraction and processing of raw materials required for the manufacturing of product	Collected data	EPD owner	2024	Primary	Very Good	Very Good	Very Good	Very Good	Very Good	80.28
Generation and distribution of electricity, based on the regional average of the consumption area	Collected data	EPD owner	2024	Primary	Very Good	Very Good	Very Good	Very Good	Very Good	5.33
Production of fuels consumed during manufacturing	Collected data	EPD owner	2024	Primary and secondary	Very Good	Very Good	Very Good	Very Good	Very Good	<1
Transportation of raw, auxiliary inputs and packaging	Collected data	EPD owner	2024	Primary	Very Good	Very Good	Very Good	Very Good	Very Good	4.6
Water consumption	Collected data	EPD owner	2024	Primary	Very good	Very good	Very good	Very good	Very good	<1
Consumption of auxiliary materials during manufacturing	Collected data	EPD owner	2024	Primary and secondary	Very good	Very good	Very good	Very good	Very good	<1
Air emissions	Collected data	EPD owner	2024	Primary and secondary	Very good	Very good	Very good	Very good	Very good	<1
Waste generation and management	Collected data	EPD owner	2024	Primary and secondary	Very good	Very good	Very good	Very good	Very good	<1
Waste transport distance	Collected data	EPD owner	2024	Primary	Very good	Very good	Very good	Very good	Very good	<1
Total										90.2

5.8 Assumptions

- It is assumed that 98% of the steel waste generated at end-of-life is sent to recycling.
- It is assumed that 2% of waste is disposed of in landfills.
- The data used to model the end-of-life scenario comes from the default values in the PCR and is based on the studies by Erlandsson et al. (2015) and OVAM (2018).
- The Ternium Steel Building Structure assessed in this EPD was represented based on 2024 mass production data reported by Ternium: Frames 40.31%, TMBT 15.17%, TMSR 11.11%, Purlins 22.72%, Bracing 6.06%, TMRW 2.83% and Ternium Trim 1.81%. These percentages were used as weighting factors to represent the production-weighted average configuration of the single declared product.

Global Warming Potential (GWP-GHG) of electricity used in Ternium México manufacturing processes

Table 8. Global Warming Potential of the electricity used in the manufacturing process.

Type of electricity	Unit	Share (%)	GWP-GHG (kg CO_2 eq / kWh)
1 kWh Electricity, high voltage, 2024 {MX}| market for electricity, high voltage | Cut-off, U*	kg CO_2 eq	100.00%	0.44**

*Electricity consumption was modeled using the Mexican national grid mix.
**According to SEMARNAT's notice, based on information notified by the Energy Regulatory Commission (CRE), the 2024 emission factor for the Mexican National Electric System applicable to indirect GHG emissions from electricity consumption is 0.444 tCO_2e/MWh.

Global Warming Potential (GWP-GHG) of Scrap used

Table 9. Scrap use, Global Warming Potential.

Scrap intensity	Unit	GWP - GHG
Global warming potential (GWP-GHG) of scrap use	kg CO_2 eq/tonne	40.9

5.9 Cut-off criteria

All fuel, energy, material, and auxiliary input flows necessary to manufacture the Ternium Steel Building Structure were considered within the system boundaries.
Infrastructure and capital goods were excluded from the system boundaries. This includes the construction, maintenance, and decommissioning of buildings, production facilities, machinery, equipment, internal roads, and other long-lived assets. Materials used for preventive or corrective maintenance of machinery and equipment, uniforms and personal protective equipment were also excluded.

5.10 Allocation

Steel scrap generated during the manufacture of the Ternium Steel Building Structure is separately collected, quantified by mass, and treated as a co-product. Environmental burdens are allocated between the finished product and the scrap based on their respective masses.

Recycled steel inputs are modeled using the cut-off approach. They enter the product system without burdens from their previous life cycle, while the impacts associated with their collection, sorting, processing, transport, and recycling are included through the corresponding background datasets.

5.11 Excluded life cycle stages

The modules: A4, A5, B1, B2, B3, B4, B5, B6, B7.

5.12 Characterisation methods

- Global Warming Potential, GWP100, EN 15804. Version: EF 3.1, February 2023.
- Acidification potential, AP, accumulated exceedance, EN 15804. Version: February 2023.
- Eutrophication potential (EP) Version 2.0 of the default list of indicators (valid from 2022-03-29).
- Photochemical ozone creation potential (POCP), ReCiPe, EN 15804 Version: February 2023.
- Ozone depletion potential (ODP), EN 15804. Version: February 2023.
- Abiotic depletion potential (ADP) for minerals and metals (non-fossil resources), ADP minerals & metals, EN 15804. Version: February 2023.
- Abiotic depletion potential (ADP) for fossil resources, ADP fossil resources, EN 15804. Version: August 2021.
- Water deprivation potential (WDP), Available water remaining (AWARE) method, EN 15804.

6. Environmental performance

6.1 Potential environmental impact

The Life Cycle Impact Assessment was calculated using the EN 15804+A2 Method V1.02 / EF 3.1 characterisation factors and Ecoinvent 3.10, implemented in the SimaPro 9.6.0.1 software.

Figure 4. Life Cycle Impact Assessment of 1000 kg of Ternium Steel Building Structure. Basic categories.

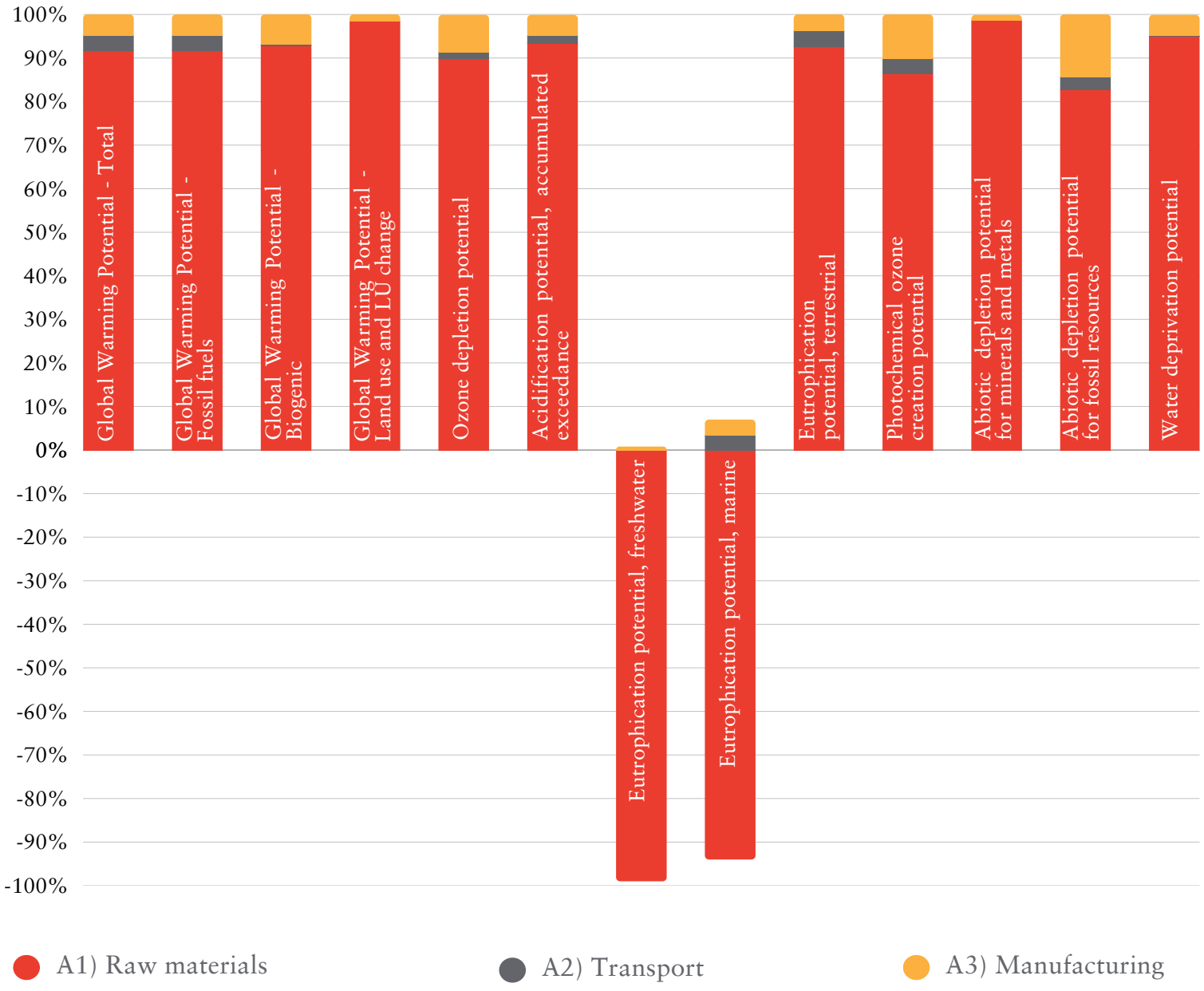


Table 10. Life Cycle Impact Assessment of 1000 kg of Ternium Steel Building Structure. Basic categories.

Basic impact categories	Unit	A1 - A3	C1	C2	C3	C4	D
Global Warming Potential - Total	kg CO_2 eq.	1.97E+03	3.72E-01	1.22E+01	4.13E+00	1.08E-02	-9.92E+02
Global Warming Potential - fossil fuels	kg CO_2 eq.	1.97E+03	3.72E-01	1.22E+01	4.12E+00	1.08E-02	-9.92E+02
Global Warming Potential - Biogenic	kg CO_2 eq.	9.27E-01	1.60E-05	5.83E-04	1.92E-04	4.66E-07	-6.01E-02
Global Warming Potential - Land use and land use change	kg CO_2 eq.	6.65E+00	1.28E-05	3.99E-04	1.21E-04	3.72E-07	-1.03E-01
Ozone depletion potential	kg CFC-11 eq.	4.61E-05	5.85E-09	1.78E-07	7.35E-08	1.70E-10	-2.17E-06
Acidification potential, accumulated exceedance	mol H+ eq.	9.15E+00	3.48E-03	4.62E-02	3.16E-02	1.01E-04	-3.11E+00
Eutrophication Potential - freshwater	kg P eq.	-2.55E-01	3.51E-07	2.96E-05	1.86E-05	1.02E-08	-3.27E-02
Eutrophication Potential- marine	kg N eq.	-1.91E+00	1.63E-03	1.89E-02	1.40E-02	4.75E-05	-6.30E-01
Eutrophication Potential - terrestrial	mol N eq.	1.95E+01	1.79E-02	2.07E-01	1.54E-01	5.21E-04	-7.37E+00
Photochemical ozone creation potential	kg NMVOC eq.	7.73E+00	5.33E-03	6.71E-02	4.66E-02	1.55E-04	-2.53E+00
Abiotic depletion potential for minerals and metals *	kg Sb eq.	7.53E-03	1.55E-08	7.26E-07	1.47E-07	4.52E-10	-1.44E-04
Abiotic depletion potential for fossil resources *	MJ, net calorific value	2.76E+04	4.90E+00	1.65E+02	5.87E+01	1.42E-01	-9.20E+03
Water deprivation potential *	m^3 world eq. deprived	4.55E+02	3.86E-03	1.49E-01	1.38E-01	1.12E-04	-6.05E+01

** Disclaimer: 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.*

"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 results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3)."

6.1.1 Global Warming Potential (GWP-GHG)

The following table presents the results of Ternium Steel Building Structure (modules A1-A3, C1-C4 and D.) evaluated with the IPCC GWP100 method.

Table 11. Climate change potential A1–A3, C1–C4 and D. 1000 kg Ternium Steel Building Structure.

Basic impact categories	Unit	A1 - A3	C1	C2	C3	C4	D
Global warming potential (GWP-GHG)[1]	kg CO_2 eq.	1.97E+03	3.72E-01	1.22E+01	4.13E+00	1.08E-02	-9.92E+02

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

6.2 Resource use indicators

Parameters describing resources use were evaluated with the Cumulated Energy Demand method version 1.09 (Frischknecht et al. 2007) and adjusted with option B of Annex 3 of the PCR 2019:14 Construction products.

Version 2.0.1. The indicator for net freshwater use was evaluated with Recipe 2016 Midpoint (H) version 1.00 (Huijbregts et al. 2017).

Table 12. Parameters describing resource use.

Indicators	Unit	A1 - A3	C1	C2	C3	C4	D
PERE	MJ	8.74E+02	1.10E-02	2.68E-01	1.52E+00	3.19E-04	-9.36E+01
PERM	MJ	1.45E+00	0.00E+00	0.00E+00	1.43E+00	0.00E+00	0.00E+00
PERT	MJ	8.75E+02	1.10E-02	2.68E-01	2.94E+00	3.19E-04	-9.36E+01
PENRE	MJ	2.97E+04	5.20E+00	1.75E+02	1.44E+01	1.51E-01	-9.78E+03
PENRM	MJ	4.95E+01	0.00E+00	0.00E+00	4.85E+01	0.00E+00	0.00E+00
PENRT	MJ	2.98E+04	5.20E+00	1.75E+02	6.29E+01	1.51E-01	-9.78E+03
SM	kg	4.08E+02	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
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	9.39E+00	1.54E-04	6.16E-03	3.48E-03	4.47E-06	-1.59E+00
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water						

6.3 Waste and output flow indicators

Environmental indicators describing waste generation were calculated using EDIP 2003 method (Hauschild and Potting, 2005).

Table 13. Parameters describing waste categories.

Indicators	Unit	A1 - A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	4.97E+01	3.36E-05	1.13E-03	3.38E-04	9.77E-07	-1.06E-01
Non-hazardous waste disposed	kg	1.78E+01	1.43E-04	6.92E-03	2.70E-03	2.00E+01	-6.13E+00
Radioactive waste disposed *	kg	1.16E-02	2.50E-07	5.81E-06	4.72E-05	7.28E-09	-1.35E-03

**The radioactive waste disposed is not generated inside Ternium facilities.*

Table 14. Parameters describing output flow categories and energy.

Indicator	Unit	A1 - A3	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling*	kg	2.85E+00	0.00E+00	0.00E+00	9.80E+02	0.00E+00	0.00E+00
Materials for energy recovery	kg	6.56E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported electrical energy	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

** Direct indicators from Ternium process data.*

6.4 Additional LCA results

In this section, the end-of-life scenarios C1–C4 are presented to assess the potential environmental impacts associated with two waste management strategies: 100% scrap recycling and 100% landfill disposal.

Table 15. Potential environmental impacts associated with 100% scrap recycling scenario.

Indicators	Unit	C1	C2	C3	C4
Global Warming Potential - Total	kg CO_2 eq.	3.72E-01	1.22E+01	4.21E+00	0.00E+00
Global Warming Potential - fossil fuels	kg CO_2 eq.	3.72E-01	1.22E+01	4.21E+00	0.00E+00
Global Warming Potential - Biogenic	kg CO_2 eq.	1.60E-05	5.83E-04	1.96E-04	0.00E+00
Global Warming Potential - Land use and land use change	kg CO_2 eq.	1.28E-05	3.99E-04	1.24E-04	0.00E+00
Ozone depletion potential	kg CFC-11 eq.	5.85E-09	1.78E-07	7.49E-08	0.00E+00
Acidification potential, accumulated exceedance	mol H+ eq.	3.48E-03	4.62E-02	3.22E-02	0.00E+00
Eutrophication Potential - freshwater	kg P eq.	3.51E-07	2.96E-05	1.89E-05	0.00E+00
Eutrophication Potential- marine	kg N eq.	1.63E-03	1.89E-02	1.43E-02	0.00E+00
Eutrophication Potential - terrestrial	mol N eq.	1.79E-02	2.07E-01	1.57E-01	0.00E+00
Photochemical ozone creation potential	kg NMVOC eq.	5.33E-03	6.71E-02	4.75E-02	0.00E+00
Abiotic depletion potential for minerals and metals	kg Sb eq.	1.55E-08	7.26E-07	1.50E-07	0.00E+00
Abiotic depletion potential for fossil resources	MJ, net calorific value	4.90E+00	1.65E+02	5.99E+01	0.00E+00
Water deprivation potential	m^3 world eq. deprived	3.86E-03	1.49E-01	1.41E-01	0.00E+00

Table 16. Parameters describing resource use. 100% scrap recycling scenario.

Indicators	Unit	C1	C2	C3	C4
PERE	MJ	1.10E-02	2.68E-01	1.54E+00	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	1.45E+00	0.00E+00
PERT	MJ	1.10E-02	2.68E-01	3.00E+00	0.00E+00
PENRE	MJ	5.20E+00	1.75E+02	1.46E+01	0.00E+00
PENRM	MJ	0.00E+00	0.00E+00	4.95E+01	0.00E+00
PENRT	MJ	5.20E+00	1.75E+02	6.41E+01	0.00E+00
SM	kg	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
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	1.54E-04	6.16E-03	3.54E-03	0.00E+00
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water				

Table 17. Parameters describing waste categories. 100% scrap recycling scenario.

Indicators	Unit	C1	C2	C3	C4
Hazardous waste disposed	kg	3.36E-05	1.13E-03	3.44E-04	0.00E+00
Non-hazardous waste disposed	kg	1.43E-04	6.92E-03	2.75E-03	0.00E+00
Radioactive waste disposed	kg	2.50E-07	5.81E-06	4.81E-05	0.00E+00

Table 18. Parameters describing output flow categories and energy. 100% scrap recycling scenario.

Indicators	Unit	C1	C2	C3	C4
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	1.00E+03	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported electrical energy	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 19. Potential environmental impacts associated with 100% landfill disposal scenario.

Basic impact categories	Unit	C1	C2	C3	C4
Global Warming Potential - Total	kg CO_2 eq.	3.72E-01	1.22E+01	0.00E+00	5.41E-01
Global Warming Potential - fossil fuels	kg CO_2 eq.	3.72E-01	1.22E+01	0.00E+00	5.41E-01
Global Warming Potential - Biogenic	kg CO_2 eq.	1.60E-05	5.83E-04	0.00E+00	2.33E-05
Global Warming Potential - Land use and land use change	kg CO_2 eq.	1.28E-05	3.99E-04	0.00E+00	1.86E-05
Ozone depletion potential	kg CFC-11 eq.	5.85E-09	1.78E-07	0.00E+00	8.51E-09
Acidification potential, accumulated exceedance	mol H+ eq.	3.48E-03	4.62E-02	0.00E+00	5.06E-03
Eutrophication Potential - freshwater	kg P eq.	3.51E-07	2.96E-05	0.00E+00	5.11E-07
Eutrophication Potential- marine	kg N eq.	1.63E-03	1.89E-02	0.00E+00	2.38E-03
Eutrophication Potential - terrestrial	mol N eq.	1.79E-02	2.07E-01	0.00E+00	2.61E-02
Photochemical ozone creation potential	kg NMVOC eq.	5.33E-03	6.71E-02	0.00E+00	7.75E-03
Abiotic depletion potential for minerals and metals	kg Sb eq.	1.55E-08	7.26E-07	0.00E+00	2.26E-08
Abiotic depletion potential for fossil resources	MJ, net calorific value	4.90E+00	1.65E+02	0.00E+00	7.12E+00
Water deprivation potential	m^3 world eq. deprived	3.86E-03	1.49E-01	0.00E+00	5.62E-03

Table 20. Parameters describing resource use. 100% landfill disposal scenario.

Indicators	Unit	C1	C2	C3	C4
PERE	MJ	1.10E-02	2.68E-01	0.00E+00	1.59E-02
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.10E-02	2.68E-01	0.00E+00	1.59E-02
PENRE	MJ	5.20E+00	1.75E+02	0.00E+00	7.57E+00
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	5.20E+00	1.75E+02	0.00E+00	7.57E+00
SM	kg	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
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	1.54E-04	6.16E-03	0.00E+00	2.24E-04
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water				

Table 21. Parameters describing waste categories. 100% landfill disposal scenario.

Indicators	Unit	C1	C2	C3	C4
Hazardous waste disposed	kg	3.36E-05	1.13E-03	0.00E+00	4.88E-05
Non-hazardous waste disposed	kg	1.43E-04	6.92E-03	0.00E+00	2.08E-04
Radioactive waste disposed	kg	2.50E-07	5.81E-06	0.00E+00	3.64E-07

Table 22. Parameters describing output flow categories and energy. 100% landfill disposal scenario.

Indicators	Unit	C1	C2	C3	C4
Components for re-use	kg	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
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported electrical energy	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00

7. Additional environmental information

Environment

The Environmental Management System of the Ternium Plants that participate in the manufacture are certified under standard ISO 14001:2015.

Sustainability

Towards sustainability and environmental protection Ternium manufactures 100% recyclable products, with the highest quality and minimizing environmental impact. Recycling is an important part of the company's production process, as well as ensuring a long-term healthy link with the communities neighboring the production centers.
Ternium is deeply committed to sustainable development, so its actions are guided by an Environmental and Energy Policy that involves employees, shareholders, suppliers, customers, and communities. The company has a Management System that foresees procedures, reviews and specific records for the proper operation, maintenance and control of facilities, as well as for the handling of substances.

Active Participation

Ternium reports, since 2005, CO2 emissions to the World Steel Association. This garnered the recognition of the
"Climate Action Member" program annually. Additionally,Ternium subscribed to the report on sustainability indicators and reports on energy consumption and personnel training. In addition, Ternium also garnered for 7 consecutive years the recognition of Sustainability Champion by the World Steel Association. Because are concerned about environmental issues, has active participation in initiatives for environmental protection, mainly the World Business Council for Sustainable Development (National Chapters), the Latin American Steel Association (Alacero), World Steel Association and various work committees in several industrial associations. In Mexico, it participates through the commissions related to environmental issues and energy saving of the National Chamber of Iron and Steel (CANACERO), the Mining Chamber of Mexico (CAMIMEX) and the Environmental Protection Institute of Nuevo León (IPA-NL).

8. Abbreviations

HRC-Hot-Rolled Coil

HRS-Hot- Rolled- Steel

LCA-Life Cycle Assessment

CADIS -Center for Life Cycle Assessment and Sustainable Design

CO_2 - Carbon dioxide

EOL- End of Life

EPD- Environmental Product Declaration

LCI -Life Cycle Inventory

LCIA -Life Cycle Impact Assessment

PCR- Product Category Rules

TMSR-Ternium Metal Seam Roof

SBS - Steel Building Structure

TMRW- Ternium Metal Rib Wall

CSC-Commercial Service Center Purlins

TMBT - Ternium Bay Truss

Bracing – Angles and Bars

Frames – Beams and Columns

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10.Version history

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