



**Declaration Owner**

Algoma Steel, Inc.  
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**Product**

Hot Rolled Steel Plate

**Declared Unit**

The declared unit is one metric ton of hot rolled steel plate

**EPD Number and Period of Validity**

SCS-EPD-10489  
EPD Valid August 26, 2025 through August 25, 2030

**Product Category Rule**



PCR Guidance for Version 4.0. UL Environment. March 2022

PCR Guidance for Building-Related Products and Services. Part B:  
Designated Steel Construction Product EPD Requirements. UL  
Environment. V.2. August 2020.

**Program Operator**

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Address:	105 West Street, Sault Ste. Marie, ON P6A 7B4
Declaration Number:	SCS-EPD-10489
Declaration Validity Period:	EPD Valid August 26, 2025 through August 25, 2030
Program Operator:	SCS Global Services
General Program Instructions and Version:	SCS Type III Environmental Declaration Program: Program Operator Manual v12.0. December 2023.
Declaration URL Link:	<a href="https://www.scsglobalservices.com/certified-green-products-guide">https://www.scsglobalservices.com/certified-green-products-guide</a>
LCA Practitioner:	Tess Garvey, Ph.D., SCS Global Services
LCA Software and LCI database:	OpenLCA v2.5.0 software and the Ecoinvent v3.11 database
Product RSL:	n/a
Markets of Applicability:	Global
EPD Type:	Product-Specific
EPD Scope:	Cradle-to-Gate
LCIA Method and Version:	TRACI 2.1 and IPCC AR5
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	<input type="checkbox"/> internal <input checked="" type="checkbox"/> external
LCA Reviewer:	 Lindita Bushi, PhD, Athena Sustainable Materials Institute
Part A Product Category Rule:	PCR Guidance for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements. Version 4.0. UL Environment. March 2022
PCR Review conducted by:	Lindita Bushi, PhD (Chair); Hugues Imbeault-Tétreault, ing., M.Sc.A.; Jack Geibig
Part B Product Category Rule:	PCR Guidance for Building-Related Products and Services. Part B: Designated Steel Construction Product EPD Requirements. UL Environment. V.2. August 2020.
PCR Review conducted by:	Thomas Gloria, PhD; Brandie Sebastian, James Littlefield
Independent verification of the declaration and data, according to ISO 14025 and the PCR	<input type="checkbox"/> internal <input checked="" type="checkbox"/> external
EPD Verifier:	 Lindita Bushi, PhD, Athena Sustainable Materials Institute
Declaration Contents:	1. Algoma ..... 2 2. Product ..... 2 3. LCA: Calculation Rules ..... 6 4. LCA: Scenarios and Additional Technical Information ..... 11 5. LCA: Results ..... 12 6. LCA: Interpretation ..... 15 7. References ..... 16
<p><b>Disclaimers:</b> This EPD conforms to ISO 14025, 14040, 14044, and ISO 21930.</p> <p><b>Scope of Results Reported:</b> The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.</p> <p><b>Accuracy of Results:</b> Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.</p> <p><b>Comparability:</b> The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.</p> <p>In accordance with ISO 21930:2017, EPDs are comparable only if they comply with the core PCR, use the same sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works. The owner of the declaration shall be liable for the underlying information and evidence; SCS shall not be liable with respect to manufacturer information, life cycle assessment data, and evidence supplied or made available to SCS.</p>	

## 1. Algoma Steel, Inc.

With over a century of experience, Algoma Steel has established itself as a trusted partner with their long-running commitment to innovation by investing in the latest technologies in steel production. A proud supplier of high-quality, Canadian-made steel, Algoma's Sault Ste. Marie, Ontario facility supports local jobs and infrastructure with durability tailored to North America's climate. The location's fully integrated production of hot and cold-rolled steel sheet and plate products enables responsive and customer-driven product solutions for a wide range of industries including automotive, construction, energy, and defense.

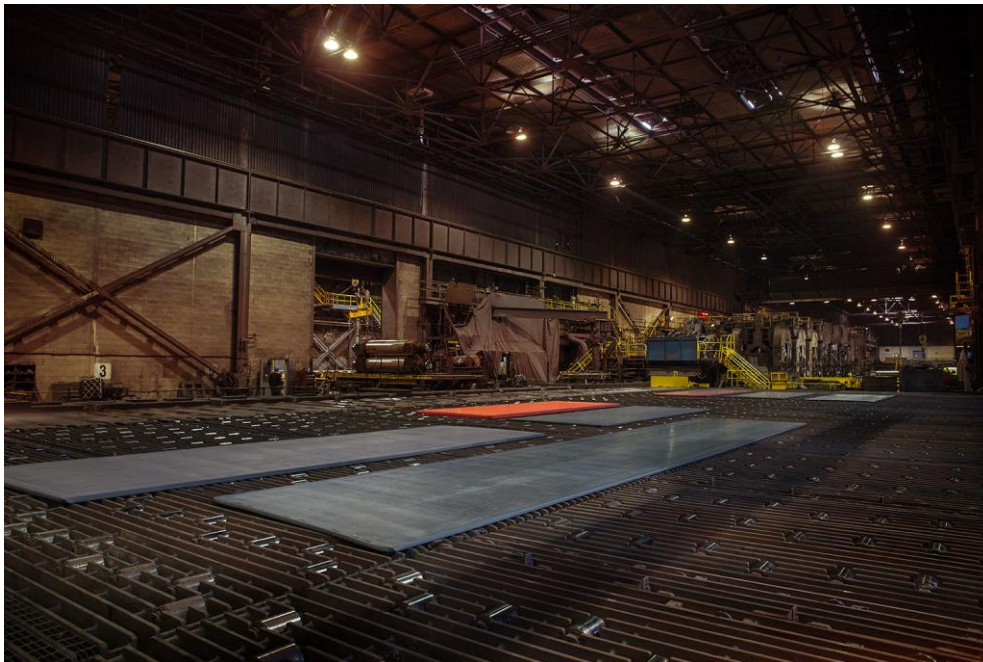
## 2. Product

### 2.1 PRODUCT DESCRIPTION

Algoma's newly modernized plate mill offers enhanced flatness, increased thickness and high strength capabilities with 0.5" ASTM thickness tolerance and 0.25" ASTM flatness tolerance for all plates. Their continuously cast steel slab production process manufactures both carbon and high-strength low alloy (HSLA) plates for a wide range of applications, including automotive, heavy equipment and agriculture, construction, infrastructure and industrial fabrication.

**Table 1.** Declared unit for Algoma Hot Rolled Steel Plate and the approximate density.

Parameter	Value
Declared Unit	1 metric ton
Density	7,850 kg/m <sup>3</sup>



**Figure 1.** Plate Production at Algoma Steel.

## 2.2 PRODUCT FLOW DIAGRAM

The flow diagram below illustrates the production processes, and the life cycle phases included in the scope of the EPD.

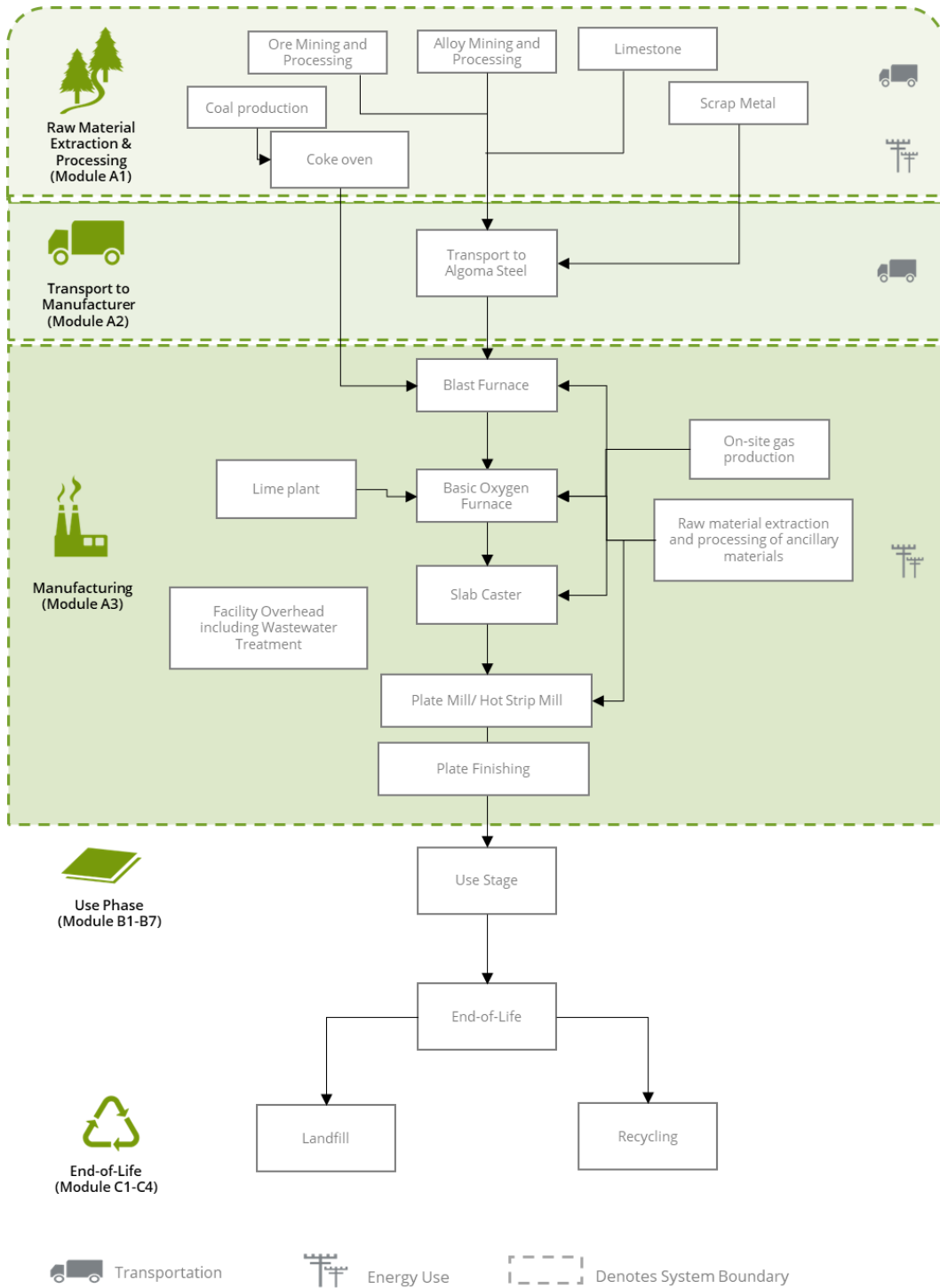


Figure 2. Flow diagram for the life cycle of the Algoma Hot Rolled Steel Plate.

### 2.3 INTENDED APPLICATION

Algoma's hot rolled steel plates can be used for a variety of intended applications, including heavy equipment and ag, automotive, construction and infrastructure. Examples of uses have included, among others, furniture production, bridge and automotive construction.

### 2.4 DECLARATION OF METHODOLOGICAL FRAMEWORK

The scope of the EPD is cradle-to-gate, including raw material extraction and processing, transportation, and product manufacture. The life cycle phases included in the product system boundary are shown below. Cut-off and allocation procedures are described below and conform to the PCR and ISO standards.

**Table 2.** Life cycle phases included in the product system boundary.

Product			Construction Process		Use							End-of-life				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material extraction and processing	Transport to manufacturer	Manufacturing	Transport	Construction - installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, recovery and/or recycling potential
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

X = Module Included | MND = Module Not Declared

### 2.5 TECHNICAL DATA

A summary of technical specifications for the hot rolled steel plates include those listed in Table 3.

**Table 3.** Technical specifications for Hot rolled steel plates

Product	ASTM Standards	Sub-Product	Range of Nominal Gauges in (mm)	Standard Widths in (mm)
Hot Rolled Plate	A36, A514, A537, A572	General Structural Steels, HSLA, Pressure Vessel Steels	0.25" (6.35) -1" (25.4) standard sizes 4" (101) max	84 "(2,133)-132" (3,353) standard sizes 150" (3,810) max

### 2.6 PROPERTIES OF DECLARED PRODUCT AS DELIVERED

Algoma hot rolled steel plates are custom-made for every project and are delivered in a variety of sizes-widths.

### 2.7 MATERIAL COMPOSITION

The steel is made from virgin iron ore, secondary materials, and an alloy content lower than 5%. The material composition in the year of data modeled were 73.6% primary iron, 8.4% external recycled material, 13.3% internally-produced scrap and secondary material, 3.1% cold pig iron, and 1.6% alloy materials.

Under normal conditions Algoma hot rolled steel plates do not present inhalation, ingestion, or contact health hazards including but not limited to indoor air emissions, gamma or ionizing radiation emissions, or chemicals released to air or

leached to water or soil. However, operations such as welding, grinding, sawing and burning, which may cause airborne particulates or fume formation, may present a health hazard.

In conformance with the PCR, product materials were reviewed for the presence of any toxic or hazardous chemicals. Based on a review of the product components provided by the manufacturer, no regulated chemicals are expected to be released to the environment.

## 2.8 MANUFACTURING

The processes in scope for this study at the Sault Ste. Marie, Ontario Algoma facility consist of one blast furnace, a basic oxygen furnace, a slab caster and a hot strip mill. Electricity and steam are produced on-site and are used throughout the Algoma facilities. A lime plant operates to process limestone into high quality lime products used within the steelmaking operations. Additionally, wastewater treatment operations occur on-site. Primary data was collected from Algoma for all production processes from a collection period spanning January 1st, 2022, to December 31, 2022.

The electricity mix for each of the Algoma Steel operations and facilities are modeled using the data collected for the powerhouse, which produces steam and electricity from blast furnace gas, coke oven gas, grid electricity and natural gas. The grid electricity used in the Powerhouse is modeled using the province-specific Ecoinvent electricity grid for Canada (Ontario). No CO2 certificates are included in this LCA.

## 2.9 FURTHER INFORMATION

Further information on the product can be found on the manufacturer's website: [www.algoma.com](http://www.algoma.com)



Figure 3. Algoma Steel Plate Processing.

## 3. LCA: Calculation Rules

### 3.1 DECLARED UNIT

The declared unit used in the study is one (1) metric ton of steel hot rolled plate, consistent with the PCR.

The hot rolled steel plates produced by Algoma are custom-made products for specific projects, and therefore, the raw material composition may change depending on the project. An average product is modeled, representing one metric ton of steel hot rolled plate.

### 3.2 SYSTEM BOUNDARY

The scope of the EPD is cradle-to-gate, including raw material extraction and processing, transportation, and product manufacture. The construction process stage, use stage, end-of-life stage, and Module D of the product are excluded from the system boundaries of this study. Additional elements that are excluded from the study are capital equipment and infrastructure. The life cycle phases included in the EPD scope are described in Table 4.

**Table 4.** *The modules and unit processes included in the scope for Hot Rolled Steel Plates.*

Module	Module Description	Unit Processes Included in Scope
A1	Extraction and processing of raw materials; any reuse of products or materials from previous product systems; processing of secondary materials; generation of electricity from primary energy resources; energy, or other, recovery processes from secondary fuels	Raw material extraction and processing for the raw materials upstream of the Algoma facility.  Ore mining and processing, alloy mining and processing, limestone processing and coal production are included in scope of this study.
A2	Transport (to the manufacturer)	Transportation of component materials from upstream manufacture to the Algoma facility in Sault Ste. Marie, Ontario.
A3	Manufacturing, including packaging and ancillary material production	Manufacture and fabrication at the Algoma facility in Sault Ste. Marie, Ontario for the hot rolled steel plates, ancillary materials, lime production, on-site electricity production and waste water treatment.
A4	Transport (to the building site)	Module Not Declared
A5	Construction-installation process	Module Not Declared
B1	Product use	Module Not Declared
B2	Product maintenance	Module Not Declared
B3	Product repair	Module Not Declared
B4	Product replacement	Module Not Declared
B5	Product refurbishment	Module Not Declared
B6	Operational energy use by technical building systems	Module Not Declared
B7	Operational water uses by technical building systems	Module Not Declared
C1	Deconstruction, demolition	Module Not Declared
C2	Transport (to waste processing)	Module Not Declared
C3	Waste processing for reuse, recovery and/or recycling	Module Not Declared
C4	Disposal	Module Not Declared
D	Reuse-recovery-recycling potential	Module Not Declared

### 3.3 UNITS

All data and results are presented using SI units.

### 3.4 ESTIMATES AND ASSUMPTIONS

The assessment relied on several assumptions. The major assumptions used in the assessment are described below.

- The hot strip mill for products other than plate was included in the production for 2022, while the hot strip mill is currently only operational for plate products.
- Compressed air production is produced on-site, and electricity used by compressors is modeled and allocated to compressed air used within the steel mills.
- A third-party operates gas production (argon, nitrogen and oxygen) on-site at Algoma. The electricity use for gas production was provided, as well as the the production and distribution of gases within the Algoma processes. Electricity use was allocated to the gas production based on volume.
- Water use and Wastewater treatment was allocated to the overhead of the facility, as it was not possible to separate out between processes on-site.
- For purchased electricity from the grid, the Ecoinvent dataset for electricity from the respective Canadian province, Ontario, was selected and use. This grid mix is based upon statistics from the Government of Canada - Statistics Canada (StatCAN) for 2022 .
- Disposal of some manufacturing wastes were modeled within overhead.

### 3.5 CUT-OFF RULES

According to the PCR, processes contributing greater than 1% of the total environmental impact indicator for each impact are included in the inventory. No data gaps were allowed which were expected to significantly affect the outcome of the indicator results. No known flows are deliberately excluded from this EPD.

### 3.6 DATA SOURCES

Primary data were provided by Algoma for their manufacturing facility in Sault Ste. Marie, Ontario. The sources of secondary LCI data are the Ecoinvent database.

**Table 5.** LCI datasets and associated databases used to model raw material processing, transport and product manufacturing for the Algoma Hot Rolled Steel Plates.

Flow	Dataset	Data Source	Publication Date
<b>Raw Materials</b>			
<b>Coke oven</b>			
External coal	hard coal mine operation and hard coal preparation   hard coal   Cutoff, U - RNA	Ecoinvent 3.11	2024
<b>Blast furnace</b>			
Internal Coke	Algoma coke oven model	--	--
External coke	coke production   coke   Cutoff, U - US	Ecoinvent 3.11	2024
Iron pellet	iron pellet production   iron pellet   Cutoff, U - RoW	Ecoinvent 3.11	2024
Limestone (external)	market for limestone, milled, loose   limestone, milled, loose   Cutoff, U - RoW	Ecoinvent 3.11	2024
Natural gas (raw material)	market for natural gas, high pressure   natural gas, high pressure   Cutoff, U - CA	Ecoinvent 3.11	2024
<b>Basic oxygen furnace/ Alloys</b>			
Copper	market for copper, cathode   copper, cathode   Cutoff, U - GLO	Ecoinvent 3.11	2024
Ferroboron	boric oxide production   boric oxide   Cutoff, U - GLO	Ecoinvent 3.11	2024
Ferrochrome	ferrochromium production, high-carbon, 68% Cr   ferrochromium, high-carbon, 68% Cr   Cutoff, U - RoW	Ecoinvent 3.11	2024
Ferromanganese	ferromanganese production, high-coal, 74.5% Mn   ferromanganese, high-coal, 74.5% Mn   Cutoff, U - RER	Ecoinvent 3.11	2024
Manganese	manganese production   manganese   Cutoff, U - RER	Ecoinvent 3.11	2024
Ferroniobium	market for ferroniobium, 66% Nb   ferroniobium, 66% Nb   Cutoff, U - GLO	Ecoinvent 3.11	2024
Ferrosilicon	market for ferrosilicon   ferrosilicon   Cutoff, U - GLO	Ecoinvent 3.11	2024
Ferromolybdenum	market for molybdenum trioxide   molybdenum trioxide   Cutoff, U - GLO	Ecoinvent 3.11	2024
Nickel	market for nickel, class 1   nickel, class 1   Cutoff, U - GLO	Ecoinvent 3.11	2024
Ferrotitanium	titanium production   titanium   Cutoff, U - GLO	Ecoinvent 3.11	2024
Primary aluminum	market for aluminium, primary, ingot   aluminium, primary, ingot   Cutoff, U - IAI Area, North America	Ecoinvent 3.11	2024
Calcium carbide	calcium carbide production, technical grade   calcium carbide, technical grade   Cutoff, U - RER	Ecoinvent 3.11	2024
External scrap	sorting and pressing of iron scrap   iron scrap, sorted, pressed   Cutoff, U - RER	Ecoinvent 3.11	2024
Ferrophosphorus	market for phosphoric acid, fertiliser grade, without water, in 70% solution state   phosphoric acid, fertiliser grade, without water, in 70% solution state   Cutoff, U - RoW	Ecoinvent 3.11	2024
Quicklime	market for quicklime, milled, loose   quicklime, milled, loose   Cutoff, U - RoW	Ecoinvent 3.11	2024
Dolomitic lime	dolomite production   dolomite   Cutoff, U - RER	Ecoinvent 3.11	2024
<b>Lime plant</b>			
Dolomitic limestone	dolomite production   dolomite   Cutoff, U - RER	Ecoinvent 3.11	2024
Limestone	market for limestone, crushed, washed   limestone, crushed, washed   Cutoff, U - CH	Ecoinvent 3.11	2024
Rock salt	sodium chloride production, brine solution   sodium chloride, brine solution   Cutoff, U - RER	Ecoinvent 3.11	2024
<i>Additional ancillary materials as below</i>			
<b>Ancillary - Across Products</b>			
Gases- argon, nitrogen and oxygen	Primary data : electricity production allocated to gas production	--	--
Compressed air	Electricity use allocated to air compression		
Refractory materials	market for refractory, basic, packed   refractory, basic, packed   Cutoff, U - GLO	Ecoinvent 3.11	2024
	market for refractory, high aluminium oxide, packed   refractory, high aluminium oxide, packed   Cutoff, U - GLO		
Lubricating oils	lubricating oil production   lubricating oil   Cutoff, U - RER	Ecoinvent 3.11	2024
Various materials or chemicals based on SDS	sodium chloride production, brine solution   sodium chloride, brine solution   Cutoff, U - RER	Ecoinvent 3.11	2024
	market for silica sand   silica sand   Cutoff, U - GLO	Ecoinvent 3.11	2024
	market for sand   sand   Cutoff, U - RoW		
	market for sodium hydroxide, without water, in 50% solution state   sodium hydroxide, without water, in 50% solution state   Cutoff, U - RER	Ecoinvent 3.11	2024
	market for bleach   bleach   Cutoff, U - RER	Ecoinvent 3.11	2024

Flow	Dataset	Data Source	Publication Date
	market for phosphoric acid, fertiliser grade, without water, in 70% solution state   phosphoric acid, fertiliser grade, without water, in 70% solution state   Cutoff, U - RoW	Ecoinvent 3.11	2024
	market for rape seed   rape seed   Cutoff, U - RoW	Ecoinvent 3.11	2024
	hard coal mine operation and hard coal preparation   hard coal   Cutoff, U - RNA	Ecoinvent 3.11	2024
	market for diethylene glycol   diethylene glycol   Cutoff, U - RER	Ecoinvent 3.11	2024
	market for organophosphorus-compound, unspecified   organophosphorus-compound, unspecified   Cutoff, U - GLO	Ecoinvent 3.11	2024
<b>Plate Mill</b>			
Hardwood packaging	board, hardwood, raw, kiln drying to u=10%   sawnwood, board, hardwood, raw, dried (u=10%)   Cutoff, U - Europe without Switzerland	Ecoinvent 3.11	2024
<b>Plate Finishing Mill</b>			
Acetylene	acetylene production   acetylene   Cutoff, U - RER	Ecoinvent 3.11	2024
Mortar	light mortar production   light mortar   Cutoff, U - CH	Ecoinvent 3.11	2024
Hardwood	board, hardwood, raw, kiln drying to u=10%   sawnwood, board, hardwood, raw, dried (u=10%)   Cutoff, U - Europe without Switzerland	Ecoinvent 3.11	2024
softwood	market for sawnwood, board, softwood, raw, dried (u=20%)   sawnwood, board, softwood, raw, dried (u=20%)   Cutoff, U - Europe without Switzerland	Ecoinvent 3.11	2024
<b>Fuels (Across Operations)</b>			
	market for electricity, medium voltage   electricity, medium voltage   Cutoff, U - CA-ON		
Electricity and Steam from Powerhouse	market for natural gas, high pressure   natural gas, high pressure   Cutoff, U - CA  <i>Air emissions per primary data.</i>  <i>Blast furnace and coke oven gas per primary data</i>	Ecoinvent 3.11	2024
Natural gas	market for natural gas, high pressure   natural gas, high pressure   Cutoff, U - CA	Ecoinvent 3.11	2024
Diesel	diesel, burned in building machine   diesel, burned in building machine   Cutoff, U - GLO	Ecoinvent 3.11	2024
Gasoline	petrol, unleaded, burned in machinery   petrol, unleaded, burned in machinery   Cutoff, U - GLO	Ecoinvent 3.11	2024
Propane	propane, burned in building machine   propane, burned in building machine   Cutoff, U - GLO	Ecoinvent 3.11	2024
<b>Transportation</b>			
Rail	market for transport, freight, train, fleet average   transport, freight, train, fleet average   Cutoff, U - US	Ecoinvent 3.11	2024
Road	transport, freight, lorry, 16-32 metric ton, diesel, EURO 4   transport, freight, lorry, 16-32 metric ton, diesel, EURO 4   Cutoff, U - RER	Ecoinvent 3.11	2024
Inland water transport	transport, freight, inland waterways, barge, diesel   transport, freight, inland waterways, barge, diesel   Cutoff, U - RER	Ecoinvent 3.11	2024
<b>Wastewater treatment - ancillary materials</b>			
Carbon dioxide	market for carbon dioxide, liquid   carbon dioxide, liquid   Cutoff, U - RER	Ecoinvent 3.11	2024
WWTP - gravel	market for gravel, round   gravel, round   Cutoff, U - CH	Ecoinvent 3.11	2024
Chemical - Based on SDS	market for isopropanol   isopropanol   Cutoff, U - RER	Ecoinvent 3.11	2024
	market for naphtha   naphtha   Cutoff, U - RER	Ecoinvent 3.11	2024
Fine salt	market for salt   salt   Cutoff, U - GLO	Ecoinvent 3.11	2024
<b>Waste treatment</b>			
Landfill general	process-specific burdens, inert material landfill   process-specific burdens, inert material landfill   Cutoff, U - RoW	Ecoinvent 3.11	2024
Dust treatment	treatment of basic oxygen furnace dust, residual material landfill   basic oxygen furnace dust   Cutoff, U - GLO	Ecoinvent 3.11	2024
Sludge treatment	treatment of basic oxygen furnace sludge, residual material landfill   basic oxygen furnace sludge   Cutoff, U - GLO	Ecoinvent 3.11	2024

### 3.7 DATA QUALITY

The data quality assessment addresses the following parameters: time-related coverage, geographical coverage, technological coverage, precision, completeness, representativeness, consistency, reproducibility, sources of data, and uncertainty.

**Table 6.** Data quality assessment for the product system.

Data Quality Parameter	Data Quality Discussion
<b>Time-Related Coverage:</b> Age of data and the minimum length of time over which data is collected	The most recent available data are used, based on other considerations such as data quality and similarity to the actual operations. Typically, these data are less than 10 years old (typically 2019 or more recent). All of the data used represented an average of at least one year's worth of data collection. Manufacturer-supplied data (primary data) is based on a full year of operations at the Algoma facility from January 1, 2022 - December 31, 2022.
<b>Geographical Coverage:</b> Geographical area from which data for unit processes is collected to satisfy the goal of the study	The data used in the analysis provide the best possible representation available with current data. Actual processes for upstream operations are primarily North American. Surrogate data used in the assessment are representative of North American operations. Data representative of European operations are considered sufficiently similar to actual processes. Data representing disposal practices are based on regional statistics.
<b>Technology Coverage:</b> Specific technology or technology mix	For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations.
<b>Precision:</b> Measure of the variability of the data values for each data expressed	Precision of results are not quantified due to a lack of data. Data collected for operations were typically averaged for one or more years and over multiple operations, which is expected to reduce the variability of results.
<b>Completeness:</b> Percentage of flow that is measured or estimated	The LCA model included all known mass and energy flows for the production of hot rolled steel plates. In some instances, surrogate data used to represent upstream and downstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 1% of the total environmental impact for each indicator are excluded.
<b>Representativeness:</b> Qualitative assessment of the degree to which the data set reflects the true population of interest	Data used in the assessment represent typical or average processes as currently reported from multiple data sources and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction. For supplier information, the most representative source of data possible was chosen or modeled.
<b>Consistency:</b> Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The consistency of the assessment is considered to be high. Data sources of similar quality and age are used with a bias towards Ecoinvent v3.11 data. Different portions of the product life cycle are equally considered; however, it must be noted that final disposition of the product is based on assumptions of current average practices in Europe and North America.
<b>Reproducibility:</b> Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Based on the description of data and assumptions used, this assessment would be reproducible by other practitioners with access to the primary data. All assumptions, models, and data sources are documented.
<b>Sources of the Data:</b> Description of all primary and secondary data sources	Data representing energy use at the Algoma manufacturing facilities represent an annual average and are considered of high quality due to the length of time over which these data are collected, as compared to a snapshot that may not accurately reflect fluctuations in production. The Ecoinvent database is used for secondary LCI datasets. The other EPD data are also considered high quality due to the fact that they similarly span a full calendar year and are representative of the materials.
<b>Uncertainty of the Information:</b> Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the products is low. Actual supplier data for upstream operations was not available for all suppliers and the study relied upon the use of existing representative datasets. These datasets contained relatively recent data (<10 years) but lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are high. The impact assessment method required by the PCR includes impact potentials, which lack characterization of providing and receiving environments or tipping points.

### 3.8 PERIOD UNDER REVIEW

The period of review for the primary data is from January 1st, 2022, to December 31, 2022.

### 3.9 ALLOCATION

This study follows the allocation guidelines of ISO 14044 and allocation rules specified in the PCR and minimizes the use of allocation wherever possible. This LCA follows the attributional LCA approach.

Per the worldsteel allocation guidance, blast furnace slag and basic oxygen furnace slag are considered co-products within their respective processes. All other materials are considered by-products and not allocated any impacts. For the blast furnace and BOF processes, the slag is allocated a portion of the shared materials, resource use (e.g., electricity, natural gas, water), waste/byproducts, and emissions released, on based on the amount of energy required to heat steel and slag. The allocation factors were derived from actual slag production within the Algoma processes using the equations provided in the worldsteel guidance.

Elsewhere, primary data for resource use (e.g., electricity, natural gas, water), waste/byproducts, and emissions released are allocated on a mass basis as a fraction of total annual production of each steel product and co-products.

With respect to the steel scrap, the 100-0 recycled content approach is used in which the recycled material bears only the burden of any processing from waste material.

Transportation from the primary producer of material components to the manufacturing facility is based on primary data provided by Algoma, including modes, distances, and amount of material transported. Transportation was allocated on the basis of the mass and distance the material was transported.

### 3.10 COMPARABILITY

The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.

## 4. LCA: Scenarios and Additional Technical Information

### Manufacturing

This stage includes all the on-site steelmaking and processing steps including Blast Furnace, Basic Oxygen Furnace (BOF), the Slab Caster, the Plate Mill, and Plate Finishing Mill. Other processes such as lime production and waste water treatment are also included in scope. Production of capital goods, infrastructure, manufacturing equipment, and personnel-related activities are not included. The grid electricity used in the powerhouse is modeled using the province-specific Ecoinvent electricity grid for Canada (Ontario).

Transportation for waste materials at the manufacturing facility assumes a 20 miles (~32 km) average distance to disposal, consistent with assumptions used in the EPA WARM model. Based on statistics for solid waste generation and disposal in Canada, the model assumes 80% of non-hazardous wastes are disposed in landfill and 20% incinerated.

## 5. LCA: Results

Results of the Life Cycle Assessment are presented below. The following environmental impact category indicators are reported using characterization factors based on the TRACI 2.1, IPCC AR5 and CML-IA impact assessment methods. It is noted that LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks.

All LCA results are stated to three significant figures in agreement with the PCR for this product.

**Table 7.** Nomenclature and reporting units for LCIA impact category indicators.

TRACI 2.1 Impact Category	Unit	IPCC AR5	Unit
Global Warming Potential (GWP)	kg CO <sub>2</sub> eq	Global Warming Potential (GWP)	kg CO <sub>2</sub> eq
Ozone Depletion Potential (ODP)	kg CFC 11 eq	CML-IA Impact Category	Unit
Acidification Potential (AP)	kg SO <sub>2</sub> eq	Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ, LHV
Eutrophication Potential (EP)	kg N eq	-	-
Smog Formation Potential (SFP)	kg O <sub>3</sub> eq	-	-
Fossil Fuel Depletion Potential (FFD)	MJ Surplus, LHV	-	-

The following inventory parameters, specified by the PCR, are also reported.

**Table 8.** Nomenclature and reporting units for resource use and waste flows.

Parameter	Units
<b>RESOURCES</b>	
Use of renewable primary resources used as an energy carrier (RPR <sub>E</sub> )	MJ, LHV
Use of renewable primary resources used as material (RPR <sub>M</sub> )	MJ, LHV
Non-renewable primary resources used as an energy carrier (NRPR <sub>E</sub> )	MJ, LHV
Non-renewable primary resources used as material (NRPR <sub>M</sub> )	MJ, LHV
Secondary materials (SM)	mt
Renewable secondary fuels (RSF)	MJ, LHV
Non-renewable secondary fuels (NRSF)	MJ, LHV
Recovered energy (RE)	MJ, LHV
Use of net freshwater resources (FW)	m <sup>3</sup>
<b>WASTES</b>	
Non-hazardous waste disposed (NHWD)	kg
Hazardous waste disposed (NWD)	kg
High-level radioactive waste (HLRW)	kg
Intermediate- and low-level radioactive waste (ILLRW)	kg
Components for re-use (CRU)	kg
Materials for recycling (MR)	kg
Materials for energy recovery (MER)	kg
Recovered energy exported from the product system (EE)	MJ, LHV

**Table 9.** Life Cycle Impact Assessment results by life cycle phase for the declared unit (metric ton) of Hot Rolled Steel Plate. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.

Impact Category	Raw Materials (A1)	Upstream Transport (A2)	Manufacturing (A3)	Total (A1-A3)
<b>IPCC AR5</b>				
Global Warming Potential (kg CO <sub>2</sub> eq)	755	70.7	2,680	3,510
	22%	2%	76%	100%
<b>TRACI 2.1</b>				
Global Warming Potential (kg CO <sub>2</sub> eq)	736	69.7	2,670	3,470
	21%	2%	77%	100%
Ozone Depletion Potential (kg CFC-11 eq)	1.91x10 <sup>-5</sup>	1.15x10 <sup>-6</sup>	7.08x10 <sup>-6</sup>	2.73x10 <sup>-5</sup>
	70%	4%	26%	100%
Acidification Potential (kg SO <sub>2</sub> eq)	3.09	0.565	4.14	7.80
	40%	7%	53%	100%
Eutrophication Potential (kg N eq)	0.764	6.51x10 <sup>-3</sup>	0.0279	0.799
	96%	1%	3%	100%
Smog Formation Potential (kg O <sub>3</sub> eq)	42.8	16.2	53.6	113
	38%	14%	48%	100%
Fossil Fuel Depletion (MJ surplus)	988	121	2,070	3,180
	31%	4%	65%	100%
<b>CML-IA</b>				
Abiotic Depletion Potential, FF (MJ)	18,100	872	12,700	31,600
	57%	3%	40%	100%

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted.

**Table 10.** Resource use and waste flows per declared unit (metric ton) for Hot Rolled Steel Plate. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.

Parameter	Raw Materials (A1)	Upstream Transport (A2)	Manufacturing (A3)	Total (A1-A3)
<b>RESOURCES</b>				
Renewable primary resources used as energy carrier (RPR <sub>E</sub> ) (MJ)	766	22.2	1,900	2,690
	28%	0.8%	71%	100%
Renewable primary resources used as material (RPR <sub>M</sub> ) (MJ)	0.00	0.00	0.00	0.00
	N/A	N/A	N/A	N/A
Non-renewable primary resources used as an energy carrier (NRPR <sub>E</sub> ) (MJ)	5,790	897	15,500	22,200
	26%	4%	70%	100%
Non-renewable primary resources used as material (NRPR <sub>M</sub> ) (MJ)	12,900	0.00	0.00	12,900
	100%	0%	0%	100%
Secondary materials (SM) (metric ton)	0.280	0.00	0.00	0.280
	100%	0%	0%	100%
Renewable secondary fuels/ Nonrenewable secondary fuels (RSF/NRSF) (MJ)	0.00	0.00	0.00	0.00
Recovered energy (MJ)	0.00	0.00	0.00	0.00
Use of net freshwater resources (FW) (m <sup>3</sup> )	4.01	0.148	63.0	67.2
	6.0%	0.2%	94%	100%
<b>WASTES</b>				
Non-hazardous waste disposed (NHWD) (kg)	0.00	0.00	61.7	61.7
	0.0%	0.0%	100%	100%
Hazardous waste disposed (HWD) (kg)	0.00	0.00	0.00	0.00
	N/A	N/A	N/A	N/A
High-level radioactive waste (HLRW) (kg)	0.00	0.00	0.00	0.00
	N/A	N/A	N/A	N/A
Low-level radioactive waste (LLRW) (kg)	0.00	0.00	0.00	0.00
	N/A	N/A	N/A	N/A
Components for Reuse (CRU) (kg)	0.00	0.00	0.00	0.00
Materials for Recycling (MR) (kg)	0.00	0.00	108	108
	0.0%	0.0%	100%	100%
Materials for Energy Recovery (MER) (kg)	0.00	0.00	0.00	0.00
Exported Energy (EE) (MJ)	0.00	0.00	0.00	0.00

Additionally, the PCR requires the calculation of carbon emissions and removals. No biogenic materials are used in the product system, and as such carbon emissions and removals associated with each products are 0.0 kg per declared unit.

## 6. LCA: Interpretation

LCIA results were assessed relative to the production of 1 metric ton of hot rolled steel plates, and the impact category indicator results are presented in Section 5. The indicator results when considered across all life cycle stages indicate that the manufacturing stage (A1) is the most significant contributor to results, except in the case of Ozone Depletion Potential, Eutrophication, and Abiotic Depletion in which the manufacturing stage (A3) is most significant. Total (A1-A3) GHG impacts are driven by the Plate Mill process (27%), Blast Furnace Operations (19%), and Basic Oxygen Furnace (13%).

### Limitations

As a result of the choice of study scope and LCIA methodologies used, there are several important study limitations which should be understood to ensure an appropriate interpretation of results, as described below.

#### Limitations in the Study Scope

Primary data of material components was not available for some raw materials upstream of Algoma. Secondary data consists ofecoinvent datasets.

Comparability of EPDs is limited to those applying a functional unit. Any comparison of EPDs shall be subject to the requirements of ISO 21930. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

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