GERDAU NEWECO™

# ENVIRONMENTAL PRODUCT DECLARATION

## NewEco – Low Emission Structural Steel

## Facility Average

EPD

**Declaration Owner**
Gerdau Long Steel North America
4221 West Boy Scout Blvd Tampa, FL 33607, USA
www.gerdau.com | GLNinfo@gerdau.com

**Gerdau Facilities Included:**
Cartersville, GA
Midlothian, TX
Petersburg, VA

**Product:**
Unfabricated NewEco Structural Steel

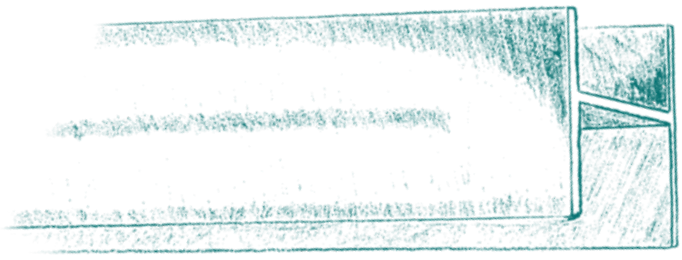
**Declared Unit**
The declared unit is one metric ton of unfabricated NewEco Structural Steel

**EPD Number and Period of Validity**
SCS-EPD-10756
EPD Valid October 21, 2026 through October 20, 2031

**Product Category Rule**
Smart EPD Part A Product Category Rules for Building and Construction Products and Services. Standard 1000, version 1.2, March 14, 2025

Smart EPD Part B Product Category Rules for Designated Steel Construction Products. Standard 1000-008, version 3. April 3, 2025

**Program Operator**
SCS Global Services
2000 Powell Street, Ste. 600, Emeryville, CA 94608
+1.510.452.8000 | www.SCSglobalServices.com



**Product sketched by**
Michael Vidal, Tampa FL
Customer Service Manager

| | |
|---|---|
| Declaration owner: | Gerdau Long Steel North America |
| Address: | 4221 West Boy Scout Blvd, Tampa, FL 33607, USA |
| Declaration Number: | SCS-EPD-10756 |
| Declaration Validity Period: | EPD Valid October 21,2026 through October 20, 2031 |
| Program Operator: | SCS Global Services |
| Program Operator General Program Instructions | SCS Type III Environmental Declaration Program: Program Operator Manual v12.0. December 2023. SCS Global Services |
| Declaration URL Link: | https://www.scsglobalservices.com/certified-green-products-guide |
| LCA Practitioner: | Riley Tesman |
| LCA Software and LCI database: | OpenLCA v2.5 software and the Ecoinvent v3.11 database, Allocation Cut-off System Model |
| Product's Intended Application: | Unfabricated NewEco Structural Steel |
| Product RSL: | n/a |
| Markets of Applicability: | Global |
| EPD Type: | Product-Specific |
| EPD Scope: | Cradle-to-Gate |
| LCIA Method and Version: | EF 3.1 and TRACI 2.2 |
| Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071 | ☐ internal ☒ external |
| LCA Reviewer: | Lindita Bushi, PhD, Athena Sustainable Materials Institute |
| Product Category Rule: | Core Standard: ISO 21930:2017<br>PCR: Smart EPD Part A Product Category Rules for Building and Construction Products and Services, version 1.2, March 14, 2025.<br>Sub-Category PCR: Smart EPD Part B Product Category Rules for Designated Steel Construction Products. Standard 1000-008, version 3. April 3, 2025 |
| PCR Review conducted by: | Chair: Jack Geibig (chair); Organization: Ecoform; Contact: jgeibig@ecoform.com |
| Sub-Category PCR Review conducted by: | Chair: Dr. Thomas Gloria (chair); Organization: Industrial Ecology Consulting<br>Contact: t.gloria@industrial-ecology.com |
| Independent Verification of the declaration and data, according to ISO 21930, ISO 14025:2006 and PCR | ☐ internal ☒ external |
| EPD Verifier: | Lindita Bushi, PhD, Athena Sustainable Materials Institute |
| Declaration Contents: | 1. Gerdau Long Steel North America ..... 3<br>2. Products ..... 3<br>3. LCA: Calculation Rules ..... 8<br>4. LCA: Scenarios and Additional Technical Information ..... 14<br>5. LCA: Results ..... 15<br>6. LCA: Interpretation ..... 19<br>7. Additional Environmental Information ..... 20<br>8. References ..... 27 |

***Disclaimers:*** *This EPD conforms to ISO 14025, 14040, 14044, and ISO 21930.*

*A manufacturer shall not make claims based on an industry-average EPD which leads the market to believe the industry-average is representative of manufacturer-specific or product-specific results.*

***Scope of Results Reported:*** *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.*

***Accuracy of Results:*** *Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.*

***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.*

*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.*

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# 1. Gerdau Long Steel North America

## Gerdau Company Profile

Gerdau is a leading producer of long and special steel in the Americas. It is the largest recycler in Latin America and one of the largest recyclers in North America, transforming millions of tons of scrap into steel each year and reinforcing its commitment to sustainable development in the regions where it operates.

Gerdau's North American business division focus on long steel and special steel products including beams and piling, merchant bar quality, rebar, and special bar quality products. The company serves the construction, automotive, agricultural, service center and energy markets through its vertically integrated network of steel mills and metals recycling facilities.

# 2. Products

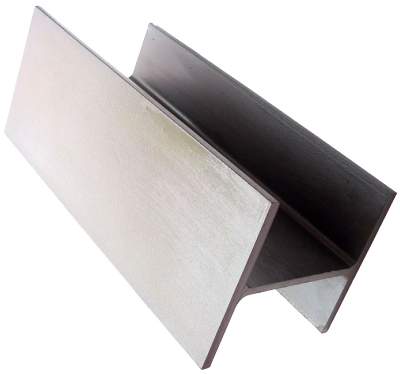
### 2.1 PRODUCT DESCRIPTION

Gerdau is a global leader in the production of hot-rolled structural products. Gerdau NewEco Structural steel is manufactured from recycled steel – both pre-consumer and post-consumer scrap, demonstrating the company's commitment to environmentally-responsible steel production. From hospitals in Montreal to schools in Texas, from data halls to fulfillment centers across North America, and from the Panama Canal to the bays of Alaska, Gerdau beams and piling products have proven the company's commitment to consistently high production standards.

Gerdau produces four distinct beam shapes in North America, providing a range of geometries to suit applications from construction to manufacturing. Gerdau also produces three primary categories of piling, typically used in deep foundation and geo-technical construction projects, such as foundations, marine, environmental and transportation.

Gerdau's NewEco low-emission product line offers reduced embodied carbon steel through the use of recycled raw materials and renewable electricity attributes allocated through Renewable Energy Certificates (RECs). Each product is backed by the EPD methodology, providing customers with verified, reliable data on Global Warming Potential calculations for every project.

This Environmental Product Declaration is for 1 metric ton of unfabricated NewEco Structural Steel produced at three US steel mills by Gerdau. Structural steel products are manufactured from steel scrap, melted in an Electric Arc Furnace (EAF), and hot rolled.





## 2.2 PRODUCT FLOW DIAGRAM

A flow diagram illustrating the production processes and life cycle phases included in the scope of the EPD is provided below.

**Figure 1.** *Flow Diagram for the life cycle of the Gerdau Structural steel.*

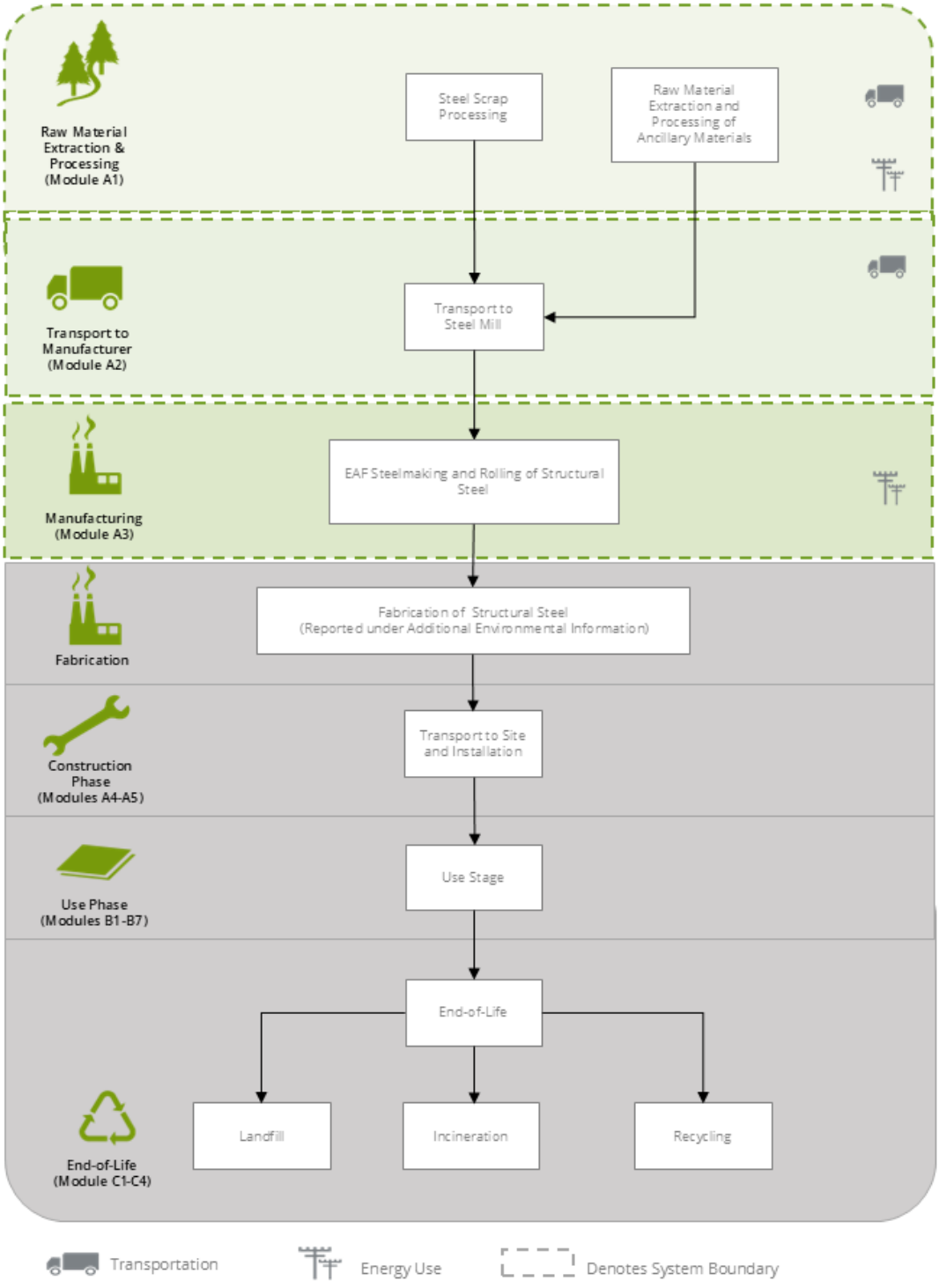
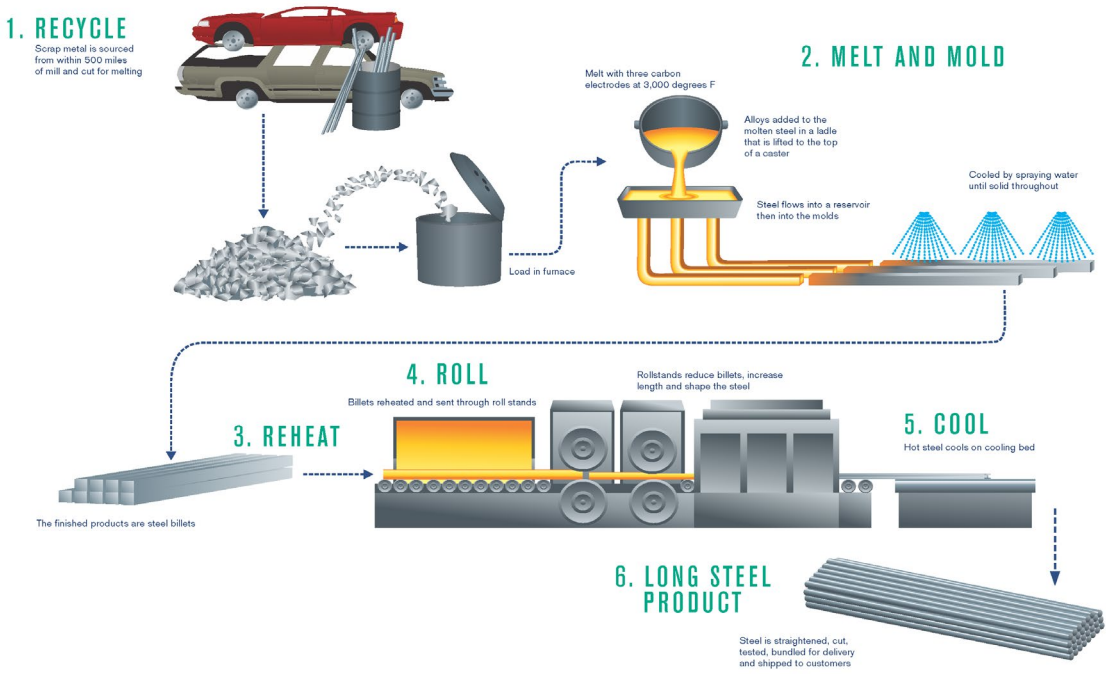


**Figure 2.** *Production of the Gerdau Structural Steel.*




### 2.3 DECLARATION OF METHODOLOGICAL FRAMEWORK

The scope of the EPD is cradle-to-gate, including raw material extraction and processing, transportation, steel manufacture and rolling of the NewEco Structural Steel. The life cycle phases included in the product system boundary are shown below.

**Table 1.** *Life cycle phases included in the Gerdau NewEco Structural Steel product system boundary.*

| Product | | | Construction Process | | Use | | | | | | | End-of-life | | | | Benefits and loads beyond the system boundary |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | A2 | A3 | A4 | A5 | B1 | B1 | 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

Cut-off and allocation procedures are described below and conform to the PCR and ISO standards.

### 2.4 TECHNICAL DATA

Technical specifications for the NewEco Structural Steel in this study include applicable customer and industry standards such as ASTM A992 and A572-65.

The structural steel covered by this EPD may be classified under the following schemes. This list reflects common applications and is non-exhaustive, consistent with PCR Part A, Table A-7.

- **CSI MasterFormat:** 05 10 00 (Structural Metal Framing); 05 12 00 (Structural Steel Framing); 05 12 13 (Architecturally-Exposed Structural Steel Framing); 05 12 23 (Structural Steel for Buildings)
- **UNCPC:** 4112 (Crude steel); 421 (Structural metal products and parts thereof); 11101704 (Steel); 11171500 (Basic steels)
- **UNSPSC:** 30103618 (Steel framework); 30103614 (Steel plate joist)

### 2.5 INTENDED APPLICATION

The intended application of the NewEco Structural Steel is for providing structural support to buildings, foundations and other structures. The product line consists of a range of beam and piling products.

### 2.6 MATERIAL COMPOSITION

The approximate material content of carbon structural steel will vary slightly from batch to batch. In general, the steel will contain < 97% recycled iron, < 2% Manganese, <1.5% Copper, <0.9% Carbon, and a total of 1.5% or less of Nickel, Silicon, Sulfur, Tin, Phosphorus, and Vanadium. While it is not possible to precisely determine the pre and post consumer recycled content, the total recycled content for the steel used in Gerdau products are approximately 98-100%.

In conformance with the PCR, product materials were reviewed for the presence of any toxic, dangerous, 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.

### 2.7 PROPERTIES OF DECLARED PRODUCT AS DELIVERED

The unfabricated NewEco Structural Steel are produced at the three US mills in a range of shapes.

The products represented by this EPD are manufactured using similar production processes and are covered by a production-weighted average approach based on production volumes during the reporting period. Variations in product dimensions and alloying constituents may occur to meet customer specifications; however, the products included in this declaration satisfy the requirements of Section 5.3.1.1 of the PCR. The reported results are based on a production-volume-weighted average of the included products, and the environmental impacts of individual products do not differ from the reported average by more than ±10% for the declared indicators.

### 2.8 MANUFACTURING

The NewEco Structural Steel covered in this study is manufactured in the electric arc furnace steel mill and hot rolled at all facilities in this study, where primary data were collected from January 1st to December 31st, 2024.

The US mills included to model the average product include:

- Cartersville, Georgia

- Petersburg, Virginia
- Midlothian, Texas

**Table 2.** *Technical specifications for the Gerdau NewEco Structural Steel*

| Product | System boundary option | Form factor | Production route representation | | | Steel type |
|---|---|---|---|---|---|---|
| | | | Route | Is represented | Percentage of representation | |
| Structural Steel | 1. Mill product | Hot rolled sections, Piling (Midlothian only) | BOF | False | - | Carbon/Alloy |
| | | | EAF | True | 100% | |
| | | | OHF | False | - | |
| | | | Other | False | - | |

In accordance with the PCR, EPDs shall calculate and report the percentage of data used that is supply-chain-specific per Section 9.3.4 of the ACLCA Open Standard: Data Specificity Addendum. The calculated supply chain specificity is 63% for NewEco structural steel averaged across the Gerdau facilities under study.

Electricity and resource use at the Gerdau facility is allocated based on the worldsteel allocation method, described in Section 3.10.

### 2.9 PACKAGING

NewEco Structural Steel requires minimal packaging, and none is modeled in the present study.

### 2.10 BIOGENIC CONTENT

Table 3 summarizes the biogenic carbon content associated with the product and its packaging materials, as required for disclosure in accordance with relevant EPD standards**.**

**Table 3.** *Biogenic carbon of Gerdau NewEco Structural Steel and packaging.*

| Parameter | Parameter Description | Unit | NewEco Structural Steel |
|---|---|---|---|
| BCRP | Biogenic Carbon Removal from Product | kg $CO_2$ | 0.00 |
| BCEP | Biogenic Carbon Emission from Product | kg $CO_2$ | 0.00 |
| BCRK | Biogenic Carbon Removal from Packaging | kg $CO_2$ | 0.00 |
| BCEK | Biogenic Carbon Emission from Packaging | kg $CO_2$ | 0.00 |
| BCEW | Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes | kg $CO_2$ | 0.00 |
| CCE | Calcination Carbon Emissions | kg $CO_2$ | 0.00 |
| CCR | Carbonation Carbon Removals | kg $CO_2$ | 0.00 |

### 2.11 FURTHER INFORMATION

Further information on the product can be found on the manufacturers' website at www.gerdau.com.



# 3. LCA: Calculation Rules

### 3.1 DECLARED UNIT

The declared unit used in the study is defined as one (1) metric ton of unfabricated NewEco Structural Steel, consistent with the PCR.

The environmental impact results of products in this document are based on a declared unit and therefore do not provide sufficient information to establish comparisons. The results shall not be used for comparisons without knowledge of how the physical properties of the product impact the precise function at the construction level. The environmental impact results shall be converted to a functional unit basis before any comparison is attempted.

### 3.2 SYSTEM BOUNDARY

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 EPD scope are described in Table 4.

**Table 4.** *The modules and unit processes included in the scope for the Gerdau NewEco Structural Steel.*

| 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 | All raw material extraction and processing (e.g., mining, crushing, sorting, handling, and transportation) as well as processing of secondary material inputs (e.g., recycling processes, including sorting, handling, transportation, and reprocessing) upstream of the Gerdau facilities |
| A2 | Transport to the steel mill | Transportation from primary production facility to the Gerdau steel mills |
| A3 | Product Manufacturing | EAF Steelmaking and hot rolling at the three US Gerdau steel mills. This module includes production of ancillary materials and waste disposal. |
| 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 |

| Module | Module Description | Unit Processes Included in Scope |
|---|---|---|
| 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.

- Representative inventory data were used to reflect the energy mix for electricity use. For NewEco steel products, electricity consumption associated with the represented production volume was modeled using a solar electricity generation dataset to represent the renewable electricity attributes allocated through eligible Renewable Energy Certificates (RECs). The photovoltaic electricity dataset was selected to represent renewable electricity associated with REC-backed NewEco production at the Midlothian facility, where on-site solar generation is present. Electricity represented by allocated RECs was modeled using the photovoltaic electricity dataset shown in Table 5.

- Primary data for resource use (e.g., electricity, natural gas, water), waste/co-products, and emissions released, are allocated to structural steel and co-products (e.g. slag) per the worldsteel allocation method, as required under the PCR. Based on primary data, no overhead resource usage is assumed for Petersburg.

- Representative inventory data for raw materials and ancillary materials were modeled with unit process data taken from Ecoinvent.

- All steel scrap inputs were assumed to originate from 100% post-consumer sources. An Ecoinvent process representing the handling and processing of steel scrap was selected to estimate the environmental burden associated with preparing the recovered scrap for use as a raw material input. Home scrap (mill scrap generated and reused within the facility) is not counted as recycled content, in accordance with the PCR definition of recycled content.

- Results are calculated as a production-weighted average across facilities.
- Transportation distances for scrap were provided for Cartersville; however the transportation distances for other raw materials were not provided. A distance of 200 miles was assumed for all raw materials. This assumption accounts for 15% of the modeled transit for Cartersville.
- The mode of transport for external billet to the relevant facilities was assumed to be by truck freight.
- Disposal of manufacturing waste where unknown is modeled based for solid and hazardous waste generation and disposal in the United States, as specified in the PCR. Specifically, 80% of non-hazardous wastes are disposed in landfill and 20% incinerated. Transportation for end-of-life scenarios was modeled using the EPA WARM model assumption of 20 miles (~32 km), from the point of product use to a landfill, material recovery center, or waste incinerator. Ecoinvent datasets are used to model the impacts associated with incineration and landfilling, which does not include energy recovery from landfill gas.

The PCR requires the results for several inventory flows related to construction products to be reported including energy and resource use and waste and outflows. These are aggregated inventory flows, and do not characterize any potential impact; results should be interpreted considering this limitation.

Purchased carbon offsets and other market-based instruments were not applied to modify the life cycle assessment results reported in this EPD. Environmental impacts are based on the underlying physical production system and associated life cycle inventory data.

### 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 Gerdau for the manufacturing facilities. The sources of secondary LCI data are the Ecoinvent database and summarized in Table 5.

**Table 5.** *Data sources for the Gerdau NewEco Structural Steel.*

| Flow | Dataset | Data Source | Publication Date |
|---|---|---|---|
| Raw Materials and Consumables | | | |
| Scrap | sorting and pressing of iron scrap \| iron scrap, sorted, pressed \| Cutoff, U - RoW | Ecoinvent v3.11 | 2024 |
| High Cal Lime | market for quicklime, milled, loose \| quicklime, milled, loose \| Cutoff, U - RoW | Ecoinvent v3.11 | 2024 |
| Dolomitic Lime | market for quicklime, milled, loose \| quicklime, milled, loose \| Cutoff, U – RoW | Ecoinvent v3.11 | 2024 |
| Anthracite Carbon | market for hard coal \| hard coal \| Cutoff, U - RoW | Ecoinvent v3.11 | 2024 |
| Ferrochrome | market for ferrochromium, high-carbon, 68% Cr \| ferrochromium, high-carbon, 68% Cr \| Cutoff, U - GLO | Ecoinvent v3.11 | 2024 |
| Iron Silicide | market for iron-nickel-chromium alloy \| iron-nickel-chromium alloy \| Cutoff, U – GLO | Ecoinvent v3.11 | 2024 |
| Ferrovanadium | market for ferrochromium, high-carbon, 68% Cr \| ferrochromium, high-carbon, 68% Cr \| Cutoff, U – GLO | Ecoinvent v3.11 | 2024 |
| Ferromanganese, | ferromanganese production, high-coal, 74.5% Mn \| ferromanganese, high-coal, 74.5% Mn \| Cutoff, U – GLO | Ecoinvent v3.11 | 2024 |

| Flow | Dataset | Data Source | Publication Date |
|---|---|---|---|
| Carbon Coke | market for coke \| coke \| Cutoff, U - RoW | Ecoinvent v3.11 | 2024 |
| Calcium carbide | market for calcium carbide, technical grade \| calcium carbide, technical grade \| Cutoff, U - RoW | Ecoinvent v3.11 | 2024 |
| Ferroniobium | market for ferroniobium, 66% Nb \| ferroniobium, 66% Nb \| Cutoff, U – GLO | Ecoinvent v3.11 | 2024 |
| Aluminum | market for aluminium production, primary, ingot \| aluminium, primary, ingot \| Cutoff, U – RoW | Ecoinvent v3.11 | 2024 |
| Silicon Carbide | market for silicon carbide \| silicon carbide \| Cutoff, U - GLO | Ecoinvent v3.11 | 2024 |
| Ferro silicon | market for ferrosilicon \| ferrosilicon \| Cutoff, U – GLO | Ecoinvent v3.11 | 2024 |
| Nickel | market for nickel, class 1 \| nickel, class 1 \| Cutoff, U – GLO | Ecoinvent v3.11 | 2024 |
| Calcium Silicide | market for calcium chloride \| calcium chloride \| Cutoff, U - RoW | Ecoinvent v3.11 | 2024 |
| Cored Wire | market for wire drawing, steel \| wire drawing, steel \| Cutoff, U - GLO | Ecoinvent v3.11 | 2024 |
| Ferro Columbium | market for ferroniobium, 66% Nb \| ferroniobium, 66% Nb \| Cutoff, U - GLO | Ecoinvent v3.11 | 2024 |
| Iron Aluminide | market for iron-nickel-chromium alloy \| iron-nickel-chromium alloy \| Cutoff, U - GLO | Ecoinvent v3.11 | 2024 |
| Iron Monosilicide | market for iron-nickel-chromium alloy \| iron-nickel-chromium alloy \| Cutoff, U - GLO | Ecoinvent v3.11 | 2024 |
| Ferro Molybdenum | market for ferroniobium, 66% Nb \| ferroniobium, 66% Nb \| Cutoff, U - GLO | Ecoinvent v3.11 | 2024 |
| Nitrovan | market for iron-nickel-chromium alloy \| iron-nickel-chromium alloy \| Cutoff, U - GLO | Ecoinvent v3.11 | 2024 |
| Magnesium Oxide | market for magnesium oxide \| magnesium oxide \| Cutoff, U - GLO | Ecoinvent v3.11 | 2024 |
| Pebble Lime | market for quicklime, milled, loose \| quicklime, milled, loose \| Cutoff, U – RoW | Ecoinvent v3.11 | 2024 |
| Carbon Products | market for hard coal \| hard coal \| Cutoff, U - GLO | Ecoinvent v3.11 | 2024 |
| Ancillary Materials | | | |
| Slag Mix | market for blast furnace slag \| blast furnace slag \| Cutoff, U | Ecoinvent v3.11 | 2024 |
| Refractory | market for refractory, basic, packed \| refractory, basic, packed \| Cutoff, U - GLO | Ecoinvent v3.11 | 2024 |
| Electrodes | market for graphite \| graphite \| Cutoff, U - GLO | Ecoinvent v3.11 | 2024 |
| Sand | market for sand \| sand \| Cutoff, U - RoW | Ecoinvent v3.11 | 2024 |
| Nitrogen | market for nitrogen, liquid \| nitrogen, liquid \| Cutoff, U - RoW | Ecoinvent v3.11 | 2024 |
| Argon | market for argon, liquid \| argon, liquid \| Cutoff, U - RoW | Ecoinvent v3.11 | 2024 |
| Oxygen | market for oxygen, liquid \| oxygen, liquid \| Cutoff, U - RoW | Ecoinvent v3.11 | 2024 |
| Electricity/Heat | | | |
| Electricity | electricity production, photovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted, renewable energy product \| electricity, low voltage, renewable energy products \| Cutoff, U - CH | Ecoinvent v3.11 | 2024 |
| Natural gas | market for natural gas, high pressure \| natural gas, high pressure \| Cutoff, U - US | Ecoinvent v3.11 | 2024 |
| Diesel | market for diesel, low-sulfur \| diesel, low-sulfur \| Cutoff, U - RoW | Ecoinvent v3.11 | 2024 |
| Propane | market for propane \| propane \| Cutoff, U - GLO | Ecoinvent v3.11 | 2024 |
| Water | market for tap water \| tap water \| Cutoff, U - RoW | Ecoinvent v3.11 | 2024 |
| Transportation | | | |
| Rail | market for transport, freight, train, fleet average \| transport, freight, train, fleet average \| Cutoff, U - US | Ecoinvent v3.11 | 2024 |
| Road | market for transport, freight, lorry, 16-32 metric ton, diesel, EURO 4 \| transport, freight, lorry, 16-32 metric ton, diesel, EURO 4 \| Cutoff, U - RoW | Ecoinvent v3.11 | 2024 |
| Ocean shipping | market for transport, freight, sea, container ship, heavy fuel oil \| transport, freight, sea, container ship, heavy fuel oil \| Cutoff, U - GLO | Ecoinvent v3.11 | 2024 |
| Waste Treatment | | | |
| Inert Waste | market for inert waste, for final disposal \| inert waste, for final disposal \| Cutoff, U - RoW | Ecoinvent v3.11 | 2024 |

### 3.7 DATA QUALITY

The data quality assessment addressed 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 Gerdau NewEco Structural Steel product system.*

| Data Quality Parameter | Data Quality Discussion |
|---|---|
| **Time-Related Coverage:** 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 2015 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) are based on annual production for calendar year 2024. |
| **Geographical Coverage:** 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 waste disposal are based on regional statistics. |
| **Technology Coverage:** Specific technology or technology mix | For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations. |
| **Precision:** 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. |
| **Completeness:** Percentage of flow that is measured or estimated | The LCA model included all known mass and energy flows for production of the steel products. 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. |
| **Representativeness:** 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. |
| **Consistency:** 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 where available. 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 the United States. |
| **Reproducibility:** 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. All assumptions, models, and data sources are documented. |
| **Sources of the Data:** Description of all primary and secondary data sources | Data from the Gerdau 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. |
| **Uncertainty of the Information:** Uncertainty related to data, models, and assumptions | Uncertainty related to materials in the steel products are moderate. Specifically, some alloys were not available in the secondary datasets were modeled with proxy datasets. Actual supplier data for upstream operations was not available for steel 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 |

| Data Quality Parameter | Data Quality Discussion |
|---|---|
| | 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 is January 01, 2024 through December 31, 2024.

### 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.

For steel construction products, allocation approaches are commonly applied to co-products of steel production, as well as steel scrap entering the product system as an input to steelmaking and recycled from the product manufacturing, fabrication, and end-of-life stages. The production of steel generates several co-products that are beneficially used as inputs to other product systems including solid materials, such as slags, sludges, scales, and dust. Slags are generated by the blast furnace, basic oxygen furnace, and electric arc furnace and beneficially used in concrete, construction aggregate, and fertilizer applications.

Per ISO 21930, steel slag meets the definition of a co-product, and the production of steel slag is a joint co-production process. Therefore, the process inventory should be allocated between products and co-products based on underlying physical relationships. In accordance with the PCR, the physical partitioning approach developed by the World Steel Association and EUROFER [A methodology to determine the LCI of steel industry co-products[1]] shall be used for slag produced from the blast furnace and basic oxygen furnace (BOF). The method may also be applied to EAF slag using the same partitioning approach and allocation factors. 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.

The transportation from primary producer of material components (e.g., alloys, fluxes) to the steel mill is based on primary data provided by the manufacturer, including modes, distances, and amount of material transported from each supplier to the Gerdau facility. Transportation was allocated on the basis of the mass of material and distance 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.

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.

It is recognized that by following the typical ISO 21930:2017 definitions of modules A1, A2, and A3 for a specific production facility, inconsistencies may occur in classifying individual processes as either A1 or A3 based on the scope of the operations that take place at a given facility. Care must be taken not to compare A1, A2, or A3 on an individual basis for a given product from various mill producers, but instead on the aggregated total of A1, A2, and A3. Separate A1, A2, and A3 values are provided for a better understanding of the processes taking place at a given facility and a greater level of transparency.

[1] https://worldsteel.org/wp-content/uploads/A-methodology-to-determine-the-LCI-of-steel-industry-co-products.pdf. Specific allocation factors are available in "Appendix 3: List of allocation rules applied to specific inputs and output flows in steelmaking processes."

Construction product environmental impact results provide a sufficient basis for comparison only when considered in the context of the construction works project. In all cases of comparing construction products, the principle that the basis for comparison of the assessment is the construction works level shall be maintained by ensuring that the same functional requirements are met and that the criteria in ISO 21930:2017 Section 5.5, *Comparability of EPDs for Construction Products*, are satisfied.

The EPD owner has sole ownership, liability, and responsibility for the EPD. Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building or construction works level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Examples of variations include the use of different LCA software and background LCI datasets, which may lead to differences in results upstream or downstream of the life cycle stages declared.

## 4. LCA: Scenarios and Additional Technical Information

**Inputs for the Manufacture of Structural Steel**

The primary material input for this unit process is steel scrap, ferroalloys, lime and carbonaceous materials. Energy inputs include electricity and fuel resources (natural gas, diesel). Electricity and resources (e.g., natural gas, diesel, process water) used at the manufacturing facilities are allocated to the products based on the worldsteel method for steel production at the Gerdau facility from January 01, 2024, to December 31, 2024.  100% of the electricity needs for steel manufacturing and rolling are provided by renewable energy credits for the NewEco Structural Steel.

**Outputs from the Manufacture of Structural Steel**

The primary intended outputs of the facility include structural steel and steel slag. Byproducts produced at the facilities can include baghouse dust, mill scale, shear crops, and pond fines. Air emissions result from onsite process emissions, the combustion of fossil fuels, and electricity used.

**Transportation**

Transportation impacts were modeled in accordance with Section 7.1.7.2.3 of the Smart EPD Part B PCR for Designated Steel Construction Products. For trips under 200 miles, short-haul transport was modeled as round-trip, consistent with PCR guidance that assumes local trucks return empty. The ecoinvent transportation datasets used in this study include return trip assumptions.

For long-haul transport (over 200 miles), calculations were adjusted to exclude the default return trip assumption. This aligns with PCR guidance that bulk carriers used for long distances typically do not return empty.

Transportation of waste materials at manufacturing assumes a 20 mile (~32 km) average distance to disposal, where unknown, consistent with assumptions used in the US EPA WARM model.

**Waste Disposal**

Assumed disposal rates for nonhazardous wastes are based on US EPA MSW statistics rate of 20% incineration and 80% landfilled. The majority of hazardous waste at Gerdau facilities are recycled with only a small amount going to landfills.

**Renewable Electricity**

For NewEco steel products, electricity consumption associated with the represented production volume is matched with renewable electricity attributes through eligible Renewable Energy Certificates (RECs). The renewable electricity portion of manufacturing was modeled using a solar electricity generation dataset to represent the renewable electricity attributes allocated to NewEco production.

REC documentation, facility-specific electricity consumption, and production data were used to determine the quantity of renewable electricity represented in the assessment. Renewable electricity allocation was evaluated in accordance with the ACLCA Guidance for Quantifying Renewable Electricity Instruments in Environmental Product Declarations.

**Table 7.** *Renewable Electricity Information*

| Renewable Electricity Information | NewEco Structural Steel |
|---|---|
| Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results: | Yes |
| Electricity Source: | Offsite (Petersburg and Cartersville) and Onsite (Midlothian) |
| Renewable type(s): | Solar |
| Percent of EPD Owner's product-related electricity covered: | 100% |
| Commitment pledged for entire EPD validity period: | Yes |
| Electricity accounting methodology: | Market-based |

# 5. LCA: Results

Results of the Life Cycle Assessment are calculated using Life Cycle Impact Assessment (LCIA) methods. The following environmental impact category indicators are reported using characterization factors based on the TRACI 2.2 and EF 3.1 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.

The Global Warming Potential (GWP) indicators reported under the EF 3.1 method are calculated using the 100-year time horizon characterization factors from the IPCC Sixth Assessment Report (AR6, 2021), excluding carbon-climate feedbacks, as specified by the EF 3.1 reference package.

**Table 8.** *Impact categories and units*

| EF 3.1 Impact Categories | Unit | TRACI 2.2 Impact Category | Unit |
|---|---|---|---|
| Global Warming Potential - total (GWP-total) | kg $CO_2$ eq. | Ozone Depletion Potential **(ODP)** | kg CFC 11 eq |
| Global Warming Potential - fossil fuels (GWP-fossil) | kg $CO_2$ eq. | Acidification Potential **(AP)** | kg $SO_2$ eq |
| Global Warming Potential - biogenic (GWP-biogenic) | kg $CO_2$ eq. | Eutrophication Potential - marine **(EP)** | kg N eq |
| Global Warming Potential - land use and land use change (GWP-luluc) | kg $CO_2$ eq. | Eutrophication Potential - freshwater **(EP)** | kg N eq |
| | | Smog (Photochemical Oxidation Formation) | kg $O_3$ eq |

These impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development. However, the EPD users shall not use additional measures for comparative purposes.

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

**Table 9.** *Nomenclature and reporting units for resource use and waste flows.*

| Resources | Unit | Waste and Outflows | Unit |
|---|---|---|---|
| **$RPR_E$:** Renewable primary resources used as energy carrier (fuel) | MJ, LHV | **HWD:** Hazardous waste disposed | kg |
| **$RPR_M$:** Renewable primary resources with energy content used as material | MJ, LHV | **NHWD:** Non-hazardous waste disposed | kg |
| **$RPR_T$:** Total renewable primary resources | MJ, LHV | **HLRW:** High-level radioactive waste, conditioned, to final repository | kg |
| **$NRPR_E$:** Non-renewable primary resources used as an energy carrier (fuel) | MJ, LHV | **ILLRW:** Intermediate- and low-level radioactive waste, conditioned, to final repository | kg |
| **$NRPR_M$:** Non-renewable primary resources with energy content used as material | MJ, LHV | **CRU:** Components for re-use | kg |
| **$NRPR_T$:** Total non-renewable primary resources | MJ, LHV | **MR:** Materials for recycling | kg |
| **SM:** Secondary materials | kg | **MER:** Materials for energy recovery | kg |
| **RSF:** Renewable secondary fuels | MJ, LHV | **EE:** Recovered energy exported from the product system | MJ, LHV |
| **NRSF:** Non-renewable secondary fuels | MJ, LHV | **ADPF:** Abiotic Depletion Potential for Fossil Fuels | MJ, LHV |
| **RE:** Recovered energy | MJ, LHV | - | - |
| **FW:** Use of net freshwater resources | $m^3$ | - | - |

## 5.1 FACILITY-SPECIFIC RESULTS

**Table 10.** *Global Warming Potential (Total) results by life cycle phase for the declared unit (metric ton) of unfabricated NewEco Structural Steel, for each producing facility. All values are rounded to three significant digits. Values below indicator results show the percentage contribution of each life cycle module to the result for each impact category.*

| Impact Category | A1 | A2 | A3 | Total (A1-A3) |
|---|---|---|---|---|
| **GWP – Total** | | | | |
| Cartersville, GA | 137 | 42.5 | 236 | 415 |
| Midlothian, TX | 151 | 22.1 | 405 | 579 |
| Petersburg, VA | 65.8 | 49.8 | 324 | 440 |

The results are presented for the declared unit of 1 metric ton of unfabricated structural steel produced at the US Gerdau steel mills, per the requirements of the PCR under Option 1. *Note that results in the 2021Gerdau Structural steel EPDs were presented for 1 metric ton of fabricated structural steel.* Additional results for the fabricated structural steel are presented in Section 7 – Additional Environmental Information.

## 5.2 PRODUCTION-AVERAGE RESULTS

**Table 11.** *Resource use and waste indicators per declared unit (metric ton) for unfabricated **NewEco Structural Steel** (facility-average) **produced in the US**. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.*

| Parameter | Life cycle stage | | | |
|---|---|---|---|---|
| | Raw Materials (A1) | Upstream Transport (A2) | Manufacturing (A3) | Total (A1-A3) |
| **RESOURCES** | | | | |
| Renewable primary resources used as energy carrier ($RPR_E$) (MJ) | 280 | 9.35 | 2,830 | 3,120 |
| | 9% | 0% | 91% | 100% |
| Renewable primary resources used as material ($RPR_M$) (MJ) | 0.00 | 0.00 | 0.00 | 0.00 |
| | n/a | n/a | n/a | n/a |
| Total renewable primary resources with energy content ($RPR_T$) (MJ) | 280 | 9.35 | 2,830 | 3,120 |
| | 9% | 0% | 91% | 100% |
| Non-renewable primary resources used as an energy carrier ($NRPR_E$) (MJ) | 2,070 | 471 | 4,390 | 6,930 |
| | 30% | 7% | 63% | 100% |
| Non-renewable primary resources used as material ($NRPR_M$) (MJ) | 358 | 0.00 | 0.00 | 358 |
| | 100% | 0% | 0% | 100% |
| Total non-renewable primary resources with energy content ($RPR_T$) (MJ) | 2,430 | 471 | 4,390 | 7,290 |
| | 33% | 6% | 60% | 100% |
| Secondary materials (SM) (kg) | 1,110 | 0.00 | 0.00 | 1,110 |
| | 100% | 0% | 0% | 100% |
| Renewable secondary fuels (RSF) (MJ) | 0.00 | 0.00 | 0.00 | 0.00 |
| Nonrenewable secondary fuels (NRSF) (MJ) | 0.00 | 0.00 | 0.00 | 0.00 |
| Recovered energy (MJ) | 0.00 | 0.00 | 0.00 | 0.00 |
| Abiotic Depletion Potential for Fossil Resources ($ADP_{Fossil}$) (MJ) | 1,110 | 463 | 7,030 | 8,600 |
| | 13% | 5% | 82% | 100% |
| Use of net freshwater resources (FW) ($m^3$) | 1.07 | $7.63x10^{-2}$ | 3.80 | 4.95 |
| | 22% | 2% | 77% | 100% |
| **WASTES** | | | | |
| Hazardous waste disposed (HWD) (kg) | 0.00 | 0.00 | 0.00 | 0.00 |
| | n/a | n/a | n/a | n/a |
| Non-hazardous waste disposed (NHWD) (kg) | 0.00 | 0.00 | 20.7 | 20.7 |
| | 0% | 0% | 100% | 100% |
| High-level radioactive waste (HLRW) (kg) | $6.78x10^{-4}$ | $3.87x10^{-5}$ | $6.90x10^{-4}$ | $1.41x10^{-3}$ |
| | 48% | 3% | 49% | 100% |
| Low-level radioactive waste (ILLRW) (kg) | $8.29x10^{-4}$ | $9.28x10^{-5}$ | $1.69x10^{-3}$ | $2.61x10^{-3}$ |
| | 32% | 4% | 65% | 100% |
| Components for Reuse (CRU) (kg) | 0.00 | 0.00 | 0.00 | 0.00 |
| Materials for Recycling (MR) (kg) | 0.00 | 0.00 | 13.8 | 13.8 |
| | 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 |

**Table 12.** *Life Cycle Impact Assessment results by life cycle phase for the declared unit (metric ton) of unfabricated* ***NewEco Structural Steel*** *(facility-average)* ***produced in the US****. All values are rounded to three significant digits. Values below indicator results show the percentage contribution of each life cycle module to the result for each impact category.*

| Impact Category (Units) | A1 | A2 | A3 | Total (A1-A3) |
|---|---|---|---|---|
| **EF 3.1** | | | | |
| Global Warming Potential - Total (kg $CO_2$ eq) | 123 | 34.9 | 343 | 501 |
| | 24% | 7% | 69% | 100% |
| Global Warming Potential - Fossil (kg $CO_2$ eq) | 122 | 34.8 | 343 | 500 |
| | 24% | 7% | 69% | 100% |
| Global Warming Potential - Biogenic (kg $CO_2$ eq) | 0.227 | $1.06x10^{-2}$ | 0.260 | 0.498 |
| | 46% | 2% | 52% | 100% |
| Global Warming Potential – Land Use and Land Use Change (kg $CO_2$ eq) | 0.147 | $1.91x10^{-2}$ | 0.191 | 0.357 |
| | 41% | 5% | 53% | 100% |
| **TRACI 2.2** | | | | |
| Ozone Depletion Potential (kg CFC-11 eq) | $1.97x10^{-6}$ | $4.79x10^{-7}$ | $7.38x10^{-6}$ | $9.83x10^{-6}$ |
| | 20% | 5% | 75% | 100% |
| Acidification Potential (kg $SO_2$ eq) | 1.45 | 0.172 | 0.988 | 2.61 |
| | 55% | 7% | 38% | 100% |
| Eutrophication Potential: Freshwater (kg P eq) | $5.36x10^{-2}$ | $4.02x10^{-3}$ | $5.52x10^{-2}$ | 0.113 |
| | 48% | 4% | 49% | 100% |
| Eutrophication Potential: Marine (kg N eq) | 0.692 | 0.183 | 0.491 | 1.37 |
| | 51% | 13% | 36% | 100% |
| Smog Formation Potential (kg $O_3$ eq) | 16.7 | 4.46 | 14.7 | 35.8 |
| | 47% | 12% | 41% | 100% |

The results are presented for the declared unit of 1 metric ton of unfabricated structural steel produced at the Gerdau steel mills, per the requirements of the PCR under Option 1.Additional results for the fabricated structural steel are presented in Section 7 – Additional Environmental Information.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building or construction works has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase only when product or construction works 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. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. 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 comparisons can be inaccurate and could lead to erroneous selection of materials or products that are higher-impact, at least in some impact categories.

Relative to the corresponding facility-average structural steel product modeled using facility-specific electricity grid mixes, the NewEco Structural Steel product demonstrates a reduction of 41% in cradle-to-gate GWP-total. The reduction is primarily attributable to the renewable electricity modeling approach associated with allocated renewable electricity attributes

# 6. LCA: Interpretation

LCIA results were assessed relative to the production of 1 metric ton of unfabricated NewEco Structural Steel, and the impact category indicator results are presented in Section 5. Generally speaking, for the product systems and indicators included in this study, the contribution to impacts from the production of unfabricated structural steel (A3) are the largest, followed largely by extraction and processing of raw materials (A1).

### 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 the Gerdau facility. Secondary data consists of Ecoinvent datasets.

Comparison of the environmental performance of construction products should be based on the product's use in a building, considering the complete life cycle. Results that do not consider the complete building context are inappropriate for comparing construction products. Comparability of EPDs is limited to those applying a functional unit.

### Limitations in the Life Cycle Impact Assessment Phase

There are several important limitations in the LCIA methodologies used, which are based upon the requirements of the PCR. These limitations are described below.

There may be additional impacts relevant to the manufacture of the final products. Some of these omitted impact categories are listed in Table 13. This list is not exhaustive; there may be other impact categories which are not included.

**Table 13**. *Impact categories omitted from the LCIA of the final products.*

| Impact Categories | Impact Categories |
|---|---|
| Terrestrial Biome Disturbance | Hazardous Environmental Contaminant Exposure Risks |
| Freshwater Biome Disturbance | $PM^{2}_{.5}$ Exposures |
| Loss of Key Species | Hazardous Ambient Air Contaminant Exposure Risks |
| Arctic Climate Change | Hazardous Food and Water Contaminant Exposure Risks |
| Ocean Acidification | Risks from Radioactive Wastes |

It should also be noted that LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

### Limitations in Results for Other Parameters

The PCR requires that results for several inventory flows related to construction products are to be reported as "other parameters". These are aggregated inventory flows, and do not characterize any potential impact; results should be interpreted taking into account this limitation.

# 7. Additional Environmental Information

## 7.1 NewEco Steel

The Gerdau NewEco product is based on the following premises: it must be produced via EAF route, it must be produced using electricity considered $CO_2e$ neutral, and this information must be assured by a third party. Additional information provided by Gerdau on NewEco methodology if desired.

Gerdau NewEco is a low-emission steel line designed to support the decarbonization of the steel value chain. The production route for this line results in greenhouse gas emissions intensity that is approximately 50% lower than the global industry average as reported by Worldsteel

NewEco is based on three main pillars:

1. Recycled Raw Materials - NewEco steel is manufactured from ferrous scrap, utilizing Gerdau's position as one of the largest recyclers in the Americas.

   Beyond NewEco: Gerdau transforms approximately 11 million tons of scrap into steel products each year. Currently, 70% of all steel produced by Gerdau globally and 100% of the steel produced by the company in North America is already derived from ferrous scrap.

2. Renewable Energy - NewEco is manufactured using 100% renewable electricity, including the use of Renewable Energy Credits.

3. Verification and Transparency - Carbon calculations are based on established industry best practices to ensure technical accuracy. All emissions data and sustainability claims undergo third-party auditing, through the EPD process, to provide verified transparency for customer reporting and compliance.

*Gerdau defines NewEco as low-emission steel produced via the electric route at Industrial Units using 100% renewable energy from certified sources via RECs. Following WorldSteel definitions, the product maintains a verified greenhouse gas threshold of 400 kgCO2e/t.* **Note:** *the system boundary for this GHG threshold is based on the Worldsteel definition and therefore differs from the EPD boundary somewhat.*

## 7.2 Sustainability at Gerdau

### Sustainability at the Forefront

Climate change is an important topic for Gerdau within its business and sustainability strategy. For over 125 years, our company has operated sustainably by utilizing a production matrix based primarily on recycled scrap and charcoal, which has always placed it among the lowest greenhouse gas emitters in the global steel industry. Since 2015, the company has been publishing its audited carbon data and working on further reducing its emissions.

Within North America, Gerdau's steel products are among those with the lowest embodied carbon and Global Warming Potential (GWP). This is driven by our highly efficient Electric Arc Furnace (EAF) operations, which rely exclusively on scrap as the primary feedstock. Unlike many EAF-based producers in the region, our process does not depend on Direct Reduced Iron (DRI) or Hot Briquetted Iron (HBI)—inputs that are often used to supplement scrap but typically carry a higher carbon footprint due to their upstream processing requirements.

In 2019, Gerdau established its Strategy and Sustainability Committee that works closely with the Board of Directors to incorporate ESG factors when determining capital allocation and defining investment plans - not just the production and

return on capital aspects. Additionally, in 2021, the performance targets for ESG indicators, such as CO2e emissions, were included in the Long-Term Incentive Plans (ILP) of the company's senior executives.

Gerdau has adopted the MACC (Marginal Abatement Cost Curve) and MEAC (Marginal Energy Abatement Cost Curve) methodologies to establish the short-,medium- and long-term emission reduction targets. These studies aim at exploring both available and evolving technologies that are relevant to Gerdau's steelmaking process, prioritize and plan investments.

**Our Commitment**

Gerdau is committed to a low-carbon economy and has drawn up a medium and long-term strategy to be part of the solutions in this regard. Our ambition is to be carbon neutral by 2050.

We'll reach our goals by:

- Actively collaborating with industry organizations, universities and research centers in the pursuit of disruptive steelmaking technologies.
- Streamlining our production processes and investing in clean and renewable energy matrices, such as our 80-megawatt solar farm in Texas.
- Dialoguing and collaborating with diverse segments of society to implement public policies, new technologies and improve industrial processes.
- Pursuing certifications that are best-in-class and relevant to our clients and industry stakeholders. For instance, Gerdau utilizes ISO 14001, which is an international standard for Environmental Management Systems (EMS) and defines how a company should manage, monitor, and improve its environmental performance. Gerdau also takes an active role in supporting a greener built environment through the implementation of the Leadership in Energy and Environmental Design (LEED) and Green Globes Certification Programs. Please check more on our certifications in our portal.

**Training: Empowering Our People for a Low-Carbon Future**

Sustainability is no longer a standalone initiative—it is a core business priority embedded across every function, decision, and interaction. Achieving meaningful progress requires more than commitments or targets; it demands a workforce that is informed, engaged, and equipped to act.

This is where training becomes critical. Through the Gerdau Learning platform, employees are provided with the tools and resources needed to deepen their understanding of sustainability practices, decarbonization strategies, and environmental compliance requirements. By making learning accessible and continuous, the platform enables teams to translate knowledge into action across both operational and commercial functions.

As a result, Gerdau's workforce is better prepared to support the company's carbon neutrality ambitions while meeting increasingly stringent environmental and regulatory expectations.

## 7.3 Results Without RECs

The PCR requires the reporting of results without RECs for EPDs in which RECs are incorporated into the baseline result (Section 6). Results without RECs are presented below for Structural Steel.

**Table 14.** *Resource use and waste indicators per declared unit (metric ton) for the **US production average** unfabricated structural steel. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.*

| Parameter | Life cycle stage | | | |
|---|---|---|---|---|
| | Raw Materials (A1) | Upstream Transport (A2) | Manufacturing (A3) | Total (A1-A3) |
| **RESOURCES** | | | | |
| Renewable primary resources used as energy carrier ($RPR_E$) (MJ) | 280 | 9.35 | 461 | 751 |
| | 37% | 1% | 61% | 100% |
| Renewable primary resources used as material ($RPR_M$) (MJ) | 0.00 | 0.00 | 0.00 | 0.00 |
| | n/a | n/a | n/a | n/a |
| Total renewable primary resources with energy content ($RPR_T$) (MJ) | 280 | 9.35 | 461 | 751 |
| | 37% | 1% | 61% | 100% |
| Non-renewable primary resources used as an energy carrier ($NRPR_E$) (MJ) | 2,070 | 471 | 9,420 | 12,000 |
| | 17% | 4% | 79% | 100% |
| Non-renewable primary resources used as material ($NRPR_M$) (MJ) | 358 | 0.00 | 0.00 | 358 |
| | 100% | 0% | 0% | 100% |
| Total non-renewable primary resources with energy content ($RPR_T$) (MJ) | 2,430 | 471 | 9,420 | 12,300 |
| | 20% | 4% | 76% | 100% |
| Secondary materials (SM) (kg) | 1,110 | 0.00 | 0.00 | 1,110 |
| | 100% | 0% | 0% | 100% |
| Renewable secondary fuels (RSF) (MJ) | 0.00 | 0.00 | 0.00 | 0.00 |
| Nonrenewable secondary fuels (NRSF) (MJ) | 0.00 | 0.00 | 0.00 | 0.00 |
| Recovered energy (MJ) | 0.00 | 0.00 | 0.00 | 0.00 |
| Abiotic Depletion Potential for Fossil Resources ($ADP_{Fossil}$) (MJ) | 1,110 | 463 | 7,030 | 8,600 |
| | 13% | 5% | 82% | 100% |
| Use of net freshwater resources (FW) ($m^3$) | 1.07 | $7.63x10^{-2}$ | 3.03 | 4.18 |
| | 26% | 2% | 73% | 100% |
| **WASTES** | | | | |
| Hazardous waste disposed (HWD) (kg) | 0.00 | 0.00 | 0.00 | 0.00 |
| | n/a | n/a | n/a | n/a |
| Non-hazardous waste disposed (NHWD) (kg) | 0.00 | 0.00 | 20.7 | 20.7 |
| | 0% | 0% | 100% | 100% |
| High-level radioactive waste (HLRW) (kg) | $6.78x10^{-4}$ | $3.87x10^{-5}$ | $6.90x10^{-3}$ | $7.62x10^{-3}$ |
| | 9% | 1% | 91% | 100% |
| Low-level radioactive waste (ILLRW) (kg) | $8.29x10^{-4}$ | $9.28x10^{-5}$ | $2.79x10^{-2}$ | $2.88x10^{-2}$ |
| | 3% | 0% | 97% | 100% |
| Components for Reuse (CRU) (kg) | 0.00 | 0.00 | 0.00 | 0.00 |
| Materials for Recycling (MR) (kg) | 0.00 | 0.00 | 13.8 | 13.8 |
| | 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 |

**Table 15.** *Life Cycle Impact Assessment results by life cycle phase for the declared unit (metric ton) of the* ***US production average*** *unfabricated structural steel. All values are rounded to three significant digits. Values below indicator results show the percentage contribution of each life cycle module to the result for each impact category.*

| Impact Category (Units) | A1 | A2 | A3 | Total (A1-A3) |
|---|---|---|---|---|
| **IPCC AR6** | | | | |
| Global Warming Potential - Total (kg $CO_2$ eq) | 123 | 34.9 | 550 | 708 |
| | 17% | 5% | 78% | 100% |
| Global Warming Potential - Fossil (kg $CO_2$ eq) | 122 | 34.8 | 550 | 707 |
| | 17% | 5% | 78% | 100% |
| Global Warming Potential - Biogenic (kg $CO_2$ eq) | 0.227 | $1.06 \times 10^{-2}$ | 0.114 | 0.352 |
| | 65% | 3% | 32% | 100% |
| Global Warming Potential – Land Use and Land Use Change (kg $CO_2$ eq) | 0.147 | $1.91 \times 10^{-2}$ | 0.111 | 0.277 |
| | 53% | 7% | 40% | 100% |
| **TRACI 2.2** | | | | |
| Ozone Depletion Potential (kg CFC-11 eq) | $1.97 \times 10^{-6}$ | $4.79 \times 10^{-7}$ | $2.64 \times 10^{-6}$ | $5.09 \times 10^{-6}$ |
| | 39% | 9% | 52% | 100% |
| Acidification Potential (kg $SO_2$ eq) | 1.45 | 0.172 | 1.28 | 2.89 |
| | 50% | 6% | 44% | 100% |
| Eutrophication Potential: Freshwater (kg P eq) | $5.36 \times 10^{-2}$ | $4.02 \times 10^{-3}$ | 0.105 | 0.163 |
| | 33% | 2% | 65% | 100% |
| Eutrophication Potential: Marine (kg N eq) | 0.692 | 0.183 | 0.660 | 1.54 |
| | 45% | 12% | 43% | 100% |
| Smog Formation Potential (kg $O_3$ eq) | 16.7 | 4.46 | 18.8 | 39.9 |
| | 42% | 11% | 47% | 100% |

## 7.4 Results With Fabrication

The environmental impact results presented in this Environmental Product Declaration represent unfabricated structural steel produced at the Gerdau facilities, with a cradle-to-gate system boundary (modules A1–A3). Fabrication activities such as cutting, drilling, welding, surface preparation, and handling are not included within the declared product system boundary and are therefore not reflected in the LCA results reported in Sections 5 and 6.

Additional results for fabrication were modeled separately using the approach specified in the PCR in which the A1 impacts of the fabricated product are reported as 1.0771 x the A1-A3 impacts of the mill-level product, and modules A2 and A3 are taken directly from the 2025 industry-average American Institute of Steel Construction (AISC) EPD for Structural Steel. The AISC fabrication model represents typical North American steel fabrication operations and includes energy use, auxiliary materials, and process emissions associated with common fabrication activities. The modeling approach, assumptions, and data sources for fabrication are consistent with published AISC LCA guidance and are separate from the manufacturer-specific primary data used to model steel production at the Gerdau facilities.

Results for fabricated structural steel are presented in Tables 16 and 17. For the fabrication-inclusive results, modules A2 and A3 report marine eutrophication, per TRACI 2.2 as reported in the industry-wide EPD. Note that the industry-wide EPD does not report freshwater eutrophication and therefore these results are reported as INA herein.

The reported fabricated product results are based on industry-average fabrication impacts. Actual impacts for fabricated products vary depending on the particular project and its fabrication demands.

**Table 16**. *Resource use and waste indicators per declared unit (metric ton) for the **US production average** of **fabricated NewEco** structural steel. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.*

| Parameter | Life cycle stage | | | |
|---|---|---|---|---|
| | Raw Materials (A1) | Upstream Transport (A2) | Manufacturing (A3) | Total (A1-A3) |
| **RESOURCES** | | | | |
| Renewable primary resources used as energy carrier ($RPR_E$) (MJ) | 3,360 | 1.11 | 150 | 3,510 |
| | 96% | 0% | 4% | 100% |
| Renewable primary resources used as material ($RPR_M$) (MJ) | 0.00 | 0.00 | 0.00 | 0.00 |
| | n/a | n/a | n/a | n/a |
| Total renewable primary resources with energy content ($RPR_T$) (MJ) | 3,360 | 1.11 | 150 | 3,510 |
| | 96% | 0% | 4% | 100% |
| Non-renewable primary resources used as an energy carrier ($NRPR_E$) (MJ) | 7,470 | 503 | 1,460 | 9,430 |
| | 32% | 3% | 9% | 44% |
| Non-renewable primary resources used as material ($NRPR_M$) (MJ) | 385 | 0.00 | 0.00 | 385 |
| | 100% | 0% | 0% | 100% |
| Total non-renewable primary resources with energy content ($RPR_T$) (MJ) | 7,850 | 503 | 1,460 | 9,820 |
| | 80% | 5% | 15% | 100% |
| Secondary materials (SM) (kg) | 1,190 | 0.00 | 0.00 | 1,190 |
| | 100% | 0% | 0% | 100% |
| Renewable secondary fuels (RSF) (MJ) | 0.00 | 0.00 | 0.00 | 0.00 |
| Nonrenewable secondary fuels (NRSF) (MJ) | 0.00 | 0.00 | 0.00 | 0.00 |
| Recovered energy (MJ) | 0.00 | 0.00 | 0.00 | 0.00 |
| Abiotic Depletion Potential for Fossil Resources ($ADP_{Fossil}$) (MJ) | 9,260 | 506 | 1,130 | 10,900 |
| | 85% | 5% | 10% | 100% |
| Use of net freshwater resources (FW) ($m^3$) | 5.33 | $5.51x10^{-3}$ | 0.372 | 5.71 |
| | 93% | 0% | 7% | 100% |
| **WASTES** | | | | |
| Hazardous waste disposed (HWD) (kg) | 0.00 | $3.53x10^{-3}$ | $4.08x10^{-3}$ | $7.61x10^{-3}$ |
| | 0% | 46% | 54% | 100% |
| Non-hazardous waste disposed (NHWD) (kg) | 22.3 | $7.05x10^{-2}$ | 12.3 | 34.7 |
| | 64% | 0% | 35% | 100% |
| High-level radioactive waste (HLRW) (kg) | $1.51x10^{-3}$ | 0.00 | 0.00 | $1.51x10^{-3}$ |
| | 100% | 0% | 0% | 100% |
| Low-level radioactive waste (ILLRW) (kg) | $2.81x10^{-3}$ | 0.00 | 0.00 | $2.81x10^{-3}$ |
| | 100% | 0% | 0% | 100% |
| Components for Reuse (CRU) (kg) | 0.00 | 0.00 | 0.00 | 0.00 |
| Materials for Recycling (MR) (kg) | 14.8 | 0.00 | 77.1 | 91.9 |
| | 16% | 0% | 84% | 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 |

**Table 17.** *Life Cycle Impact Assessment results by life cycle phase for the declared unit (metric ton) of the* ***US production average of fabricated NewEco*** *structural steel. All values are rounded to three significant digits. Values below indicator results show the percentage contribution of each life cycle module to the result for each impact category.*

| Impact Category (Units) | A1 | A2 | A3 | Total (A1-A3) |
|---|---|---|---|---|
| **IPCC AR6** | | | | |
| Global Warming Potential - Total (kg $CO_2$ eq) | 540 | 26.2 | 82.4 | 648 |
| | 83% | 4% | 13% | 100% |
| Global Warming Potential - Fossil (kg $CO_2$ eq) | 539 | 26.2 | 82.3 | 647 |
| | 83% | 4% | 13% | 100% |
| Global Warming Potential - Biogenic (kg $CO_2$ eq) | 0.536 | $1.85x10^{-3}$ | $4.27x10^{-2}$ | 0.581 |
| | 92% | 0% | 7% | 100% |
| Global Warming Potential – Land Use and Land Use Change (kg $CO_2$ eq) | 0.384 | $1.71x10^{-3}$ | $5.48x10^{-2}$ | 0.441 |
| | 87% | 0% | 12% | 100% |
| **TRACI 2.2** | | | | |
| Ozone Depletion Potential (kg CFC-11 eq) | $1.06x10^{-5}$ | $5.41x10^{-7}$ | $7.72x10^{-7}$ | $1.19x10^{-5}$ |
| | 89% | 5% | 6% | 100% |
| Acidification Potential (kg $SO_2$ eq) | 2.81 | $9.89x10^{-2}$ | 0.215 | 3.12 |
| | 90% | 3% | 7% | 100% |
| Eutrophication Potential: Freshwater (kg P eq) | 0.122 | 0.113 | 0.108 | 0.343 |
| | 35% | 33% | 32% | 100% |
| Eutrophication Potential: Marine (kg N eq) | 1.47 | 0.113 | 0.108 | 1.69 |
| | 87% | 7% | 6% | 100% |
| Smog Formation Potential (kg $O_3$ eq) | 38.6 | 2.77 | 2.70 | 44.1 |
| | 88% | 6% | 6% | 100% |

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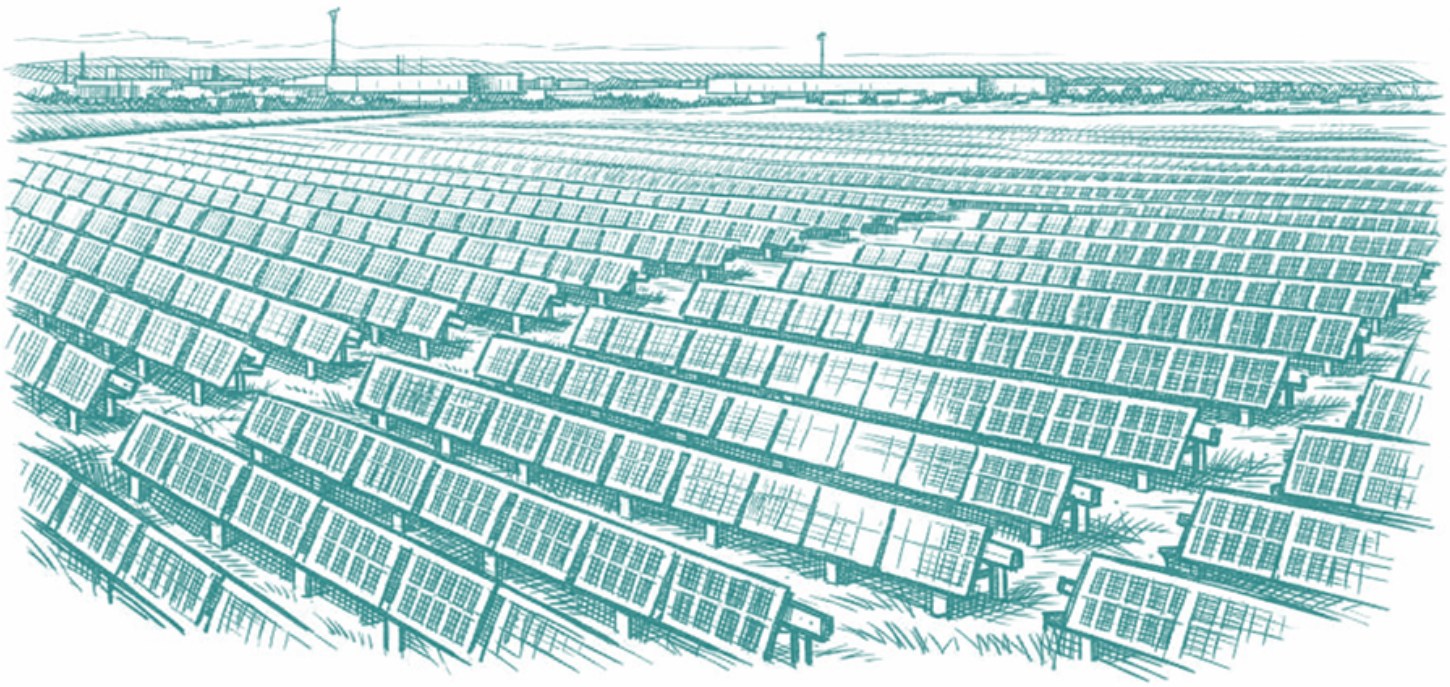

Gerdau Midlothian, TX 80 MW solar farm