ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH ISO 14025:2006 AND ISO 21930:2017

SmartEPD-2026-159-1129-01

Unfabricated Low-Embodied Carbon (LEC) Steel Pipe and Tube



BULL MOOSE TUBE

SMART EPD
ENVIRONMENTAL PRODUCT DECLARATION

Date of Issue:	Expiration:	Last updated:
Nov 05, 2026	Nov 05, 2031	Nov 05, 2026

Refer to the EPD Library at **www.smartepd.com** for the latest EPD listing information

General Information



Bull Moose Tube Company

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bullmoosetube.com

Product Name:	Unfabricated Low-Embodied Carbon (LEC) Steel Pipe and Tube
Declared Unit:	1 metric ton
Declaration Number:	SmartEPD-2026-159-1129-01
Date of Issue:	November 05, 2026
Expiration:	November 05, 2031
Last updated:	November 05, 2026
EPD Scope:	Cradle to gate A1 - A3
Market(s) of Applicability:	North America

General Organization Information

Founded in 1962, Bull Moose Tube Company boasts more than a half-century of proven experience providing customers with superior steel pipe and tube.

Our enduring commitment to quality, innovation, and service has made us one of the most respected names in our field and allowed us to grow into one of the largest producers of HSS, pipe piling and mechanical tubing in North America – and the market leader in sprinkler pipe. Our seven manufacturing facilities help ensure consistent product availability with industry-leading geographic reach.

This EPD represents steel tubes produced by Bull Moose Tube Company at the following manufacturing sites: Casa Grande, AZ; Chicago Heights, IL; Elkhart, IN; Gerald, MO; Masury, OH; Trenton, GA; and Sinton, TX.

Further information can be found at: **https://www.bullmoosetube.com/**

Limitations, Liability and Ownership

This EPD has been developed in accordance with ISO 14025, ISO 21930, Smart EPD® Part A Product Category Rules for Building and Construction Products and Services, and Smart EPD® Part B Product Category Rule version 3 Designated Steel Construction Products. Results are based on LCA modelling assumptions, data availability, and defined system boundaries.

It is recognized that by following the typical ISO 21930:2017 definitions of module A1, A2 and A3 for a specific production facility, inconsistencies will 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.

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 the criteria in ISO 21930:2017 Section 5.5 “Comparability of EPDs for construction products” are satisfied.

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. Example of variations: Different LCA software and background LCI datasets may lead to differences in results upstream or downstream of the life cycle stages declared.

The EPD owner has sole ownership, liability, and responsibility for the EPD. However, no warranty is made regarding completeness or accuracy beyond the defined scope. The EPD is provided for informational purposes only, and no liability is accepted for use, interpretation, or decisions based on its content.

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.

Reference Standards

Standard(s):	ISO 14025:2006 and ISO 21930:2017
Core PCR:	Smart EPD® Part A Product Category Rules for Building and Construction Products and Services, 1000 v1.2
	Date of issue: March 14, 2025
Sub-category PCR:	Smart EPD® Part B PCR for Designated Steel Construction Products, 1000-008 v3.0
	Date of issue: April 03, 2025
	Valid until: April 03, 2030
Sub-category PCR review panel:	Contact Smart EPD for more information.
General Program Instructions:	Smart EPD General Program Instructions v.2.0, March 2025

Verification Information

ACLCA PCR Guidance Version:	1.0
ACLCA PCR Conformance Level:	Transparency
LCA Author/Creator:	Doyin Oladele
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	585 Grove St., Ste. 145, Herndon, VA 20170, USA

Verification:

Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071: External

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Independent external verification of EPD, according to ISO 14025 and reference PCR(s): External

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Product Information

Declared Unit: 1 metric ton
Mass: 1000 kg
Product Specificity: ✓ Product Average
✗ Product Specific
Supply Chain Specific Data: 10.2 %
Variation in GWP Result (Facilities): -25% to +32.5%

Cradle-to-Gate GWP for Unfabricated LEC HSS

Site	Value	Unit
Casa Grande	1.09	metric tonne CO2 eq per 1 metric tonne HSS
Chicago Heights	0.87	metric tonne CO2 eq per 1 metric tonne HSS
Elkhart	1.08	metric tonne CO2 eq per 1 metric tonne HSS
Gerald	1.14	metric tonne CO2 eq per 1 metric tonne HSS
Masury	1.51	metric tonne CO2 eq per 1 metric tonne HSS
Sinton	0.85	metric tonne CO2 eq per 1 metric tonne HSS
Trenton	1.44	metric tonne CO2 eq per 1 metric tonne HSS

Product Description

Steel tubes and pipes covered under this declaration represent hollow structural sections (HSS), mechanical tube, pipe piling and sprinkler pipe. These products can have circular, square, or rectangular cross sections, and are widely used in building, bridge and industrial projects. Bull Moose Tube produces HSS in the range of 1” to 14” square (and rectangular and round equivalents), with wall thickness of 0.065” to 0.750”. Bull Moose produces mechanical tube in the range of 0.5” to 2.5” square (and rectangular and round equivalents), with wall thickness of 0.049” to 0.134”. Bull Moose Tube produces Sprinkler Pipe from 1” NPS to 10” NPS, wall thickness of Bull Moose sprinkler pipe includes Schedule 10, Schedule 30 and Schedule 40 as well as engineered wall thicknesses. Bull Moose Tube produces Pipe Pile from 5.563” to 18” outer diameter round, with wall thickness of 0.188” to 0.750”.

Further information can be found at: https://www.bullmoosetube.com/

Product Specifications

Product SKU(s):

System boundary option: Manufactured product

Form factor: Hollow Sections
Production route representation: EAF
Steel type: Carbon/Alloy

Product Classification Codes: EC3 - Steel -> StructuralSteel -> HollowSections

Product Composition Diagram



Table 1. Material Composition

Material/Component Category	Origin	% Mass
Iron	None	97-99
Manganese	None	≤1.25

Material/Component Category	Origin	% Mass
Carbon	None	≤1.25
Silicon	None	≤1
Aluminum	None	≤1
Other alloying elements	None	<0.1

Packaging Material	Origin	kg Mass
Metal banding	None	1.61
Plastic banding	None	1.02
Wood packaging and dunnage	None	49

Biogenic Carbon Content	kg C per metric ton
Biogenic carbon content in product	0
Biogenic carbon content in accompanying packaging	25.4

Hazardous Materials
None

Technical Data

Steel tubes produced by Bull Moose are defined by ASTM standards outlined below:

- ASTM A135 Standard Specification for Electric-Resistance-Welded Steel Pipe
- ASTM A252 Standard Specification for Welded and Seamless Steel Pipe Piles
- ASTM A500 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Tubing in Rounds and Shapes.
- ASTM A513 Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
- ASTM A795 Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
- ASTM A847 Standard Specification for Cold-Formed Welded and Seamless High-Strength, Low-Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance.
- ASTM A1085 Standard Specification for Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS).
- ASTM A1110 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes with 52KSI minimum yield strength and impact requirements.
- ASTM A1112 Standard Specification for Cold-Formed Welded High Strength Carbon Steel or High Strength Low-Alloy Hollow Structural Sections (HSS) in Rounds and Shapes.

Recycled content of steel supplied to Bull Moose Sites

Site	Pre-consumer recycled content (%)	Post-consumer recycled content (%)	Total recycled content (%)
Casa Grande	33%	43%	76%
Chicago Heights	42%	50%	92%
Elkhart	40%	54%	94%
Gerald	47%	36%	83%
Masury	74%	1.1%	76%
Sinton	36%	42%	78%
Trenton	34%	28%	63%

EPD Data Specificity

Primary Data Year: 2025

Manufacturing Specificity:

- ✗ Industry Average
- ✓ Manufacturer Average
- ✓ Facility Specific

Averaging:

Alongside facility-specific results, this EPD also provides average EPD results for the product. The average EPD results represent a production-weighted average across the participating Bull Moose manufacturing facilities. Facility-specific environmental results were weighted according to each site's annual production volume and aggregated to generate a manufacturer-average result representative of overall production during the reporting period. This approach is consistent with ISO 21930 and the applicable PCR requirements for average EPDs.

Table 2. System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	ND
	A5	Assembly / Install	ND

Use	B1	Use	ND
	B2	Maintenance	ND
	B3	Repair	ND
	B4	Replacement	ND
	B5	Refurbishment	ND
	B6	Operational Energy Use	ND
	B7	Operational Water Use	ND
End of Life	C1	Deconstruction	ND
	C2	Transport	ND
	C3	Waste Processing	ND
	C4	Disposal	ND
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	ND

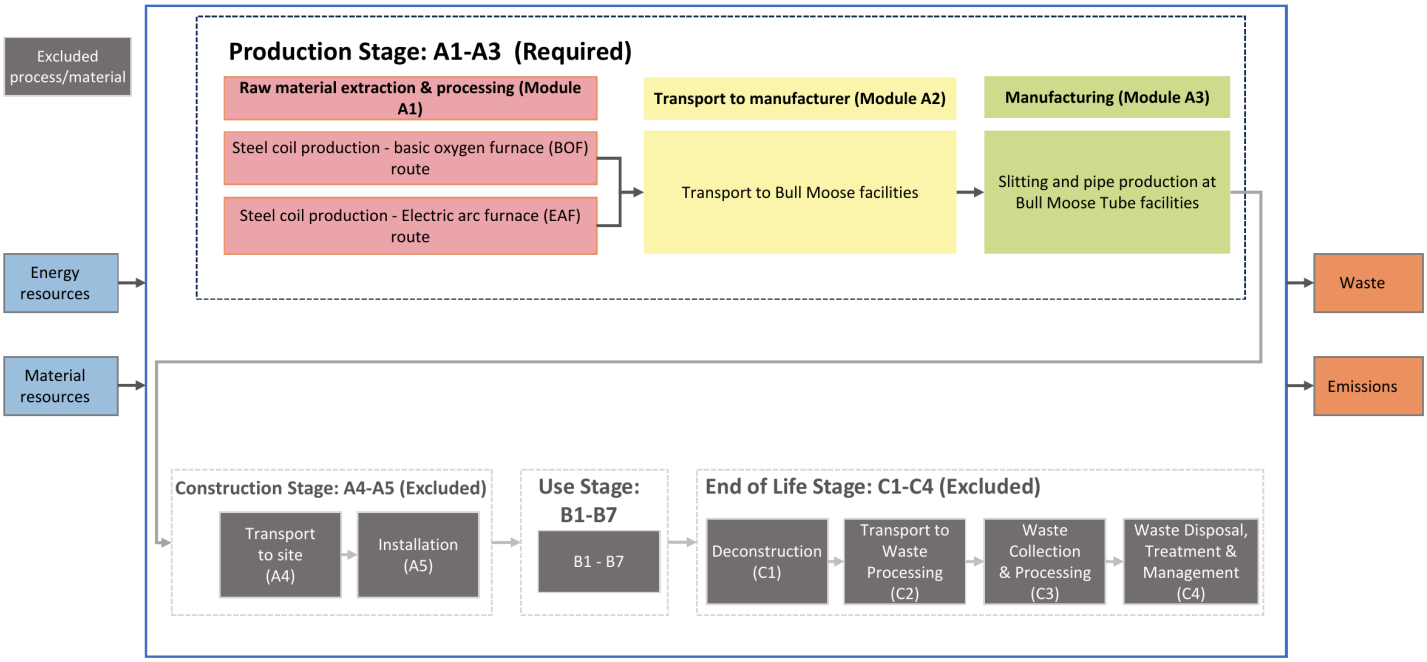
Note:

ND = Module not declared

Plants

- **Casa Grande** 1001 N Jefferson Ave, Casa Grande, AZ 85122, USA
- **Chicago Heights** 555 E 16th St, Chicago Heights, IL 60411, USA
- **Elkhart** 29851 County Road 20, Elkhart, IN, USA
- **Gerald** 406 East Industrial Drive, Gerald, MO 63037, USA
- **Masury** 1433 Standard Ave, Masury, OH 44438, USA
- **Sinton** 8534 Hwy 89, Sinton, TX, USA
- **Trenton** 195 North Industrial Boulevard, Trenton, GA 30752, USA

Product Flow Diagram



Module A1: The steel products included in this study are manufactured from hot-rolled coil, cold-rolled steel pickled and oiled steel coil or hot dip galvanized steel produced either using just electric arc furnace (EAF) steel (LEC product). For the EAF route, scrap steel is added to an electric arc furnace to melt it and convert it into high quality steel before it is cast into slabs. The steel slabs are hot-rolled into strip and coiled and for cold-rolled coil, the hot-rolled product is further pickled and rolled at ambient temperature to achieve tighter thickness tolerance and improved surface finish.

Module A2: The modes of transport and transportation distances of raw materials and outbound packaging to Bull Moose sites were provided by Bull Moose.

Module A3: At the Bull Moose facilities, the master coil is received and then split into smaller, slit coils for each tube mill located in the plant. The slit coils are loaded into the tube mills and are formed into tubes and welded using electric resistance welding (ERW) and cut to length on the tube mill. The tubes are then packaged or bundled and placed into the warehouse for shipment to customers. Only EAF steel coils are used for the production of LEC steel tube and pipe.
Packaging consists of metal banding, plastic banding and lumber and wood for dunnage, depending upon the site. Bull Moose provided data for fuels and energy required for this process, as well as ancillary materials used.
The transportation of fuels and packaging to the manufacturing site, and the transportation and treatment of waste are considered in this study. Steel scraps are sent to recycling and hazardous waste is assumed to be sent to incineration.

Software And Database

LCA Software:	SimaPro v. 10.2						
LCI Foreground Database(s):	Ecoinvent v. 3.11	North America	US LCI v. 1.2025-06.0	US
LCI Background Database(s):	Ecoinvent v. 3.11	North America		

A foreground LCI database is the database used to model the primary, site-specific data collected for this EPD. A background LCI database is the database used to model generic or non-specific data.

Data Quality

Aspect	Description	Requirement in this study
Time-related coverage	Desired age of data and the minimum length of time over which data should be collected.	General data is representative of the current situation of the date of study (2025), or as close as possible. All data should be less than 10 years old. Primary data cover 12 consecutive months (01/01/2025-31/12/25).
Geographical coverage	Area from which data for unit processes should be collected.	Manufacturing is representative of the countries it is manufactured in.
Technology coverage	Type of technology (specific or average mix).	Data are generally representative of the actual technologies used for processing, transportation, and manufacturing operations.
Completeness	Assessment of whether all relevant input and output data are included for each data set.	The LCA model included all known mass and energy flows for production of pipe and tube. Surrogate datasets may be missing some information, but no known processes or activities contributing more than 1% of total environmental impact for any indicator were excluded.
Representativeness	Degree to which the data set reflects the true population of interest.	Data represent typical or average current processes reported from multiple sources and are generally representative of actual production technologies. However, considerable variation may exist at the site level and would require detailed supply chain data collection to assess fully.
Precision	Measure of the variability of the data values.	Data as representative as possible are used. Data are derived from credible sources, and references are provided.
Reproducibility	Assessment of the method and data, and whether an independent practitioner will be able to reproduce the results.	The study is considered reproducible by other practitioners based on the documented methodology, assumptions, models, and data sources.
Sources of the data	Assessment of the data sources used.	Primary data on energy and resource use were supplied by Bull Moose Tube manufacturing facilities and represent annual averages. These are considered high quality because they reflect long-term operational performance. Secondary datasets were sourced from the Ecoinvent database.
Uncertainty of the information	For example, data, models, assumptions.	Data are derived from credible sources, and references are provided.

The reported impact assessment values in this EPD may not be a precise representation of potential environmental burdens.

Table 3. Data Sources

Input / Unit Process	Origin of Material or Process	LCI data source reference
Steel scrap processing	Global	ecoinvent 3.11: Steel and iron (waste treatment) {GLO} | recycling of steel and iron | Cut-off, U
Hot-rolled coil, EAF	USA	Supplier-specific EPD data from Big River Steel
Hot-rolled coil, EAF	USA	Supplier-specific EPD data from Steel Dynamics – Sinton
Hot-rolled coil, EAF	USA	Supplier-specific EPD data from Steel Dynamics – Butler
Hot-rolled coil, EAF	USA	Supplier-specific EPD data from Nucor Steel – Crawfordsville
Hot-rolled coil, EAF	USA	Supplier-specific EPD data from NLMK Indiana Steel
Hot-rolled coil, EAF	USA	Supplier-specific EPD data from JSW Steel USA
Hot-rolled coil, EAF	USA / RoW proxy	ecoinvent 3.11: Steel, low-alloyed {RoW} | steel production, electric, low-alloyed | Cut-off, U, combined with AISI hot-rolling data
Hot-rolled pickled & oiled coil, EAF	USA	Supplier-specific EPD data from Steel Dynamics – Butler, Nucor Steel – Crawfordsville and Big River Steel, as applicable
Galvanised coil, EAF	USA	Supplier-specific EPD data from Steel Dynamics – Butler
Grid electricity – Casa Grande	USA	ecoinvent 3.11 medium-voltage electricity dataset; AZNM eGRID subregion identified in the report
Grid electricity – Chicago Heights	USA	ecoinvent 3.11 medium-voltage electricity dataset; RFCW eGRID subregion identified in the report
Grid electricity – Elkhart	USA	ecoinvent 3.11 medium-voltage electricity dataset; RFCW eGRID subregion identified in the report
Grid electricity – Gerald	USA	ecoinvent 3.11 medium-voltage electricity dataset; SRMW eGRID subregion identified in the report
Grid electricity – Masury	USA	ecoinvent 3.11 medium-voltage electricity dataset; RFCW eGRID subregion identified in the report
Grid electricity – Sinton	USA	ecoinvent 3.11 medium-voltage electricity dataset; ERCT eGRID subregion identified in the report
Grid electricity – Trenton	USA	ecoinvent 3.11 medium-voltage electricity dataset; RFCE eGRID subregion identified in the report

Input / Unit Process	Origin of Material or Process	LCI data source reference
Natural gas	RoW	ecoinvent 3.11: Heat, district or industrial, natural gas {RoW} | market for heat, district or industrial, natural gas | Cut-off, U
Propane	Global	ecoinvent 3.11: Propane, burned in building machine {GLO} | market for propane, burned in building machine | Cut-off, U
Diesel	Global	ecoinvent 3.11: Diesel, burned in building machine {GLO} | market for diesel, burned in building machine | Cut-off, U
Gasoline	Global	ecoinvent 3.11: Heavy fuel oil, burned in refinery furnace {GLO} | market for heavy fuel oil, burned in refinery furnace | Cut-off, U[dataset should be checked]
Road transportation	USA	USLCI: Transport, combination truck; diesel powered
Rail transportation	USA	USLCI: Transport, rail, freight; diesel powered; Tier 2
Container ship transportation	International / USA	USLCI: Transport, container ship; residual fuel oil powered; Europe to US East Coast
Waste road transportation	USA	USLCI: Transport, combination truck; diesel powered
Oil-based lubricant	RoW	ecoinvent 3.11: Lubricating oil {RoW} | market for lubricating oil | Cut-off, U
Solvent / paint	RoW	ecoinvent 3.11: Acrylic dispersion, with water, in 58% solution state {RoW} | market for acrylic dispersion, with water, in 58% solution state | Cut-off, U
Plastic banding	Global	ecoinvent 3.11: Packaging film, low density polyethylene {GLO} | market for packaging film, low density polyethylene | Cut-off, U
Metal banding	Global / RoW	ecoinvent 3.11: Steel, low-alloyed {GLO} | market for steel, low-alloyed | Cut-off, U and Sheet rolling, steel {RoW} | sheet rolling, steel | Cut-off, U
Wood packaging and dunnage	RoW	ecoinvent 3.11: EUR-flat pallet {RoW} | market for EUR-flat pallet | Cut-off, U
Hazardous waste incineration	RoW	ecoinvent 3.11: Hazardous waste, for incineration {RoW} | market for hazardous waste, for incineration | Cut-off, U

Life Cycle Module Description

Module A1: The steel products included in this study are manufactured from hot-rolled coil, cold-rolled steel pickled and oiled steel coil or hot dip galvanized steel produced either using just electric arc furnace (EAF) steel (LEC product). For the EAF route, scrap steel is added to an electric arc furnace to melt it and convert it into high quality steel before it is cast into slabs. The steel slabs are hot-rolled into strip and coiled and for cold-rolled coil, the hot-rolled product is further pickled and rolled at ambient temperature to achieve tighter thickness tolerance and improved surface finish.
Data from some of the Bull Moose steel coil suppliers' EPDs were used to model steel coil inputs procured from the respective suppliers.

Module A2: The modes of transport and transportation distances of raw materials and outbound packaging to Bull Moose sites were provided by Bull Moose.

Module A3: At the Bull Moose facilities, the master coil is received and then split into smaller, slit coils for each tube mill located in the plant. The slit coils are loaded into the tube mills and are formed into tubes and welded using electric resistance welding (ERW) and cut to length on the tube mill. The tubes are then packaged or bundled and placed into the warehouse for shipment to customers. Only EAF steel coils are used for the production of LEC steel tube and pipe.
Packaging consists of metal banding, plastic banding and lumber and wood for dunnage, depending upon the site. Bull Moose provided data for fuels and energy required for this process, as well as ancillary materials used.
The transportation of fuels and packaging to the manufacturing site, and the transportation and treatment of waste are considered in this study. Steel scraps are sent to recycling and hazardous waste is assumed to be sent to incineration.

LCA Discussion

Allocation Procedure

As no co-products are produced, the flows of materials and energy and the associated release of substances and energy into the environment are therefore related exclusively to the steel pipe and tube products produced. The LCA model does not contain any foreground allocation to co-products.

In the case of end-of-life allocation of generic data, the ecoinvent v3.11 with a cut-off by classification end-of-life allocation method was used. In this approach, environmental burdens and benefits of recycled/reused materials are given to the product system consuming them, rather than the system providing them, and are quantified based on recycling content of the material under investigation. This is a common approach in LCA for materials where there is a loss in inherent properties during recycling, the supply of recycled material exceeds demand and recycled content of the product is independent of whether it is recycled downstream. It follows the ISO standards on LCA.

Metal process scrap generated during manufacturing is treated in accordance with ISO 21930 requirements for process scrap. No allocation of environmental burdens or credits is made to the scrap. Instead, all impacts associated with material production and manufacturing are fully assigned to the main product. The scrap is subsequently sent off-site for recycling, but no recycling credits or avoided burden benefits are attributed within the system boundary.

Cut-off Procedure

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.

Renewable Electricity

Energy Attribute Certificates (EACs) such as Renewable Energy Certificates (RECs) or Power Purchase Agreements (PPAs) are included in the baseline reported results:	✕ No

Results

Table 4. Environmental Impact Assessment Results

IPCC AR6 GWP 100, TRACI 2.2, EF3.1

per 1 metric ton of product.

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Casa Grande

Impact Category	Unit	Method	A1	A2	A3	A1 - A3	Total
GWP-total	kg CO2 eq	IPCC AR6 GWP 100	9.45e+2	3.35e+1	1.09e+2	1.09e+3	1.09e+3
GWP-fossil	kg CO2 eq	IPCC AR6 GWP 100	9.43e+2	3.35e+1	1.09e+2	1.09e+3	1.09e+3
GWP-biogenic	kg CO2 eq	IPCC AR6 GWP 100	6.46e-1	1.44e-3	2.41e-1	8.89e-1	8.89e-1
GWP-luluc	kg CO2 eq	IPCC AR6 GWP 100	4.67e-1	1.20e-3	7.49e-2	5.43e-1	5.43e-1
ODP	kg CFC 11 eq	TRACI 2.2	8.11e-6	5.31e-7	6.56e-7	9.30e-6	9.30e-6
AP	kg SO2 eq	TRACI 2.2	4.14e+0	2.12e-1	2.86e-1	4.64e+0	4.64e+0
EP-freshwater	kg P eq	TRACI 2.2	1.02e-1	1.25e-5	4.20e-3	1.06e-1	1.06e-1
EP-marine	kg N eq	TRACI 2.2	3.34e-1	5.82e-2	4.45e-2	4.36e-1	4.36e-1
POCP	kg O3 eq	TRACI 2.2	7.54e+1	6.95e+0	5.15e+0	8.75e+1	8.75e+1
ADP-fossil	MJ, net calorific value	EF3.1	1.30e+4	4.33e+2	1.68e+3	1.51e+4	1.51e+4

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

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. 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 comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Chicago Heights

Impact Category	Unit	Method	A1	A2	A3	A1 - A3	Total
GWP-total	kg CO2 eq	IPCC AR6 GWP 100	7.60e+2	2.85e+1	8.40e+1	8.73e+2	8.73e+2
GWP-fossil	kg CO2 eq	IPCC AR6 GWP 100	7.58e+2	2.85e+1	8.37e+1	8.70e+2	8.70e+2
GWP-biogenic	kg CO2 eq	IPCC AR6 GWP 100	4.15e-1	1.20e-3	2.14e-1	6.30e-1	6.30e-1
GWP-luluc	kg CO2 eq	IPCC AR6 GWP 100	1.56e+0	1.00e-3	7.16e-2	1.63e+0	1.63e+0
ODP	kg CFC 11 eq	TRACI 2.2	3.56e-6	4.43e-7	7.32e-7	4.73e-6	4.73e-6
AP	kg SO2 eq	TRACI 2.2	2.96e+0	5.41e-2	2.73e-1	3.28e+0	3.28e+0
EP-freshwater	kg P eq	TRACI 2.2	1.07e-1	1.04e-5	1.71e-3	1.09e-1	1.09e-1
EP-marine	kg N eq	TRACI 2.2	2.65e-1	1.23e-2	3.58e-2	3.14e-1	3.14e-1
POCP	kg O3 eq	TRACI 2.2	6.35e+1	1.39e+0	4.14e+0	6.91e+1	6.91e+1
ADP-fossil	MJ, net calorific value	EF3.1	1.21e+4	3.61e+2	1.47e+3	1.40e+4	1.40e+4

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

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Elkhart

Impact Category	Unit	Method	A1	A2	A3	A1 - A3	Total
GWP-total	kg CO2 eq	IPCC AR6 GWP 100	1.01e+3	1.33e+1	5.71e+1	1.08e+3	1.08e+3
GWP-fossil	kg CO2 eq	IPCC AR6 GWP 100	1.00e+3	1.33e+1	5.68e+1	1.07e+3	1.07e+3
GWP-biogenic	kg CO2 eq	IPCC AR6 GWP 100	1.47e+0	5.59e-4	2.08e-1	1.67e+0	1.67e+0
GWP-luluc	kg CO2 eq	IPCC AR6 GWP 100	1.15e+0	4.66e-4	7.14e-2	1.23e+0	1.23e+0
ODP	kg CFC 11 eq	TRACI 2.2	2.13e-4	2.06e-7	5.89e-7	2.14e-4	2.14e-4
AP	kg SO2 eq	TRACI 2.2	5.08e+0	2.51e-2	2.18e-1	5.32e+0	5.32e+0
EP-freshwater	kg P eq	TRACI 2.2	3.77e-2	4.85e-6	1.07e-3	3.87e-2	3.87e-2
EP-marine	kg N eq	TRACI 2.2	2.08e+0	5.72e-3	3.21e-2	2.12e+0	2.12e+0
POCP	kg O3 eq	TRACI 2.2	8.00e+1	6.46e-1	3.72e+0	8.44e+1	8.44e+1
ADP-fossil	MJ, net calorific value	EF3.1	1.45e+4	1.68e+2	9.57e+2	1.56e+4	1.56e+4

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

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Gerald

Impact Category	Unit	Method	A1	A2	A3	A1 - A3	Total
GWP-total	kg CO2 eq	IPCC AR6 GWP 100	1.03e+3	2.15e+1	8.49e+1	1.14e+3	1.14e+3
GWP-fossil	kg CO2 eq	IPCC AR6 GWP 100	1.03e+3	2.15e+1	8.46e+1	1.13e+3	1.13e+3
GWP-biogenic	kg CO2 eq	IPCC AR6 GWP 100	1.44e+0	9.64e-4	2.12e-1	1.65e+0	1.65e+0
GWP-luluc	kg CO2 eq	IPCC AR6 GWP 100	1.23e+0	8.07e-4	7.31e-2	1.31e+0	1.31e+0
ODP	kg CFC 11 eq	TRACI 2.2	2.53e-6	3.49e-7	6.88e-7	3.57e-6	3.57e-6
AP	kg SO2 eq	TRACI 2.2	3.66e+0	7.72e-2	2.80e-1	4.02e+0	4.02e+0
EP-freshwater	kg P eq	TRACI 2.2	3.93e-2	8.49e-6	1.85e-3	4.11e-2	4.11e-2
EP-marine	kg N eq	TRACI 2.2	2.11e-1	1.85e-2	4.49e-2	2.74e-1	2.74e-1
POCP	kg O3 eq	TRACI 2.2	6.72e+1	2.17e+0	5.21e+0	7.46e+1	7.46e+1
ADP-fossil	MJ, net calorific value	EF3.1	5.13e+3	2.94e+2	1.50e+3	6.92e+3	6.92e+3

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

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Masury

Impact Category	Unit	Method	A1	A2	A3	A1 - A3	Total
GWP-total	kg CO2 eq	IPCC AR6 GWP 100	1.43e+3	1.23e+1	6.23e+1	1.51e+3	1.51e+3
GWP-fossil	kg CO2 eq	IPCC AR6 GWP 100	1.43e+3	1.23e+1	6.22e+1	1.51e+3	1.51e+3
GWP-biogenic	kg CO2 eq	IPCC AR6 GWP 100	2.45e+0	5.19e-4	6.12e-2	2.51e+0	2.51e+0
GWP-luluc	kg CO2 eq	IPCC AR6 GWP 100	1.28e+0	4.33e-4	2.07e-2	1.30e+0	1.30e+0
ODP	kg CFC 11 eq	TRACI 2.2	1.24e-4	1.91e-7	3.87e-7	1.25e-4	1.25e-4
AP	kg SO2 eq	TRACI 2.2	6.11e+0	2.34e-2	1.75e-1	6.31e+0	6.31e+0
EP-freshwater	kg P eq	TRACI 2.2	2.21e-3	4.51e-6	1.60e-3	3.82e-3	3.82e-3
EP-marine	kg N eq	TRACI 2.2	4.35e+0	5.32e-3	1.77e-2	4.38e+0	4.38e+0
POCP	kg O3 eq	TRACI 2.2	8.69e+1	6.00e-1	2.04e+0	8.95e+1	8.95e+1
ADP-fossil	MJ, net calorific value	EF3.1	1.71e+3	1.56e+2	1.17e+3	3.03e+3	3.03e+3

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

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Sinton

Impact Category	Unit	Method	A1	A2	A3	A1 - A3	Total
GWP-total	kg CO2 eq	IPCC AR6 GWP 100	8.11e+2	1.77e-1	4.33e+1	8.54e+2	8.54e+2
GWP-fossil	kg CO2 eq	IPCC AR6 GWP 100	8.11e+2	1.77e-1	4.32e+1	8.54e+2	8.54e+2
GWP-biogenic	kg CO2 eq	IPCC AR6 GWP 100	2.94e-1	7.51e-6	5.17e-2	3.46e-1	3.46e-1
GWP-luluc	kg CO2 eq	IPCC AR6 GWP 100	2.83e-1	6.27e-6	2.20e-2	3.05e-1	3.05e-1
ODP	kg CFC 11 eq	TRACI 2.2	5.40e-6	2.77e-9	3.34e-7	5.73e-6	5.73e-6
AP	kg SO2 eq	TRACI 2.2	3.77e+0	5.38e-4	1.17e-1	3.88e+0	3.88e+0
EP-freshwater	kg P eq	TRACI 2.2	1.15e-1	6.52e-8	1.54e-3	1.17e-1	1.17e-1
EP-marine	kg N eq	TRACI 2.2	2.11e-1	1.36e-4	1.56e-2	2.27e-1	2.27e-1
POCP	kg O3 eq	TRACI 2.2	6.92e+1	1.59e-2	1.82e+0	7.11e+1	7.11e+1
ADP-fossil	MJ, net calorific value	EF3.1	1.45e+4	2.26e+0	6.88e+2	1.52e+4	1.52e+4

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

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Trenton

Impact Category	Unit	Method	A1	A2	A3	A1 - A3	Total
GWP-total	kg CO2 eq	IPCC AR6 GWP 100	1.35e+3	2.22e+1	6.89e+1	1.44e+3	1.44e+3
GWP-fossil	kg CO2 eq	IPCC AR6 GWP 100	1.34e+3	2.22e+1	6.86e+1	1.43e+3	1.43e+3
GWP-biogenic	kg CO2 eq	IPCC AR6 GWP 100	2.30e+0	9.35e-4	2.12e-1	2.51e+0	2.51e+0
GWP-luluc	kg CO2 eq	IPCC AR6 GWP 100	1.20e+0	7.80e-4	7.21e-2	1.27e+0	1.27e+0
ODP	kg CFC 11 eq	TRACI 2.2	5.09e-6	3.45e-7	5.92e-7	6.03e-6	6.03e-6
AP	kg SO2 eq	TRACI 2.2	4.61e+0	4.21e-2	2.49e-1	4.90e+0	4.90e+0
EP-freshwater	kg P eq	TRACI 2.2	2.25e-3	8.12e-6	1.47e-3	3.74e-3	3.74e-3
EP-marine	kg N eq	TRACI 2.2	2.77e-1	9.58e-3	3.36e-2	3.20e-1	3.20e-1
POCP	kg O3 eq	TRACI 2.2	7.59e+1	1.08e+0	3.88e+0	8.09e+1	8.09e+1
ADP-fossil	MJ, net calorific value	EF3.1	1.53e+3	2.81e+2	1.19e+3	3.00e+3	3.00e+3

Note:

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Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

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Weighted manufacturer average

Impact Category	Unit	Method	A1	A2	A3	A1 - A3	Total
GWP-total	kg CO2 eq	IPCC AR6 GWP 100	9.61e+2	1.25e+1	6.12e+1	1.03e+3	1.03e+3
GWP-fossil	kg CO2 eq	IPCC AR6 GWP 100	9.59e+2	1.25e+1	6.10e+1	1.03e+3	1.03e+3
GWP-biogenic	kg CO2 eq	IPCC AR6 GWP 100	1.01e+0	5.32e-4	1.51e-1	1.17e+0	1.17e+0
GWP-luluc	kg CO2 eq	IPCC AR6 GWP 100	8.21e-1	4.44e-4	5.26e-2	8.74e-1	8.74e-1
ODP	kg CFC 11 eq	TRACI 2.2	6.68e-5	1.96e-7	5.13e-7	6.75e-5	6.75e-5
AP	kg SO2 eq	TRACI 2.2	4.24e+0	3.76e-2	1.97e-1	4.48e+0	4.48e+0
EP-freshwater	kg P eq	TRACI 2.2	7.10e-2	4.63e-6	1.63e-3	7.26e-2	7.26e-2
EP-marine	kg N eq	TRACI 2.2	8.50e-1	9.37e-3	2.81e-2	8.87e-1	8.87e-1
POCP	kg O3 eq	TRACI 2.2	7.33e+1	1.09e+0	3.26e+0	7.76e+1	7.76e+1
ADP-fossil	MJ, net calorific value	EF3.1	1.18e+4	1.60e+2	1.02e+3	1.30e+4	1.30e+4

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

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Table 5. Resource Use Indicator

per 1 metric ton of product.

Casa Grande

Indicator	Unit	A1	A2	A3	A1 - A3	Total
RPRE	MJ	3.32e+2	8.05e-1	2.16e+3	2.49e+3	2.49e+3
RPRM	MJ	0	0	1.14e+3	1.14e+3	1.14e+3
RPRT	MJ	3.32e+2	8.05e-1	3.30e+3	3.63e+3	3.63e+3
NRPRE	MJ	1.29e+4	4.60e+2	1.79e+3	1.52e+4	1.52e+4
NRPRM	MJ	1.12e+3	0	4.51e+1	1.17e+3	1.17e+3
NRPRT	MJ	1.40e+4	4.60e+2	1.84e+3	1.63e+4	1.63e+4
SM	kg	9.35e+2	0	0	9.35e+2	9.35e+2
RSF	MJ	1.85e-2	0	0	1.85e-2	1.85e-2
NRSF	MJ	2.61e+0	0	0	2.61e+0	2.61e+0
FW	m3	3.94e+0	1.17e-2	8.58e-1	4.81e+0	4.81e+0
RE	MJ	0	0	0	0	0.00e+0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Chicago Heights

Indicator	Unit	A1	A2	A3	A1 - A3	Total
RPRE	MJ	2.21e+2	6.70e-1	1.77e+3	1.99e+3	1.99e+3
RPRM	MJ	5.08e-1	0	1.14e+3	1.14e+3	1.14e+3
RPRT	MJ	2.21e+2	6.70e-1	2.91e+3	3.13e+3	3.13e+3
NRPRE	MJ	9.62e+3	3.84e+2	1.56e+3	1.16e+4	1.16e+4
NRPRM	MJ	1.34e+3	0	4.51e+1	1.39e+3	1.39e+3
NRPRT	MJ	1.10e+4	3.84e+2	1.61e+3	1.30e+4	1.30e+4
SM	kg	9.23e+2	0	0	9.23e+2	9.23e+2
RSF	MJ	1.70e-2	0	0	1.70e-2	1.70e-2
NRSF	MJ	9.59e-1	0	0	9.59e-1	9.59e-1
FW	m3	1.21e+2	9.72e-3	4.75e-1	1.22e+2	1.22e+2
RE	MJ	0	0	0	0	0.00e+0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Elkhart

Indicator	Unit	A1	A2	A3	A1 - A3	Total
RPRE	MJ	9.19e+2	3.12e-1	1.76e+3	2.68e+3	2.68e+3
RPRM	MJ	0	0	1.14e+3	1.14e+3	1.14e+3
RPRT	MJ	9.19e+2	3.12e-1	2.90e+3	3.82e+3	3.82e+3
NRPRE	MJ	1.73e+4	1.78e+2	1.02e+3	1.85e+4	1.85e+4
NRPRM	MJ	4.33e+2	0	4.51e+1	4.78e+2	4.78e+2
NRPRT	MJ	1.77e+4	1.78e+2	1.06e+3	1.89e+4	1.89e+4
SM	kg	9.30e+2	0	0	9.30e+2	9.30e+2
RSF	MJ	3.23e-3	0	0	3.23e-3	3.23e-3
NRSF	MJ	2.81e-1	0	0	2.81e-1	2.81e-1
FW	m3	5.57e+1	4.52e-3	3.88e-1	5.61e+1	5.61e+1
RE	MJ	0	0	0	0	0.00e+0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Gerald

Indicator	Unit	A1	A2	A3	A1 - A3	Total
RPRE	MJ	4.87e+2	5.42e-1	1.79e+3	2.28e+3	2.28e+3
RPRM	MJ	2.51e-1	0	1.14e+3	1.14e+3	1.14e+3
RPRT	MJ	4.87e+2	5.42e-1	2.93e+3	3.42e+3	3.42e+3
NRPRE	MJ	1.24e+4	3.12e+2	1.60e+3	1.43e+4	1.43e+4
NRPRM	MJ	8.14e+2	0	4.51e+1	8.59e+2	8.59e+2
NRPRT	MJ	1.32e+4	3.12e+2	1.65e+3	1.51e+4	1.51e+4
SM	kg	7.91e+2	0	0	7.91e+2	7.91e+2
RSF	MJ	7.02e-3	0	0	7.02e-3	7.02e-3
NRSF	MJ	3.54e-1	0	0	3.54e-1	3.54e-1
FW	m3	4.63e+1	7.10e-3	4.89e-1	4.68e+1	4.68e+1
RE	MJ	0	0	0	0	0.00e+0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Masury

Indicator	Unit	A1	A2	A3	A1 - A3	Total
RPRE	MJ	7.11e+2	2.90e-1	4.00e+2	1.11e+3	1.11e+3
RPRM	MJ	0	0	2.42e+2	2.42e+2	2.42e+2
RPRT	MJ	7.11e+2	2.90e-1	6.42e+2	1.35e+3	1.35e+3
NRPRE	MJ	2.13e+4	1.66e+2	1.23e+3	2.27e+4	2.27e+4
NRPRM	MJ	7.71e+2	0	4.52e+1	8.16e+2	8.16e+2
NRPRT	MJ	2.21e+4	1.66e+2	1.28e+3	2.35e+4	2.35e+4
SM	kg	1.01e+3	0	0	1.01e+3	1.01e+3
RSF	MJ	2.21e-4	0	0	2.21e-4	2.21e-4
NRSF	MJ	1.93e-2	0	0	1.93e-2	1.93e-2
FW	m3	2.80e+0	4.20e-3	3.09e-1	3.11e+0	3.11e+0
RE	MJ	0	0	0	0	0.00e+0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Sinton

Indicator	Unit	A1	A2	A3	A1 - A3	Total
RPRE	MJ	2.90e+2	4.19e-3	4.35e+2	7.25e+2	7.25e+2
RPRM	MJ	0	0	2.42e+2	2.42e+2	2.42e+2
RPRT	MJ	2.90e+2	4.19e-3	6.76e+2	9.66e+2	9.66e+2
NRPRE	MJ	1.20e+4	2.40e+0	7.38e+2	1.27e+4	1.27e+4
NRPRM	MJ	1.11e+3	0	4.51e+1	1.16e+3	1.16e+3
NRPRT	MJ	1.31e+4	2.40e+0	7.83e+2	1.39e+4	1.39e+4
SM	kg	8.98e+2	0	0	8.98e+2	8.98e+2
RSF	MJ	2.10e-2	0	0	2.10e-2	2.10e-2
NRSF	MJ	2.97e+0	0	0	2.97e+0	2.97e+0
FW	m3	2.66e+0	6.08e-5	2.11e-1	2.88e+0	2.88e+0
RE	MJ	0	0	0	0	0.00e+0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Trenton

Indicator	Unit	A1	A2	A3	A1 - A3	Total
RPRE	MJ	8.73e+2	5.22e-1	1.76e+3	2.64e+3	2.64e+3
RPRM	MJ	0	0	1.14e+3	1.14e+3	1.14e+3
RPRT	MJ	8.73e+2	5.22e-1	2.91e+3	3.78e+3	3.78e+3
NRPRE	MJ	1.74e+4	2.99e+2	1.26e+3	1.90e+4	1.90e+4
NRPRM	MJ	4.98e+2	0	4.51e+1	5.43e+2	5.43e+2
NRPRT	MJ	1.79e+4	2.99e+2	1.31e+3	1.95e+4	1.95e+4
SM	kg	8.31e+2	0	0	8.31e+2	8.31e+2
RSF	MJ	2.25e-4	0	0	2.25e-4	2.25e-4
NRSF	MJ	1.96e-2	0	0	1.96e-2	1.96e-2
FW	m3	7.15e+0	7.56e-3	4.41e-1	7.60e+0	7.60e+0
RE	MJ	0	0	0	0	0.00e+0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Weighted manufacturer average

Indicator	Unit	A1	A2	A3	A1 - A3	Total
RPRE	MJ	5.55e+2	2.97e-1	1.27e+3	1.83e+3	1.83e+3
RPRM	MJ	5.29e-2	0	7.90e+2	7.90e+2	7.90e+2
RPRT	MJ	5.55e+2	2.97e-1	2.06e+3	2.62e+3	2.62e+3
NRPRE	MJ	1.42e+4	1.70e+2	1.09e+3	1.55e+4	1.55e+4
NRPRM	MJ	8.36e+2	0	4.51e+1	8.81e+2	8.81e+2
NRPRT	MJ	1.50e+4	1.70e+2	1.13e+3	1.63e+4	1.63e+4
SM	kg	8.97e+2	0	0	8.97e+2	8.97e+2
RSF	MJ	1.17e-2	0	0	1.17e-2	1.17e-2
NRSF	MJ	1.46e+0	0	0	1.46e+0	1.46e+0
FW	m3	2.94e+1	4.24e-3	3.75e-1	2.98e+1	2.98e+1
RE	MJ	0	0	0	0	0.00e+0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Table 6. Waste and Output Flow Indicators

per 1 metric ton of product.

Casa Grande

Indicator	Unit	A1	A2	A3	A1 - A3	Total
HWD	kg	6.79e+1	2.96e-3	8.13e-3	6.79e+1	6.79e+1
NHWD	kg	1.02e+3	1.27e-2	1.88e+0	1.02e+3	1.02e+3
HLRW	kg	1.45e-4	1.68e-5	7.39e-4	9.01e-4	9.01e-4
ILLRW	kg	3.12e-4	3.15e-5	2.89e-3	3.24e-3	3.24e-3
CRU	kg	0	0	0	0	0.00e+0
MFR	kg	2.10e+0	0	1.16e+2	1.18e+2	1.18e+2
MER	kg	6.18e-4	0	0	6.18e-4	6.18e-4
EEE	MJ	9.60e-1	0	0	9.60e-1	9.60e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Chicago Heights

Indicator	Unit	A1	A2	A3	A1 - A3	Total
HWD	kg	5.14e+1	2.47e-3	6.44e-3	5.14e+1	5.14e+1
NHWD	kg	6.97e+2	1.06e-2	8.21e-1	6.98e+2	6.98e+2
HLRW	kg	5.04e-5	9.50e-6	1.06e-3	1.12e-3	1.12e-3
ILLRW	kg	1.09e-4	1.99e-5	4.25e-3	4.37e-3	4.37e-3
CRU	kg	0	0	0	0	0.00e+0
MFR	kg	4.35e+0	0	8.04e+1	8.48e+1	8.48e+1
MER	kg	2.13e-4	0	0	2.13e-4	2.13e-4
EEE	MJ	5.04e-1	0	0	5.04e-1	5.04e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Elkhart

Indicator	Unit	A1	A2	A3	A1 - A3	Total
HWD	kg	1.56e+1	1.15e-3	5.07e-3	1.56e+1	1.56e+1
NHWD	kg	3.68e+2	4.92e-3	6.76e-1	3.69e+2	3.69e+2
HLRW	kg	4.13e-4	4.42e-6	5.51e-4	9.69e-4	9.69e-4
ILLRW	kg	8.90e-4	9.27e-6	2.14e-3	3.04e-3	3.04e-3
CRU	kg	0	0	0	0	0.00e+0
MFR	kg	1.20e+0	0	8.03e+1	8.15e+1	8.15e+1
MER	kg	6.17e-5	0	0	6.17e-5	6.17e-5
EEE	MJ	1.48e-1	0	0	1.48e-1	1.48e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Gerald

Indicator	Unit	A1	A2	A3	A1 - A3	Total
HWD	kg	2.46e+1	1.91e-3	6.89e-3	2.46e+1	2.46e+1
NHWD	kg	2.72e+2	8.03e-3	9.32e-1	2.73e+2	2.73e+2
HLRW	kg	2.57e-5	7.57e-6	9.87e-4	1.02e-3	1.02e-3
ILLRW	kg	5.93e-5	1.52e-5	3.94e-3	4.01e-3	4.01e-3
CRU	kg	0	0	0	0	0.00e+0
MFR	kg	4.72e+1	0	1.64e+1	6.36e+1	6.36e+1
MER	kg	7.89e-5	0	0	7.89e-5	7.89e-5
EEE	MJ	1.86e-1	0	0	1.86e-1	1.86e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Masury

Indicator	Unit	A1	A2	A3	A1 - A3	Total
HWD	kg	1.07e+0	1.07e-3	4.80e-3	1.07e+0	1.07e+0
NHWD	kg	1.49e+1	4.57e-3	7.09e-1	1.56e+1	1.56e+1
HLRW	kg	5.17e-3	4.11e-6	1.09e-3	6.26e-3	6.26e-3
ILLRW	kg	1.11e-2	8.62e-6	4.45e-3	1.56e-2	1.56e-2
CRU	kg	0	0	0	0	0.00e+0
MFR	kg	2.29e+1	0	3.67e+1	5.96e+1	5.96e+1
MER	kg	4.23e-6	0	0	4.23e-6	4.23e-6
EEE	MJ	1.02e-2	0	0	1.02e-2	1.02e-2

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Sinton

Indicator	Unit	A1	A2	A3	A1 - A3	Total
HWD	kg	7.57e+1	1.54e-5	4.34e-3	7.57e+1	7.57e+1
NHWD	kg	1.15e+3	6.62e-5	8.26e-1	1.15e+3	1.15e+3
HLRW	kg	0	6.68e-8	2.63e-4	2.63e-4	2.63e-4
ILLRW	kg	0	1.35e-7	1.01e-3	1.01e-3	1.01e-3
CRU	kg	0	0	0	0	0.00e+0
MFR	kg	1.66e+0	0	4.86e+1	5.03e+1	5.03e+1
MER	kg	7.03e-4	0	0	7.03e-4	7.03e-4
EEE	MJ	1.09e+0	0	0	1.09e+0	1.09e+0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Trenton

Indicator	Unit	A1	A2	A3	A1 - A3	Total
HWD	kg	1.27e+1	1.92e-3	5.56e-3	1.27e+1	1.27e+1
NHWD	kg	5.39e+1	8.24e-3	8.08e-1	5.48e+1	5.48e+1
HLRW	kg	7.94e-5	7.39e-6	8.53e-4	9.40e-4	9.40e-4
ILLRW	kg	1.71e-4	1.55e-5	3.38e-3	3.57e-3	3.57e-3
CRU	kg	0	0	0	0	0.00e+0
MFR	kg	1.20e+2	0	9.45e+1	2.15e+2	2.15e+2
MER	kg	4.30e-6	0	0	4.30e-6	4.30e-6
EEE	MJ	1.04e-2	0	0	1.04e-2	1.04e-2

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Weighted manufacturer average

Indicator	Unit	A1	A2	A3	A1 - A3	Total
HWD	kg	4.40e+1	1.09e-3	5.31e-3	4.40e+1	4.40e+1
NHWD	kg	6.77e+2	4.65e-3	8.64e-1	6.78e+2	6.78e+2
HLRW	kg	2.50e-4	4.60e-6	5.70e-4	8.25e-4	8.25e-4
ILLRW	kg	5.39e-4	9.32e-6	2.24e-3	2.79e-3	2.79e-3
CRU	kg	0	0	0	0	0.00e+0
MFR	kg	1.85e+1	0	6.63e+1	8.48e+1	8.48e+1
MER	kg	3.43e-4	0	0	3.43e-4	3.43e-4
EEE	MJ	5.63e-1	0	0	5.63e-1	5.63e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Table 7. Carbon Emissions and Removals

per 1 metric ton of product.

Casa Grande

Indicator	Unit	A1	A2	A3	A1 - A3	Total
BCEP	kg CO2	0	0	0	0	0.00e+0
BCEK	kg CO2	0	0	1.33e+2	1.33e+2	1.33e+2

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Chicago Heights

Indicator	Unit	A1	A2	A3	A1 - A3	Total
BCEP	kg CO2	0	0	0	0	0.00e+0
BCEK	kg CO2	0	0	1.33e+2	1.33e+2	1.33e+2

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Elkhart

Indicator	Unit	A1	A2	A3	A1 - A3	Total
BCEP	kg CO2	0	0	0	0	0.00e+0
BCEK	kg CO2	0	0	1.33e+2	1.33e+2	1.33e+2

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Gerald

Indicator	Unit	A1	A2	A3	A1 - A3	Total
BCEP	kg CO2	0	0	0	0	0.00e+0
BCEK	kg CO2	0	0	1.33e+2	1.33e+2	1.33e+2

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Masury

Indicator	Unit	A1	A2	A3	A1 - A3	Total
BCEP	kg CO2	0	0	0	0	0.00e+0
BCEK	kg CO2	0	0	3.07e+1	3.07e+1	3.07e+1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Sinton

Indicator	Unit	A1	A2	A3	A1 - A3	Total
BCEP	kg CO2	0	0	0	0	0.00e+0
BCEK	kg CO2	0	0	3.06e+1	3.06e+1	3.06e+1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Trenton

Indicator	Unit	A1	A2	A3	A1 - A3	Total
BCEP	kg CO2	0	0	0	0	0.00e+0
BCEK	kg CO2	0	0	1.33e+2	1.33e+2	1.33e+2

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Weighted manufacturer average

Indicator	Unit	A1	A2	A3	A1 - A3	Total
BCEP	kg CO2	0	0	0	0	0.00e+0
BCEK	kg CO2	0	0	9.30e+1	9.30e+1	9.30e+1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

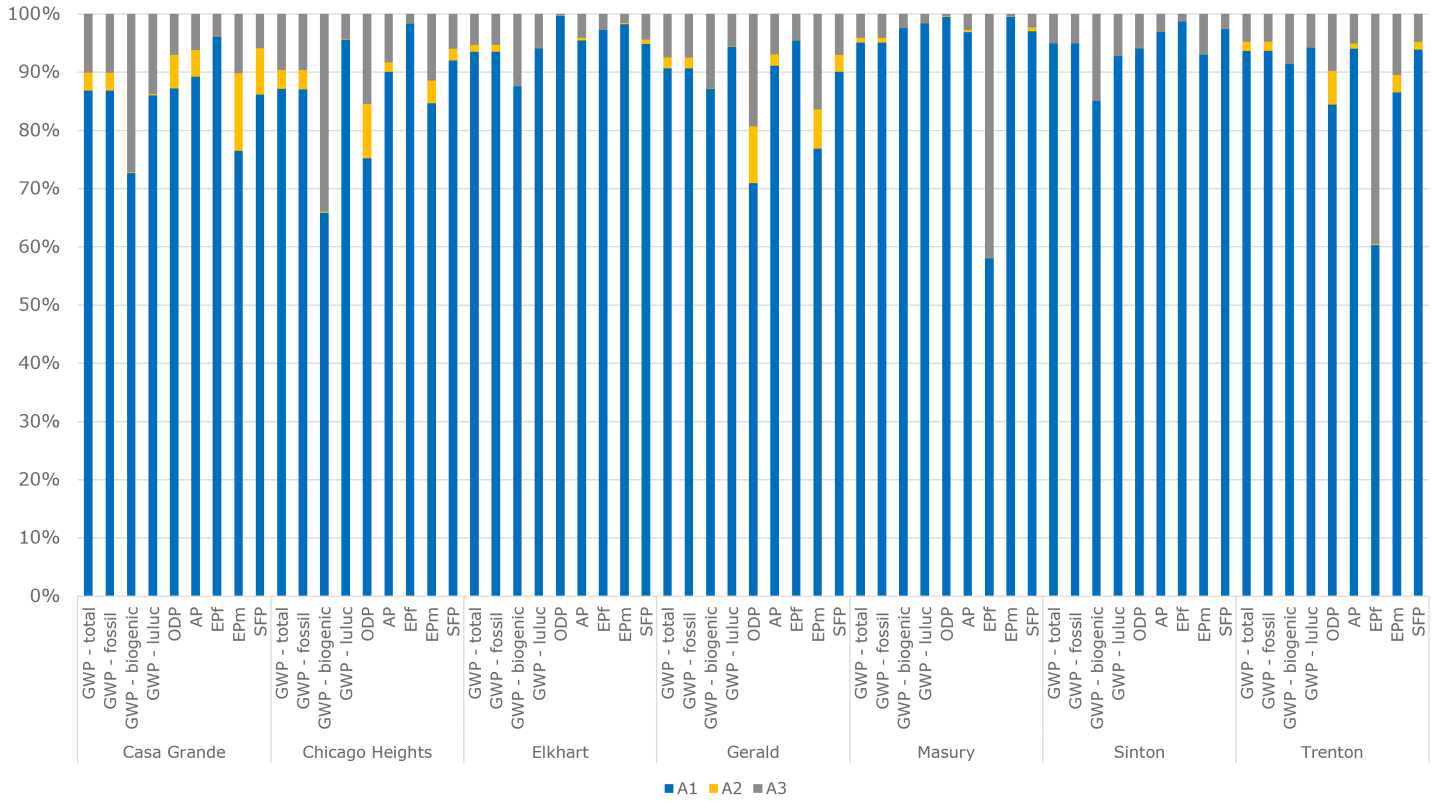
BCRP = Biogenic Carbon Removal from Product, BCEP = Biogenic Carbon Emission from Product, BCRK = Biogenic Carbon Removal from Packaging, BCEK = Biogenic Carbon Emission from Packaging, BCEW = Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes, CCE = Calcination Carbon Emissions, CCR = Carbonation Carbon Removals, CWNR = Carbon Emissions from Combustion of Waste from Non-Renewable Sources used in Production Processes, GWP-luc = Carbon Emissions from Land-use Change.

Interpretation

The figure illustrates the percentage contribution of each module to all impact categories for one metric ton of LEC steel tube and pipe products at each Bull Moose site. These environmental hotspots show which life cycle stage contributes most (and least) to the cradle-to-gate system boundary.

- The results indicate that module A1 (steelmaking) remains the dominant contributor across all impact categories, although its relative contribution is slightly reduced compared to the standard EAF/BOF products, typically contributing approximately 70–95% of total impacts depending on the site and impact category. This reflects the reduced embodied impacts associated with LEC steel inputs.
- Contributions from modules A2 (inbound transportation) and A3 (manufacturing) are therefore relatively more pronounced for LEC products, although still secondary to A1. In most cases, combined A2 and A3 contributions remain below 20–30%, but can be higher for selected impact categories.
- For Casa Grande, Gerald and Chicago Heights, greater variability across impact categories is observed. In particular, for categories such as EP, AP, and SFP. This reflects the influence of site-specific electricity consumption, fuel use, and process emissions in forming operations, which become more significant as upstream burdens are reduced.
- For the remaining sites (Elkhart, Masury, Sinton, and Trenton), results are more consistent, with A1 contributing >85–95% across most impact categories, highlighting the continued dominance of upstream processes, even for lower-carbon steel inputs.
- For Module A2 (inbound transportation), contributions remain consistently low across all sites, generally <5%, with slightly higher shares in impact categories sensitive to transport emissions (AP and EP).
- For LEC products, A3 becomes relatively more important due to the reduced A1 burden, particularly for energy-intensive impact categories (AP, EP, SFP). In addition, wood packaging contributes to GWP – biogenic and GWP – land use and land use change, consistent with biogenic carbon accounting and land-related emissions.

Note: A collection of manufacturer-average and/or facility-specific EPDs is insufficient for setting benchmarks and thresholds unless production volumes are taken into account. Benchmarking and threshold setting efforts shall also consider that some manufacturer-average data and facility-specific data may be represented in Industry-average EPDs and may result in double counting of the same data.



Additional Environmental Information

Steel products under normal conditions do not present inhalation, ingestion or contact health hazards, including but not limited to indoor air emissions, gamma or ionising radiation emissions, or chemicals released to air or leached to water or soil. These products are used inside the building envelope, or other structures, and do not include materials or substances which have potential route of exposure to humans or flora/fauna in the environment.

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