ENVIRONMENTAL PRODUCT DECLARATION

CENTRIA Versawall Insulated Metal Panels

NUCOR INSULATED PANEL GROUP – A NUCOR COMPANY



Nucor Corporation (Nucor) is North America's most diversified steel and steel products company. They specialize in a wide array of products, such as Versawall Insulated Metal Panels produced by CENTRIA, a Nucor company, which is part of Nucor's Insulated Panel Group (IPG). Versawall Insulated Metal Panels for this EPD is manufactured at the Nucor IPG facility located in Sheridan, Arkansas, United States.

Nucor is North America's largest steel producer and recycler, turning approximately 20.6 million net tons of scrap steel in 2023 into new steel. Nucor uses Electric Arc Furnace (EAF) technology at each of its steel recycling facilities. Unlike traditional blast furnace steelmaking—which produces more than 70% of the world's steel using mined iron ore and metallurgical coal as feedstock—EAFs use post-consumer scrap as their major feedstock.

Through its use of EAFs, Nucor's steelmaking CO_2 emissions are less than one-half of the global average on a per ton basis, and Nucor's energy intensity is approximately one-quarter the global average.

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CENTRIA Versawall Insulated Metal Panels
Insulated Metal Panels, Metal Composite Panels, and Metal Cladding

According to ISO 14025, and ISO 21930:2017

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	**SCS GLOBAL SERVICES HEADQUARTERS** 2000 POWELL STREET, SUITE 600 EMERYVILLE, CA 94608, USA HTTPS://WWW.SCSGLOBALSERVICES.COM/
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	SCS Type III Environmental Declaration Program: Program Operator Manual. v12.0 (December 2024)
MANUFACTURER NAME AND ADDRESS	Nucor Corporation, 1915 Rexford Road, Charlotte, North Carolina 28211
DECLARATION NUMBER	SCS-EPD-10341
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	Versawall Insulated Metal Panels, 100 m^2
REFERENCE PCR AND VERSION NUMBER	ISO 21930:2017 serves as the core PCR and UL Part A: Life Cycle Assessment Calculation Rules and Report Requirements (UL Environment, V4.0, 2022) and Part B: Insulated Metal Panels, Metal Composite Panels, and Metal Cladding: Roof and Wall Panels (UL Environment, V2.0, 2018).
DESCRIPTION OF PRODUCT APPLICATION/USE	Comprised of polyisocyanurate (PIR) foam core between two pre-finished steel sheets which form a single, all-in-one insulated metal panel (IMP) used as exterior wall and roof cladding systems, interior ceiling, and partition walls.
PRODUCT RSL DESCRIPTION (IF APPL.)	N/A
MARKETS OF APPLICABILITY	North America
DATE OF ISSUE	March 28, 2025
PERIOD OF VALIDITY	5 years
EPD TYPE	Product-Specific, Manufacturer-Specific
EPD SCOPE	Cradle to Gate
YEAR(S) OF REPORTED PRIMARY DATA	2023
LCA SOFTWARE & VERSION NUMBER	LCA for Experts v10.9.0.20
LCI DATABASE(S) & VERSION NUMBER	LCA for Experts 2024.2
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1, IPCC 2013 (AR5), CML-baseline v4.7 August 2016
The PCR Part A review was conducted by:	**Dr. Lindita Bush, Chair, Athena Sustainable Materials Institute** **Hugues Imbeault-Tétreault, Eng., M.A.Sc., Groupe AGÉCO** **Jack Geibig, Ecoform**
The PCR Part B review was conducted by:	**Dr. Tom Gloria, Chair, Industrial Ecology Associates** **Brandie Sebastian, JBE Consultants** **James Littlefield, Independent Consultant**
This declaration was independently verified in accordance with ISO 14025: 2006, ISO 14044:2006, ISO 21930:2017, and the reference PCRs. ☐ INTERNAL ☒EXTERNAL	 **Dr. Tess Garvey, SCS Global Services**
This life cycle assessment was conducted in accordance with ISO 14025:2006, ISO 14044:2006, ISO 21930:2017, and the reference PCRs by:	**Trinity Consultants**

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LIMITATIONS
The environmental impact results of steel 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 steel 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. Environmental declarations from different programs (ISO 14025) may not be comparable.

Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g., Type 1 certifications, health assessments and declarations, environmental impact assessments, etc.

Accuracy of Results: EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any particular product line and reported impact.

Comparability: Comparisons of the environmental performance of steel products using EPD information shall be based on the product's use and impacts at the construction works level, and therefore EPDs may not be used for comparability purposes when not considering the construction works energy use phase as instructed under this PCR. 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.

EPDs from different programs may not be comparable. Full conformance with a PCR for steel products allows EPD comparability only when all stages of a life cycle have been considered, when they comply with all referenced standards, use the same sub-category Part B PCR, and use equivalent scenarios with respect to construction works. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

This declaration was independently verified in accordance with ISO 14025: 2006. The UL Environment "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report," v4.0 (March 2022), in conformance with ISO 21930:2017, serves as the core PCR, with additional considerations from the USGBC/UL Environment Part A Enhancement (2017). EPDs are only comparable if they comply with this document, 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.

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1. PRODUCT DEFINITION AND INFORMATION

Description of Organization

This environmental product declaration (EPD) represents Versawall Insulated Metal Panels produced by CENTRIA, a Nucor company, which is part of Nucor's Insulated Panel Group (IPG). Versawall Insulated Metal Panels for this EPD are manufactured at the Nucor IPG facility located in Sheridan, AR, US.

CENTRIA is a recognized leader in the advancement of building cladding, panel, and facade technology, serving the architectural, commercial and industrial industries with energy efficient and cost-effective cladding and insulated metal wall and roof panels. Aware of the increasing interest in transparent reporting of products' environmental performance, CENTRIA seeks to demonstrate their sustainability leadership and leverage business value through evaluating the environmental profile of insulated metal panels (IMPs) and communicating the results via environmental product declarations (EPDs).

As a vertically integrated company, Nucor controls a large and growing part of its supply chain from scrap recycling to raw steelmaking to steel products and distribution. Nucor IMP utilities steel sheets that are sourced from Nucor steel mills as well as external non-Nucor steel mills. All steel produced by Nucor is 100% recyclable at the end of its useful life.

For production of the raw steel used in Nucor's steel mills, Nucor uses scrap as its primary feedstock, which is largely provided by its wholly owned subsidiary, the David J. Joseph Company (DJJ). DJJ operates more than 60 scrap recycling facilities within close proximity to Nucor steel mills, processing approximately 5,000,000 tons of ferrous scrap annually and providing an abundant supply of scrap to the steel mills. Having an abundant and reliable supply of recycled scrap within close proximity not only gives Nucor's steel mills a logistics and economic advantage over their competitors, but also a carbon footprint that is a fraction of the average steel producer.

Product Description

CENTRIA insulated metal panels (IMPs) consist of polyisocyanurate (PIR) foam between two sheets of galvanized steel. Several configurations of IMPs exist depending on where and how they are used (e.g. building walls, roofs, cold storage, etc.) and the styling as desired by the architect. Additionally, IMPs can be manufactured either on a continuous or discontinuous manufacturing line. CENTRIA panels are comprised of an advanced PIR core that is injected between two pre-finished steel sheets, forming a single, all-in-one unit. The result is a highly thermal efficient insulated panel. Finished panels are mounted to the building's framework, outboard of the structural supports and provide continuous insulation with no thermal bridges for maximum thermal efficiency. CENTRIA panels meet or exceed code requirements for foam plastic insulation.

Information for CENTRIA Versawall panels was supplied by one (1) Nucor IPG facility located in Sheridan, AR, USA.

IMP are used for exterior wall and roof cladding systems as well as interior ceilings and wall partitions. They are installed in an array of industries including automotive, food production, EV battery plants, data centers, aviation, storage facilities, stadiums, healthcare, education, manufacturing, warehousing and more. IMPs are available in variety of configurations depending on the customer's requirements, including panel profile, thickness, module, paint system and color.

In addition, Nucor manufactures steel to various customer-specific standards. The IMP core thickness varies according to building site. Therefore, this EPD reports LCA results for each thickness separately.

Applications

CENTRIA's commercial & industrial insulated metal panels deliver the industry's best combination of aesthetics, performance, sustainability and value. These lightweight panels provide tremendous flexibility with long lengths, various finish options and superior weather resistance, as well as vertical installation capability. These panels are the ideal product to create a modern aesthetic for large-scale buildings like warehouses, industrial facilities, schools and shopping centers.

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Declaration of Methodological Framework

The scope of the EPD is cradle-to-gate, including raw material extraction and processing, upstream transportation, and product manufacture (Modules A1, A2, and A3). The PCR considers installation, use, end-of-life, and recovery stages (Modules A4 through D) as optional. As such, this study excludes the optional stages. The life cycle phases included are illustrated in Figure 1 below.

Since this is a "cradle-to-gate" study, the products are not declared as fulfilling a building reference service life. This study also excludes construction of capital equipment, including tools used to produce, install and maintain the products; maintenance and operation of support equipment; human labor and commute; building energy consumption; and all other impacts associated with the use stage relative to energy use for the building in which the product is installed.

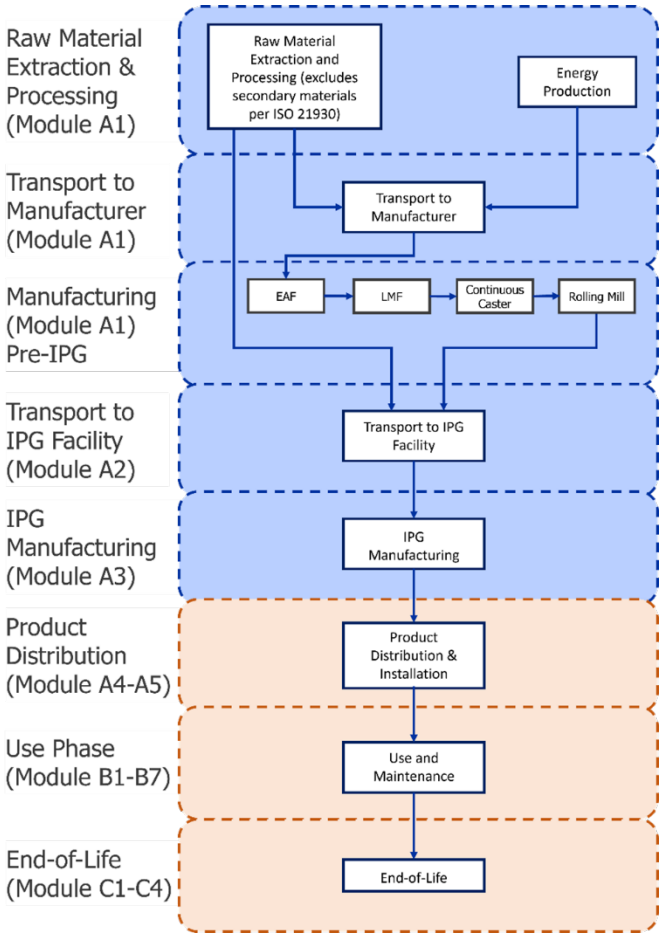


Figure 1. Flow Chart for Product System

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Technical Data

Versawall IMP produced by Nucor are defined by the following standards:

Substrate Performance:

- AISI S100
- ASTM A653
- ASTM A792
- ASTM A924
- ASTM E8

Metal Wall Performance:

- ASTM C518
- ASTM C271
- ASTM C272
- ASTM C273
- ASTM C1363
- ASTM D1621
- ASTM D1622
- ASTM 1623
- ASTM E72
- ASTM E90
- ASTM E283
- ASTM E330
- ASTM E331
- FM 4881

Fire Performance:

- ASTM E84
- ASTM E119
- FM 4880
- NFPA 259
- NFPA 268
- NFPA 285
- CAN/ULC S134
- CAN/ULC S101
- CAN/ULC S102
- UL 263

Model Codes or Standards:

- ASCE/SEI 7
- FS HH-I-1972
- ANSI B18.6.4
- SAE J78
- AAMA 501

Paint Finish Performance:

- ASTM B117
- ASTM D523
- ASTM D968
- ASTM D2244
- ASTM D2247
- ASTM D2794
- ASTM D4214

The United Nations Standard Products and Service Code (UNSPSC) and the Construction Specifications Institute (CSI) / Constructions Specifications Canadian (CSC) classification identified for IMP are:

- CSI MasterFormat Codes:
  - 07 40 00 Roofing and Siding Panels
  - 07 41 00 Roof Panels
  - 07 42 00 Wall Panels
  - 07 44 00 Faced Panels
  - 07 46 00 Siding
- UNSPSC Code: 56101905 Panel assemblies or sections

Properties of Declared Product as Delivered

IMP products can be provided in a variety of specifications including insulated capacity, thickness, and styling based on customer requirements and final applications. These products are then shipped directly to a job site or end user. No fabrication is performed by Nucor – however, additional fabrication may be performed by third-party entities before final installation. Impacts from downstream third-party fabrication are not included in this EPD.

IMPs come in a variety of sizes and configurations customized to each project's requirements. Variations in panel configuration are as follows:

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Table 1. Panel Sizes

PARAMETER	VALUE	UNIT
Panel Thickness	2, 2.5, 2.75, 3, 4	Inches
Panel Width	30 to 36	Inches
Panel Length	6 to 52	Feet

Material Composition

The two (2) exterior sheets of the IMP are comprised of 20, 22, 24, 26 or 29 gauge hot-dipped galvanized steel. The insulated layer interior to the steel sheets is polyisocyanurate (PIR) foam that is manufactured from methylene diphenyl diisocyanate (MDI), polyester polyols, catalysts, sealants, adhesives, and a blowing agent comprised of a mixture of cyclopentane and isopentane.

Composition data for the studied product can be found in the table below, which outlines all materials that constitute the final product. Ancillary materials do not constitute any part of the final product. Exact specifications may be found by calling the division and asking for a specifications sheet. No substances required to be reported as hazardous are associated with the production of this product.

Table 2. Composition Data for IMP Product

NAME	2’	2.5’	2.75’	3’	4’	UNIT
Steel Sheet	81%	80%	76%	73%	71%	% by mass
PIR foam Insulation	19%	20%	24%	27%	29%	% by mass

Steel is an alloy of iron containing small amounts of manganese, silicon, chromium, nickel, aluminum, copper, and trace alloys. These alloying elements improve the chemical and physical properties of steel, such as strength, ductility, durability, and corrosion resistance. There are many different grades of steel with many different physical, chemical, and environmental properties.

Table 3. Composition data for galvanized steel[1]

NAME	VALUE	UNIT
Aluminum	< 3.0	% by mass
Boron	< 1.1	% by mass
Chromium	0.01 - 12.5	% by mass
Copper	< 3.5	% by mass
Manganese	< 16	% by mass
Molybdenum	< 1.1	% by mass
Nickel	0.01 - 3.0	% by mass
Silicon	< 5.0	% by mass
Hydrochloric Acid	< 3.0	% by mass
Zinc	< 15.0	% by mass
Iron	Balance	% by mass

The product does not include materials or substances which may have any potential route of exposure to humans or flora/fauna in the environment. The product does not contain any hazardous substances according to the Resource Conservation and Recovery Act (RCRA), Subtitle 3. The products as manufactured do not release dangerous substances to the environment, including indoor air emissions, gamma or ionizing radiation, or chemicals released to air or leached to water and soil.

Manufacturing

Nucor Sheridan IPG facility manufactures CENTRIA Versawall insulated metal panel product. Steel coils are received from other Nucor mills and external manufacturers, unraveled, and fed into the process. Then liquid isocyanate foam is injected between two (2) sheets of metal. The foam undergoes a chemical reaction which causes it to expand inside the cavity between the sheets, completely filling the space and bonding the PIR foam to the metal surfaces. A cyclopentane/isopentane blowing agent is used during the injection process to aid in the expansion of the foam. The life cycle assessment conducted for this EPD accounts for fugitive blowing agent emissions to atmosphere during manufacturing. Once the foam has been cured, panels are cut to length, packaged, and distributed to construction sites. This process allows the production of insulation panels in a wide range of sizes, styles, and colors to suit different applications.

The life cycle phases included in this study are illustrated in Figure 1.

Packaging

Packaging of final product is included in the LCA for this EPD. Packaging materials include polyurethane foam, expanded polystyrene (EPS) foam, oriented strandboard, cardboard, and polyethylene film.

Product Average

The 2023 calendar year production data used in this EPD considers IMP produced by Nucor IPG during the year (12 consecutive months of averaged data as required for manufacturer-specific datasets). The product is manufactured at the following location:

- 1811 N. Rock Street, Sheridan, Arkansas, 72150

LCA Results are reported by IMP thickness. Additionally, a summary table of global warming potential results by IMP thickness is provided in a separate table.

[1] Galvanized steel chemical composition from Nucor Sheet SDS.

2. LCA CALCULATION RULES

Declared Unit

The declared unit is one hundred (100) m^2 of IMP product. The coverage area refers to the projected flat area covered by the product as output by the final manufacturing process step, and does not account for losses due to overlap and scrap during installation.

Table 4. Declared Unit for IMP Product

NAME	2”	2.5”	2.75’	3”	4”	UNIT
Declared Unit	100	100	100	100	100	m^2
Mass per 100 m^2	1,095	1,323	1,238	1,189	1,505	kg
Conversion Factor to 1 kg	9.13E-04	7.56E-04	8.08E-04	8.41E-04	6.64E-04	-

System Boundary

Per the PCR, this cradle-to-gate analysis provides information on the Product Stage of the steel product life cycle, including modules A1, A2, and A3. Product delivery, installation and use, and product disposal (modules A4 – A5, B1 – B7, C1 – C4, and D) have not been included, nor were the construction and maintenance of capital equipment (e.g., production equipment). Additionally, human labor and employee commute were not included in the analysis.

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
Raw material supply	Transport	Manufacturing	Transport from gate to site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling Potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

X = Module declared
MND = Module not declared

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. In cases where no matching life cycle inventories were available to represent a flow, proxy data were applied based on conservative assumptions regarding environmental impacts. No data gaps were allowed which were expected to significantly affect the outcome of the indicator results. No other known flows are deliberately excluded from this EPD.

The mass input of each omitted stream is less than 1% of the total mass input streams into the system and the cumulative mass input of all omitted streams is less than 5% of the total mass input streams. Therefore, no data gaps were allowed which were expected to significantly affect the outcome of the indicator results.

Biogenic Carbon and Land-Use Change

The production of IMP products at Nucor IPG facilities do not include significant sources of biogenic carbon or GHG emissions occurring as a result of land-use change. The biogenic carbon emissions and removals were determined to be negligible for both products; therefore, the biogenic carbon emissions are considered zero in this analysis. Similarly, GHG emissions occurring as a result of land-use change were determined to be negligible and land-use change emissions considered zero in this analysis. The characterization method for GWP100 excludes both biogenic carbon and land-use change. Additional indicators on the uptake and emissions of CO_2 are not included or published in this EPD as they are not considered relevant.

Carbonation, Calcination, and Combustion of Waste

There is no carbonation, calcination or combustion of waste from renewable or non-renewable sources used in the production processes of IMP products and the scope of this analysis did not include use and end-of-life stages. Accordingly, the environmental impacts do not account for any environmental benefits attributed to carbonation, calcination or combustion of waste from renewable or non-renewable sources.

Data Sources

The LCA model was created using the LCA for Experts (formerly GaBi) Software system for life cycle engineering, version 10.9.0.20, developed by Sphera. Background life cycle inventory data for raw materials and processes were obtained from LCA for Experts 2024.2 databases (formerly known as GaBi databases). Primary manufacturing data were provided by Nucor.

Data Quality

A variety of tests and checks were performed by the LCA practitioner throughout the project to ensure high quality of the completed LCA. Checks included an extensive review of project-specific LCA models as well as the background data used.

IMP production data has been collected by Nucor directly from the production sites and are average values for calendar year 2023 (12 consecutive months of averaged data as required for manufacturer-specific data sets). The data has been measured and verified internally. The data is assumed to be the most relevant according to current conditions and production practices. Based on availability of data, natural gas, and electricity usage for the operation of administrative offices was included in the system boundary.

Time-related coverage, geographical coverage, technological coverage, precision, completeness, representativeness, consistency, reproducibility, sources of data, and uncertainty have each been analyzed as part of this LCA. All inputs and data sources meet the requirements set forth in the PCR and there is no reason to believe that any of the employed material, data, or inputs are not representative of the product under study.

Geographical Coverage

Primary data represents productions at the following Nucor facility:

- Nucor Insulated Panel Group – 1811 N. Rock Street, Sheridan, Arkansas, 72150

Regionally specific datasets, where available, were used to represent the manufacturing location's energy consumption. Proxy datasets were used as needed for raw material inputs to address lack of data for a specific material or for a specific geographical region. These proxy datasets were chosen for their technological representation of the actual materials.

Period under Review

Primary data collected represent IMP production during calendar year 2023.



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Allocation

Per ISO 21930 and the PCR, this is an attributional LCA and as such, no allocation using system expansion was performed. Allocation of background data (energy and materials) taken from the Managed LCA Content (formerly known as GaBi databases) is documented online at https://sphera.com/life-cycle-assessment-lca-database/. No allocation was conducted for recycling occurring at the facility, and there are no reuse or energy recovery operations occurring at Nucor IPG facilities.

Square meters of each thickness of Nucor panel produced is tracked at each facility. Metric tons of steel coil from each manufacturer is tracked by facility and by product thickness, therefore no allocation was required for the steel coil. For all other raw materials, fuel, electricity, water use, waste, etc. total usage was tracked by facility but not by product thickness. Therefore, usage was allocated based on the square meters of each Nucor panel thickness produced, except for the insulation chemicals for IMP. Thicker IMP requires more insulation chemicals, and therefore the insulation chemicals were allocated not only by square meters of each IMP thickness produced but also allocated by the IMP thickness itself, such that thicker IMP were allocated more insulation chemicals.

Estimates and Assumptions

The underlying study was conducted in accordance with the PCR. While this EPD has been developed by industry experts to best represent the product system, real life environmental impacts of fabricated steel products may extend beyond those defined in this document.

All the raw materials and energy inputs have been modeled using processes and flows that closely follow actual production data on raw materials and processes. All the reported material and energy flows have been accounted for.

Raw material procurement and upstream transport to Nucor IPG Facilities is included for all raw materials above the cut-off thresholds. For each raw material, a representative dataset was selected to represent the geographic region of origin. Distances by truck and rail were estimated using Google Maps. Distances by ship were estimated using ports.com.[3] In some cases, Nucor IPG facilities sourced a single raw material from multiple distributors, in which case the transport from every distributor was modeled. Only travel to the facility is accounted for (i.e., return truck and rail trips are considered out of scope).

This study assumes that 5% of cyclopentane/isopentane blowing agent used in the IMP production process are emitted during manufacturing. However, actual blowing agent releases may vary and additional releases may take place during subsequent life cycle stages.

[3] http://ports.com/sea-route/

3. LCA RESULTS

North American life cycle impact assessment (LCIA) results are declared using TRACI 2.1 methodology, with the exception of GWP and ADP_{fossil}. GWP 100 is reported using the IPCC 2013 (AR5) methodology, and ADP_{fossil} is reported using CML-baseline v4.7 August 2016. LCIA results are relative expressions and do not predict actual impacts, the exceeding of thresholds, safety margins or risks.

The impact categories reported in the LCIA tables below 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.

Any comparison of EPDs shall be subject to the requirements of ISO 21930. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. 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. EPDs are only comparable if they comply with the same document, 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.

Summary of GWP Results

The table below reports a summary of the GWP100 results, broken out by facility and by product thickness.

Table 5. GWP100 results by thickness, per 100 square meters of IMP (kg CO2 eq.)

Facility	2”	2.5”	2.75”	3”	4”
Sheridan	3.59E+03	4.09E+03	3.92E+03	3.83E+03	4.53E+03

Sheridan – 2 Inch Panels

Table 6. LCIA results, per 100 square meters of IMP

PARAMETER	UNIT	A1	A2	A3	TOTAL
GWP 100 (excl. biogenic C and land-use)	kg CO_2 eq.	2.70E+03	1.41E+02	7.52E+02	3.59E+03
ODP	kg CFC 11 eq.	2.39E-05	4.15E-13	2.35E-07	2.41E-05
AP	kg SO_2 eq.	7.74E+00	6.80E-01	2.64E+00	1.11E+01
EP	kg N eq.	4.51E-01	5.87E-02	1.45E-01	6.55E-01
SFP	kg O_3 eq.	1.11E+02	1.55E+01	2.35E+01	1.50E+02
ADP_{FOSSIL}	MJ	3.66E+04	1.84E+03	1.14E+04	4.98E+04

Table 7. Resource use results, per 100 square meters of IMP [a]

PARAMETER	UNIT	A1	A2	A3	TOTAL
RPR_E	MJ LHV	2.19E+03	8.18E+01	2.84E+03	5.12E+03
RPR_M	MJ LHV	0.00E+00	N/A	N/A	0.00E+00
$NRPR_E$	MJ LHV	4.03E+04	1.86E+03	1.36E+04	5.58E+04
$NRPR_M$	MJ LHV	2.43E+02	N/A	N/A	2.43E+02
SM	kg	4.93E+02	N/A	0.00E+00	4.93E+02
RSF	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
NRSF	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
RE	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
FW	m^3	1.04E+02	2.72E-01	2.52E+00	1.07E+02

a. Lower calorific values (LHV) of fuels are used for energy parameters.

Table 8. Output flows and waste categories results, per 100 square meters of IMP [a,b]

PARAMETER	UNIT	A1	A2	A3	Total
HWD	kg	1.41E+00	N/A	2.07E+00	3.48E+00
NHWD	kg	1.84E+01	N/A	3.63E+01	5.47E+01
HLRW	kg	1.03E-03	6.65E-06	9.13E-04	1.95E-03
ILLRW	kg	7.85E-01	5.60E-03	7.63E-01	1.55E+00
CRU	kg	N/A	N/A	N/A	N/A
MR	kg	2.85E+01	N/A	1.63E+02	1.91E+02
MER	kg	N/A	N/A	0.00E+00	0.00E+00
EE	MJ LHV	N/A	N/A	0.00E+00	0.00E+00

a. High-level radioactive waste, e.g., when generated by electricity production, consists mostly of spent fuel from reactors (ISO 21930:2017, clause 7.2.14).
b. Low- and intermediate-level radioactive wastes, e.g., when generated by electricity production, arise mainly form routing facility maintenance and operations (ISO 21930:2017, clause 7.2.14).

Sheridan – 2.5 Inch Panels

Table 9. LCIA results, per 100 square meters of IMP

PARAMETER	UNIT	A1	A2	A3	TOTAL
GWP 100 (excl. biogenic C and land-use)	kg CO_2 eq.	3.18E+03	1.61E+02	7.52E+02	4.09E+03
ODP	kg CFC 11 eq.	2.98E-05	4.74E-13	2.35E-07	3.00E-05
AP	kg SO_2 eq.	9.17E+00	7.80E-01	2.64E+00	1.26E+01
EP	kg N eq.	5.37E-01	6.71E-02	1.45E-01	7.49E-01
SFP	kg O_3 eq.	1.31E+02	1.78E+01	2.38E+01	1.72E+02
ADP_{FOSSIL}	MJ	4.37E+04	2.11E+03	1.14E+04	5.72E+04

Table 10. Resource use results, per 100 square meters of IMP [a]

PARAMETER	UNIT	A1	A2	A3	TOTAL
RPR_E	MJ LHV	2.57E+03	9.35E+01	2.84E+03	5.51E+03
RPR_M	MJ LHV	0.00E+00	N/A	N/A	0.00E+00
$NRPR_E$	MJ LHV	4.81E+04	2.13E+03	1.36E+04	6.39E+04
$NRPR_M$	MJ LHV	2.81E+02	N/A	N/A	2.81E+02
SM	kg	5.72E+02	N/A	0.00E+00	5.72E+02
RSF	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
NRSF	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
RE	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
FW	m^3	1.21E+02	3.10E-01	2.52E+00	1.24E+02

b. Lower calorific values (LHV) of fuels are used for energy parameters.

Table 11. Output flows and waste categories results, per 100 square meters of IMP [a]

PARAMETER	UNIT	A1	A2	A3	Total
HWD	kg	1.63E+00	N/A	2.07E+00	3.70E+00
NHWD	kg	2.13E+01	N/A	3.63E+01	5.76E+01
HLRW	kg	1.23E-03	7.60E-06	9.13E-04	2.15E-03
ILLRW	kg	9.31E-01	6.40E-03	7.63E-01	1.70E+00
CRU	kg	N/A	N/A	N/A	N/A
MR	kg	3.30E+01	N/A	1.63E+02	1.96E+02
MER	kg	N/A	N/A	0.00E+00	0.00E+00
EE	MJ LHV	N/A	N/A	0.00E+00	0.00E+00

c. High-level radioactive waste, e.g., when generated by electricity production, consists mostly of spent fuel from reactors (ISO 21930:2017, clause 7.2.14).
d. Low- and intermediate-level radioactive wastes, e.g., when generated by electricity production, arise mainly form routing facility maintenance and operations (ISO 21930:2017, clause 7.2.14).

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Table 12. LCIA results, per 100 square meters of IMP

PARAMETER	UNIT	A1	A2	A3	TOTAL
GWP 100 (excl. biogenic C and land-use)	kg CO_2 eq.	3.02E+03	1.51E+02	7.52E+02	3.92E+03
ODP	kg CFC 11 eq.	3.25E-05	4.44E-13	2.35E-07	3.27E-05
AP	kg SO_2 eq.	8.83E+00	7.36E-01	2.64E+00	1.22E+01
EP	kg N eq.	5.23E-01	6.30E-02	1.45E-01	7.31E-01
SFP	kg O_3 eq.	1.25E+02	1.67E+01	2.40E+01	1.66E+02
ADP_{FOSSIL}	MJ	4.31E+04	1.98E+03	1.14E+04	5.64E+04

Table 13. Resource use results, per 100 square meters of IMP [a]

PARAMETER	UNIT	A1	A2	A3	TOTAL
RPR_E	MJ LHV	2.41E+03	8.75E+01	2.84E+03	5.34E+03
RPR_M	MJ LHV	0.00E+00	N/A	N/A	0.00E+00
$NRPR_E$	MJ LHV	4.72E+04	1.99E+03	1.36E+04	6.28E+04
$NRPR_M$	MJ LHV	2.55E+02	N/A	N/A	2.55E+02
SM	kg	5.18E+02	N/A	0.00E+00	5.18E+02
RSF	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
NRSF	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
RE	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
FW	m^3	1.11E+02	2.90E-01	2.52E+00	1.13E+02

c. Lower calorific values (LHV) of fuels are used for energy parameters.

Table 14. Output flows and waste categories results, per 100 square meters of IMP [a,b]

PARAMETER	UNIT	A1	A2	A3	Total
HWD	kg	1.48E+00	N/A	2.07E+00	3.55E+00
NHWD	kg	1.93E+01	N/A	3.63E+01	5.56E+01
HLRW	kg	1.20E-03	7.12E-06	9.13E-04	2.12E-03
ILLRW	kg	8.98E-01	6.00E-03	7.63E-01	1.67E+00
CRU	kg	N/A	N/A	N/A	N/A
MR	kg	2.99E+01	N/A	1.63E+02	1.93E+02
MER	kg	N/A	N/A	0.00E+00	0.00E+00
EE	MJ LHV	N/A	N/A	0.00E+00	0.00E+00

a. High-level radioactive waste, e.g., when generated by electricity production, consists mostly of spent fuel from reactors (ISO 21930:2017, clause 7.2.14).
b. Low- and intermediate-level radioactive wastes, e.g., when generated by electricity production, arise mainly form routing facility maintenance and operations (ISO 21930:2017, clause 7.2.14).

Sheridan – 3 Inch Panels

Table 15. LCIA results, per 100 square meters of IMP

PARAMETER	UNIT	A1	A2	A3	TOTAL
GWP 100 (excl. biogenic C and land-use)	kg CO_2 eq.	2.93E+03	1.45E+02	7.52E+02	3.83E+03
ODP	kg CFC 11 eq.	3.53E-05	4.25E-13	2.35E-07	3.55E-05
AP	kg SO_2 eq.	8.68E+00	7.09E-01	2.64E+00	1.20E+01
EP	kg N eq.	5.20E-01	6.04E-02	1.45E-01	7.25E-01
SFP	kg O_3 eq.	1.22E+02	1.61E+01	2.41E+01	1.62E+02
ADP_{FOSSIL}	MJ	4.31E+04	1.89E+03	1.14E+04	5.64E+04

Table 16. Resource use results, per 100 square meters of IMP [a]

PARAMETER	UNIT	A1	A2	A3	TOTAL
RPR_E	MJ LHV	2.31E+03	8.36E+01	2.84E+03	5.24E+03
RPR_M	MJ LHV	0.00E+00	N/A	N/A	0.00E+00
$NRPR_E$	MJ LHV	4.71E+04	1.91E+03	1.36E+04	6.27E+04
$NRPR_M$	MJ LHV	2.37E+02	N/A	N/A	2.37E+02
SM	kg	4.81E+02	N/A	0.00E+00	4.81E+02
RSF	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
NRSF	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
RE	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
FW	m^3	1.03E+02	2.77E-01	2.52E+00	1.06E+02

d. Lower calorific values (LHV) of fuels are used for energy parameters.

Table 17. Output flows and waste categories results, per 100 square meters of IMP [a,b]

PARAMETER	UNIT	A1	A2	A3	Total
HWD	kg	1.37E+00	N/A	2.07E+00	3.44E+00
NHWD	kg	1.79E+01	N/A	3.63E+01	5.42E+01
HLRW	kg	1.20E-03	6.81E-06	9.13E-04	2.12E-03
ILLRW	kg	8.84E-01	5.74E-03	7.63E-01	1.65E+00
CRU	kg	N/A	N/A	N/A	N/A
MR	kg	2.78E+01	N/A	1.63E+02	1.90E+02
MER	kg	N/A	N/A	0.00E+00	0.00E+00
EE	MJ LHV	N/A	N/A	0.00E+00	0.00E+00

a. High-level radioactive waste, e.g., when generated by electricity production, consists mostly of spent fuel from reactors (ISO 21930:2017, clause 7.2.14).
b. Low- and intermediate-level radioactive wastes, e.g., when generated by electricity production, arise mainly form routing facility maintenance and operations (ISO 21930:2017, clause 7.2.14).

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Table 18. LCIA results, per 100 square meters of IMP

PARAMETER	UNIT	A1	A2	A3	TOTAL
GWP 100 (excl. biogenic C and land-use)	kg CO_2 eq.	3.61E+03	1.71E+02	7.52E+02	4.53E+03
ODP	kg CFC 11 eq.	4.69E-05	5.01E-13	2.35E-07	4.71E-05
AP	kg SO_2 eq.	1.08E+01	8.43E-01	2.64E+00	1.43E+01
EP	kg N eq.	6.51E-01	7.14E-02	1.45E-01	8.67E-01
SFP	kg O_3 eq.	1.51E+02	1.91E+01	2.47E+01	1.94E+02
ADP_{FOSSIL}	MJ	5.44E+04	2.23E+03	1.14E+04	6.80E+04

Table 19. Resource use results, per 100 square meters of IMP [a]

PARAMETER	UNIT	A1	A2	A3	TOTAL
RPR_E	MJ LHV	2.82E+03	9.86E+01	2.84E+03	5.76E+03
RPR_M	MJ LHV	0.00E+00	N/A	N/A	0.00E+00
$NRPR_E$	MJ LHV	5.92E+04	2.25E+03	1.36E+04	7.51E+04
$NRPR_M$	MJ LHV	2.82E+02	N/A	N/A	2.82E+02
SM	kg	5.73E+02	N/A	0.00E+00	5.73E+02
RSF	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
NRSF	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
RE	MJ LHV	N/A	N/A	0.00E+00	0.00E+00
FW	m^3	1.24E+02	3.27E-01	2.52E+00	1.27E+02

e. Lower calorific values (LHV) of fuels are used for energy parameters.

Table 20. Output flows and waste categories results, per 100 square meters of IMP [a,b]

PARAMETER	UNIT	A1	A2	A3	Total
HWD	kg	1.63E+00	N/A	2.07E+00	3.71E+00
NHWD	kg	2.13E+01	N/A	3.63E+01	5.76E+01
HLRW	kg	1.50E-03	8.04E-06	9.13E-04	2.42E-03
ILLRW	kg	1.10E+00	6.77E-03	7.63E-01	1.87E+00
CRU	kg	N/A	N/A	N/A	N/A
MR	kg	3.31E+01	N/A	1.63E+02	1.96E+02
MER	kg	N/A	N/A	0.00E+00	0.00E+00
EE	MJ LHV	N/A	N/A	0.00E+00	0.00E+00

a. High-level radioactive waste, e.g., when generated by electricity production, consists mostly of spent fuel from reactors (ISO 21930:2017, clause 7.2.14).
b. Low- and intermediate-level radioactive wastes, e.g., when generated by electricity production, arise mainly form routing facility maintenance and operations (ISO 21930:2017, clause 7.2.14).

4. LCA INTERPRETATION

In order to facilitate a more detailed understanding of the contributions from different processes, an analysis is included in this section which details the contribution from Modules A1, A2, and A3.

The impact assessment results indicate that Module A1, i.e. Raw Materials, is the key contributor to potential environmental impact categories for global warming potential, ozone depletion potential, acidification potential, eutrophication potential, smog formation potential, and abiotic resource depletion potential of fossil energy resources. Module A2, i.e. transport to IPG, and Module A3, i.e. manufacturing at the IPG facility, are not the most significant contributor to any impact category.

5. ADDITIONAL ENVIRONMENTAL INFORMATION

Safety

Safety: Nucor's top priority is to become the safest steel company in the world. This is accomplished through the empowerment of each and every teammate to hold one another accountable to work safely. In 2020, Nucor had its best safety performance in company history. At Nucor, nothing is more important than our teammates returning home safely to their families after each and every shift.

Environmental Activities and Certifications

Sustainability: Nucor is dedicated to engineering a wide range of steel product lines, prioritizing safety, and sustainability throughout the manufacturing process. For more than 50 years, Nucor has been making steel using an electric arc furnace (EAF) that melts recycled scrap and turns it into new steel. EAFs are far less energy intensive and more energy efficient than traditional blast furnace steel making. Electric arc furnaces allow Nucor to produce less emissions than competitors who often make steel by melting iron ore and coking coal.

By recycling scrap in EAFs, Nucor's energy intensity (average gigajoules per metric ton of steel produced) is 74% lower than the global average, and its greenhouse gas intensity (metric tons CO_2 per ton of steel produced) is less than one-fourth the global average, and nearly one-fifth of the average integrated (BF/BOF) steel producer. Nucor is also committed to a net-zero 2050 science-based greenhouse gas (GHG) target as defined by the Global Steel Climate Council's (GSCC) "Steel Climate Standard", an ambitious standard consistent with the International Energy Agency Net Zero by 2050: A Roadmap for the Global Energy System glidepath for the industry (IEA NZE). The net-zero 2050 target will result in a GHG intensity of 116 kg GHGs per metric ton of steel, including Scopes 1, 2 and 3 emissions as defined by GSCC. Nucor will continue to be an industry leader in GHG transparency, with reporting continuing to be third-party verified.

Currently, Nucor accounts for more than 25% of the United States' steel production, but only accounts for 8% of the domestic steel industry's greenhouse gas emissions. Nucor is also committing to a 35% combined reduction in its steel mill Scope 1 and Scope 2 greenhouse gas intensity by 2030, measured against a 2015 baseline. This goal will take Nucor's steel mill CO_2 emissions down to 77% less than today's global steelmaking average, and 82% less than today's integrated steelmaking average.

In November 2022, Nucor, along with five other international steel manufacturers, formed a new coalition to establish and promote a global steel standard that leads toward a cleaner, lower GHG future. This coalition, named the Global Steel Climate Council (GSCC), is a nonprofit association dedicated to sharing best practices, establishing standards, and advocating for carbon emissions reductions by members of the steel industry.

The specific purposes of the GSCC include supporting technology-agnostic reduction methods that reduce greenhouse gas emissions from the global steel industry; creating a system boundary that includes Scope 1, 2, and 3 emissions; and adopting a science-based glidepath to achieve a 1.5 degrees Celsius (1.5°C) scenario by 2050.

In alignment with the Global Steel Climate Council's (GSCC) "Steel Climate Standard" and the International Energy Agency's Net Zero by 2050: A Roadmap for the Global Energy Sector, Nucor is steadfast in its commitment to achieving a net-zero greenhouse gas (GHG) target by 2050. This ambitious target, defined by science-based criteria, aligns with the Paris Agreement's efforts to limit global temperature rise to less than 1.5 degrees Celsius (1.5°C) above pre-industrial levels.

Recycled Materials Content: Nucor proudly uses recycled scrap to make high-quality steel with low emissions, using one of the cleanest and most energy efficient steel-making processes available. Steel is unique in its ability to be repeatedly recycled and reused without loss of quality. Nationwide, in 2023 Nucor steel products were made from an average of 77.0% recycled content, with some products containing almost 100% recycled content.



CENTRIA Versawall Insulated Metal Panels
Insulated Metal Panels, Metal Composite Panels, and Metal Cladding

According to ISO 14025, and ISO 21930:2017

Globally, only 26.3% of the more than 2 billion net tons of steel produced in 2020 was made by recycling scrap in EAFs. Scrap inputs for the total crude steel production globally have remained at around 35% since 2013.

Waste and Water Recycling: Nucor's EAFs emit less than 1% of the particulate matter of a traditional steel blast furnace – and the company recycles 99% of the EAF dust it collects in its baghouses. Nucor also recognizes that water is a critical natural resource and is essential to Nucor and the communities in which it operates. Nucor has worked extensively to improve water use efficiency in its processes.

Nucor also participates in the Network for Business Innovation and Sustainability (NBIS) By-Product Synergy Group. This NBIS group brings together environmental experts from a wide variety of industries to allow them to compare waste streams and find ways to divert materials from landfills.

Clean Energy: Nucor is increasing its utilization of renewable energy and supporting the continued growth of clean power generation in the United States. In addition, in November 2020 and March 2021, Nucor entered two Virtual Power Purchase Agreements (VPPAs) which support the development of more than 350 megawatts of new clean energy infrastructure.

The VPPAs enable the construction of 250MW of new solar energy and 100MW of new wind energy in Texas. Together, these two projects are equal to the electricity usage of nearly 70,000 Texas homes and have the potential to supply renewable power to the regional electric grid 24-hours a day.

Environmental Training: In 2015, Nucor established Nucor Environmental University (NEU), an online training platform for Nucor teammates with environmental responsibilities and others looking to expand their involvement with the environmental team. From the beginning, Nucor designed this program to help teammates develop a thorough and meaningful understanding of environmental compliance.

NEU has had over 1,000 active users since its inception and Nucor teammates have completed at least 10,000 environmental training courses, passed over 6,600 training exams, and helped develop dozens of courses. Because of NEU, Nucor's teammates are better prepared to meet the demands of environmental compliance and achieve Nucor's goal of being a sustainable organization.

Additional Information: Refer to Nucor's website for additional information: https://nucor.com/company.

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7. CONTACT INFORMATION

Study Commissioner

NUCOR®

NUCOR CORPORATION
1915 Rexford Road
Charlotte, NC 28211
Ph: 704.366.7000
www.nucor.com

LCA Practitioner

Trinity Consultants

TRINITY CONSULTANTS, INC.
12700 Park Central Drive, Suite 600
Dallas, TX 75251
https://www.trinityconsultants.com/

Program Operator

SCSglobal SERVICES
Setting the standard for sustainability

SCS GLOBAL SERVICES
2000 Powell Street, Suite 600
Emeryville, CA 94608
https://www.scsglobalservices.com