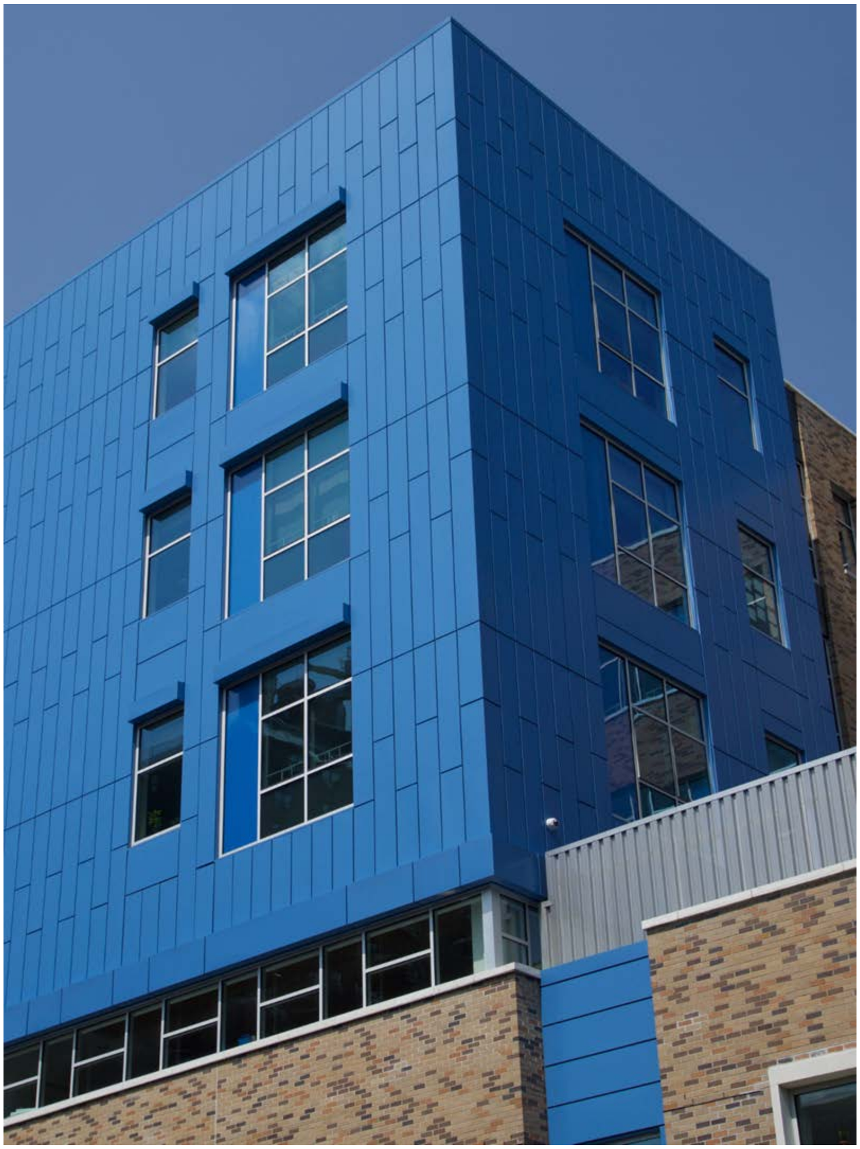
ENVIRONMENTAL PRODUCT DECLARATION

INTERCEPT PANEL SYSTEM

WALL CLADDING SYSTEMS



CENTRIA

CENTRIA offers factory formed wall and roof cladding and panel systems for architectural and industrial applications along with field assembled metal panels, and architectural and engineering support services. For 100 years, the continuous pursuit of innovation and excellence has been synonymous to CENTRIA and its predecessor companies H.H. Robertson, E.G. Smith and Steelite. CENTRIA strives to offer sustainable, eco-friendly metal wall and roof systems.

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ENVIRONMENTAL PRODUCT DECLARATION
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ENVIRONMENTAL PRODUCT DECLARATION

CENTRIA

Intercept Panel System
Product-Specific EPD

According to ISO 14025, EN 15804, and ISO 21930:2017

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL Environment 333 Pfingsten Road Northbrook, IL 60611 https://www.ul.com/ https://spot.ul.com
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	General Program Instructions v.2.4 July 2018
MANUFACTURER NAME AND ADDRESS	CENTRIA 1550 Coraopolis Heights Road Suite 500 Moon Township, PA 15108
DECLARATION NUMBER	4788736474.105.1
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	Intercept Panel System Wall Cladding Systems; 100m²
REFERENCE PCR AND VERSION NUMBER	Part B: Insulated Metal Panels, Metal Composite Panels, and Metal Cladding: Roof and Wall Panels, v2.0, UL 10010-5 [UL Environment]
DESCRIPTION OF PRODUCT APPLICATION/USE	Aluminum sheet formed into a variety of profiles
PRODUCT RSL DESCRIPTION (IF APPL.)	N/A
MARKETS OF APPLICABILITY	North America
DATE OF ISSUE	October 1, 2020
PERIOD OF VALIDITY	5 Years
EPD TYPE	Product-Specific
RANGE OF DATASET VARIABILITY	N/A
EPD SCOPE	Cradle to gate
YEAR(S) OF REPORTED PRIMARY DATA	2018
LCA SOFTWARE & VERSION NUMBER	GaBi ts, 9
LCI DATABASE(S) & VERSION NUMBER	GaBi 2019 (service pack 39)
LCIA METHODOLOGY & VERSION NUMBER	TRACI 2.1

This PCR review was conducted by:	UL Environment PCR Review Panel epd@ulenvironment.com
This declaration was independently verified in accordance with ISO 14025: 2006. ☐ INTERNAL ☒ EXTERNAL	Grant R. Martin Grant R. Martin, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Thomas Gloria Thomas P. Gloria, Industrial Ecology Consultants

LIMITATIONS

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: EPDs from different programs may not be comparable. Full conformance with a PCR allows EPD comparability only 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 results for upstream or downstream of the life cycle stages declared.

1. EPD Content

1.1. Description of Company/Organization

CENTRIA is a recognized leader in the advancement of building cladding, panel, and façade technology, serving the architectural, commercial, industrial and cold storage 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 cladding and communicating the results via environmental product declarations (EPDs).

1.2. Product Description

Incercept formed aluminum cladding products undergo a simple production process, as no foam core is used. Aluminum coated coils are formed into the desired profile using a robotic sheet forming machine. Cladding is then cut to length, packaged, and distributed to construction sites.

CENTRIA products are used in a multitude of building coverage applications and offer a wide range of benefits, including aesthetics, durability, rain screening, fireproofing, and reduced energy costs, with each product type offering its own unique properties.

This EPD focuses on three aluminum cladding products within the Incercept family: ENTYRE, LVLZ, and RZR, as seen in Table 1. A flow diagram depicting the manufacturing process can be found in Figure 3.

Table 1: Panel products under study

NAME	ENTYRE	LVLZ	RZR
Weight [lbs. / sq. ft.]	2.02	2.79	2.15
Sheet metal gauge	0.060" Aluminum	0.060" Aluminum	0.060" Aluminum

Manufacturing information for the aforementioned products was supplied by the CENTRIA facility in Frankfort, KY.

1.3. Application

Intercept is a modular metal wall panel system that allows for design versatility by incorporating different substrates, depths, tapers, slopes, curves and perforations into an easy-to-install rainscreen. The lightweight, back-ventilated system combines aesthetics with function, directing water away from your structure, without using sealants of any kind. Our Intercept panels deliver the protection you're looking for in a rainscreen system with an architecturally pleasing exterior façade. They're ideal for use in a variety of industries including healthcare, pharmaceuticals, office buildings, retail and more.

1.4. Declaration of Methodological Framework

The production stage (i.e., cradle-to-gate), including raw material extraction and processing, processing of secondary material, transport to the manufacturer, and manufacturing, is required by the PCR. 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. 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. The included and excluded life cycle stages are summarized in Table 2.

Table 2: Life cycle modules included in EPD

Production			Installation		Use stage							End-of-Life				Next product system
Raw material supply (extraction, processing, recycled material)	Transport to manufacturer	Manufacturing	Transport to building site	Installation into building	Use / application	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / demolition	Transport to EoL	Waste processing for reuse, recovery or recycling	Disposal	Reuse, recovery or 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 = declared module; MND = module not declared

1.5. Technical Data

Substrate Performance

Specification for Aluminum Structures	Specifications for Aluminum Structures, the Aluminum Association
ASTM B209	Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

Metal Wall Performance

ASTM E72	Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
ASTM E330	Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

Paint Finish Performance

ASTM B117	Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM D523	Standard Test Method for Specular Gloss
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D2244	Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
ASTM D2247	Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
ASTM D2794	Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D4214	Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films

Model Codes or Standards

International Building Code
Local Building Code
ASCE/SEI 7 – Minimum Design Loads for Buildings and Other Structures
UL-Building Materials Directory
UL- Fire Resistance Directory
SMACNA, [Architectural Sheet Metal Manual – Gutter design and flashing details]
ANSI B18.6.4 –[Steel Self-Tapping Screw Standard]
SAE J78 Self Drilling Tapping Screws
MCA Technical Bulletin, Fastener Selection Guidelines, 2008

1.6. Properties of Declared Product as Delivered

Products within the Intercept family come in a variety of sizes and configurations customized to each project's requirements. Technical properties of the aluminum cladding products under study can be seen in Table 3.

Table 3: Product properties

PARAMETER	UNIT	ENTYRE	LVLZ	RZR
Thickness	inch	1 3/8"	2 – 4"	1 3/8 – 4"
Length	inch	12 – 144"	12 – 144"	16 – 144"
Width	inch	12 – 48"	12 – 36"	16 – 48"
Weight	lb. / sq. ft.	2.02	2.79	2.15

1.7. Material Composition

Intercept aluminum cladding products are made of 100% aluminum and are formed into the desired profile from 0.060" aluminum sheet.

1.8. Manufacturing

Raw materials and manufacturing (A1 – A3) represent the cradle-to-gate portion of a metal panel's life cycle and are required by the PCR. Metal coil (either coated or bare), containing recycled content, is transported to CENTRIA's manufacturing facility in Frankfort. CENTRIA also purchases and transports packaging and auxiliary materials. All materials are transported solely via truck from within North America. At the manufacturing facility, metal coil is trimmed and formed according to product requirements. The profile of the aluminum cladding is produced with the aid of a robotic sheet forming machine.

All finished cladding products are packaged in custom built wooden crates, along with a variety of protective materials, including expanded polystyrene, corrugate, oriented strand board, paper, and plastic film shrink wrap.

Ancillary materials, such as lubricants and sealants, were also used to facilitate operations. Utilities including municipal water, electricity, natural gas, and propane were also used on site at manufacturing facilities. Materials used during installation and manufactured by CENTRIA, such as clips, fasteners, and flashing, were included in this study.

Figure 3 shows a cradle-to-gate flow diagram of Intercept aluminum cladding production.

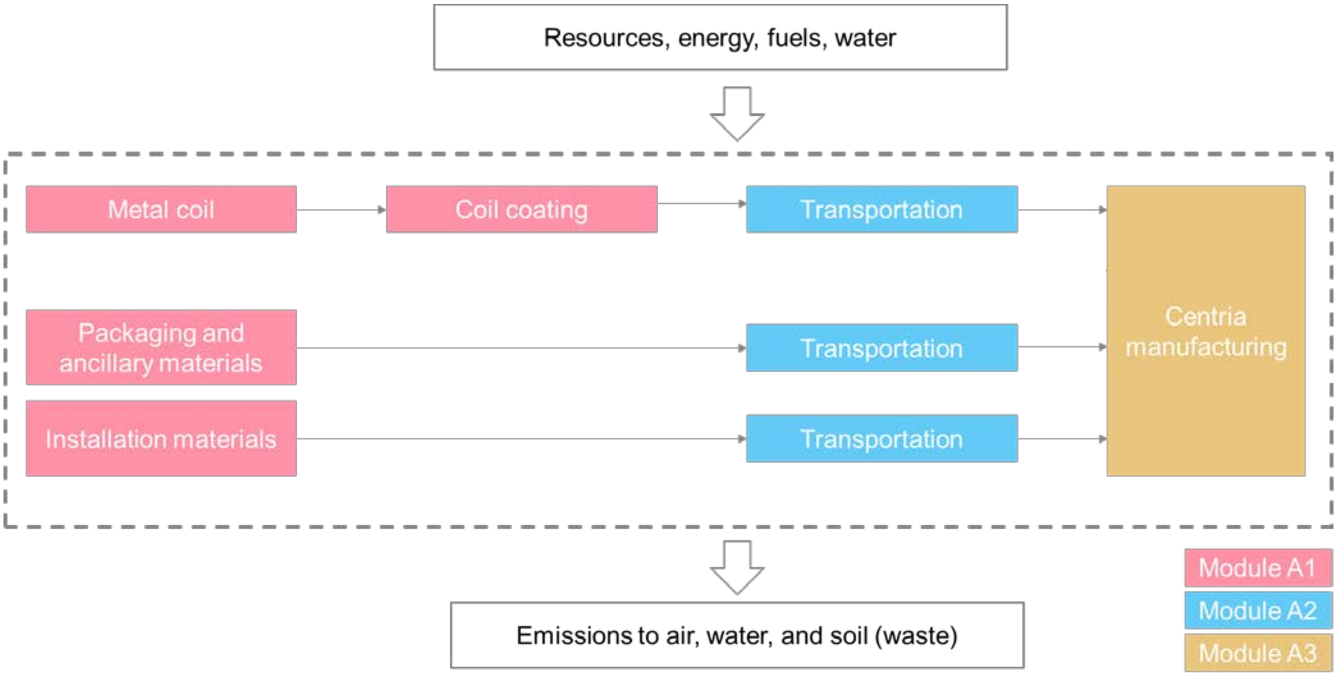

Figure 1: Intercept cradle-to-gate flow diagram

Intercept aluminum cladding can be formed into a variety of profiles and sizes depending on the need of the project, as seen in Figure 4.

Figure 2: Types of Intercept products

1.9. Packaging

Intercept products are packaged in custom built crates, consutructed with lumber and plywood. Packaging materials also include plastic stretch film, paper, cardboard, and expanded polystyrene (EPS). Figure 5 shows an example of an Intercept product being packaged.

Figure 3: Packaging crate for formed aluminum product

1.10. Transportation

Average transportation distances and modes of transport are used to model the transport of the raw materials, operating materials, and auxiliary materials to the Frankfort production facilities.

2. Life Cycle Assessment Background Information

2.1. Functional Unit

The main purpose of aluminum cladding is to provide weather protection for building walls and roofs. The panels create barriers that control water and air transmission between an external environment and interior building space. Accordingly, the PCR's declared unit for metal panels, metal composite panels, and metal cladding is the coverage of 100 square meters (1076.4 square feet) of building area. 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: Reference flows

NAME	ENTYRE	LVLZ	RZR
Declared unit [m^2]	100	100	100
Product mass [kg / 100 m^2]*	1,049	1,436	1,131

*Product mass includes installation materials

2.2. System Boundary

A "cradle-to-gate" life cycle analysis was conducted. Within these boundaries, only the product stage (A1 – A3)—raw material supply, inbound transport of raw materials to manufacturing facility, manufacturing—is considered. The construction stage (A4 – A5), building use stage (B1 - B7), and end-of-life stage (C1 - C4) were not assessed, 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.

2.3. Estimates and Assumptions

This study was based on primary data collected at the CENTRIA Frankfort, KY facility. Datasets selected to represent the production of raw materials by upstream suppliers are based on regional or global averages rather than on primary data collected directly from CENTRIA supply chains. When selecting these datasets, a conservative approach was applied in that datasets associated with higher impacts were used when there were multiple possible options. However, these choices were not shown to significantly affect results.

Secondly, this study was conducted in accordance with a PCR. While this guidance document has been developed by industry experts to best represent this product system, real life environmental impacts of aluminum cladding products may extend beyond those defined in this document.

2.4. Cut-off Criteria

Data were included whenever possible. If it was necessary to exclude materials in order to facilitate the analysis, only flows representing less than 1% of the cumulative mass of the product system were excluded, providing their environmental relevance was judged not to be a concern.

Packaging of incoming raw materials (e.g. pallets) are excluded as they represent less than 1% of the product mass and are not environmentally relevant. Capital goods and infrastructure required to produce metal panel and cladding products are presumed to produce millions of units to over the course of their life, so impact of a single functional unit attributed to this equipment is negligible; therefore, capital goods and infrastructure were excluded from this study.

2.5. Data Sources

As a general rule, specific data derived from specific production processes or average data derived from specific production processes shall be the first choice as a basis for calculating LCA results.

For life cycle modeling of the considered products, the GaBi Software System for Life Cycle Engineering, developed by Sphera, was used. All relevant background datasets were taken from the GaBi 2019 software database (service pack 39). The datasets from the GaBi database are documented in the online documentation (Sphera, 2019).

2.6. Data Quality

A variety of tests and checks were performed 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.

Temporal Coverage

All of the primary data is taken from 12 months of continuous operation in the 2018 calendar year. All secondary data were obtained from the GaBi 2019 databases and published EPDs. Data are representative of the years 2011 to 2018

Geographical Coverage

All primary and secondary data were collected specific to the countries or regions under study. Where country-specific or region-specific data were unavailable, proxy data were used.

Technological Coverage

All primary and secondary data were modeled to be specific to the technologies or technology mixes under study. Where technology-specific data were unavailable, proxy data were used.

2.7. Reference Period

CENTRIA provided annual data for 2018.

2.8. Allocation

Since only facility level data were available, input and output flows were allocated among the facility's co-products to determine the flows associated with the products analyzed. Allocation of materials was done on an mass-basis as appropriate.

End-of-life allocation generally follows the requirements of ISO 14044, section 4.3.4.3 and the product category rule. (UL Environment, 2018). Under the PCR, the product life cycle is modeled using the cut-off approach. Scrap inputs to manufacturing are reported under the secondary materials metric.

Processing and recycling of the net amount of scrap leaving the system (i.e., scrap outputs minus secondary material inputs) is not included in this study.

2.9. Comparability

No comparisons or benchmarking is included in this EPD. LCA results across EPDs can be calculated with different background databases, modeling assumptions, geographic scope and time periods, all of which are valid and acceptable according to the Product Category Rules (PCR) and ISO standards. Caution should be used when attempting to compare EPD results.

3. Scenarios and Additional Technical Information

This EPD represents a cradle-to-gate analysis; as such, no additional information is provided as the downstream modules are not declared.

4. Life Cycle Assessment Results

Cradle-to-gate life cycle impact assessment results are shown for TRACI 2.1 characterization factors. These results are relative expressions and do not predict impacts on category endpoints such as human health or ecosystem quality, the exceeding of thresholds, safety margins, or risks.

With respect to global warming potential, biogenic carbon is not considered as the declared products only use biogenic materials for packaging. For packaging, no credit was given for the sequestration of biogenic carbon during the growth of plants used in plant-derived packaging materials. Since the lifetime of plant-derived packaging materials is shorter than the 100 year time horizon of this impact category (GWP 100), GWP including biogenic carbon is not reported. Table 5 through Table 7 provide descriptions of the environmental metric acronyms.

Table 5: Impact assessment results

ACRONYM	NAME	TRACI 2.1 UNIT
GWP	Global Warming Potential	[kg CO_2 eq.]
ODP	Ozone Depletion Potential	[kg CFC-11 eq.]
AP	Acidification Potential	[kg SO_2 eq.]
EP	Eutrophication Potential	[kg N eq.]
SFP	Smog Formation Potential	[kg O_3 eq.]
ADPF	Abiotic Depletion Potential - Fossil	[MJ, LHV]

Table 6: LCI Results: Resource Use

ACRONYM	NAME	UNIT
RPRE	Renewable primary energy as energy carrier	[MJ, LHV]
RPRM	Renewable primary energy resources as material utilization	[MJ, LHV]
RPRT	Total use of renewable primary energy resources	[MJ, LHV]
NRPRE	Non-renewable primary energy as energy carrier	[MJ, LHV]
NRPRM	Non-renewable primary energy as material-utilization	[MJ, LHV]
NRPRT	Total use of non-renewable primary energy resources	[MJ, LHV]
SM	Use of secondary material	[kg]
RSF	Use of renewable secondary fuels	[MJ, LHV]
NRSF	Use of non-renewable secondary fuels	[MJ, LHV]
RE	Recovered energy	[MJ, LHV]
FW	Use of fresh water	[m^3]

Table 7: LCI Results: Output Flows and Waste

ACRONYM	NAME	UNIT
HWD	Hazardous waste disposed	[kg]
NHWD	Non-hazardous waste disposed	[kg]
HLRW	High-level radioactive waste, condition, to final repository	[kg]

ILLRW	Intermediate- and low-level radioactive waste, conditioned, to final repository	[kg]
CRU	Components for re-use	[kg]
MFR	Materials for recycling	[kg]
MER	Materials for energy recovery	[kg]
EET	Exported energy	[MJ]

4.1. Life Cycle Impact Assessment Results

Table 8: North American Impact Assessment Results – ENTYRE

PARAMETER	UNIT	TOTAL	A1	A2	A3
GWP	[kg CO_2 eq.]	**5.65E+03**	5.36E+03	1.69E+02	1.17E+02
ODP	[kg CFC-11 eq.]	**3.06E-06**	3.06E-06	-9.45E-13	-3.89E-12
AP	[kg SO_2 eq.]	**3.09E+01**	2.99E+01	8.73E-01	1.75E-01
EP	[kg N eq.]	**6.85E-01**	5.99E-01	7.17E-02	1.44E-02
SFP	[kg O_3 eq.]	**2.87E+02**	2.64E+02	1.99E+01	2.85E+00
ADPF	Surplus MJ	**5.86E+03**	5.44E+03	3.32E+02	9.49E+01

Table 9: North American Impact Assessment Results – LVLZ

PARAMETER	UNIT	TOTAL	A1	A2	A3
GWP	[kg CO_2 eq.]	**7.70E+03**	7.35E+03	2.33E+02	1.21E+02
ODP	[kg CFC-11 eq.]	**4.22E-06**	4.22E-06	-1.30E-12	-3.94E-12
AP	[kg SO_2 eq.]	**4.23E+01**	4.09E+01	1.20E+00	1.82E-01
EP	[kg N eq.]	**9.33E-01**	8.20E-01	9.88E-02	1.49E-02
SFP	[kg O_3 eq.]	**3.92E+02**	3.62E+02	2.75E+01	3.03E+00
ADPF	Surplus MJ	**8.01E+03**	7.45E+03	4.57E+02	1.04E+02

Table 10: North American Impact Assessment Results – RZR

PARAMETER	UNIT	TOTAL	A1	A2	A3
GWP	[kg CO_2 eq.]	**6.02E+03**	5.72E+03	1.80E+02	1.17E+02
ODP	[kg CFC-11 eq.]	**3.26E-06**	3.26E-06	-1.01E-12	-3.89E-12
AP	[kg SO_2 eq.]	**3.30E+01**	3.19E+01	9.30E-01	1.76E-01
EP	[kg N eq.]	**7.29E-01**	6.38E-01	7.64E-02	1.45E-02
SFP	[kg O_3 eq.]	**3.06E+02**	2.82E+02	2.12E+01	2.88E+00
ADPF	Surplus MJ	**6.25E+03**	5.80E+03	3.53E+02	9.63E+01

4.2. Life Cycle Inventory Results

Table 11: Resource Use – ENTYRE

PARAMETER	UNIT	TOTAL	A1	A2	A3
RPRE	[MJ, LHV]	**2.42E+04**	2.40E+04	7.71E+01	9.27E+01
RPRM	[MJ, LHV]	**6.71E+03**	6.71E+03	0.00E+00	0.00E+00
RPRT	[MJ, LHV]	**3.09E+04**	3.07E+04	7.71E+01	9.27E+01
NRPRE	[MJ, LHV]	**6.59E+04**	6.15E+04	2.49E+03	1.83E+03
NRPRM	[MJ, LHV]	**1.35E+03**	1.35E+03	0.00E+00	0.00E+00
NRPRT	[MJ, LHV]	**6.72E+04**	6.29E+04	2.49E+03	1.83E+03
SM	[kg]	**9.39E+01**	9.39E+01	0.00E+00	0.00E+00
RSF	[MJ, LHV]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ, LHV]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
RE	[MJ, LHV]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
FW	[m3]	**1.53E+02**	1.52E+02	2.99E-01	5.41E-01

Table 12: Resource Use – LVLZ

PARAMETER	UNIT	TOTAL	A1	A2	A3
RPRE	[MJ, LHV]	**3.31E+04**	3.29E+04	1.06E+02	9.35E+01
RPRM	[MJ, LHV]	**9.27E+03**	9.27E+03	0.00E+00	0.00E+00
RPRT	[MJ, LHV]	**4.24E+04**	4.22E+04	1.06E+02	9.35E+01
NRPRE	[MJ, LHV]	**8.96E+04**	8.43E+04	3.44E+03	1.89E+03
NRPRM	[MJ, LHV]	**1.86E+03**	1.86E+03	0.00E+00	0.00E+00
NRPRT	[MJ, LHV]	**9.15E+04**	8.62E+04	3.44E+03	1.89E+03
SM	[kg]	**9.39E+01**	9.39E+01	0.00E+00	0.00E+00
RSF	[MJ, LHV]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ, LHV]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
RE	[MJ, LHV]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
FW	[m3]	**2.10E+02**	2.09E+02	4.12E-01	5.42E-01

Table 13: Resource Use – RZR

PARAMETER	UNIT	TOTAL	A1	A2	A3
RPRE	[MJ, LHV]	**2.58E+04**	2.56E+04	8.22E+01	9.27E+01
RPRM	[MJ, LHV]	**7.15E+03**	7.15E+03	0.00E+00	0.00E+00
RPRT	[MJ, LHV]	**3.30E+04**	3.28E+04	8.22E+01	9.27E+01
NRPRE	[MJ, LHV]	**7.01E+04**	6.57E+04	2.66E+03	1.84E+03
NRPRM	[MJ, LHV]	**1.43E+03**	1.43E+03	0.00E+00	0.00E+00
NRPRT	[MJ, LHV]	**7.16E+04**	6.71E+04	2.66E+03	1.84E+03
SM	[kg]	**9.09E+01**	9.09E+01	0.00E+00	0.00E+00
RSF	[MJ, LHV]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ, LHV]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
RE	[MJ, LHV]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
FW	[m3]	**1.63E+02**	1.62E+02	3.18E-01	5.40E-01

Table 14: Output Flows and Waste Categories – ENTYRE

PARAMETER	UNIT	TOTAL	A1	A2	A3
HWD	[kg]	**5.69E-01**	5.69E-01	2.02E-05	9.96E-07
NHWD	[kg]	**1.44E+03**	1.41E+03	9.40E-02	3.01E+01
HLRW	[kg]	**-1.27E-03**	-1.07E-03	-6.66E-06	-1.98E-04
ILLRW	[kg]	**-3.27E-02**	-2.71E-02	-1.80E-04	-5.46E-03
CRU	[kg]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	**-2.73E+02**	0.00E+00	0.00E+00	-2.73E+02
MER	[kg]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	**-5.80E+00**	-5.80E+00	0.00E+00	0.00E+00

Table 15: Output Flows and Waste Categories – LVLZ

PARAMETER	UNIT	TOTAL	A1	A2	A3
HWD	[kg]	**7.80E-01**	7.80E-01	2.78E-05	1.09E-06
NHWD	[kg]	**1.98E+03**	1.94E+03	1.30E-01	4.14E+01
HLRW	[kg]	**-1.67E-03**	-1.46E-03	-9.18E-06	-1.97E-04
ILLRW	[kg]	**-4.27E-02**	-3.70E-02	-2.48E-04	-5.45E-03
CRU	[kg]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	**-3.78E+02**	0.00E+00	0.00E+00	-3.78E+02
MER	[kg]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	**-8.01E+00**	-8.01E+00	0.00E+00	0.00E+00

Table 16: Output Flows and Waste Categories – RZR

PARAMETER	UNIT	TOTAL	A1	A2	A3
HWD	[kg]	**6.07E-01**	6.07E-01	2.15E-05	1.01E-06
NHWD	[kg]	**1.54E+03**	1.51E+03	1.00E-01	3.20E+01
HLRW	[kg]	**-1.35E-03**	-1.14E-03	-7.10E-06	-1.97E-04
ILLRW	[kg]	**-3.45E-02**	-2.89E-02	-1.91E-04	-5.45E-03
CRU	[kg]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	**-2.91E+02**	0.00E+00	0.00E+00	-2.91E+02
MER	[kg]	**0.00E+00**	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	**-6.17E+00**	-6.17E+00	0.00E+00	0.00E+00

5. LCA Interpretation

Nearly the entirety of burdens for all impact categories fall within module A1 (production of raw materials). Within raw materials production, the majority of impact categories are driven by the production of aluminum.

Though some raw materials are transported vast distances, the inbound transportation module (A2) has a modest contribution to overall impact. Module A2 also tends to have a slightly more pronounced, though overall minimal, contribution in EP, AP, and SFP.

Manufacturing (A3) impacts are minimal across all impact categories, with the exception of ODP and Water, which is primarily driven by the presence of packaging material.

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7. Contact Information

7.1. Study Commissioner

CENTRIA
1550 Coraopolis Heights Road Suite 500
Moon Township, PA 15108
www.centria.com

7.2. LCA Practitioner

Sphera
170 Milk St, 3rd floor
Boston, MA 02109
+1 (617) 247-4477
http://www.sphera.com