Life Cycle Assessment (LCA) Project Report

Submission for CAA Bonus A – as of 08/15/2025

This Life Cycle Assessment (LCA) report examines the environmental impacts of Horizon Organic's Gable Carton packaging from raw material sourcing to end of life. Prepared in line with ISO 14040 and 14044 standards and verified by Planet FWD, it supports Horizon Organic's submission for CAA Bonus A and reflects the company's commitment to sustainability.

Contents

I. General Information

PRODUCER DETAILS

Producer Name	Horizon Organic Dairy, LLC
Producer PRO ID (TIN, other) – EIN Code Provided	
Mailing Address	Horizon Organic Dairy, LLC 12303 Airport Way, Suite 200 Broomfield CO 80021
Email	legal@horizon.com
Phone	1-888-494.3020
Website	www.horizon.com
Date of report submission	15 August 2025

STANDARDS AND SCOPE VERFICATION

Commissioner of the LCA	Horizon Organic
Date of report	12 August 2025
Reference Standard(s)	ISO 14044, 14040
LCA Reference Data	Bill of materials for the product and secondary modelling
Scope of LCA (modules)	Modules A & C
LCA Verification Organization	Planet FWD
LCA Verifier	Dr. Miranda Gorman

PRODUCT & SKU DETAILS

Product Name	Gable Top Carton
SKU/Reference Number(s)	Evergreen 64oz Gable Top Carton - 1004577 Evergreen 59oz Gable Top Carton - 1006377
SKU Batch Number	
Date SKU entered OR Market	Prior to Jan 1 2023
Place of Production	
Date of data collection	4th August 2025

UNIT DATA SUMMARY

Declared functional unit (primary packaging)	The packaging required to transport 1 cubic meter of fluid from the filling site to the customer. Equivalent to 528.41 units, 64 oz each.
Declared unit mass (primary)	34.9 kg
Declared unit mass (secondary)	N/A
Declared unit mass (tertiary)	26.9 kg
Declared unit mass (total)	61.8 kg

II. Producer, Product and SKU Details

ABOUT THE PRODUCER

Horizon Organic, founded in 1991, is the largest USDA-certified organic dairy brand in North America, sourcing from over 700 family farms. Now owned by Platinum Equity, it was previously part of Danone and Dean Foods. Certified as a B Corp in 2024, Horizon is known for its sustainable practices and products like grass-fed and Growing Years® milk.

GOAL OF LCA STUDY + Relevant Bonus if applicable

Horizon Organic submits this LCA study to disclose the environmental impacts of the Gable Top Carton. They do so as an application for fee reduction as part of Bonus A.

PRODUCT DESCRIPTION

A carton container of 64 oz volume. Made of mixed materials High-Density Polyethylene, liquid packaging board, Low-Density Polyethylene, Nylon 6, Ethylene Vinyl Alcohol and Linear Low-Density Polyethylene. The weight of one unit is 0.258 lbs (3 d.p.).

No secondary packaging is present (plastic film).

Tertiary container used is a corrugated cardboard box. One box can hold six cartons, the weight of one box is 0.673 lbs (3 d.p.).

PRODUCT PHOTOS & DIAGRAMS

TOTAL MATERIAL COMPOSITION

Material Category	Mass %	Material Origin
Plastics	10%	
Paper	90%	
Metals	0%	
Minerals	0%	
Bio-based	0%	
Glass	0%	

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit (DU)	The amount of packaging required to transport 1 cubic meter of fluid.
Mass per declared unit	61.79 kg
Functional unit (FU)	The packaging required to transport 1 cubic meter of fluid from the filling site to the customer. Equivalent to 528.41 units, 64 oz each.
Averaging approach (for SKU batches)	N/A

PRIMARY PACKAGING MATERIAL COMPOSITION

Component	Material	Separable?	Component Weight, g	Weight DU, kg	Mass %	PCR Content, %	Material Origin
Gable Top Carton	Liquid packaging board, Low-Density Polyethylene, Nylon 6, Ethylene Vinyl Alcohol and Linear Low-Density Polyethylene	Required processing					
PE Cap	High-Density Polyethylene	Yes					

SECONDARY PACKAGING MATERIAL COMPOSITION

Component	Material	Separable?	Component Weight, g	Weight DU, kg	Mass %	PCR Content, %	Material Origin
N/A							

TERTIARY PACKAGING MATERIAL COMPOSITION

Component	Material	Separable?	Component Weight, g	Weight DU, kg	Mass %	PCR Content, %	Material Origin
Box	Cardboard	Yes					

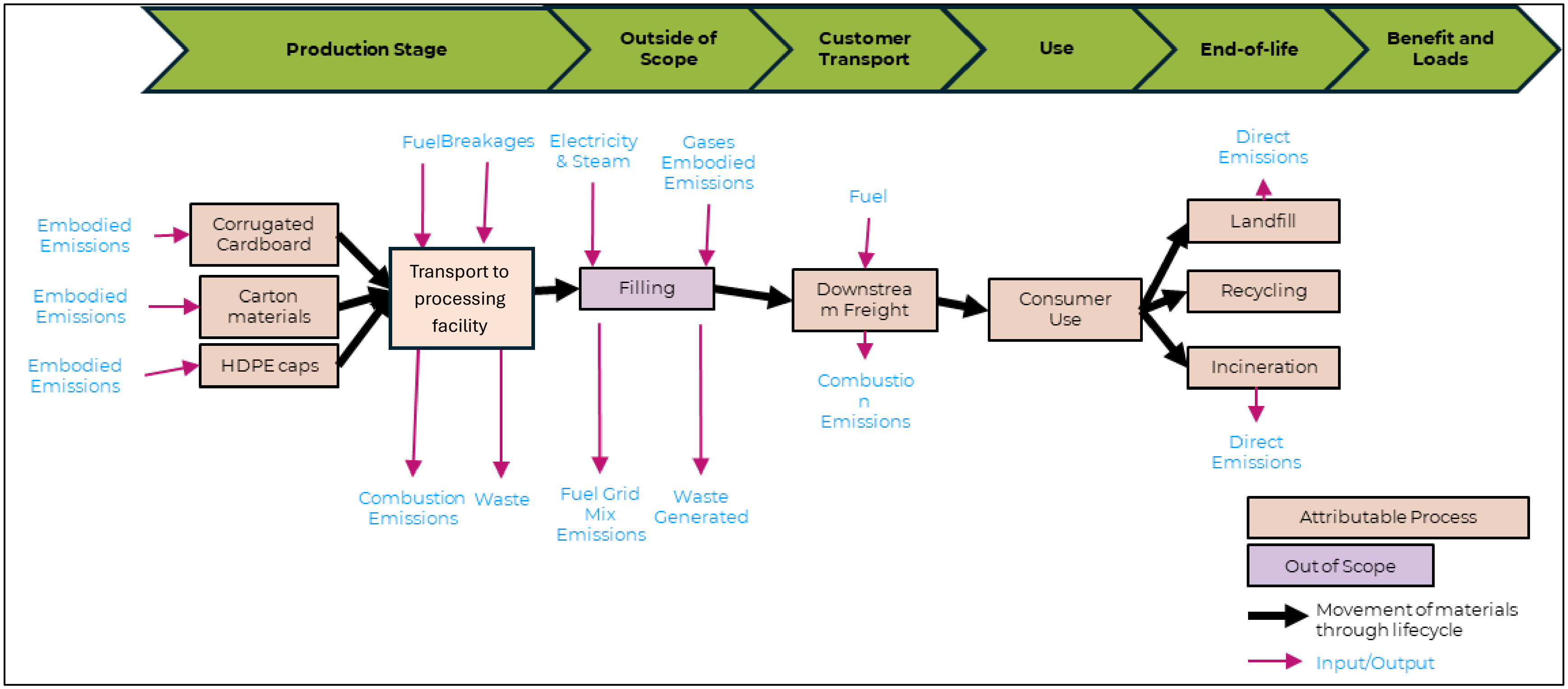
III. Product Life Cycle

SYSTEM BOUNDARY

This report presents the Life Cycle Assessment (LCA) data for the Gable Top Carton used by Horizon Organic as a packaging material. The analysis follows the Core Product Category Rules outlined in Chapter 340, as required by the Oregon Authority. It evaluates environmental impacts associated with the product stage (A) and the end-of-life stage (C). Since the carton is not reusable, the use stage is excluded from the assessment. Impact conversion factors were sourced from the Ecoinvent databases and applied using the SimaPro software.

This LCA identifies the raw material composition of the packaging material based on a provided bill of materials alongside secondary data. The transportation routes of this packaging to Horizon are quantified based on the identified location of the supplier and manufacturing site. All manufacturing only considers the manufacturing of the packaging based on secondary data models. The transportation to the customer is packaging weight only to the Oregon purchaser. No use stages are considered as it is a single use packaging product. End of life stages are based on assumptions for end-of-life processing. No benefits and loads are considered within the system boundary. A full system boundary diagram is provided.

Module A				**Module B**			**Module C**			**Module D**				
Production stage				**Use Stage**			**End of life Stage**			**Beyond System Boundaries**				
A1	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**C2**	**C3**	**C4**	**D**				
X	*X*	*X*	*X*	*N/A*	*N/A*	*N/A*	*X*	*X*	*X*	*X*				
Raw Materials	Transport	Manufacturing	Customer Transport	Return Transportation	Washing & sterilization	Redistribution transport	Transport to end-of-life processing	Waste processing of covered materials	Disposal or recovery	Recovery Benefits	Incineration	Landfilling	Composting	Material Substitution



Production Stage
Outside of Scope
Customer Transport
Use
End-of-life
Benefit and Loads
Embodied Emissions
Corrugated Cardboard
Embodied Emissions
Carton materials
Embodied Emissions
HDPE caps
Fuel
Breakages
Transport to processing facility
Combustion Emissions
Waste
Electricity & Steam
Gases Embodied Emissions
Filling
Fuel Grid Mix Emissions
Waste Generated
Fuel
Downstream Freight
Combustion Emissions
Consumer Use
Direct Emissions
Landfill
Recycling
Incineration
Direct Emissions
Attributable Process
Out of Scope
Movement of materials through lifecycle
Input/Output

MODULE DESCRIPTIONS

MODULE A (A1-A4)

Raw Materials	Cardboard was sourced from the US and specific US based factors were applied. All other factors for materials utilized global or rest of world factors. Provided by a bill of materials and supplier locations. Upstream transportation of these materials. Raw materials include corrugated cardboard, carton material and high density polyethylene cap – This dataset was provided by Horizon. The carton material is made of liquid packaging board, low density polyethylene, nylon 6, ethylene vinyl alcohol and linear low density polyethylene – This information was presented in an LCA report of a similar product produced by Trayak (LCA consultant of Practiv Evergreen who supplies the carton product to Horizon). Percentage contributions of the individual materials making up the carton board was used in this assessment. Assumption on Post Consumer Recycle (PCR) content of zero percent was taken from the Trayak LCA report.
Transport	Specific distances were provided by Horizon and utilized when available to calculate specific freighting (tonne.km).
Customer Transportation to place of purchase	Downstream transportation was taken the distance between manufacturing facility and Oregon, DC, in a EURO 5 >32 tonne truck.

	When not available a local transportation assumption of 450 km was utilized. This data was assumed using data in US 2017 Economic Census: Transported published by the US Department of Transportation. Global average EURO 5 >32 tonne truck was identified as the assumed vehicle.
Manufacturing (including ancillaries and co-products)	All manufacturing processes were identified by likely processing and global transformation factors based on tonnage of output. Transportation of manufacturing waste was assumed as 32 km.

MODULE B (B1-B3) – *for reusable packaging SKUs*

Return Transportation	N/A
Washing & sterilization	N/A
Redistribution transport	N/A

MODULE C (C2-C4)

Transport to End-of-Life Processing	End of life freight was estimated at 32 km for local refuse facilities in a EURO 5 >32 tonne truck. Percentages of materials being recycled, landfilled and incinerated were provided in the Trayak LCA report.
Waste processing of covered materials	No waste processing was considered for recycling activities.
Disposal or recovery activities	Landfill and incineration activities impacts were considered based on global average treatment processes.

MODULE D

Any impacts outside of system boundary	Only material substitution credits accounted for.
Incineration	No benefits considered.
Landfilling	No benefits considered.
Composting	No benefits considered.
Material Substitution Credits	Material substitution credits allocated based an estimated 90% recycling rates into the same input materials.

IV. Life-Cycle Assessment Criteria

CUT-OFF CRITERIA & ASSUMPTIONS

The collected data covered all raw materials; associated transport to manufacturing sites; process energy; direct production wastes; emissions to air and water. Cut off from core processes in the LCA have been permitted up to a maximum of 5% of the total mass of material inputs or 5% of the total energy content of fuels and energy carriers.

ASSUMPTIONS AND ESTIMATES

- A distance of 32 km was assumed for transportation activities of, waste to waste processing sites and, sourcing the corrugated cardboard material.
- Means of transportation was assumed as >32 metric ton lorries.
- Ratio between recycling, landfilling and incinerating materials both during the production stage and end of life stage was adopted from an LCA report produced by Trayak, for a similar gable top carbon product of different dimensions.
- As per the LCA produced by Trayak, the carton product is made of liquid packaging board, low-density

EXCLUDED PROCESSES

Filling and preparation were excluded for this product as this LCA considers packaging only.

ALLOCATIONS

In this study, no allocation has been completed. Consequently, no tabulated data on allocation is provided.

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. This is not the case for this assessment.

LCA SOFTWARE AND BIBLIOGRAPHY

The LCA and report have been prepared according to the reference standards and ISO 14040/14044 and PEF from EU 2021.2279 using Simapro software. Calculations utilized Ecoinvent databases as sources of environmental data.

Supplemental Report for ISO Conformant Life Cycle Assessment Related to Gable Top Cartons and Equivalent Containers for Pactiv Evergreen Inc., Group: 52 oz Premium or Plant Based Milk, prepared by Trayak LLC in March 2023.

polyethylene (LDPE), nylon 6, ethylene vinyl alcohol (EVAH) and linear low-density polyethylene (LLDPE).

- Corrugated cardboard was assumed to be 100% recyclable.
- Emission conversion factors of Ethylene vinyl acetate copolymer were used for EVAH as exact information for EVAH is not available on Ecoinvent.
- EPA SMM indicates that on average corrugated cardboard packaging in the US has a recycling rate of 96.5%, the remaining waste is assumed to be landfilled.
- Material transportation distances were assumed at 450 km when not known based on data in US 2017 Economic Census: Transported published by the US Department of Transportation.

PactivCarton-Trayak-SupplementReport-2023 FINAL - 52 oz Milk. (n.d.).

Circular Action Alliance®

V. Life Cycle Inventory Analysis & Hazardous Substance Assessment

Below the full process flow inventory is provided from the lifecycle assessment. This shows all materials and activities LCA stages, and impact factors applied within this LCA.

Item Description	Unit	ISO Category	Stage	Impact Factor (as apparent in Ecoinvent)
Corrugated cardboard	kg/FU	Raw Materials	A1	1 kg Corrugated board box {US}
HDPE	kg/FU	Raw Materials	A1	1 kg Polyethylene, high density, granulate {RoW}
Liquid packaging board	kg/FU	Raw Materials	A1	1 kg Liquid packaging board {RoW}
Low-Density Polyethylene (LDPE)	kg/FU	Raw Materials	A1	1 kg Polyethylene, low density, granulate {GLO}
Nylon 6	kg/FU	Raw Materials	A1	1 kg Nylon 6 {RoW}
Ethylene Vinyl Alcohol (EVAH)	kg/FU	Raw Materials	A1	1 kg Ethylene vinyl acetate copolymer {RoW}
Linear Low-Density Polyethylene (LLDPE)	kg/FU	Raw Materials	A1	1 kg Polyethylene, linear low density, granulate {GLO}
Transport - Corrugated cardboard	tonne.km/FU	Upstream Transport	A2	1 tkm Transport, freight, lorry >32 metric ton, EURO5 {RoW}
Transport - HDPE	tonne.km/FU	Upstream Transport	A2	1 tkm Transport, freight, lorry >32 metric ton, EURO5 {RoW}
Transport - Liquid packaging board	tonne.km/FU	Upstream Transport	A2	1 tkm Transport, freight, lorry >32 metric ton, EURO5 {RoW}
Transport - Low-Density Polyethylene (LDPE)	tonne.km/FU	Upstream Transport	A2	1 tkm Transport, freight, lorry >32 metric ton, EURO5 {RoW}
Transport - Nylon 6	tonne.km/FU	Upstream Transport	A2	1 tkm Transport, freight, lorry >32 metric ton, EURO5 {RoW}
Transport - Ethylene Vinyl Alcohol (EVAH)	tonne.km/FU	Upstream Transport	A2	1 tkm Transport, freight, lorry >32 metric ton, EURO5 {RoW}
Transport - Linear Low-Density Polyethylene (LLDPE)	tonne.km/FU	Upstream Transport	A2	1 tkm Transport, freight, lorry >32 metric ton, EURO5 {RoW}
Landfill Mass (kg) - Corrugated cardboard	kg/FU	Manufacturing	A3	1 kg Waste paperboard {RoW}

Landfill Mass (kg) – HDPE	kg/FU	Manufacturing	A3	1 kg Inert waste, for final disposal {RoW}
Landfill Mass (kg) – Liquid packaging board	kg/FU	Manufacturing	A3	1 kg Waste paperboard {RoW}
Landfill Mass (kg) – Low-Density Polyethylene (LDPE)	kg/FU	Manufacturing	A3	1 kg Inert waste, for final disposal {RoW}
Landfill Mass (kg) – Nylon 6	kg/FU	Manufacturing	A3	1 kg Inert waste, for final disposal {RoW}
Landfill Mass (kg) – Ethylene Vinyl Alcohol (EVAH)	kg/FU	Manufacturing	A3	1 kg Inert waste, for final disposal {RoW}
Landfill Mass (kg) – Linear Low-Density Polyethylene (LLDPE)	kg/FU	Manufacturing	A3	1 kg Inert waste, for final disposal {RoW}
Recycling Mass (kg) – Corrugated cardboard	kg/FU	Manufacturing	A3	Out of Scope
Recycling Mass (kg) – HDPE	kg/FU	Manufacturing	A3	Out of Scope
Recycling Mass (kg) – Liquid packaging board	kg/FU	Manufacturing	A3	Out of Scope
Recycling Mass (kg) – Low-Density Polyethylene (LDPE)	kg/FU	Manufacturing	A3	Out of Scope
Recycling Mass (kg) – Nylon 6	kg/FU	Manufacturing	A3	Out of Scope
Recycling Mass (kg) – Ethylene Vinyl Alcohol (EVAH)	kg/FU	Manufacturing	A3	Out of Scope
Recycling Mass (kg) – Linear Low-Density Polyethylene (LLDPE)	kg/FU	Manufacturing	A3	Out of Scope
Incineration Mass (kg) – Corrugated cardboard	kg/FU	Manufacturing	A3	1 kg Municipal solid waste {RoW} – Incineration
Incineration Mass (kg) – HDPE	kg/FU	Manufacturing	A3	1 kg Waste polyethylene {GLO} – Incineration
Incineration Mass (kg) – Liquid packaging board	kg/FU	Manufacturing	A3	1 kg Municipal solid waste {RoW} – Incineration
Incineration Mass (kg) – Low-Density Polyethylene (LDPE)	kg/FU	Manufacturing	A3	1 kg Waste polyethylene {GLO} – Incineration
Incineration Mass (kg) – Nylon 6	kg/FU	Manufacturing	A3	1 kg Municipal solid waste {RoW} – Incineration
Incineration Mass (kg) – Ethylene Vinyl Alcohol (EVAH)	kg/FU	Manufacturing	A3	1 kg Municipal solid waste {RoW} – Incineration

Incineration Mass (kg) – Linear Low-Density Polyethylene (LLDPE)	kg/FU	Manufacturing	A3	1 kg Waste polyethylene {GLO} – Incineration
Transport of A3 waste, assuming 32 km	tonne.km/FU	Manufacturing	A3	1 tkm Transport, freight, lorry >32 metric ton, EURO5 {RoW}
Manufacturing – HDPE – Injection molding	kg/FU	Manufacturing	A3	1 kg Injection moulding {RoW}
Manufacturing – Liquid packaging board – Offset printing	kg/FU	Manufacturing	A3	1 kg Carton board box production, with offset printing {RoW}
Manufacturing – Low-Density Polyethylene (LDPE) – Co-extrusion	kg/FU	Manufacturing	A3	1 kg Extrusion, co-extrusion {RoW}
Manufacturing – Nylon 6 – Co-extrusion	kg/FU	Manufacturing	A3	1 kg Extrusion, co-extrusion {RoW}
Manufacturing – Ethylene Vinyl Alcohol (EVAH) – Co-extrusion	kg/FU	Manufacturing	A3	1 kg Extrusion, co-extrusion {RoW}
Manufacturing – Linear Low-Density Polyethylene (LLDPE) – Co-extrusion	kg/FU	Manufacturing	A3	1 kg Extrusion, co-extrusion {RoW}
EoL – Recycling – Corrugated cardboard	kg/FU	Waste Processing	C3	Out of Scope
EoL – Recycling – HDPE	kg/FU	Waste Processing	C3	Out of Scope
EoL – Recycling – Liquid packaging board	kg/FU	Waste Processing	C3	Out of Scope
EoL – Recycling – Low-Density Polyethylene (LDPE)	kg/FU	Waste Processing	C3	Out of Scope
EoL – Recycling – Nylon 6	kg/FU	Waste Processing	C3	Out of Scope
EoL – Recycling – Ethylene Vinyl Alcohol (EVAH)	kg/FU	Waste Processing	C3	Out of Scope
EoL – Recycling – Linear Low-Density Polyethylene (LLDPE)	kg/FU	Waste Processing	C3	Out of Scope
EoL – Incineration – Corrugated cardboard	kg/FU	Waste Processing	C3	1 kg Municipal solid waste {RoW} – Incineration
EoL – Incineration – HDPE	kg/FU	Waste Processing	C3	1 kg Waste polyethylene {GLO} – Incineration
EoL – Incineration – Liquid packaging board	kg/FU	Waste Processing	C3	1 kg Municipal solid waste {RoW} – Incineration

EoL – Incineration – Low-Density Polyethylene (LDPE)	kg/FU	Waste Processing	C3	1 kg Waste polyethylene {GLO} – Incineration
EoL – Incineration – Nylon 6	kg/FU	Waste Processing	C3	1 kg Municipal solid waste {RoW} – Incineration
EoL – Incineration – Ethylene Vinyl Alcohol (EVAH)	kg/FU	Waste Processing	C3	1 kg Municipal solid waste {RoW} – Incineration
EoL – Incineration – Linear Low-Density Polyethylene (LLDPE)	kg/FU	Waste Processing	C3	1 kg Waste polyethylene {GLO} – Incineration
EoL – Landfilling – Corrugated cardboard	kg/FU	Disposal	C4	1 kg Waste paperboard {RoW}
EoL – Landfilling – HDPE	kg/FU	Disposal	C4	1 kg Inert waste, for final disposal {RoW}
EoL – Landfilling – Liquid packaging board	kg/FU	Disposal	C4	1 kg Waste paperboard {RoW}
EoL – Landfilling – Low-Density Polyethylene (LDPE)	kg/FU	Disposal	C4	1 kg Inert waste, for final disposal {RoW}
EoL – Landfilling – Nylon 6	kg/FU	Disposal	C4	1 kg Inert waste, for final disposal {RoW}
EoL – Landfilling – Ethylene Vinyl Alcohol (EVAH)	kg/FU	Disposal	C4	1 kg Inert waste, for final disposal {RoW}
EoL – Landfilling – Linear Low-Density Polyethylene (LLDPE)	kg/FU	Disposal	C4	1 kg Inert waste, for final disposal {RoW}
EoL – Transport, assuming 32 km	tonne.km/FU	Transport	C2	1 tkm Transport, freight, lorry >32 metric ton, EURO5 {RoW}
Downstream Freight – Large truck	tonne.km/FU	Downstream Transport	A4	1 tkm Transport, freight, lorry >32 metric ton, EURO5 {RoW}

MODULE A – INVENTORY FLOWS

Type	Flow	Value	Unit	Distance	Mode
Inputs	Biogenic carbon flows	27.53	kg C	N/A	N/A

Type	Flow	Value	Unit	Distance	Mode
Outputs	Biogenic carbon flows	2.75	kg C	N/A	N/A
	Hazardous waste	0.00	kg	N/A	N/A
	Non-hazardous waste	6.87	kg	N/A	N/A
	Plastic leakage inventory	0.04	kg	N/A	N/A
	Methane leakage	22.13	kg CO_2e CH_4	N/A	N/A

MODULE B – INVENTORY FLOWS

Type	Flow	Value	Unit	Distance	Mode
Inputs	Biogenic carbon flows	N/A	N/A	N/A	N/A
Outputs	Biogenic carbon flows	N/A	N/A	N/A	N/A
	Hazardous waste	N/A	N/A	N/A	N/A
	Non-hazardous waste	N/A	N/A	N/A	N/A
	Plastic leakage inventory	N/A	N/A	N/A	N/A
	Methane leakage	N/A	N/A	N/A	N/A

MODULE C – INVENTORY FLOWS

Type	Flow	Value	Unit	Distance	Mode
Inputs	Biogenic carbon flows	N/A	kg C	N/A	N/A
Outputs	Biogenic carbon flows	24.78	kg C	N/A	N/A

Type	Flow	Value	Unit	Distance	Mode
	Hazardous waste	-	kg	N/A	N/A
	Non-hazardous waste	61.79	kg	N/A	N/A
	Plastic leakage inventory	0.33	kg	N/A	N/A
	Methane leakage	38.70	kg CO_2e CH_4	N/A	N/A

MODULE D – INVENTORY FLOWS

Type	Flow	Value	Unit	Distance	Mode
Inputs	Biogenic carbon flows	N/A	N/A	N/A	N/A
Outputs	Biogenic carbon flows	N/A	N/A	N/A	N/A
	Hazardous waste	N/A	N/A	N/A	N/A
	Non-hazardous waste	N/A	N/A	N/A	N/A
	Plastic leakage inventory	N/A	N/A	N/A	N/A
	Methane leakage	N/A	N/A	N/A	N/A

HAZARDOUS SUBSTANCE ASSESSMENT

The hazardous substances are assessed using the freshwater ecotoxicity indicator. This measures the quantity of environmental emissions resulting in aquatic toxic impacts. These emissions are released throughout the product life cycle. The indicator is reported in Comparative Toxic Units for ecosystems (CTUe). Each CTUe corresponds to the fraction of disappeared species over a cubic metre of freshwater or marine water during one year. The calculation utilizes aquatic toxicity characterization factors from USEtox 2.0. Impact factors are derived from BS EN 15804 + A2. The Ecoinvent database and Simapro software support the calculations.

HUMAN HEALTH IMPACT STATEMENT

The human health impacts are evaluated using the human toxicity midpoint indicator. This calculates the quantity of short-term environmental emissions leading to cancer and toxic non-cancer effects on humans. These emissions occur throughout the life cycle. The indicator is reported in Comparative Toxic Units for humans (CTUh). According to the ILCD Handbook, CTUh reflects the compatibility between midpoint and endpoint recommendations for life cycle impact assessment in the European context. The midpoint indicator, defined in USEtox as Comparative Toxic Units (CTUhuman), corresponds to cases of cancer and non-cancer. The severity factor reflects Disability Adjusted Life Years per case. Impact factors are derived from BS EN 15804 + A2. The Ecoinvent database and Simapro software support the calculations.

VI. Life Cycle Impact Assessment

	Impact Category	Unit	A1	A2	A3	A4	B1	B2	B3	C2	C3	C4	D
A	Climate Change	kg CO_2 eq.	5.93E+00	1.67E+01	2.80E+01	6.40E+00	-	-	-	2.09E-01	8.78E+00	5.28E+01	-
B	Ozone depletion	kg CFC-11 eq.	2.58E-06	2.61E-07	1.57E-06	1.00E-07	-	-	-	3.27E-09	5.79E-09	5.80E-09	-
C	Human toxicity, cancer	CTUh	1.03E-07	1.44E-08	3.51E-08	5.53E-09	-	-	-	1.80E-10	2.49E-08	6.29E-08	-
D	Human toxicity, non-cancer	CTUh	3.02E-06	3.54E-07	5.01E-07	1.36E-07	-	-	-	4.42E-09	1.21E-07	2.64E-07	-
E	Particulate matter	no. of disease incidents	7.64E-06	1.68E-06	2.59E-06	6.43E-07	-	-	-	2.10E-08	2.50E-07	5.12E-06	-
F	Ionizing radiation, human health	kBq U-235 eq.	6.16E+00	2.23E-01	1.81E+00	8.55E-02	-	-	-	2.79E-03	2.53E-03	2.97E-03	-
G	Photochemical ozone formation, human health	kg NMVOC eq.	4.06E-01	8.57E-02	1.22E-01	3.28E-02	-	-	-	1.07E-03	7.33E-03	2.65E-02	-
H	Acidification	mol H^+ eq.	4.61E-01	6.03E-02	1.20E-01	2.31E-02	-	-	-	7.54E-04	3.23E-03	9.47E-03	-
I	Eutrophication, terrestrial	mol N eq.	1.24E+00	2.13E-01	2.76E-01	8.15E-02	-	-	-	2.66E-03	1.56E-02	3.77E-02	-
J	Eutrophication, freshwater	kg P eq.	2.66E-02	1.36E-03	1.22E-02	5.20E-04	-	-	-	1.70E-05	1.86E-04	1.99E-05	-
K	Eutrophication, marine	kg N eq.	1.51E-01	2.01E-02	3.10E-02	7.69E-03	-	-	-	2.51E-04	1.59E-03	1.51E-02	-
L	Ecotoxicity, freshwater	CTUe	9.32E+02	2.62E+02	3.86E+02	1.00E+02	-	-	-	3.27E+00	5.82E+01	1.73E+02	-
M	Land use	pt	8.22E+03	2.46E+02	3.56E+02	9.42E+01	-	-	-	3.07E+00	9.99E-01	6.56E+00	-
N	Water use	m^3 water eq	-1.05E+00	3.81E-02	2.33E-01	1.46E-02	-	-	-	4.76E-04	5.28E-03	3.75E-03	-
O	Resource use, minerals and metals	kg Sb eq	3.09E-04	4.51E-05	5.40E-05	1.73E-05	-	-	-	5.63E-07	3.39E-07	4.06E-07	-
P	Resource use, fossils	MJ	1.29E+03	2.43E+02	3.02E+02	9.31E+01	-	-	-	3.04E+00	1.46E+00	2.78E+00	-

VII. Sensitivity Analysis

The purpose of a sensitivity analysis is to check for variability of the results stemming from key data, parameters, or methodological choices in the life cycle evaluation of covered products. This requirement provides additional quantitative information about the potential variability of the evaluation results. Sensitivity analysis shall disclose the range, minimum and maximum, and variance across all required impact categories and indictors in the project report.

To assess the impact that changes in the supply chain or manufacturing processes sensitivity analysis can be employed. Herein, we calculated the same system whereby recycling was increased to 100% at end of life in addition to an alternative scenario where landfill was increased to 100% at end of life. This makes a “best-case” and “worst-case” scenario to compare the impact of this change. This was the only sensitivity analysis employed, due to limitation in the data primary data on electricity consumption was not available. Instead, market-based production factors were utilized. This meant that electricity sensitivity analysis was not possible. The range of results across all impact categories (where there is a variation) is provided below, where there is no material variation, the cell is left as “-”. Note B and D are not reported as they are not within scope and shall not be affected by sensitivity analysis.

	Impact Category	Unit	A1	A2	A3	A4	C2	C3	C4
A	Climate Change	kg CO2 eq.	–	–	21.2 - 38	–	–	0 - 8.8	0 - 151.5
B	Ozone depletion	kg CFC-11 eq.	–	–	–	–	–	–	–
C	Human toxicity, cancer	CTUh	–	–	–	–	–	–	–
D	Human toxicity, non-cancer	CTUh	–	–	–	–	–	–	–
E	Particulate matter	no. of disease incidents	–	–	–	–	–	–	–
F	Ionizing radiation, human health	kBq U-235 eq.	–	–	–	–	–	–	–
G	Photochemical ozone formation, human health	kg NMVOC eq.	–	–	–	–	–	–	0 - 0.1
H	Acidification	mol H+ eq.	–	–	–	–	–	–	–
I	Eutrophication, terrestrial	mol N eq.	–	–	–	–	–	–	0 - 0.1
J	Eutrophication, freshwater	kg P eq.	–	–	–	–	–	–	–
K	Eutrophication, marine	kg N eq.	–	–	–	–	–	–	–
L	Ecotoxicity, freshwater	CTUe	–	–	360 - 415	–	–	0 - 58.2	0 - 495.2
M	Land use	pt	–	–	354.9 - 356.8	–	–	0 - 1	0 - 17.2
N	Water use	m3 water eq	–	–	–	–	–	–	–
O	Resource use, minerals and metals	kg Sb eq	–	–	–	–	–	–	–
P	Resource use, fossils	MJ	–	–	301.2 - 302	–	–	0 - 1.5	0 - 7.1

VIII. Critical Review Report – LCA Third-Party Verification

To be filled in by qualified, independent verifier

CAA GUIDANCE ON LCA REPORT VERIFICATION

We ask that the verifier attest to the following:

- ☐ Are the methods used to carry out the LCA consistent with ISO 14040/14044 international standards?
- ☐ Are the methods used to carry out the LCA scientifically and technically valid?
- ☐ Are the LCA software, data and data sources used appropriate and reasonable in relation to the goal of the study?
- ☐ Do the assumptions and interpretations reflect the limitations identified and the goal of the study?
- ☐ Is the report complete, consistent, and transparent?
- ☐ Does the LCA adhere to section 8.4.1 of Annex I of EU 2021/2279?
- ☐ Are the products within the SKU batch comparable and is it reasonable to assume all products within the SKU batch would have proportional or identical LCA outcomes?
- ☐ Are all steps of the product's life cycle adequately described and are all assumptions or averages sufficiently substantiated within each life cycle stage?
- ☐ Are plastic leakage values in accordance with the Plastic Footprint Network's methodologies for (1) Macroplastics from packaging and (2) Microplastics from tires?
- ☐ Was an adequate sensitivity analysis performed on the grid mixture and recycling methodologies?
- ☐ Is it reasonable to believe all hazardous substances have been accounted for within the hazardous substance assessment?
- ☐ Are all foreseeable human health impacts captured within the human health impact statement?

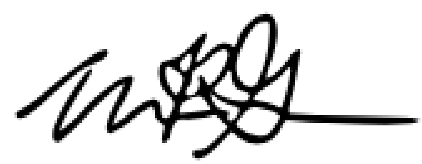
SELF-DECLARATION OF VERIFIER: *I confirm that I have sufficient knowledge and experience with the specific product category, industry, relevant standards, and geographical area of the LCA to carry out this verification. I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.*

THIRD PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations in this LCA project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the LCA report, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14040/14044 and reference standards. I confirm that the company-specific data has been examined in regards to its plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

VERIFIER SCORE *(eligibility – per PEF EU 2021.2279):* 9

VERIFIER SIGNATURE:



DATE OF VERIFICATION: *08/15/2025*

Please attach any additional documentation from the LCA or critical review report.