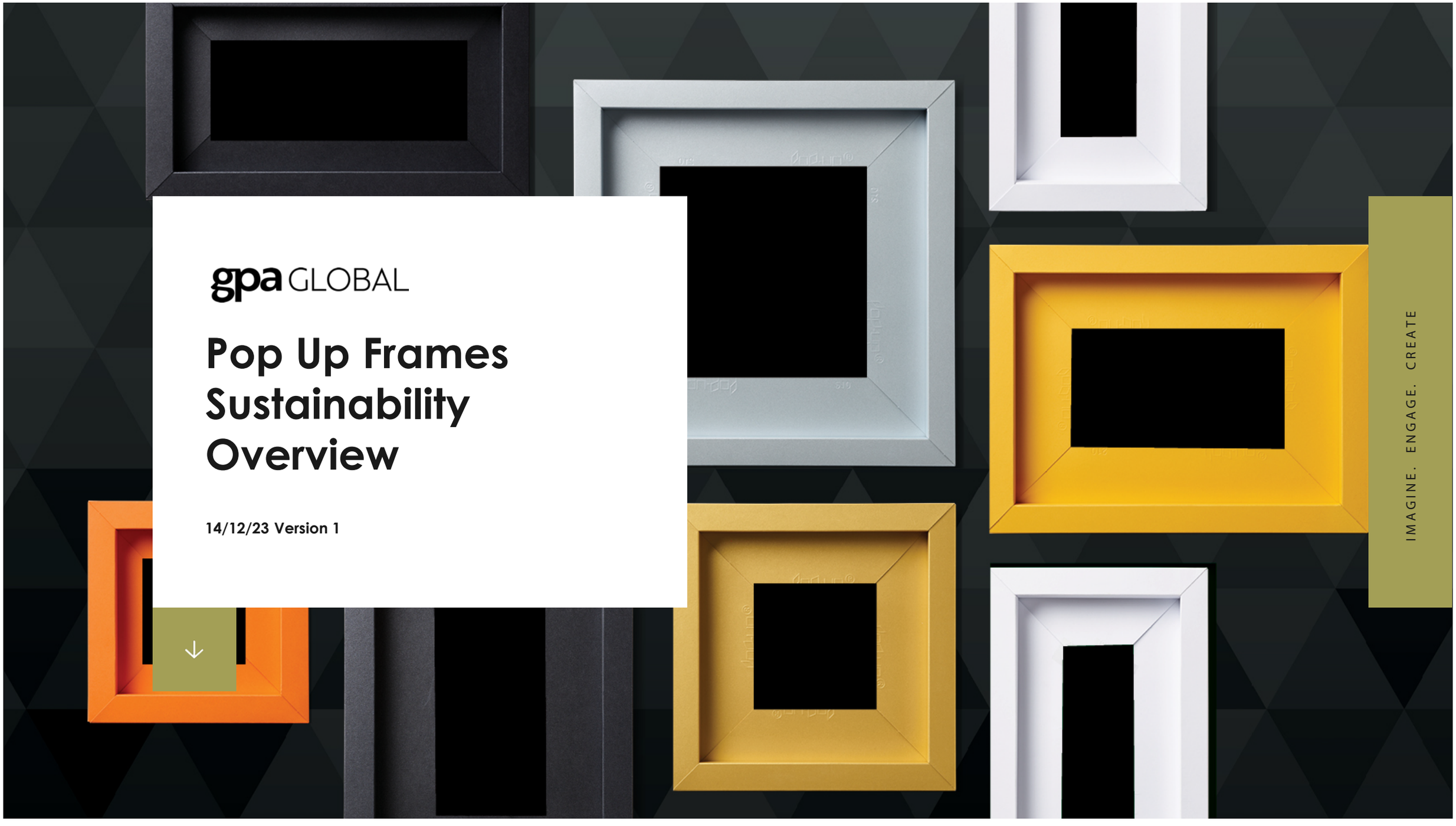

gpa GLOBAL
Pop Up Frames Sustainability Overview
14/12/23 Version 1
IMAGINE. ENGAGE. CREATE

Appendix
LCA report pages

COMPASS EcoImpact TRAYAK

Package Compare Report

Tuesday, 2023-10-31 10:05:46 AM

Goal & Scope

This report shows the environmental impact calculated using a screening Life Cycle Analysis. The analysis below can include the environmental impact for all life cycle phases in a Cradle-to-Grave analysis.

Analysis
Data Version: COMPASS 2023.3
User: Lindsey.b@gpaglobal.net
Company: GPA Global
Number of BOMs in Analysis: 4
Status: Open
Type: Internal
Material Scrap Rates considered: No

Note: This COMPASS report uses life cycle inventory (LCI) data that represents an industry average for materials, manufacturing processes, and end of life impacts. The Life Cycle Analysis (LCA) in this report can be used for directional guidance in internal decision making and understanding trade-offs. COMPASS follows the guidelines of ISO 14040 in determining and documenting the scope, assumptions, consistent boundary conditions and data sources. According to ISO 14040, LCA results should not be used to make comparative assertions between competitive products to be disclosed to the public without first conducting a third party critical review.

Functional Unit: 5,000 oz
The environmental impact calculated in this analysis is for the packaging required to deliver the amount of product described by the functional unit. This includes the number of primary, secondary and tertiary packages shown below. These package numbers were calculated based on the pallet configuration modeled in the BOM. If the secondary and tertiary package data is not entered their environmental impact cannot be calculated.The analysis below can include the environmental impact for all life cycle phases in a Cradle-to-Grave analysis.

Package Name	# of Primary Packages	# of Secondary Packages	# of Tertiary Packages
Pop Up Frames	5,000	0	0
Pine or Cedar (China)	5,000	0	0
Ramin or Basswood (Indonesia)	5,000	0	0
MDF (China)	5,000	0	0

Assumptions & Comments
All packaging/product components required to achieve the LCA goal are added to the BOM and included in the analysis : Yes
All significant manufacturing processes are included for the components of the BOM : Yes
Any components or manufacturing steps that are omitted are documented along with the reason for omission. : Yes
All relevant transportation modes & distances are included in the analysis. : Yes
Any proxies used for any of the data are documented. : Yes
All end-of-life rates for recycling, landfill, incineration etc. are appropriate for the selected end-of-life region. Any changes made are documented. : Yes

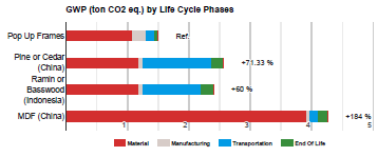
Total Environmental Impact

This section shows the total impact for each of the selected indicators used for the Life Cycle Analysis. Each indicator is composed of the material extraction, manufacturing, transportation, end of life, and use phase impacts. This will allow you to determine which life cycle phase has the greatest impact.

Note: The material phase measures the environmental footprint of extracting and processing materials. The manufacturing phase calculates the impact of the manufacturing or conversion processes that companies use to add value and create the package or product. Use phase includes the environmental impact during the useful life of the package/product. Typically, the use phase impact is due to the consumption of resources like electricity, fuel, or other consumables. For the transportation phase, the impact is calculated based on the mode of transportation (road, rail, air, sea) as well as the distances travelled. The end of life impact calculation incorporates the most likely fate of the product/package and its components based on typical curbside municipal waste management. Typical percentage rates for region based recycling, incineration, and landfill are used to calculate the impacts.

Global Warming Potential (GWP) considers the total quantity of greenhouse gasses (GHG) emitted throughout the life cycle reported in kilograms of CO2 equivalents. This calculation follows the IPCC Sixth Assessment Report (AR6) 2021 100a w/o CO2 Uptake method and considers climate feedback loops. It considers global warming potential for a 100-year timeframe.

Pop Up Frames	Material (71.68%)	1.07	Manufacturing (15.86%)	0.2378	Transportation (7.95%)	0.1192	EndOfLife (4.51%)	0.0676	UsePhase (0%)	0	Total 1.5
Pine or Cedar (China)	Material (46.2%)	1.19	Manufacturing (2.34%)	0.0601	Transportation (43.43%)	1.12	EndOfLife (8.03%)	0.2063	UsePhase (0%)	0	Total 2.57
Ramin or Basswood (Indonesia)	Material (49.45%)	1.19	Manufacturing (2.5%)	0.0601	Transportation (39.45%)	0.9468	EndOfLife (8.6%)	0.2063	UsePhase (0%)	0	Total 2.4
MDF (China)	Material (91.66%)	3.91	Manufacturing (1.13%)	0.0481	Transportation (3.34%)	0.1425	EndOfLife (3.87%)	0.165	UsePhase (0%)	0	Total 4.26



Simple Indicators
Computed based on the US Region
Differences for each BOM compared to the reference

Pine or Cedar (China)
0.229 Passenger Vehicles Driven Yearly
4,218.61 Kilometers Driven by Passenger Vehicles Yearly
455.55 Liters of Gasoline Consumed
27.71 Tree Seedlings Grown for 10 Years
0.5092 Hectares of Forests Yearly

Ramin or Basswood (Indonesia)
0.1929 Passenger Vehicles Driven Yearly
3,552.52 Kilometers Driven by Passenger Vehicles Yearly
383.62 Liters of Gasoline Consumed
23.34 Tree Seedlings Grown for 10 Years
0.4288 Hectares of Forests Yearly

MDF (China)
0.5921 Passenger Vehicles Driven Yearly
10,907.17 Kilometers Driven by Passenger Vehicles Yearly
1,177.83 Liters of Gasoline Consumed
71.66 Tree Seedlings Grown for 10 Years
1.32 Hectares of Forests Yearly

GWP (ton CO_2 eq.) of Components

Pop Up Frames	Pine or Cedar (China)	Ramin or Basswood (Indonesia)	MDF (China)
PS 0.1192 (7.95%)	PS 1.12 (43.43%)	PS 0.9468 (39.45%)	PS 0.1425 (3.34%)
PP 0 (0%)	PP 0 (0%)	PP 0 (0%)	PP 0 (0%)
Paper 1.38 (92.05%)	NA	NA	NA
NA	Pine or Cedar 1.45 (56.57%)	NA	NA
NA	NA	Ramin or Basswood 1.45 (60.55%)	NA
NA	NA	NA	MDF 4.12 (96.66%)
SP 0 (0%)	SP 0 (0%)	SP 0 (0%)	SP 0 (0%)
TP 0 (0%)	TP 0 (0%)	TP 0 (0%)	TP 0 (0%)
Item 3 0 (0%)	Item 3 0 (0%)	Item 3 0 (0%)	Item 3 0 (0%)
Total 1.5	Total 2.57	Total 2.4	Total 4.26

Compare BOM Details

Name	Unit Of Measure	Quantity	Total Package Weight/Unit Product Ratio	Primary Package Cube Efficiency %	Secondary Package Cube Efficiency %	Tertiary Package (Pallet) Cube Efficiency %	Primary Package Recyclable Score	EOL Recycling Potential	EOL Recycling Potential (%)	EOL Waste Potential	EOL Waste Potential (%)	EOL Total Mass
Pop Up Frames	Each	5,000	100.0 g/oz	0	0	0	5	410 kg	82	90 kg	18	500 kg
Pine or Cedar (China)	Each	5,000	1000.0 g/oz	0	0	0	5	0 kg	0	5 ton	100	5 ton
Ramin or Basswood (Indonesia)	Each	5,000	1000.0 g/oz	0	0	0	5	0 kg	0	5 ton	100	5 ton
MDF (China)	Each	5,000	800.0 g/oz	0	0	0	5	0 kg	0	4 ton	100	4 ton

Component EOL Percentage Breakdown

Pop Up Frames

Name	EOL Recycling Potential %	EOL Waste to Energy Potential %	EOL Composting Potential %	EOL Landfill Potential %
PS				
PP (1 oz)				
Paper	82 %	9 %	0 %	9 %
SP (1 PPs per)				
TP (1 SPs per)				
Item 3	0 %	0 %	0 %	0 %

Pine or Cedar (China)

Name	EOL Recycling Potential %	EOL Waste to Energy Potential %	EOL Composting Potential %	EOL Landfill Potential %
PS				
PP (1 oz)				
Pine or Cedar	0 %	52 %	0 %	48 %
SP (1 PPs per)				
TP (1 SPs per)				
Item 3	0 %	0 %	0 %	0 %

Ramin or Basswood (Indonesia)

Name	EOL Recycling Potential %	EOL Waste to Energy Potential %	EOL Composting Potential %	EOL Landfill Potential %
PS				
PP (1 oz)				
Ramin or Basswood	0 %	52 %	0 %	48 %
SP (1 PPs per)				
TP (1 SPs per)				
Item 3	0 %	0 %	0 %	0 %

MDF (China)

Note: This COMPASS report uses life cycle inventory (LCI) data that represents an industry average for materials, manufacturing processes, and end of life impacts. The Life Cycle Analysis (LCA) in this report can be used for directional guidance in internal decision making and understanding trade-offs. COMPASS follows the guidelines of ISO 14040 in determining and documenting the scope, assumptions, consistent boundary conditions and data sources. According to ISO 14040, LCA results should not be used to make comparative assertions between competitive products to be disclosed to the public without first conducting a third party critical review.

Life Cycle Assessment
Methodology

Life Cycle Assessment Current Vs New

Current Packaging
The wooden frame is:
4x pieces of solid routed wood at 350x25x25mm
Made up size would be 350x350x25mm

Total weight WITHOUT backing board, glass and staples/clips:
> Ramin or Basswood from Indonesia = 1kg
> Pine or Cedar from China = 1kg
> MDF = 0.8kg

New Packaging
The Pop Up Frame is:
4 pieces packed dimensions 380x135x7mm and weigh 100g
(this is average as we use 300-400gsm)

•GWP EMISSIONS: GWP (ton CO_2 eq): Global Warming Potential (GWP) considers the total quantity of greenhouse gasses (GHG) emitted throughout the life cycle reported in Tons of CO_2equivalents. This calculation follows the IPCC Sixth Assessment Report (AR6) 2021 100a w/o CO_2 Uptake method and considers climate feedback loops. It considers global warming potential for a 100-year timeframe.

LCA Lite interpretation

Options	Pack Weight	GWP Emissions for 5000 units Ton of CO_2 eq
1. Pop Up Frames (Europe)	0.100 kgs	1.5 ton of CO_2 eq
2. Pine or Cedar (China)	1 kgs	2.57 ton of CO_2 eq
3. Ramin or Basswood (Indonesia)	1 kgs	2.4 ton of CO_2 eq
4. MDF (China)	0.800 kgs	4.26 ton of CO_2 eq

Life Cycle Assessment – Individual

1: Pop Up Frames (Europe)

Calculations are based on 5000 units

GWP = 1.5 ton CO_2 eq.

Global Warming Potential (GWP) considers the total quantity of greenhouse gasses (GHG) emitted throughout the life cycle reported in kilograms of CO2 equivalents. This calculation follows the IPCC Sixth Assessment Report (AR6) 2021 100a w/o CO2 Uptake method and considers climate feedback loops. It considers global warming potential for a 100-year timeframe.

Material 1.07 (71.68%)	Manufacturing 0.2378 (15.86%)	Transportation 0.1192 (7.95%)	End Of Life 0.0676 (4.51%)	Use Phase 0 (0%)

GWP (ton CO2 eq.) by Life Cycle Phases

Simple Indicators

Computed based on the US Region

1.5 ton CO_2 eq. is equivalent to the emissions/carbon sequestered by:

- **0.321** Passenger Vehicles Driven Yearly
- **5,913.45** Kilometers Driven by Passenger Vehicles Yearly
- **638.57** Liters of Gasoline Consumed
- **38.85** Tree Seedlings Grown for 10 Years
- **0.7138** Hectares of Forests Yearly

2: Pine or Cedar (China)

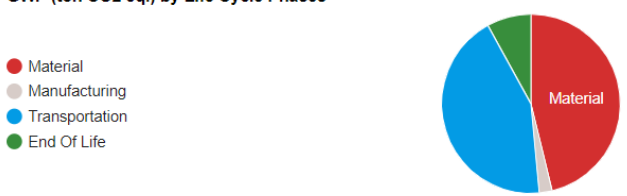
Calculations are based on 5000 units

GWP = 2.57 ton CO_2 eq.

Global Warming Potential (GWP) considers the total quantity of greenhouse gasses (GHG) emitted throughout the life cycle reported in kilograms of CO2 equivalents. This calculation follows the IPCC Sixth Assessment Report (AR6) 2021 100a w/o CO2 Uptake method and considers climate feedback loops. It considers global warming potential for a 100-year timeframe.

Material 1.19 (46.2%)	Manufacturing 0.0601 (2.34%)	Transportation 1.12 (43.43%)	End Of Life 0.2063 (8.03%)	Use Phase 0 (0%)

GWP (ton CO2 eq.) by Life Cycle Phases



Simple Indicators

Computed based on the US Region

2.57 ton CO_2 eq. is equivalent to the emissions/carbon sequestered by:

- **0.55** Passenger Vehicles Driven Yearly
- **10,132.06** Kilometers Driven by Passenger Vehicles Yearly
- **1,094.13** Liters of Gasoline Consumed
- **66.56** Tree Seedlings Grown for 10 Years
- **1.22** Hectares of Forests Yearly

Life Cycle Assessment – Individual

3: Ramin or Basswood (Indonesia)

Calculations are based on 5000 units

GWP = 2.4 ton CO_2 eq.

Global Warming Potential (GWP) considers the total quantity of greenhouse gasses (GHG) emitted throughout the life cycle reported in kilograms of CO2 equivalents. This calculation follows the IPCC Sixth Assessment Report (AR6) 2021 100a w/o CO2 Uptake method and considers climate feedback loops. It considers global warming potential for a 100-year timeframe.

Material 1.19 (49.45%)	Manufacturing 0.0601 (2.5%)	Transportation 0.9468 (39.45%)	End Of Life 0.2063 (8.6%)	Use Phase 0 (0%)

GWP (ton CO2 eq.) by Life Cycle Phases

Simple Indicators

Computed based on the US Region

2.4 ton CO_2 eq. is equivalent to the emissions/carbon sequestered by:

- **0.5139** Passenger Vehicles Driven Yearly
- **9,465.97** Kilometers Driven by Passenger Vehicles Yearly
- **1,022.2** Liters of Gasoline Consumed
- **62.19** Tree Seedlings Grown for 10 Years
- **1.14** Hectares of Forests Yearly

4: MDF (China)

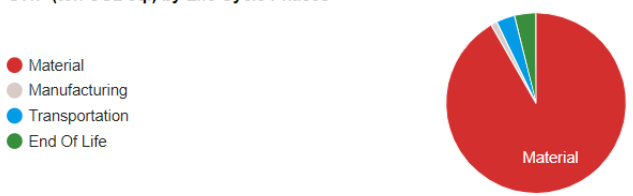
Calculations are based on 5000 units

GWP = 4.26 ton CO_2 eq.

Global Warming Potential (GWP) considers the total quantity of greenhouse gasses (GHG) emitted throughout the life cycle reported in kilograms of CO2 equivalents. This calculation follows the IPCC Sixth Assessment Report (AR6) 2021 100a w/o CO2 Uptake method and considers climate feedback loops. It considers global warming potential for a 100-year timeframe.

Material 3.91 (91.66%)	Manufacturing 0.0481 (1.13%)	Transportation 0.1425 (3.34%)	End Of Life 0.165 (3.87%)	Use Phase 0 (0%)

GWP (ton CO2 eq.) by Life Cycle Phases



Simple Indicators

Computed based on the US Region

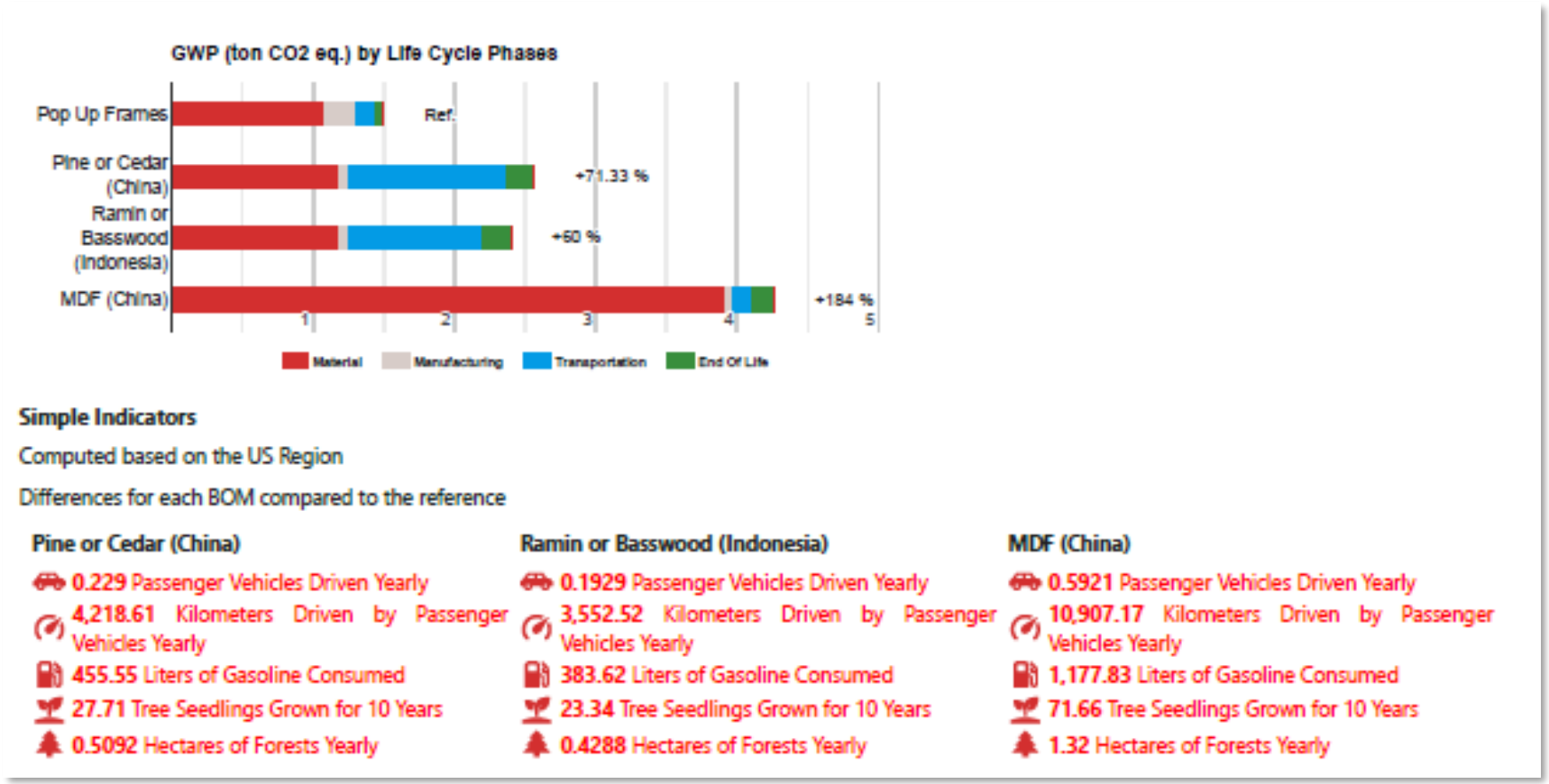
4.26 ton CO_2 eq. is equivalent to the emissions/carbon sequestered by:

- **0.9131** Passenger Vehicles Driven Yearly
- **16,820.62** Kilometers Driven by Passenger Vehicles Yearly
- **1,816.4** Liters of Gasoline Consumed
- **110.5** Tree Seedlings Grown for 10 Years
- **2.03** Hectares of Forests Yearly

Life Cycle Assessment – Comparison

Below is the comparison data showing the GWP savings

Calculations are based on 5000 units



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EOL RECYCLING POTENTIAL: This measures the potential number of Tons that could be placed in curbside recycling.

LCA Lite Interpretation – *EOL

Options	Recycling Potential %	Waste to Energy Potential %	Landfill Potential %
1. Pop Up Frames (Europe)	82%	9%	9%
2. Pine or Cedar (China)	0%	52%	49%
3. Ramin or Basswood (Indonesia)	0%	52%	49%
4. MDF (China)	0%	52%	49%

Options	Recycling Potential	Waste Potential
1. Pop Up Frames (Europe)	410 kgs	90 kgs
2. Pine or Cedar (China)	0 kgs	5 tons
3. Ramin or Basswood (Indonesia)	0 kgs	5 tons
4. MDF (China)	0 kgs	4 tons

*EOL Region is Europe
Based on 3 Million Units, Ex Works

Summary

Considerable reductions in Global Warming Potential (GWP) are observed when contrasting conventional materials and transportation approaches with Pop Up Frames. For instance, when compared to Medium Density Fiberboard (MDF), there is a potential GWP reduction exceeding 180%, equivalent to saving 2.76 tons of CO2 equivalent.

In terms of waste generation and recyclability, the utilization of Pop Up Frames has resulted in an 82% reduction in waste potential, amounting to approximately 4.99 tonnes. This decrease represents material that might otherwise have been destined for landfills or energy recovery.

Furthermore, Pop Up Frames offer a substantial weight reduction compared to traditional materials, with a notable decrease of 90%.

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