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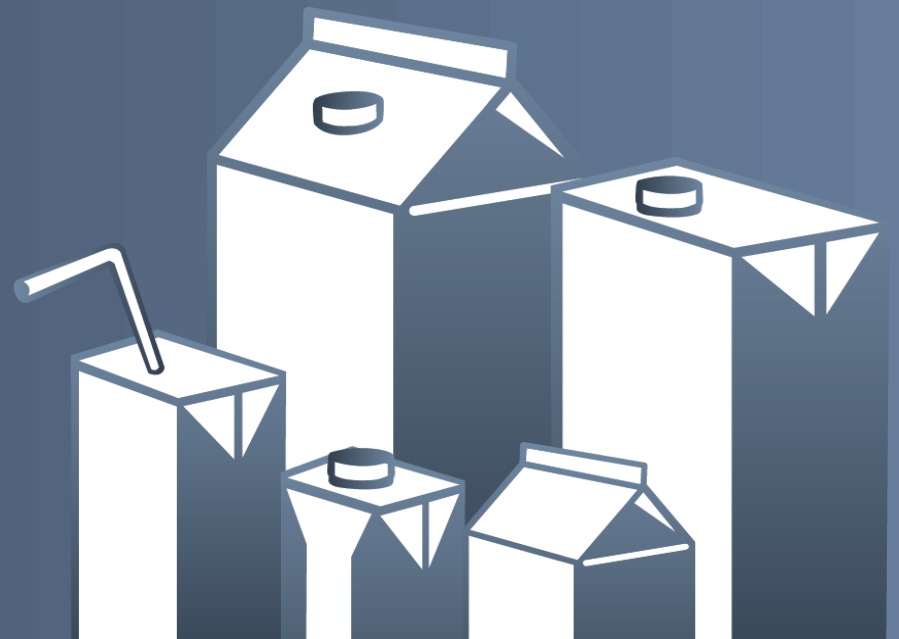
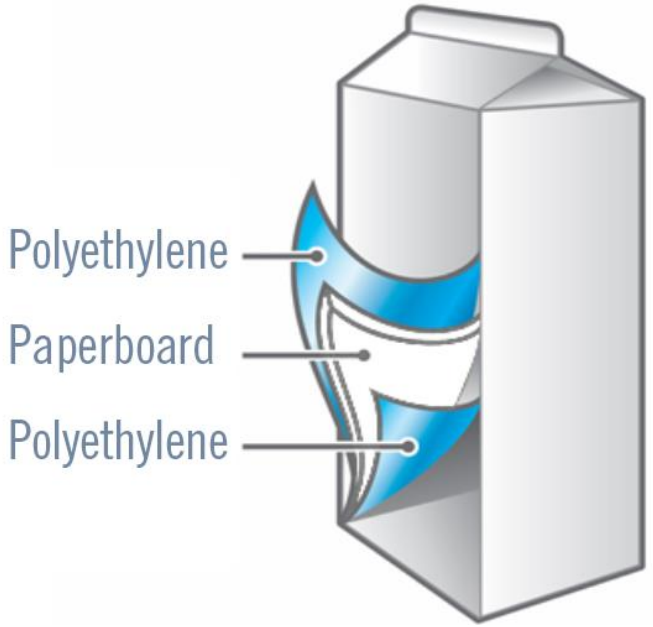
Oregon RFI Response

March 20, 2022

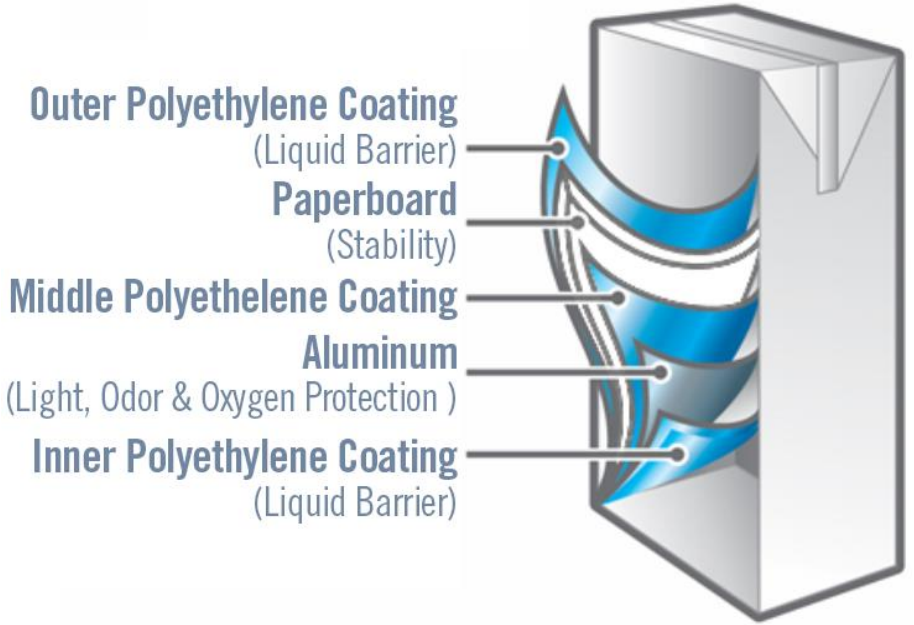


Carton design provides protection against light, air and harmful bacteria

Refrigerated “gable top”



Shelf stable “aseptic”



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Who is the Carton Council

- Composed of four leading carton manufacturers, Elopak, Pactiv Evergreen, SIG Combibloc, and Tetra Pak, the Carton Council formed in 2009 to deliver long-term **collaborative solutions** to divert valuable cartons from the landfill.

- Through a united effort, the Carton Council is committed to expanding carton recycling nationwide.

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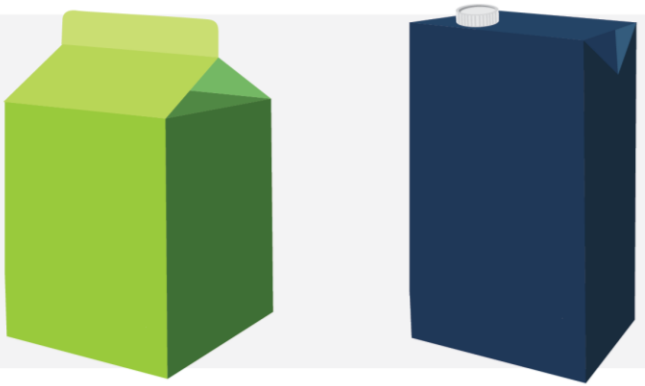
Carton Council Strategy

OUR ULTIMATE GOAL: Increase the carton recycling rate and decrease the amount of cartons going to landfills or becoming litter

OUR OBJECTIVES:

- Expand Access
- Increase Participation



STRATEGIES FOR ACHIEVING:

- Provide counsel and resources to MRFs to encourage sorting of Grade #52 cartons
- Engage with recycling facilities/officials
- Support implementation of school recycling programs
- Partner with stakeholders/advocates
- Foster the development of solid end markets
- Educate consumers
- Encourage company/brand involvement
- Participate in legislative discussions

Cartons are increasingly used in markets that are diverse, stable and expanding

Cartons are a feedstock in end markets totaling $335B

- Building Products
  - Roofing board — $20B US Market
  - Wall board — $14B US Market
  - Exterior sheathing — $7B Global Market
  - Ceiling tiles — $2B US Market
- Tissue and Toweling
  - Tissue and toweling — $250B US Market
- Deinked Pulp
  - Market pulp — $7B Global Market
- Board, Packaging and Toweling Market– as mixed paper furnish
  - Paper mills — $35B US Market

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Carton end markets: yield and size

Recycling end market:	Building materials	Tissue and Toweling	De-ink pulp	Tissue Toweling/Packaging
Grade consumed as:	Grade 52	Grade 52	Grade 52	Mixed
% yield for entire package	100%	67-70%	67-70%	50-60%
% yield for fiber content	100%	85-90%	85-90%	65-80%
% yield for poly & polyAl content	100%	0%	0%	0%
What happens to poly & polyAl residual	Poly and PolyAl residual becomes part of end product.	Poly & PolyAl residual is either landfilled or captured and used as waste to energy.	Poly & PolyAl residual is either landfilled or captured and used as waste to energy.	Poly & PolyAl residual is either landfilled or captured and used as waste to energy.
Existing end market viability:	11,000 tpy capacity	15,000 tpy capacity	20,000 tpy capacity	est. 75,000 tpy capacity
Long term end market viability:	Potential growth capacity estimated at 200,000 tpy	Potential growth capacity estimated at 20,000 tpy	Potential growth capacity estimated at 50,000 tpy	Significant growth potential

These numbers are based on information received from mills in various parts of the US and Canada and Mexico as well as some mills overseas.
Due to the proprietary nature of this information, we are unable to provide further specifics as many recyclers were not willing to share more detailed information.
Some expressed an openness to connecting directly with DEQ.

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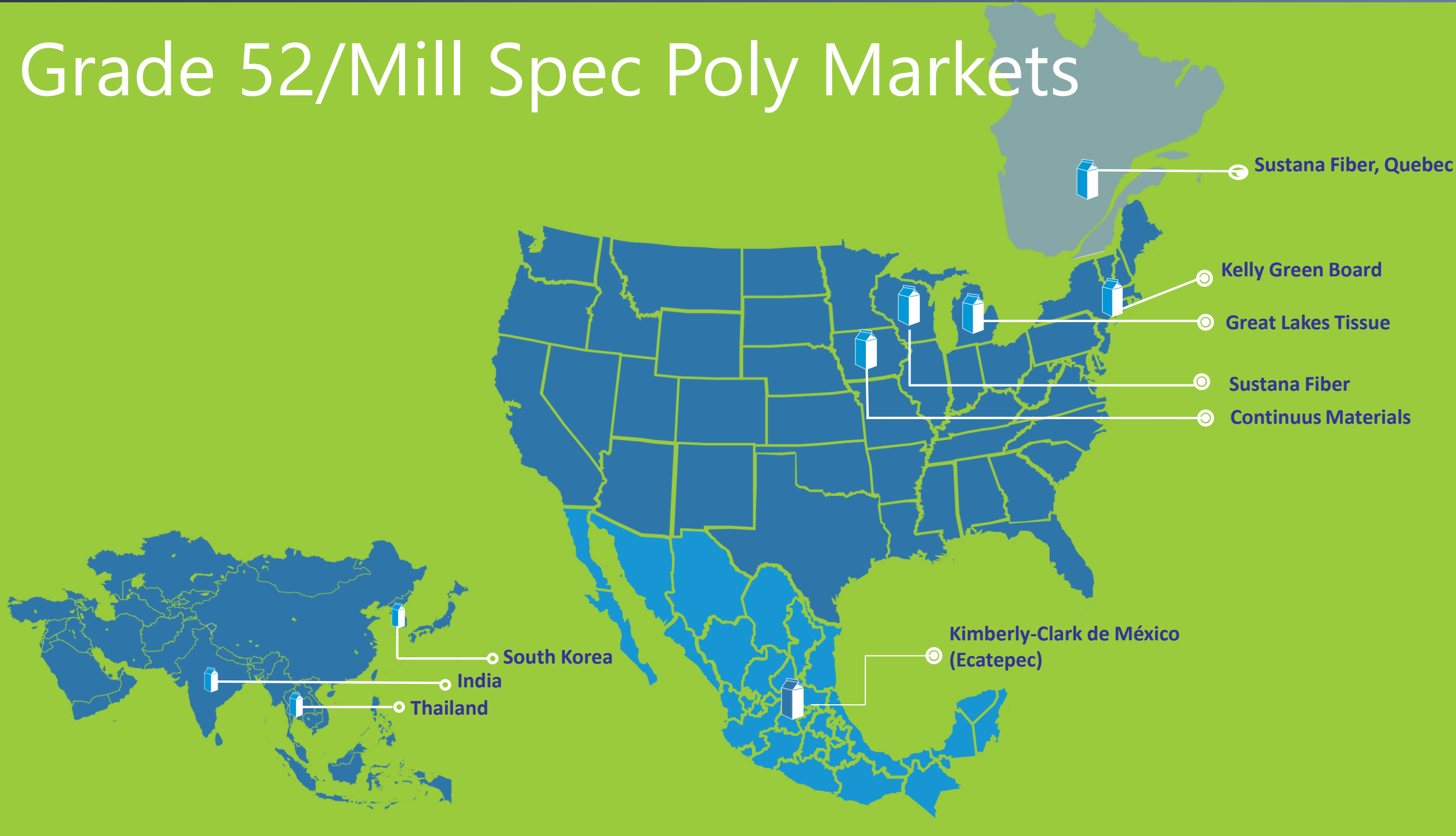
Grade 52/Mill Spec Poly Markets



Mixed Paper & Grade 52/Poly Markets

End Markets: validation

- Attached to this submission are letters from Kimberly Clark of Mexico, one of the end-markets for cartons, and Omnisphere, a broker that moves bales of materials including cartons.

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Environmental health and safety considerations

- Please refer to Elopak's, Pactiv Evergreen's, SIG Combibloc's, and Tetra Pak's comprehensive sustainability reporting for information on environmental health and safety.
- Additionally, please refer to Tetra Pak's alignment with the Global Reporting Initiative.

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Compatibility with existing Oregon recycling infrastructure

- Slightly less than half the households* in Oregon have access to carton recycling:
  - 37% have access through curbside recycling
  - 10% have access through drop off recycling
- Once collected, cartons are either sorted into Grade 52 or into Mixed Paper to be sent on for recycling.
- Carton Council's grant program for MRFs can help to offset the capital costs of equipment needed to sort cartons.
  - Carton Council has been engaged with and continues to look for other opportunities to increase access to carton recycling in more parts of the state of Oregon.

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*Household access data is from CCNA database managed by a third-party organization.

Cartons available for recycling per EPA

- The estimated quantity of gable-top and aseptic cartons generated in the US is 10.5 lbs/household/year[1]. At this generation rate, Oregon households would generate roughly 8,000 tons of cartons per year.
- Carton Council estimates that cartons should make up 0.5% - 1% of the inbound material stream of a typical MRF that accepts cartons for recycling. Based on this MRF composition, the quantity of cartons available to be recovered in Oregon would be between 4,000-8,000 tons annually[2].

1. US EPA, *Advancing Sustainable Materials Management: Facts and Figures 2018*

2 Oregon DEQ, *2019 Material Recovery and Waste Generation Rates Report*.

Other calculations by RRS.

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The practicalities of sorting and storing the material

- Cartons can be sorted into either PSI Grades spec 52 (Post Consumer Aseptic and Gable Top Cartons), or into a mixed paper grade along with other paper and packaging.
  - While Carton Council promotes the sortation of cartons into Grade 52, it is ultimately the decision of the MRF and their end markets as to which stream they chose to direct cartons for recycling.
- When sorting cartons into grade 52 at the MRF; cartons can be sorted by hand or using automation such as optical sortation and robotic sortation. Carton Council has a well-established grant program for MRFs to help procure the necessary equipment to accept and sort cartons. Carton Council also provides technical expertise to help MRFs find the best sorting solution.
- Carton Council has experience in working with MRFs on LTL (less than truckload) solutions where baled carton volumes might be lower. Carton Council would be willing to investigate similar solutions where appropriate in Oregon.

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Contamination

- Contamination can be present in all material used for food and beverage packaging, including metal cans, plastic bottles, jugs, tubs and jars, and glass bottles and jars, as well as cartons.
- Contamination present in carton packages could include food material, liquids, and straws (specific to juice boxes).
- Carton Council provides simple recycling education to improve consumer preparation, emphasizing the steps of emptying, placing in the recycling bin without flattening, and attaching caps. These steps align with the consumer directions for recycling packages such as PET bottles, HDPE jugs, etc.
- Carton Council provides comprehensive materials to be used in school recycling programs, featuring the "Drink, Empty, Recycle" message, as well as educational materials that students can take home to reinforce the lessons around recycling preparation with their families.
- Plastic components (caps and straws) are intended to be reattached or pushed into the carton package. This prevents them from potentially being lost as litter or residue. At the end market, the plastic components become part of the polyAl fraction as described on page 6, and may become part of an end product, used for energy production, or landfilled.

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The ability for waste generators to easily identify and properly prepare the material

- Carton Council provides extensive educational material on carton recycling, including visual and video content. All materials are available for recycling program use via www.cartonopportunities.org
- Carton Council has been an industry leader in conducting research with consumers on how they make the decision to recycle, what steps go into making behavior changes, and their perceptions of recycling. Findings from this research have been published in numerous trade articles, including those linked below.

- Study: Decision to recycle is only the first step
- Consumers Aren't Making Connection Between Recycling and Creating New Products
- Show don't tell when it comes to reminding consumers to recycle
- Additional publications and media coverage can be found at https://cartonopportunities.org/carton-news

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Economic factors

- Carton Council's grant program for MRFs helps to support the capital costs of equipment used to sort cartons.
  - Carton Council can also provide technical expertise to help MRFs find the best sorting solution.
- Carton Council has provided grant funding to almost 100 MRFs nationwide since it was established.
- While the economic factors vary from MRF to MRF, cartons can be a valuable product for MRFs to accept and sort into Grade 52 or as part of mixed paper.

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Environmental factors from a life cycle perspective

- From a life cycle perspective, cartons represent a lightweight and efficient packaging choice with a high product-to-package weight ratio. When analyzed, cartons have been found to only produce between 17%-40% CO2E emissions on a normalized basis, e.g., per 1,000 liters of product versus traditional comparable packaging formats, such as PET bottles, glass bottles, and steel cans.

- Please refer to the following LCA references:
  - US-based study for Tetra Recart: LCA: Soup in Tetra Recart carton packages (tetrapak.com)
  - Wine container systems: Life cycle inventory of container systems for wine (tetrapak.com)
  - Milk container systems: ELOPAK NORTH AMERICA: TOWARDS A SUSTAINABLE FUTURE LCA, NOVEMBER 2021 (attached)

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Thank you

- The CCNA organization appreciates your time reviewing the submitted information and we welcome the opportunity to further discuss carton recycling in Oregon.

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Kimberly-Clark de México, S.A. de C.V.

Date: March 9, 2022

Mr. David Allaway
Oregon Department of Environmental Quality

Dear Sirs,

Kimberly-Clark de Mexico (KCM), at our recycled tissue mill in Ecatepec, has been a consumer of fiber from aseptic cartons for several years. In 2017, after doing equipment modifications, we began to use ISRI Grade 52 (Post-Consumer Aseptic and Gable Top Cartons) from the US and Canada as part of our raw material. This grade is a good source of fiber for our recycled tissue products being produced at our Ecatepec mill.

Lic. Marco Antonio Jiménez Ríos
Purchasing Manager (Recycled Fibers)
Kimberly Clark de México S.A. de C.V.

Oficinas Administrativas

Jaime Balmes No. 8, Piso 9
Polanco, 11510 México, D.F.
Tel: (55) 5282-7273

OMNISPHERE CORPORATION

March 11, 2022

Mr. David Allaway
Oregon Department of Environmental Quality

Dear Mr. Allaway,

My name is Alexander F Valdes, and I am the president of Omnisphere Corporation. We are a trading company with 48 years of experience marketing waste paper from all 50 states to Paper Mills that manufacture recycled tissue and toweling. One of our primary customers is the Kimberly-Clark de Mexico (KCM) paper mill in Ecatepec, Mexico. This paper mill uses waste paper, including ISRI Grade 52 (Post-Consumer Aseptic and Gable Top Cartons), as part of its paper-making raw material.

In 2017, after equipment modifications, the Ecatepec mill began using ISRI Grade 52 from the US and Canada, and they have been a consistent monthly buyer of this grade. We believe that this interest will continue in the foreseeable future, as KCM sees value in the fiber contained in Grade #52.

We would welcome the opportunity to source ISRI Grade 52 from Oregon.

Alexander F. Valdes
President

9950 SW 107th Avenue, Suite 100
Miami, Florida 33176 Tel: 305 388 4075 Fax: 305 388 5380

ELOPAK NORTH AMERICA

TOWARDS A SUSTAINABLE FUTURE LCA NOVEMBER, 2021

PRESENTATION TO THE NACC
(NORTH AMERICAN CARTON COUNCIL)
MARCH 3RD, 2022

ELOPAK

LCA MAIN OBJECTIVES

- Compare the environmental profiles of primary packaging for fresh milk and juice in USA and Canada
- Identify significant contributions to the environmental impacts across the product lifecycle (Cradle to grave)
- Identify possible improvement areas of the studied systems

ELOPAK AMERICAS LCA – MAY 2021

Comparative LCA of different primary packaging solutions of fresh milk and juice sold in North America (Canada and USA).

Pure-Pak®
White board

Pure-Pak®
Natural brown
board

HDPE
bottle

PET
bottle

Cradle-to-grave (multiple impact categories, ISO 14044 compliant)

LCA CONDUCTED BY ANTHESIS

- Anthesis is a specialist global sustainability services and solutions provider founded on the belief that sustainable business practices are at the heart of long-term commercial success
- Launched in March 2013 to meet market demand for an international firm whose core business is providing commercially relevant sustainability services
- Around 500 staff globally, through organic and acquisitive growth
- Global team of LCA specialists with experience across many sectors
- Strong presence in North America (Boulder, San Francisco Bay, Boston, Ottawa, New Brunswick)

Anthesis

STEPS OF LCA


1. Define goal & scope
2. Data collection
3. Analysis & impact assessment
4. Sensitivity analysis
5. Interpretation & reporting

PEER REVIEW

Lise Laurin

CEO at EarthShift Global,

New insights for Life Cycle Assessment, Sustainability and S-ROI

Bill Flanagan

Co-Founder & Director at Aspire Sustainability

Chair, Board of Directors, of the American Center for Life Cycle Assessment (ACLCA)

Rafael Auras

Professor at the Michigan State University School of Packaging

Packaging Sustainability, Polymeric Packaging Materials, LCA

COMPETITOR ANALYSIS (HDPE) – 15 SAMPLES

	Milk	Juice
Canada (1 L, 2 L)		
USA (quart, ½ gallon)		

COMPETITOR ANALYSIS (PET) – 14 SAMPLES

Milk

Juice

Canada

(1 L, 2 L)

USA

(quart, ½ gallon)

LCA DESCRIPTION

A Life Cycle Assessment (LCA) is a tool to quantify the environmental impacts associated with a product, throughout its life cycle. The system boundary for each product system in this LCA was ‘‘cradle-to-grave’’, which comprises: the extraction/cultivation and processing of raw materials, manufacturing, forming and filling processes, end-of-life, and all transportation and waste stages.

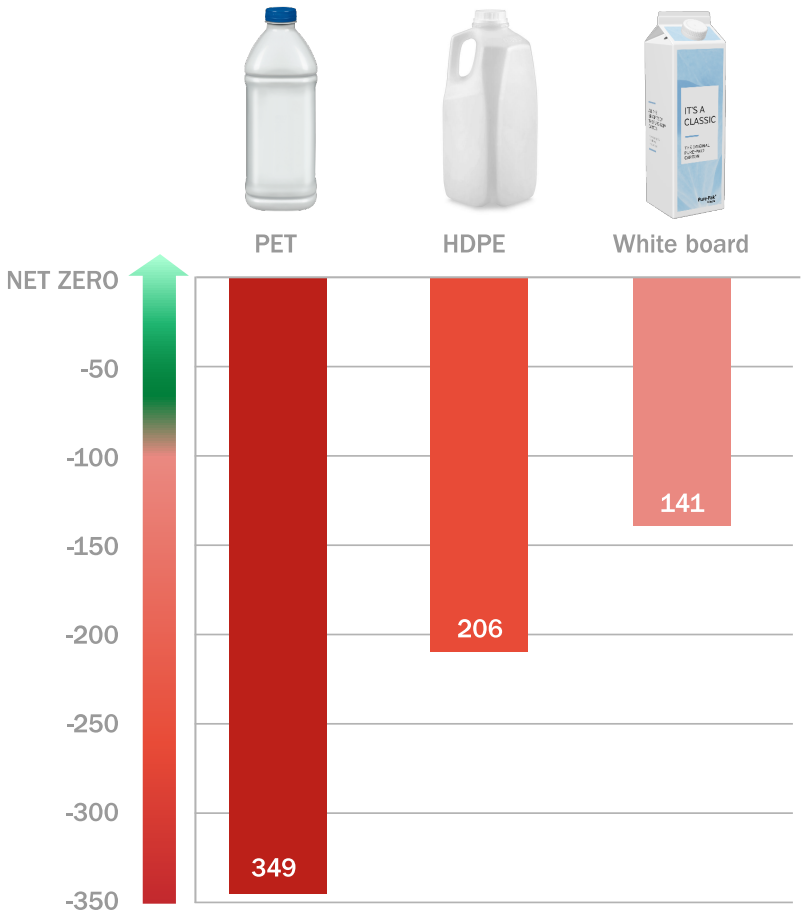
An independent panel of experts carried out a critical review of the study to ensure compliance with the ISO standards for LCA (ISO 14040 and 14044).

In this LCA, it was assumed that plastic bottles contained post-consumer recycled content, 15% for HDPE bottles and 7,5% for PET bottles which was seen as a conservative assumption in respect of cartons (i.e. favoring competitor bottles to Elopak).

A key focus for this study was the Global Warming impact category, measured in carbon dioxide equivalent.

BASIC PURE-PAK: MUCH LOWER CO2 IMPACT VS PLASTIC BOTTLES

GLOBAL WARMING
g CO2 eq/half-gallon



GLOBAL WARMING
g CO2 eq/half-gallon

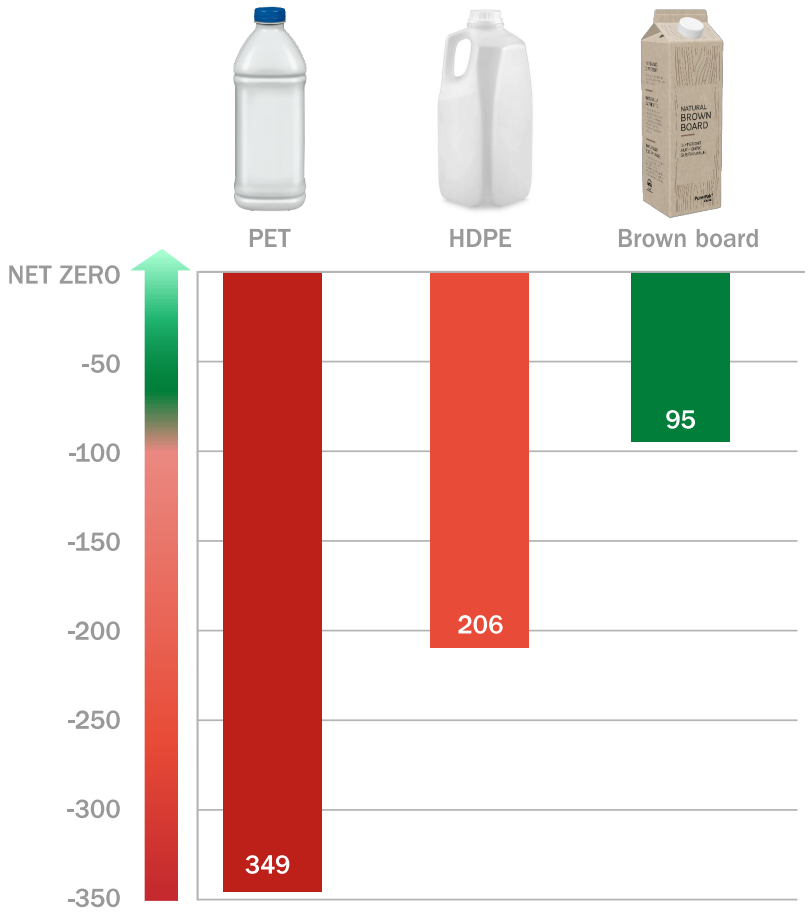
- 32%
g CO2 eq/half-gallon
Compared to HDPE

- 60 %
g CO2 eq/half-gallon
Compared to PET

North American LCA on packaging for Fresh Milk and Juices conducted by Anthesis for Elopak in May 2021

PURE-PAK NATURAL BROWN BOARD: MUCH LOWER IMPACT VS PLASTIC BOTTLES

GLOBAL WARMING
g CO2 eq/half-gallon



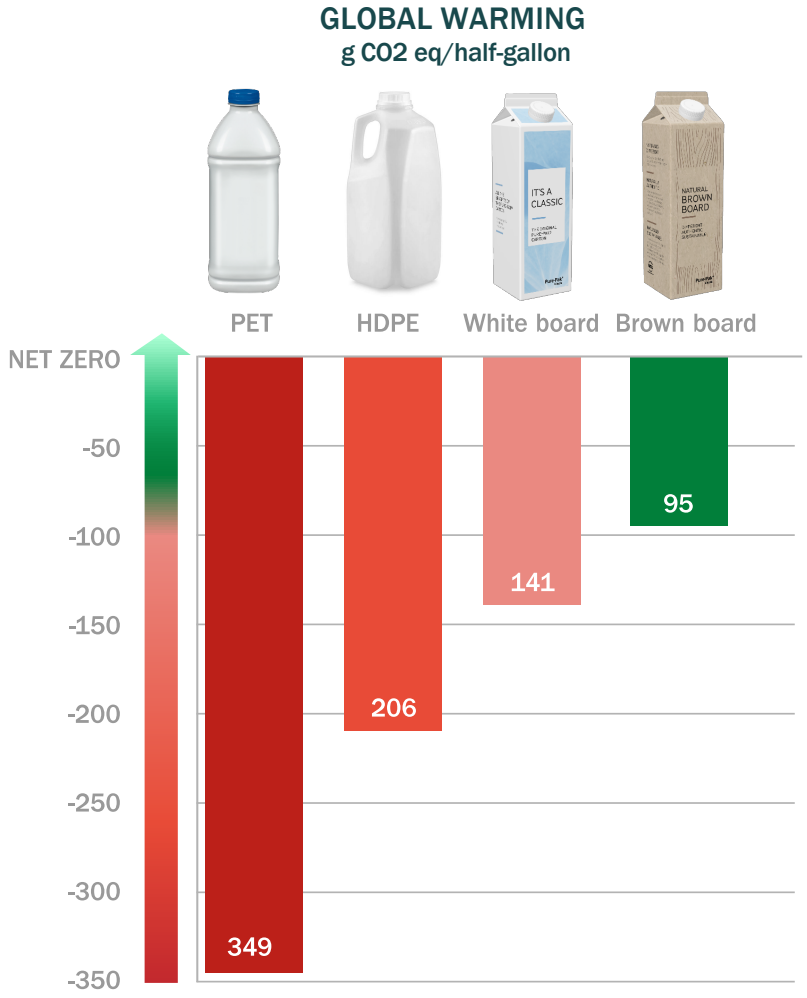
GLOBAL WARMING
g CO2 eq/half-gallon

- 54%
g CO2 eq/half-gallon
Compared to HDPE

- 73 %
g CO2 eq/half-gallon
Compared to PET

North American LCA on packaging for Fresh Milk and Juices conducted by Anthesis for Elopak in May 2021

ELOPAK'S CARTONS HAVE A MUCH LOWER CARBON FOOTPRINT THAN A TYPICAL HDPE BOTTLE OR PET BOTTLE



GLOBAL WARMING
g CO2 eq/half-gallon

- 32%
g CO2 eq/half-gallon
Compared to HDPE

- 60 %
g CO2 eq/half-gallon
Compared to PET

- 54%
g CO2 eq/half-gallon
Compared to HDPE

- 73 %
g CO2 eq/half-gallon
Compared to PET

ELOPAK

Overview of all impact categories assessed in the LCA, indicating where cartons perform better than plastic bottles

	Key Criteria	White carton	Natural brown carton	Key Comments
1	Global Warming	✓	✓✓	Significant CO_2e reduction versus PET and HDPE
2	Fine Particulate Matter Formation	✓	✓✓	Significant reduction versus PET and HDPE
3	Fossil Resource Scarcity	✓	✓✓	Significant reduction versus PET and HDPE
4	Fresh Water Eutrophication	✓	✓✓	Significant reduction versus PET and HDPE
5	Marine Eutrophication	✓	✓✓	Significant reduction versus PET and HDPE
6	Mineral Resource Scarcity	✓	✓✓	Significant reduction versus PET and HDPE
7	Terrestrial Acidification	✓	✓✓	Significant reduction versus PET and HDPE;
8	Stratospheric Ozone Depletion	✓	✓✓	Impact mostly from the paperboard production and the coating material production. Nylon production is one of the main contributors.
9	Ozone Formation Human Health	✗	✓✓	Impact mostly from fossil fuels-derived energy and direct emissions at paper mills during paperboard production in North America (white carton)
10	Ozone Formation Terrestrial Ecosystems	✗	✓✓	Impact mostly from fossil fuels-derived energy and direct emissions at papermills during paperboard production in North America (white carton)
11	Land Use	✗	✓✓	Forest-based products require some use of land, however, Elopak source only from responsibly managed forests, secured through third party verified certified or controlled sources.
12	Ionizing Radiation	✓	✗	Nuclear power in the grid electricity mix in Sweden (40% nuclear) where the brown paperboard is produced
13	Water Consumption	✗	✗	Cooling water for nuclear power plants in Sweden (brown paperboard) and paperboard production in North America (white carton)

LCA

1. Key learning of our LCA: the level of CO_2 of one pack versus another is related to the source of the raw material and the converting process
2. Recycling plays a minor role in CO_2; recycling is about reducing litering

CO2eq/Half-Gallon	Total	End of life	%
White board	140.62	4.27	3%
NBB	95.21	3.84	4%
HDPE	206.2	8.7	4.2%
PET	348.96	10.37	3%