Recycling Modernization Act Material List Request for Information:

Compilation of Selected Responses – Plastic Packaging, Part Two

Materials Management Program
700 NE Multnomah St.
Suite 600
Portland, OR 97232
Phone: 503-229-5696
800-452-4011
Fax: 503-229-6124
Contact: David Allaway

www.oregon.gov/DEQ

DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

State of Oregon
Department of Environmental Quality

This document is a compilation of selected responses to DEQ's Request for Information regarding the potential for recycling different materials. As optional background reading materials for members of DEQ's Technical Workgroup on Material Lists, DEQ has selected the following responses that addresses plastic packaging, which will be discussed at the May 31, 2022 Technical Workgroup meeting. Please note that a first batch of responses involving plastic packaging were compiled in a document transmitted previously and available here.

Please also note that the American Recyclable Plastic Bag Alliance's response included approximately 600 pages of life cycle assessment reports. DEQ has chosen not to include that content here, but it is available upon request.

Request for Information: Oregon statewide recycling collection list and producer-collected materials

Agilyx is a chemical recycling technology company which, in conjunction with its joint venture partner Americas Styrenics (AmSty), operates a chemical recycling facility in Tigard, Oregon. In its current configuration, the facility has been operating since 2018 and can process up to 10 tons per day of polystyrene. The technology converts the post-use plastic feedstock (polystyrene) back into the base chemical components of polystyrene (styrene monomer), which is used by our downstream partner in the creation of new/recycled polystyrene.

It is Agilyx's view that the plastic recycling market in the US and globally is experiencing significant growth due to environmental awareness of plastic pollution, consumer and brand owner demand for increased recycled content in products, various state governments evaluation and implementation of extended producer regulations, and the 2018 ban by China on post-consumer plastics imports.

These factors are driving growth in the US plastic recycling industry and allowing for the development and deployment of new recycling and sortation technologies, which will improve the recyclability of plastic, allowing previously unrecycled plastics to be recycled. Agilyx's conversion technology is currently recycling at a commercial scale in Oregon and expanding its technology both domestically and internationally.

Specifically, in response the Oregon Department of Environmental Quality (DEQ) February 3, 2022, request for information (RFI) to consider materials for inclusion to the statewide recycling list, Agilyx Corporation, in collaboration with our Joint Venture partner AmSty, is pleased to provide the following information:

Targeted Polymers:
Polystyrene (PS) – Agilyx technology is capable of recycling polystyrene to include the three major types: polystyrene foam (expanded and extruded), polystyrene plastic (e.g., high impact polystyrene), and polystyrene film (e.g., oriented polystyrene films).

The stability, maturity, accessibility, and viability of responsible end markets:
Polystyrene has been used in North America since the late 1930s. It is produced as either a clear general-purpose grade, a rubber-modified grade, or an impact-modified grade. Nearly all these grades are FDA-approved for direct food contact. Polystyrene production in North America in 2020 was approximately 4 billion lbs. Approximately 65% of this volume was used in food packaging and food service applications. Other major market segments are appliances, medical, building and construction, housewares and electronics. (1)

One of the unique characteristics of polystyrene is its amorphous structure, which makes it a very useful polymer. Many polymers have a crystalline structure which results in a very narrow softening point when heated. This narrow softening point results in difficulty in end-use converting processes such as foaming, thermoforming and film blowing. Polystyrene has the advantage of an amorphous structure which results in a broad softening range. This broad softening range provides easy converting in low-density foams, thin-gauge films and complicated thermoformed and injection molded parts. Other important properties of polystyrene resins are:

- High stiffness- which allows for thin gauge, lightweight products requiring minimal material usage
- High melt strength- which allows for very low-density foams providing very lightweight products with minimal material usage
- High moisture resistance- products do not require any coating or protective layer which simplifies recycling
- High insulation value- foamed structures provide high insulation value for building and construction applications significantly reducing energy costs

Many polystyrene applications are single layer applications which means the end use performance can be achieved without multiple layers of other polymers or materials. This makes polystyrene particularly easy to recycle by mechanical or chemical recycling methods.

Yet another advantage to polystyrene polymers is their thermal stability. Polystyrene is an addition polymer and is not moisture sensitive when heated during processing or recycling operations. This means that polystyrene has minimal degradation versus other polymers, which provides better end use performance with multiple uses of recycle.

Furthermore, as defined by SB 582, "Responsible end market" means a materials market in which the recycling or recovery of materials or the disposal of contaminants is conducted in a way that benefits the environment and minimizes risks to public health and worker health and safety. The ISCC PLUS certification maintained by Regenyx and its partners demonstrates their commitments to circularity, ensuring traceability of styrene monomer through the supply chain. Additionally, under the ISCC EU System Document 202, ISCC PLUS provides requirements around the following key "Sustainability Principles:"

1) Protection of land with high biodiversity value or high carbon stock
2) Environmentally responsible production to protect soil, water, and air
3) Safe working conditions
4) Compliance with human, labor, and land rights
5) Compliance with laws and international treaties
6) Good management practices and continuous improvement

Maturity of Technology:
Historically, pyrolysis has been commercialized in applications relating to charcoal, municipal solid waste and biomass. As previous stated, Agilyx operates a 10 ton per day facility located in Tigard, Oregon. During 2021, the Tigard operations surpassed 16,000 hours of operations and 8 million tons of polystyrene and mixed waste plastic processed.

Currently, Agilyx and commercial partners are expanding operations through the development of 50 to 100 ton per day facilities based on the design of the Tigard, Oregon facility.

Feedstock Conversion:
Currently this information is considered to be proprietary, however, there are a number a various publication which highlight the conversion rate of pyrolysis across various plastic types. Closed Loop Partners released a report(2) in November 2021 which indicates conversion technologies, of which pyrolysis is just one of several, has a conversion rate range of 58 to 79% based on where recycling system output point is drawn. There are number of variables which can impact the conversion rate including but not limited to: moisture, fillers contained in the recycled material, organics included and mixing of polymer types when focus on single material such as polystyrene and end users' product requirements.

Life Cycle Impacts:
Many life cycle assessments have been conducted comparing polystyrene resins and applications to a variety of other polymers and packaging materials including paper. In many cases, polystyrene has very favorable sustainability metrics including lower greenhouse gas emissions. (3) In addition, the last four years have shown major advancements in polystyrene recycling technologies, including pyrolysis, which allows the recycled polymer to be converted back into virgin polymer with all the original properties for use in the original market applications. (4)

Availability of Material and Compatibility:
Agilyx has actively engaged the local community to collect and recycle polystyrene through the implementation of a drop-off box at its Tigard, Oregon facility. Additionally, through a 2020 partnership announced with Oregon

Metro, post-use polystyrene is aggregated at the Metro South Transfer Station and subsequently transported to the Agilyx Tigard facility for processing back into a styrene monomer. Agilyx has also partnered with community recyclers, local sports teams, concert series, regional municipalities, commercial sources and educational institutions to take back polystyrene that would otherwise be bound for landfill.

Based on data from eunomia's 2021 report, The 50 States of Recycling (5), Oregon generated 0.72 million tons of packaging, of which only 0.48 million tons was recycled with remaining volumes sent to landfill or incineration. The post use packaging materials with the lowest recycling rates were PET – Other Rigid, Polypropylene and Rigids #3 to 7, all of which can be converted by Agilyx's recycling technology into new, high-quality plastics/materials. It should be noted this information only captures common containers and packaging materials (CCPM) and the potential market size could be larger when looking at plastic volumes beyond packaging.

Agilyx and its partners ability to collect and sort polystyrene can serve as an indicator that polystyrene is compatible with existing collection methods.

The policy expressed in Oregon Revised Statutes 459.015 (2)(a) to (c), as amended by Section 46 of the Recycling Modernization Act:
Agilyx pyrolysis technology and company philosophy supports the policy and hierarchy outline in ORS 459.015(2)(a) to (c). Agilyx in combination with their collection partners, work to ensure post-use plastics are diverted to the most appropriate recycling technology while ensuring polystyrene and difficult to recycled plastics are not landfilled or sent for energy recovery. Thus, in terms of this policy, Agilyx philosophy and missions directly support ORS 459.015.(2)(a)(C) – *Third, to recycle material that cannot be reused.*

REFERENCES:

1) American Chemistry Council, 2020 data.
2) Closed Loop Partners Releases First-of-its-Kind Report Evaluating the Role of Molecular Recycling Technologies in Addressing Plastic Waste, November 2021
3) Life cycle inventory of foam polystyrene, paper-based and PLA foodservice products, Franklin Associates, 2011.
4) Move to ZERO, Styrenics Circular Solutions, June 2021.
5) The 50 States of Recycling: A State-by-State Assessment of Containers and Packaging Recycling Rates, March 2021.

March 20, 2022

Submitted Electronically via rethinkrecycling@deq.oregon.gov

Mr. David Allaway
Project Manager, Recycling Modernization Act
Oregon Department of Environmental Quality

RE: Request for Information on Statewide Collection List and Producer-Collected Material for Recycling

Dear Mr. Allaway:

The American Chemistry Council (ACC) appreciates the opportunity to submit comments on the Oregon Department of Environmental Quality's (DEQ) Request for Information on the Statewide Collection List and Producer-Collected Material for Recycling.

ACC is a non-profit trade association representing the leading manufacturers of chemicals and plastics in the United States. ACC's Plastics Division is an industry leader in promoting innovative plastics recycling and recovery programs and is a proud sponsor of educational and outreach programs to improve plastics recycling nationwide. ACC recently released its "*5 Actions for Sustainable Change*"[1] and Roadmap to Reuse[2]. Taken together these announcements highlight the plastics industry's policies and plans to reach our circular economy goals of reusing, recycling, and recovering all plastic packaging by 2040.

We appreciate the opportunity to provide information that will help inform the evaluation of materials that will be considered for Oregon's statewide recycling list. The requirements for determining whether a material should be included on the state's lists should incorporate or take into consideration the following:

1) provide flexibility to allow for evolving material streams (e.g., films, flexibles, foam, tubes, and other formats);
2) consider advanced (chemical) recycling technologies for rapidly developing end market options;
3) allow for the collection and sortation of materials beyond primary material recovery facilities (MRFs) and towards the development and expansion of secondary MRFs and alternative collection options, and;
4) consider resource optimization and the full life cycle impact-benefit accounting for plastics versus alternative materials.

The following provides more specific information regarding our recommendations.

Evolving Materials Streams

Ultimately, the number one objective of the uniform statewide collection list should be working towards a

[1] *https://www.plasticmakers.org/advocacy/five-actions/*
[2] https://www.plasticmakers.org/news/acc-roadmap-to-reuse/

greater supply of material to recycle. PET and HDPE bottles are commonly sorted at MRFs, have strong end markets and should be high priorities on the list. However, Oregon should seek to grow beyond those commodities and move towards a system where more types and formats of plastics are collected and recycled.

Many companies, including brand-owners, retailers, and plastic makers, have recently made significant commitments to increase the recyclability and recycling of consumer products and packaging, as well increase the use of recycled content in the manufacture of new packaging. For example, the U.S. Plastics Pact, which launched in August 2020[3], has brought together 60 signatories around the shared goals of making plastic packaging 100% reusable, recyclable or compostable by 2025 and recycling or composting 50% of plastic packaging by 2025. The recyclability goal will help shift the recycling system to provide greater access to recycling for many items that people think of as contamination today, like films, pouches, tubs, lids, foam, and tubes. All these materials can be recycled through advanced plastic recycling processes. Therefore, the criteria should support enhanced collection and processing of these plastics to develop new commodity streams rather than keeping them out of the recycling system and destined for landfill. As the material mix will continue to change, Oregon's system must be adaptable.

Advanced (Chemical) Recycling

Mechanical processes alone cannot meet the challenges of recycling greater amounts and types of plastics packaging. In fact, to achieve Oregon's goals, a significant and growing amount of plastic packaging will need to be recycled through advanced chemical processes. Advanced plastics recycling, also called chemical recycling, refers to several different technologies such as pyrolysis, gasification, depolymerization, solvolysis, and other processes in which material is chemically changed and converted into new feedstocks for plastics and chemical products. Current research already shows growing demand for the products of advanced recycling.

A 2019 report by the Closed Loop Partners (CLP), an investment platform supporting the transition to a more circular economy, found advanced recycling technologies "could meet an addressable market with potential revenue opportunities of $120 billion" in the United States and Canada alone. Advanced recycling is also leading to certified recycled plastics products and packaging such as Wendy's new drink cup[4] and Herbal Essences shampoo and conditioner bottles.[5] Public policy approaches have also aligned with advanced recycling as sixteen states since 2017 have reformed their laws to ensure that advanced recycling technologies are regulated as manufacturing and not solid waste. In Tigard, Oregon, Regenyx, an advanced recycler and joint venture of Agilyx and Americas Styrenics, currently recycles polystyrene into styrene oil for use in the remanufacturing of virgin equivalent polystyrene. With the momentum in technological development, investment, and policy, it is clear thar advanced recycling will come to play a greater role in Oregon's recycling system, specifically for mixed plastics which include rigid containers, films and flexibles, foam, multi-layered pouches, tubes, and other plastic items.

Innovation and Alternatives for Collection and Processing

It is critical that Oregon's uniform statewide collection list allow for future innovation via the expansion of access, collection and processing options supporting increasing the types and amounts of plastics recycled. The criteria should encourage the investment and commercialization in a diverse range of collection options such as secondary bagging programs (e.g., Hefty Energy Bag), sortation enhancements at primary MRFs (e.g., Materials Recovery for the Future) and secondary sortation (e.g. Cyclyx) to support the aggregation and feedstock processing for both mechanical and advanced recycling. These types of options are currently being evaluated by The Recycling Partnership via their Pathway to Circularity initiative.[6] Furthermore, access for recycling should also recognize alternative collection programs, such as store drop-off, that provide the

[3] *https://www.ellenmacarthurfoundation.org/news/the-u-s-launches-a-national-plastics-pact-supported-by-all-sectors*
[4] https://www.environmentalleader.com/2021/10/wendys-to-start-including-recycled-plastic-in-cups/
[5] https://www.recyclingtoday.com/article/eastman-herbal-essences-packaging-chemically-recycled-plastic/
[6] https://recyclingpartnership.org/circulareconomy/

necessary widespread access for recycling certain packaging formats like polyethylene film that currently are not accepted in most municipal collection programs. Alternative collection programs serve an important interim system for recycling polyethylene films until curbside film collection can be scaled.

Resource Optimization and Life Cycle Benefits

The growth trend in performance plastics packaging has played an essential role in sustainability. For example, flexible pouches provide several sustainability benefits such as reducing food waste, protecting products during shipping to prevent damage and waste, and reducing greenhouse gas emissions over the product life cycle. And while many of these pouches are not currently mechanically recyclable, a switch to alternative materials may cause an increase in waste, resources consumed and greenhouse gas emissions. Therefore, it is essential that Oregon's uniform collection list first consider the life cycle benefits and performance attributes of these plastic packaging formats and evaluate the environmental tradeoffs in switching to other materials. Following that evaluation, the collection list should consider how new collection, sortation and processing methods coupled with advanced recycling technologies listed above will enhance the circularity and sustainability of these plastics packaging formats.

Thank you again for the opportunity to provide these comments. We would welcome an opportunity to meet with you to discuss our comments in greater detail. Should you have any questions or comments, please feel free to contact me at Tim_Shestek@americanchemistry.com or 916-448-2581.

Sincerely,

Tim Shestek
Senior Director, State Affairs

AMERICAN RECYCLABLE PLASTIC BAG ALLIANCE

March 21, 2022

Mr. David Allaway
Project Manager, Implementation Section 22 of Recycling Modernization Act
Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, OR 97232

RE: DEQ Request for Information: Oregon statewide recycling collection list and producer-collected materials.

Dear Mr. Allaway:

On behalf of the American Recyclable Plastic Bag Alliance, which represents the U.S. manufacturers and recyclers of plastic bags, I write to respond to the Oregon Department of Environmental Quality's (DEQ) Request for Information regarding the to-be-developed statewide recycling collection list and producer-collected materials.

Like Oregon, America's plastic bag manufacturers recognize the importance of sustainability and are united in the belief that a sustainable industry requires a sustainable product. ARPBA members voluntarily established an industry-wide sustainability commitment to promote increased recycling of plastic carryout bags and increased use of recycled content in these products to facilitate increased circularity.

We urge the DEQ to recognize the efficacy of the store takeback program for plastic carryout bags and other polyethylene (PE) films developed in partnership between the industry and their retail partners and ultimately include these products in its producer-collected materials list to ensure they remain recognized as recyclable. Further, we urge the DEQ to acknowledge the importance of plastic carryout bags as an end market for recycled plastic carryout bags and other film products, particularly as the industry works to meet its self-established goals to increase the amount of recycled content in these products.

Plastic Carryout Bags and Other PE Film Products Are Easily Recyclable Via the Industry- & Retailer-Pioneered Store Takeback Program, Which is Working.

As the DEQ may know, in 2019, the state legislature passed HB 2509, limiting the types of carryout bags certain Oregon establishments can distribute to consumers. Retailers and restaurants may only offer plastic carryout bags if they are at least four (4) mils thick. Consumers can easily recycle these reusable plastic carryout bags through the store takeback program the industry pioneered with its retail partners.

In addition, the store takeback program provides an alternative end-of-life option for various PE products and film, including much of the plastic packaging and other bags exempted by HB 2509. Examples of other PE products and film commonly accepted through the store takeback program includes: pallet wrap and stretch film, bread bags, case, and product overwrap, dry cleaning bags, newspaper sleeves, resealable food storage bags, produce bags, and e-commerce packaging, including air pillows, bubble wrap, plastic shipping envelopes, and product wraps.

1425 K Street NW, Suite 500, Washington, DC 20005
P 202.974.5200 | bagalliance.org

Across all plastic carryout bags, the U.S. Environmental Protection Agency estimates that over 12 percent of bags are recycled. While the industry believes that this number can and should be much higher across all bags, research on bag and film recycling reveals positive momentum.

In 2019, the last year for which data is available, just under 1 billion pounds of plastic film was recovered for recycling in the United States—a nearly 50 percent increase since 2005. Retail bag and film recycling represents the second largest category of product recovered for recycling, only trailing clear PE film. According to STINA, more than 275 million pounds of retail bags and film were recovered, a more than 13 percent increase over the previous year's data. Critically, more than 77 percent of this material was acquired by U.S. and Canadian reclaimers for processing. In short, the store takeback program is working and growing across America.

To make recycling easier for consumers and support further growth in recycling, the industry has partnered with STINA as a sponsor of its new bag and film recycling directory: www.bagandfilmrecycling.org. This important resource provides an easy and convenient mechanism for environmentally conscious consumers to identify store takeback program locations in their community. In addition, the database relies on crowd-sourced verification of the availability and location of takeback bins at local retailers to ensure it is accurate and up to date.

Including the store takeback program and plastic carryout bags and PE film products in the DEQ list will help create opportunities to expand this program, collect more PE bags and film, support end markets for these materials, and advance circularity in Oregon.

While Plastic Carryout Bags and Other PE Film Products Generally Must Be Separated from Curbside, Residential Recycling, Technology to Separate Different Materials Does Exist.

Plastic carryout bags and other PE film products are generally not accepted in curbside residential recycling, whether separated or comingled. While the technology to identify and separate recycled polyethylene products from other materials does exist, most material recovery facilities (MRFs) do not currently have the necessary machinery. However, this is changing in some areas. Recently, Boulder Colorado invested in new sorting technology, which allows it to separate our polyethylene films from its comingled products, avoiding contamination and other operational issues.

When consumers mistakenly put PE products, whether bags, film, or wraps, into their recycling, these products can cause challenges for the equipment at most MRFs. However, labeling plastic carryout bags and films as unrecyclable, even as many of these products are ubiquitous in consumers' lives, is likely to result in increased contamination at MRFs or more recyclable materials being landfilled. To recycle correctly, consumers need more education and information, not less.

For example, despite a ban on all PE carryout bags in New York, state law still requires retailers to maintain store takeback locations for other PE products and films. Research from the University at Buffalo found that once the prohibition on film bags took effect and retailers no longer had reason to communicate how to recycle these materials, contamination in the store takeback stream increased.

On the other hand, anecdotal evidence from across the country shows that there are tremendous opportunities for producers of PE packaging, bags, and film to work together with municipalities on

separating, collecting, and ultimately recycling this material into new products and supporting innovation in new applications. These emerging efforts include programs like the Hefty Energy Bag Program, which works with localities to provide convenient ways for consumers to recycle films that are then processed into other products. Pilot programs in Boise, Idaho and Gwinnett County in Georgia are proving successful in ensuring these recyclable products find new life.

The store takeback program provides a convenient and easily accessible alternative for recycling plastic carryout bags and PE films. Considering that consumers likely acquire the majority of the recyclable plastic carryout bags and other recyclable PE products and film during their trips to the grocery store, ensuring that these products can be recycled through a separate, standardized stream collected where they originate helps protect both curbside residential recycling and store takeback streams from contamination.

Plastic Carryout Bags Have Environmental Advantages Over Alternative Products

While lifecycle assessment after lifecycle assessment of carryout bags have consistently found that traditional, thin-gauge plastic bags are the option with the fewest environmental impacts when properly disposed of, the reusable plastic carryout bags allowed under Oregon law also have substantial environmental advantages over alternative products for many of the same reasons.

These lifecycle assessments reveal that carryout bags made from other materials, whether plastics like woven or nonwoven polypropylene, polyethylene terephthalate, nylon, or natural fibers like cotton, require substantially more reuses to offset their larger environmental footprints. Research finds that the number of reuses these alternative bags require rangers from several dozen to several thousand, depending on the material and the breadth of the environmental considerations included in these assessments.

Research from the University of Clemson exploring these disparate impacts on the environment also analyzed consumer behavior, finding that only 25-41% of consumers actually reuse these bags enough times to offset their environmental impact. When consumers cannot meet these "breakeven" points, reusable bags that are generally viewed as "more sustainable" prove the opposite.

In August, the New York Times reported on one of these lifecycle assessments, noting that according to the Danish Environmental Protection Agency, consumers would need to reuse an organic cotton tote as many as 20,000 times to offset its overall impact. This reuse rate, equivalent to using one tote daily for 55 years, reveals some challenges with alternative bags. On the other hand, the reusable plastic carryout bags allowed by Oregon law can be recycled through the store takeback program at any point in their life, whether used once, twice, or the entirety of the 125 reuses they are specifically designed and manufactured to withstand.

Consumers' shopping needs and habits vary wildly, even from trip to trip. Reusable plastic carryout bags play a critical role in helping retailers offer products that meet their needs in the given moment. To ensure that retailers and consumers can continue to rely on these recyclable products and access the store takeback program where they can be recycled, DEQ should include these products, as well as similar PE products and films in the producer-collected materials list.

Beyond the comments included here, I am also including several other resources related to the DEQ's request for information that should prove helpful as this process unfolds. Attached you will

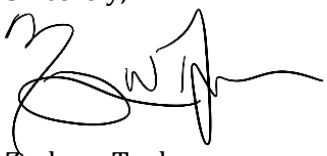
find lifecycle assessments on carryout bags referenced in this letter and the latest research from STINA on the state of PE film recycling in the United States can be accessed here.

The industry stands ready to work with the DEQ as it undergoes the rulemaking process for Section 22, which provides Oregon an excellent opportunity to collaborate with America's plastic bag manufacturers as well as the Oregon retailers and consumers who rely on these products to promote increased recycling of these products through the store takeback program.

Ultimately, we believe supporting the store takeback program provides an opportunity to establish a robust and sustainable end market for recycled plastic carryout bags and numerous other PE films consumers use every day. We hope that the store takeback program and these products will be included in the Department of Environmental Quality's initial producer-collected material lists.

Thank you for your time and attention to this issue. Should you have any questions about the information included in this letter or wish to further discuss the industry and its sustainability interests, please contact me at ztaylor@plasticsindustry.org or (202) 974-5245.

Sincerely,



Zachary Taylor
Director
American Recyclable Plastic Bag Alliance

Denton PLASTICS

MARCH 17, 2022

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

Re: Request for Information on Oregon Statewide Recycling Collection List

Dear DEQ Technical Workgroup and Rules Advisory Committee,

Denton Plastics, Inc. would like to register support for the inclusion of certain foodservice packaging items on the "Uniform Statewide Collection List". Denton Plastics, Inc. is located in Portland, Oregon and we are an end market for post-consumer materials sourced from Material Recovery Facilities (MRFs). We currently source post-consumer olefins to produce PCR Resin with a capacity of 2 million pounds post-consumer material annually.

We will begin procuring the following MRF grades

- -0- lbs of Mixed Plastic Bales [add detail as needed – e.g. 1-7, 3-7, other...)
- -0- lbs of PET Thermoform Bales
- 600,000 pounds of Polypropylene Bales
- 1,400,000 pounds of Polyethylene Bales

The following foodservice packaging items are acceptable in these incoming bales:

- **Polypropylene (PP) cups and containers,** including drink cups, deli tubs, clamshells, takeout dishes and lids and other PP thermoformed or injection molded containers
- **Rigid Polystyrene (PS) cups and containers**, including drink cups, clamshells, sandwich boxes and other thermoformed containers
- **Expanded Polystyrene (EPS or Styrofoam) cups and containers**, including drink cups and clamshells

As an end market for these materials with expanding demand from our customers Denton Plastics, Inc. wants to encourage the inclusion of these items in the statewide list to ensure an adequate supply to feed our growing operation.

Thanks very much for your consideration. We are happy to provide follow-up information upon request.

Best Regards,

Nicole Janssen,

President,

Denton Plastics, Inc.

Phone: 503-257-9945
Toll Free: 1-800-959-9945
18811 NE San Rafael St. Portland, OR 97230
www.dentonplastics.com

DEQ LIST

Provided by Denton Plastics. "#1" is Denton's recommendation for inclusion in the Uniform Statewide Collection List.

#1 PET

Category	Item	Size	Color
#2 (store/depot)	PET bottles	NA	All
#2 (store/depot)	PET clamshells	NA	Clear

#2 HDPE

Category	Item	Size	Color
#1	Milk Jugs		All
#1	Bottles		All
#1	Buckets		All
#1	Crates		All
#1	Nursery Pots/Trays		All
#2(store/depot)	Caps/Lids		All
#2(store/depot)	Drums (cleaned)		All

#3 PVC

Category	Item	Size	Color
#2(store/depot)	Packaging		All

#4 LDPE

Category	Item	Size	Color
#2 (store/depot)	Film		All
#1	Rigid Containers		All
#1 or #2(store/depot	Lids?		All
#2(store/depot)	Caps		All
#2(store/depot)	Foam		All

DEQ LIST

Provided by Denton Plastics. "#1" is Denton's recommendation for inclusion in the Uniform Statewide Collection List.

#5 PP

Category	Item	Size	Color
#1	Rigid Containers		All
#2(store/depot)	Caps		All
#1	Nursery Containers/Trays		All
#2(store/depot)	Foam/Film		All

#6 PS

Category	Item	Size	Color
#2(store/depot)	Foam		All
#1	Rigid Containers		All
#1	Nursery Containers/Trays		All
#2(store/depot)	Utensils		All

#7 OTHER

Category	Item	Size	Color
#2	Discussion on Containers		All

Oregon Recycling Modernization Act – Request for Information
Oregon Statewide Recycling Collection List and Producer-Collected Materials for Recycling

EPS-IA's response to the Oregon Department of Environmental Quality is intended to address the following statute under the Extended Producer Responsibility implementation phase.

Responsibilities of the Environmental Quality Commission and DEQ Section 22 requires the creation of the following lists of materials for recycling:

Section 22(1) requires the EQC to determine in rule materials suitable for collection and methods of collection, in consultation with PROs and the Oregon Recycling System Advisory Council. The EQC is also directed to distinguish between materials where local governments are responsible for collection (under Opportunity to Recycle Act requirements – see 22(1)(a)) versus where producers are responsible (special collections – see 22(1)(b)).

- Section 22(2) provides that materials deemed suitable for collection may be collected via on-route collection in some areas and via drop-off recycling in others.
- Section 22(3) defines criteria the EQC must consider in determining suitability of materials for collection, as well as collection mode (commingled vs. not), method (on-route vs. drop-off), and responsible party.
- Section 22(4) directs DEQ to establish the uniform collection list for the state, combining the EQC's list from Section 22(1) with additional covered products, if any, contained in an approved PRO program plan.
- Section 22(5) prohibits the commingled collection of any materials not on the uniform collection list. Section 22(6) allows material not on the uniform statewide list to be collected in a commingled program if such collection is part of a trial or research program.
- Section 22(7) establishes a process for setting collection targets, convenience standards and performance standards for materials that producers provide collection for (see 22(1)(b)).

Statutory Criteria Section 22 – <u>Response From EPS Industry Alliance</u> (note: information is U.S. specific)

Section 22 of the Recycling Modernization Act requires the Commission to consider multiple criteria when determining whether a material should be included in one of the state's lists of materials to be recycled. These criteria (a) through (k) are set out below with EPS-IA's draft responses.

(a) The stability, maturity, accessibility and viability of responsible end markets.

Expanded polystyrene transport packaging recycling markets demonstrate stability, indicating consistent growth over 20 years[1]. Major end markets for expanded polystyrene include rigid plastics applications such as recycled plastic decking, interior crown molding, recycled concrete aggregate, agricultural seed trays, coat hangers and many others. From a recycling perspective, EPS transport packaging is unique as it can be ground into bead-sized particles and reincorporated into its original manufacturing process to make new polystyrene foam (with recycled content).

The polystyrene industry maintains a map of recycling locations throughout the U.S. reflecting 214 drop-off locations and 55 curbside programs for EPS. Currently, there are five drop-off locations in Oregon – Agilyx in Tigard, Fresh Start Market and Espresso in Salem, and three St. Vincent de Paul locations in Eugene. EPS-IA only gains

[1] EPS Industry Alliance, *EPS Recycling Report*, 2019

access to specific information on the amount of material collected if locations chose to participate in the annual EPS recycling survey.

Technology provider, Agilyx, established the first U.S. chemical recycling facility, enabling strong end use markets for EPS collected in Oregon. As of July 2021, Agilyx has converted more than 4,400 tons (8.9 million pounds) of mixed waste plastic and polystyrene waste.

(b) Environmental health and safety considerations.

EPS does not use or contain hazardous chemicals that pose a significant risk to human health or the environment. EPS-IA routinely commissions third-party research to evaluate expanded polystyrene chemical composition and understand its potential impacts. Science Shows EPS Chemical Composition Is Below Established Risk Levels.

(c) The anticipated yield loss for the material during the recycling process.

In EPS molding facilities, when the waste EPS is reground to be incorporated as feedstock replacement for virgin material, there is a very small amount of dust produced that cannot be put into the recycling process, but the residual dust is typically sold into other markets.

(d) The material's compatibility with existing (Oregon) recycling infrastructure.

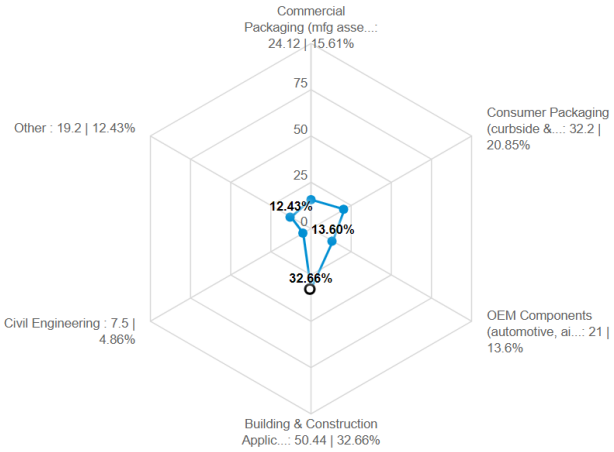
Expanded polystyrene foam is not compatible with Oregon's current recycling infrastructure.

(e) The amount of the material available.

Expanded polystyrene foam in residential waste streams is extremely low, supported by various national and state waste characterization studies. In 2020, total U.S. expandable polystyrene resin production was 431,132 tons[2], of which ~36% is used to manufacture packaging. Of that, only a portion is used for consumer packaging and another for commercial packaging applications, such as medical equipment, pharmaceutical cold-chain shipping containers, fish and produce boxes, and manufacturing parts. Another percentage is used to make durable OEM components, sports equipment and signage.[3] This indicates consumer packaging represents 21% of all EPS manufacturing in that year, translating to approximately 90,538 tons. Total U.S. residential, commercial and institutional waste was 292.4 million tons in 2018.[4] Therefore, the percentage of expanded polystyrene transport packaging would represent approximately 3.1E(-03)%.

[2] American Chemistry Council, *Plastics Industry Producers Statistics Group, As Compiled by Vault Consultants*, 2020
[3] EPS Industry Alliance, *Survey of EPS Industry Recycled Content Packaging Capabilities*, (2022 preliminary results)
[4] U.S. EPA, *Assessing Trends and Materials Generation and Management in the U.S.*, 2018

All EPS Resin (ACC) 2020	**433,132 tons**	**292,400,000 tons**	**U.S. EPA Total Waste 2018**
All EPS Packaging 36%	**155,927 tons**	**5.3E(-03) *percent***	**292.4 million tons**
Consumer Pkg Only 21%	**90,958 tons**	**3.1E(-03) *percent***	



(f) The practicalities of sorting and storing the material.

For drop-off locations the material would have a designated bin meaning sorting consists of removing contaminants. There are six municipal waste facilities in the U.S. that have recently adopted a turnkey EPS recycling system that minimizes sortation problems and significantly reduces storage space. The system consists of a refurbished freight container that houses a low-volume densifier and handling materials. As more communities adopt this approach, more information will be available on optimized sorting and storing practices.

Other drop-off locations, not under municipal oversight, most likely collect loose foam which does need temporary, covered storage. Depending on the volume being collected, EPS is bulky but extremely light weight. As an example, EPS-IA's Crofton, MD drop-off location, which has been operating since 2004, generates approximately 8.75 tons/year. EPS-IA has the material collected weekly, averaging 330 pounds of material, for which we need ~500 sq ft interim storage space. The practicality of storing EPS for recycling is entirely dependent on the material volume and facility limitations.

(g) Contamination.

For transport packaging we estimate the yield loss for collected material would be less than 2-3% (by volume). Contamination largely consists of expanded polypropylene, expanded polyethylene and other non-EPS foam, and is caused by user misidentification. Other contaminants include material that has been left outside for long periods of time and lack of packaging system sorting by consumer.

(h) The ability for waste generators to easily identify and properly prepare the material.

EPS is relatively easy for waste management facilities and consumers to identify when marked with a resin identification code.

(i) Economic factors.

Expanded polystyrene foam collected for recycling has maintained its value over time and is favorably competitive with virgin resin pricing. Historically, prices for recycled EPS have been as high $0.45 - $0.50/pound; currently pricing is reported at $0.38 - $0.40/pound. When densified, EPS material can be economically transported; when loose, a 100-mile radius is the typical rule of thumb. Economies of scale for transportation have been maximized through back hauling; examples include Walmart, Best Buy and Dart Container.

Lower thru-put densifiers can cost as low as $20,000 per unit and have low energy and maintenance costs. Basic preventative maintenance is approximately $200/year and the approximate electrical cost to per hour to operate is $0.62. Most users run densifiers four hours or less per day; the electrical cost for a four-hour day would be $2.48.

(j) Environmental factors from a life cycle perspective.

Life cycle analyses show that EPS has far less impact on the environment than other competitive materials for the same use, particularly global warming, water consumption and energy use.

(k) The policy expressed in Oregon Revised Statutes 459.015 (2)(a) to (c), as amended by Section 46 of the Recycling Modernization Act.

Relevant sections set out here: *(2) In the interest of the public health, safety and welfare, in order to allow all entities in Oregon to produce and use materials responsibly, conserve resources and protect the environment and in order to allow all people of Oregon to live well, it is the policy of the State of Oregon to establish a comprehensive statewide program for materials management that will:*

(a) Minimize the net negative impacts of materials, across their life cycle, on human well-being and environmental health, including the quality of land, air, water and ecosystems, with consideration of technical and economic feasibility.

(b) Consistent with paragraph (a) of this subsection, reduce the amount of materials used.

(c) If information on the net negative impacts described in paragraph (a) of this subsection is unavailable or highly uncertain, establish priority in methods of managing solid waste in Oregon as follows:

(A) First, to reduce the amount of solid waste generated.

(B) Second, to reuse material for the purpose for which it was originally intended.

(C) Third, to recycle material that cannot be reused, with preference given to recycling pathways, methods and responsible end markets that result in the greatest reduction of net negative impacts on human well-being and environmental health. When these impacts are not known, preference is given to:

(i) Recycling methods and responsible end markets that displace the production of more impactful materials over recycling methods and responsible end markets that displace the production of less impactful materials.

(ii) Processes that best preserve the value and molecular structure of the material being recycled.

(D) Fourth, to compost material that cannot be reused or recycled, provided that composting or digestion results in net reductions in impacts on human well-being and environmental health relative to the methods described in subparagraphs (E) and (F) of this paragraph.

(E) Fifth, to recover energy from solid waste that cannot be reused, recycled or composted, provided that the emissions and impacts of energy recovery are understood and result in net reductions in impacts on human well-being and environmental health relative to the methods described in subparagraph (F) of this paragraph.

(F) Sixth, to dispose of solid waste by landfilling or other method approved by the Department of Environmental Quality.

185 Admiral Cochrane Drive
Suite 105
Annapolis, MD 21401

Tel (410) 694-0800
Fax (410) 694-0900

www.flexpack.org

Flexible Packaging Association

Submission to Oregon State Department of Environmental Quality

Request for Information – Recyclable Materials

The Flexible Packaging Association (FPA) respectfully submits the following information in response to The Oregon Department of Environmental Quality's (DEQ) Request for Information: Oregon statewide recycling collection list and producer-collected materials (for recycling).

FPA is a national association that represents flexible packaging (such as rollstock, bags, pouches, labels, liners, wraps, and tamper-evident packaging for food and medicine) manufacturers and suppliers to the industry in the United States. Flexible packaging, a $34.8 billion industry, is the second largest and fastest growing segment of the packaging industry and employs approximately 79,000 workers in the United States. FPA appreciates DEQ's consideration of the below information regarding the recycling capacities of flexible materials and urges DEQ to classify both Polyethylene and Multi-material flexible packaging as recyclable.

Polyethylene (PE)

FPA strongly believes that Polyethylene (PE) is a recyclable, highly versatile, valuable material with a wide range of applications and uses. PE is one of the most widely used polymers worldwide. The Recycling Partnership estimates that the average household generates 75 pounds of film and flexible materials per year. This suggests a residential supply stream upwards of 7.3 billion pounds per year of flexible materials, just in the U.S, and unfortunately, most of it ends up in a landfill. This is largely because our recycling infrastructure is outdated.. Not only is PE recyclable but recycling High Density Polyethylene (HDPE) and Low Density Polyethylene (LDPE) provides benefits to the economy and environment.

When PE is mechanically recycled, the process results in small resin pellets that can be used in other production processes, either with the pellets being used alone or mixed with virgin materials, depending on the product needs. Mechanical recycling, however, generally requires a homogenous material stream, thus plastics must be sorted before they can be mechanically recycled. Mechanical recycling is widely used to regrind plastic water bottles (PET), laundry bottle and milk jugs (HDPE), as well as some flexible materials such as plastic grocery bags (PE). These materials can then be re-incorporated into new packaging or turned into another product, such as plastic lumber, which is often the case with recycled PE bags. What's more, the majority of PE plastics are able to be recycled up to 10 times.

PE based products are also, generally, much lighter than other packaging alternatives, meaning that even with no recycling, they still result in less material sent to landfill vs. other formats. Products made from all PE, such as overwraps and grocery bags can be easily recycled at front of store recycling drop off locations. In classifying PE as a recyclable material, DEQ would further encourage other

recycling collection programs. One such program, the Wrap Recycling Action Program (WRAP) allows consumers to bring PE films such as grocery bags, bread bags, and overwraps for paper towels back to stores as part of the store drop-off program. These PE bags are then combined with other PE film collected at the back of stores and sent to a reprocessing center to be recycled. Following the initial success of the program, the group developed the website www.plasticfilmrecycling.org to provide information to consumers and community leaders on how to advance flexible PE film recycling in their community. The site lists over 18,000 drop-off locations in the U.S. that accept PE films. Furthermore, Research from Europe notes that approximately 80% of flexible packaging today is made from mono-material (mostly PE), showing that the bag drop-off program has a great opportunity to expand flexible packaging recycling.

In the U.S., approximately one-third of all food produced is disposed of before it is consumed, resulting in 1.3 billion tons of food thrown out annually. A cucumber wrapped in PE film can stay fresh for up to 14 days, while an unwrapped cucumber stays fresh for about five days. In the developed world, more than 50% of food waste takes place in households, and nearly 20% is wasted during processing. Plastic packaging helps to reduce this high level of waste in both areas. Food waste is a major contributor to global greenhouse gasses and is a large contributor of methane gas at landfills. Flexible packaging, in general, and PE in particular can help reduce food waste through methods such as portion control (to prevent overuse and waste) and extending food shelf life.

In 2019 the global polyethylene market size was $107.43 billion and is projected to reach $130.26 billion by 2027. Furthermore, states and nations are increasingly requiring higher levels of post-consumer recycled (PCR) content in products and the demand for recycled/recyclable materials like PE has already outpaced the supply. PE is lightweight, highly valuable, easily recyclable, and a crucial piece of the puzzle moving towards a circular economy.

Multi-Material Flexible Packaging

FPA believes that the classification of Multi-Material Flexible Packaging (MMFP) as a recyclable material is of critical importance to the reduction of the environmental impacts of packaging and to continued progress towards a circular economy. MMFP consists of several thin layers that are typically combined with an adhesive or wax. These thin layers each have a specific strength, printing, operation, moisture, and oxygen barrier, which together allow the packaging to meet performance needs while using much less material overall than would be required of any single material. Multi-material films are strong, cost effective, and generally lighter and thinner, which helps to reduce demand for resources required both to produce and to transport packaging–including a reduction in greenhouse gases. Because of these advantages, an estimated 40 billion packages are produced from multi-material films annually in the U.S., and MMFP is anticipated to be one of the fastest growing packaging formats over the coming years. Though the recovery of MMFPs is more complicated than that of some single material packaging, it is becoming increasingly feasible, and the advantages of MMFP make it worthwhile to take extra care during its recycling now while a better infrastructure for MMFP recycling is crafted and refined.

MMFPs can be challenging to mechanically recycle under current infrastructure because they do not have a standard composition, and consequently there can be a wide range of material and some

uncertainty regarding output products. However, these outputs are still viable materials for many end users. It is important to note that multi-material films are still relatively new to the market, and as with most new materials, options for recovery have not caught up. This should not discourage the use of MMFPs or exclude them from recyclability, as there is increasing support for innovation in the recycling of multi-materials through a number of initiatives. One such example is the Hefty EnergyBag program, which collects plastics that are typically thrown away, like candy wrappers and juice pouches, through curbside collection and sorting at a material recycling facility (MRF) and converts them into energy resources. EnergyBag is a great example of an initiative that is complimentary to mechanical recycling, and additionally it demonstrates the feasibility of curbside collection, sorting, and contamination control of MMFPs.

Another example initiative is Materials Recovery For the Future (MRFF), a pilot program in Birdsboro, Pennsylvania that successfully collects, separates and prepares flexible plastic packaging for recycling, including multi-material flexibles. The flexible materials that MRFF captures are processed into a commodity bale for reuse in a variety of markets. This program aimed to and succeeded in demonstrating that adequate optical sorting capacity and peripherals allow for the efficient capture of flexible packaging in a large single-stream MRF.

In closing, the Flexible Packaging Association would also like to stress that it is highly important to consider Advanced Recycling technologies as a complementary method to mechanical recycling in any serious dialogue. Advanced Recycling through pyrolysis and gasification, best demonstrated through the University of Florida's Advanced Recycling Program, can process plastics such as MMFPs that do not have strongly defined end markets and can produce new plastics and chemicals that are virgin equivalent, ultimately enabling a more circular economy for plastics. FPA strongly supports the classification of Advanced Recycling as a form of recycling, and its benefits are particularly valuable with respect to MMFPs.

FPA is grateful for the opportunity to provide comment and would thank you in advance for your consideration. If we can provide further information or answer any questions, please do not hesitate to contact FPA via phone at 410-694-0800 or via e-mail at SSchlaich@Flexpack.org or ATrumpy@Flexpack.org.

Respectfully,

Sam Schlaich

Sam H. Schlaich, J.D.

Government Affairs Counsel, FPA

OREGON DEQ RFI RESPONSE: PP CUPS & CONTAINERS

Oregon Statewide Recycling Collection List and Producer-Collection Materials for Recycling

This information is submitted by the Foodservice Packaging Institute in response to the February 3, 2022 Request for Information: Oregon statewide recycling collection list and producer-collected materials (for recycling).

We welcome questions and can provide additional details upon request. Please contact:
Ashley Elzinga
571-407-1434
aelzinga@fpi.org

Background

The Oregon Department of Environmental Quality has requested technical information that can be used to evaluate materials against evaluation criteria set forth in statute. The Oregon Plastic Pollution and Recycling Modernization Act was passed into law in 2021 requiring numerous changes that are intended to modernize and stabilize recycling services in Oregon.

The Foodservice Packaging Institute (FPI) was founded in 1933 and is the leading authority for the North American foodservice packaging industry. FPI encourages the responsible use of all foodservice packaging through promotion of its benefits and members' products. FPI's core members are foodservice packaging manufacturers and their raw material and machinery suppliers. With over 75 members, FPI includes approximately 90% of converters and suppliers in the foodservice packaging industry in North America, and over 200 foodservice operators, distributors, and educational institutions.

FPI is committed to reducing the impact of its products on the environment and is dedicated to making sure these items recovered and diverted from the landfill. FPI has a separately funded recovery group with a focus on paper and plastic cups, containers, bags, and boxes. Since 2011, this group has been working with communities, recycling facilities, composters, and end markets to expand to find stable and sustainable recovery solutions for these valuable materials. This group receives technical support from Resource Recycling Systems (RRS).

Through the Community Partnership program that launched in 2017, FPI has partnered with 15 residential programs to add foodservice items to their accepted material lists. The specific items are determined through consultation with the individual program, the Material Recovery Facilities (MRF) and end markets that process the community's materials. Once FPI determines viability for inclusion of foodservice packaging materials into the prospective community recovery program, FPI works with the city and/or municipality to educate residents on best practices for recovery. This education campaign is a crucial component of every Community Partnership and helps elevate the whole community recovery program, not just the foodservice items. Because these efforts

are market-based, they have proven stable and sustainable without further assistance from FPI, and the partners report numerous benefits to their programs.

This RFI submission provides information regarding polypropylene cups and containers to support decisions around their inclusion in the uniform Statewide collection list (USCL). The data has been compiled with the assistance of technical consultant, RRS, who has conducted ongoing research on recycling and recyclability of these materials for FPI and other clients.

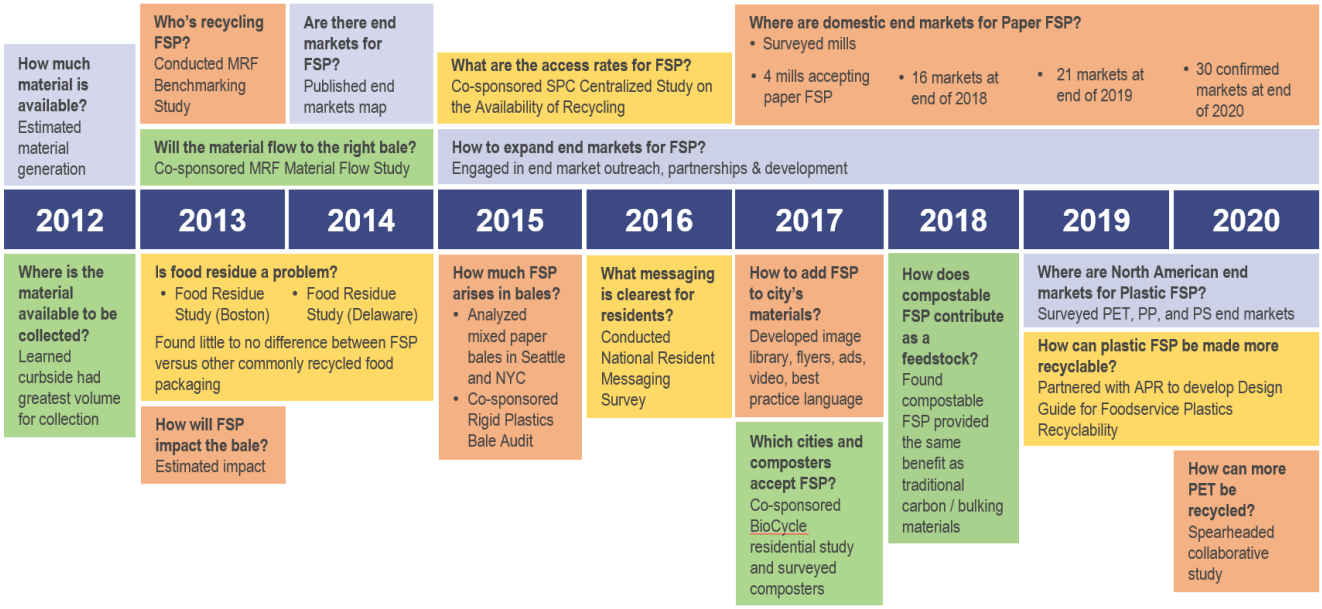
Plastics: PP Cups and Containers

Polypropylene (PP) resin, designated with the #5 resin identification code, is one of the most common resins in foodservice packaging applications, used for foodservice packaging including drink cups, deli tubs, takeout dishes, and thermoformed containers.

FPI Research

Since the inception of the FPI's recovery efforts over ten years ago, FPI has been conducting research on recyclability of foodservice packaging in order to understand and overcome potential barriers to its recovery. This research has provided the foundation for FPI's successful Community Partnership program. Many of these studies have been collaborations with other industry stakeholders including the Association of Plastic Recyclers and the Sustainable Packaging Coalition, and since 2012, much of this research has been conducted with technical support from RRS and other technical experts including Cascadia Consulting, DSM, Stina (formerly More Recycling), and Moore and Associates. Below is an overview of these research efforts and the questions they were designed to address.

Overview of FPI's Foundational Research



Overviews of studies are available at www.recycleFSP.org

Studies of particular relevance for PP cups and containers can be found in the appendix. They include research in the following areas:

- Food Residue Studies
- MRF Flow Studies
- Mixed Plastic Bale Sorts (2015 and 2021)
- Reclaimer Surveys (reflected in FPI's End Markets Map)
-

The Stability, Maturity, Accessibility and Viability of Responsible End Markets

The following map shows North American end markets for PP (yellow diamond) and mixed plastic (red diamond) bales. The list is a result of a bi-annual survey of plastics reclaimers, last conducted in 2020, supplemented with more recent market information and announcements. FPI maintains an interactive map of end markets by commodity at https://www.recyclefsp.org/end-markets-map. These markets source from a wide geographic region with Oregon-based materials known to travel to the eastern part of North America (see letter of support from EFS). End markets do not distinguish between PP cups / foodservice containers and other types of widely recycled PP such as dairy tubs. ISRI / APR specifications include these items in the specification for 1-7 and 3-7 bales. This is a growing market with increasing demand from reclaimers and manufacturers. See attached

letters of support in Appendix from Denton, EFS and Green Rhino. Generally speaking, this is representative of overall end markets .

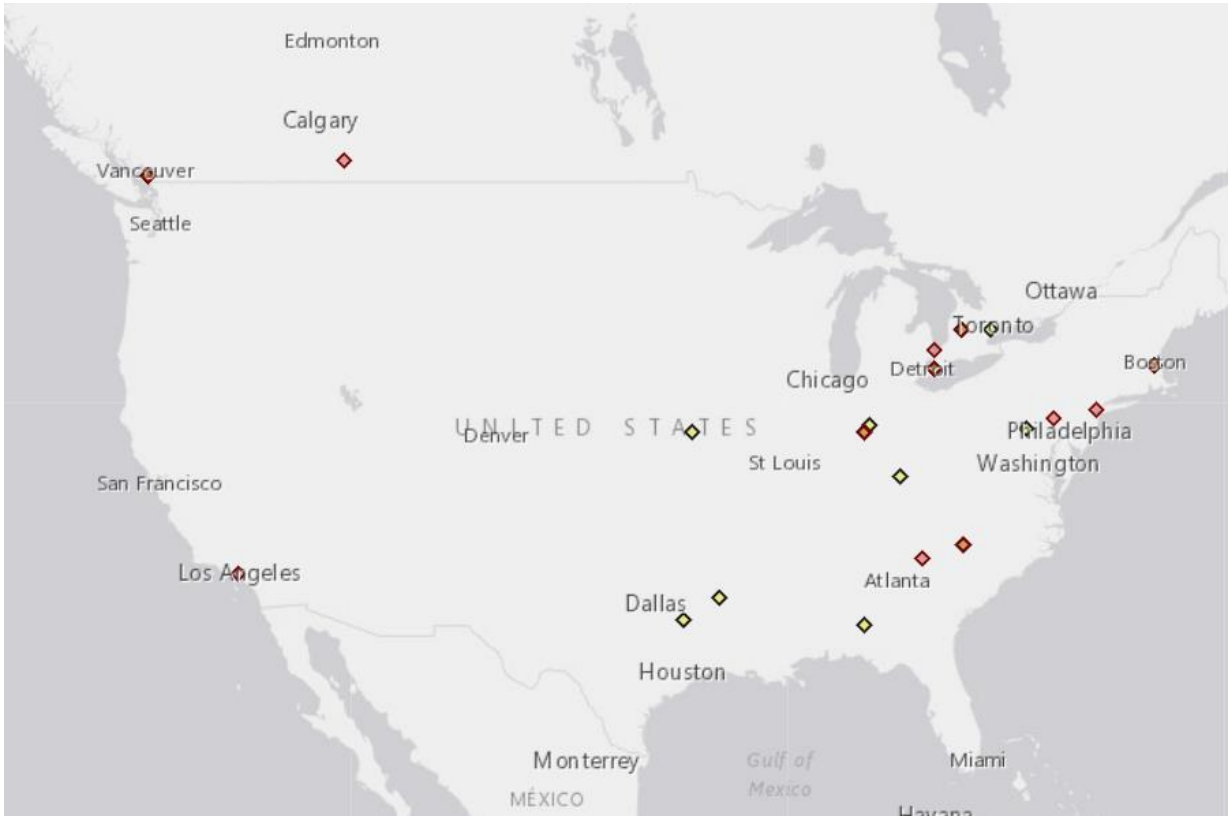


Figure 1. End Markets that Accept PP cups and containers. Source: https://www.recyclefsp.org/end-markets-map

This includes the following reclaimers:

- Merlin Plastics – Delta, British Columbia: All Rigids #1-7
- EFS Plastics – Lethbridge, Alberta: All Rigids #1-7
- St Joseph Plastics – St. Joseph, Missouri: PP bales
- Nursery Supplies – Jacksonville, TX: PP Bales
- IntegriCo – Sarepta, Louisiana: PP Bales
- KW Plastics – Troy, Alabama: PP Bales
- Pre-Zero Polymers – Westminster, South Carolina: All Rigids #1-7
- Custom Polymers - Charlotte, North Carolina: All Rigids #1-7
- Champion Polymer Recycling – Winchester, Kentucky: PP Bales
- East Terra Plastic – Indianapolis, Indiana: PP Bales

- Sirmax – Anderson, Indiana: PP Bales
- Mel Tech Plastics – Tilbury, Ontario: PP Bales
- Revital Polymers – Sarnia, Ontario: All Rigids #1-7
- EFS Plastics – Listowel, Ontario: All Rigids #1-7 & PP Bales
- Urban Polymers – North York, Ontario: PP bales
- Nursery Supplies – Chambersburg, PA: PP bales
- Trigon – Newmanstown PA: All Rigids #1-7

In addition, there are two emerging local markets in Oregon interested in sourcing PP Bales:

- Denton Plastics, located in Portland, accepts PP cups and containers in incoming bales. As described in their letter of support (located in the Appendix), Denton is experiencing expanding demand and wants to ensure an adequate supply to feed a growing operation.
- Similarly, a new plastic reclaimer, Green Rhino, is in the process of starting up in Tigard and would like to ensure an adequate supply of source separated PP for the plant. See letter of support in Appendix.

Regionally, PreZero US, located in Los Angeles, is an end market who sources mixed rigid plastics. PP cups and containers are acceptable in incoming bales (See Appendix for full letter of support). Additionally, EFS Plastics is eager to work with communities and MRFs in Oregon and keep PP in circulation. EFS Plastics has seen rapid growth in recent years and expects increased demand for PCR PP in the coming years. EFS has provided a letter of support, found in the Appendix.

The Anticipated Yield Loss for the Material During the Recycling Process

MRF Capture / Yield Loss

RRS data indicates that PP cups and containers typically have a high rate of capture / low level of loss in a MRF environment.

- According to a 2015 MRF flow study (see Appendix), PP cups flowed reliably to the container line (average loss rate to paper stream was 10%, and at the best-performing MRF, it was only 3% - note that this study represented a baseline where the MRFs had not undertaken any efforts to maximize capture of these items). The same study found the PP held its shape well and generally flowed to the container line. There are no specific studies conducted by FPI to document the flow of PP trays and other containers.
- More recent research undertaken by RRS found that more than 80% of PP cups and containers were properly directed to the container line in a typical single stream MRF environment, while less than 20% traveled with two dimensional materials to the paper line. These are likely lids or flattened containers. RRS research has also found that PP cups and containers that reach an optical sorter are captured nearly 90% of the time, and less than 10 percent of PP flows to residue. Capture in the MRF would be increased if quality control measures were implemented on the paper line.

Reclaimer Capture / Yield Loss

RRS research indicates that the reclaimer yield loss when recycling PP is approximately 30%. By comparison, this is lower than the yield in a typical curbside collected PET bale (38%) but higher than the yield loss of HDPE bottle bales (18%).

The Material's Compatibility with Existing (Oregon) Recycling Infrastructure

According to FPI research, most foodservice packaging is discarded at home or in the workplace. This means that residential curbside collection offers significant potential for capturing this material to achieve optimal diversion. Due to conditions spurred by the ongoing pandemic, takeout and delivery have likely prompted more opportunity for at home collection.

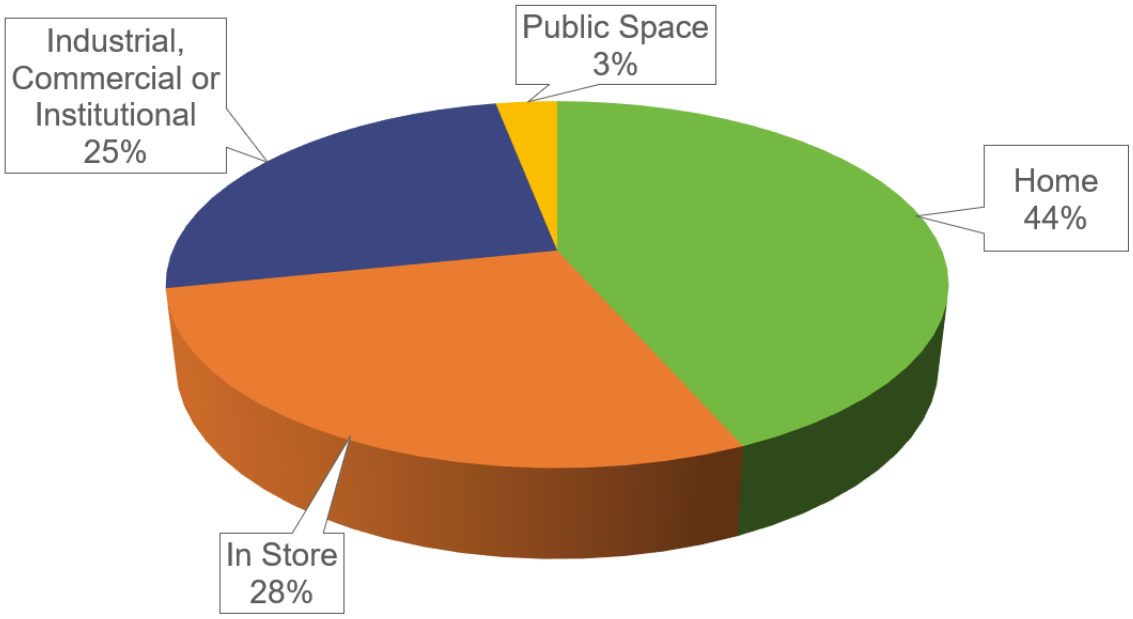


Chart showing breakdown of foodservice packaging by point of disposal

Round containers greater than 6 oz are currently accepted in a majority of households in Oregon. This would encompass some foodservice packaging PP containers, such as deli tubs. Drink cups, trays, lids, and other foodservice packaging containers are not yet generally accepted in Oregon's franchise collection programs. An FPI-sponsored study is currently underway which will provide more detailed insights into whether any Oregon communities accept these items cups in residential programs.

As noted above drink cups behave like "tubs" or "round plastic containers" through the recycling system. This is relevant because some recycling guidelines, such as those listed by Metro Regional Government, accept "round plastic containers" but explicitly prohibit "plastic beverage cups". This is confusing and contradictory, as PP beverage cups are round containers typically greater than 6 oz., they flow through the MRF in the same way, and are just as valuable to end markets, yet are not currently collected.

The Amount of Material Available

There are varying estimates of the availability of PP Cups and Containers, ranging from 8.5 to over 20 million lbs generated in Oregon.

- 2016 Oregon Waste Characterization study indicated 3,712 tons (7.4 million lbs.) of 8oz and larger tubs and another 544 tons (1.09 million lbs.) 6oz tubs, for a total of 8.49 million lbs estimated PP availability.
- Based on national sales data from the American Chemistry Council in the 2020 Resin Review, in 2019 there were 789 million lbs. of PP cups and containers sold into the US market. When looked at on a per capita basis this amounts to 2.3 lbs. per year or about 9.9 million lbs. per year available material.
- According to The Recycling Partnership's *2020 State of Curbside Recycling* report, some limited data from capture studies suggest there may be as much as 17 pounds of polypropylene available per year from a single-family household. This would place polypropylene at higher generation rates than both natural and colored HDPE. Total annual polypropylene tonnage by U.S. single-family households would be an estimated 827,000 tons or 1.65 billion pounds. Extrapolated per capita into Oregon this could represent over 20 million lbs of material.

The Practicalities of Sorting and Storing the Material

It is RRS' understanding that most Metro MRFs would sort PP into mixed plastic 3-7 bales. However, growing demand for #5 bale and support for MRF upgrades through the PP Coalition has the potential to shift the market away from mixed bales toward PP specific bales. Nationally, the trend among MRFs operated by the enterprise companies (WM, Republic, Waste Connections) and regional entities is also to move away from mixed plastic and toward PP specific bales.

When considering mixed bales in relation to PP cups, a 2020-2021 bale audit was conducted by FPI and RRS to evaluate prevalence in bales marketed by MRFs[1]. The study consisted of nine bales, classified into either *pre-picked rigids plastics: with bulky* or *pre-picked rigids: no bulky*. Within the *pre-picked rigids: no bulky* category, cups made up a small portion of all the bales sorted, averaging just over 6% of the total bale weight. This bale sort study shows that plastic cups are still successfully reaching plastic reclaimers, where they can be recycled into new products. By including cups and other non-bottle plastic containers in residential recycling programs, communities can provide a pathway for these cups and containers to be recycled. See Appendix for full study.

See additional notes on material flows in the anticipated yield loss section above.

Contamination

There are multiple aspects of contamination to consider. One issue is food residue on the packaging. According to a series of studies looking at food residue in foodservice packaging conducted by FPI in 2013 and 2014 the amount of residue in foodservice packaging was similar to any other type of food contact packaging and

[1] RRS was unable to source bales for this study from the west coast; bales audited were sourced from CO, NE, IN, OH, VA, SC, GA and NY. The results were similar to those of an earlier study that did include west coast bales.

determined to be consistent with what markets are accepting. Cups are used to contain liquids, and generally, residual liquid drains out of the cup by the time it reaches the MRF.

Another issue is related to cross contamination, when the material flows to the non-target material stream. As noted above. PP cups and containers are correctly captured 80% of the time. Cross contamination is primarily a result of two-dimensional lids flowing to the mixed paper line. Additional quality control on the paper line can reduce cross contamination and yield loss.

The real-world experiences of communities and MRF accepting PP cups and containers indicate that with good resident education, PP cups and containers other foodservice packaging can be added successfully while reducing overall contamination. The communities and MRFs that have participated in FPI's Community Partnership program have not reported any problems with quality or marketability of bales as a result of adding PP cups and containers, and the foodservice items added via the partnerships remain in their programs.

The Ability for Waste Generators to Easily Identify and Properly Prepare the Material

PP cups and containers are easily identifiable by waste generators by looking at the #5 resin identification code. Alternatively, residents of programs that use broader language such as "plastic cups and containers" can usually identify the accepted items intuitively.

The only preparation needed is to empty the cup/container and remove the lid or any other ancillary items.

FPI inventoried the messaging used in leading recycling programs, the terminology recommended by several industry groups, and conducted a resident messaging survey specific to foodservice packaging in order to develop best practices. FPI employs these findings in every Community Partnership program and resident communications for each program addition. These best practices include recommended terminology, effective graphics, and simple preparation instructions aimed at promoting recycling of clean and empty items and minimizing contamination (the resident education kit, including the study results, is available for download). The graphics feature clean, empty cups, with no lids or straws attached. This messaging strategy has proven effective, and our partner communities have reported reductions in residue following the communications campaign.

Economic Factors

Historically, PP items have been marketed in mixed plastic bales. However, there is increasing demand for a single resin PP bale. The demand for polypropylene bales is strong currently with an average national price over the past 12 months of $.29/lb. This is higher than the price of curbside PET bottles (based on data from recyclingmarkets.net). Mixed plastic 3-7 bales have a 12-month average price of about $.01/lb (based on data from recyclingmarkets.net).

A key economic factor for capture of PP is related to volume. In recent years, a number of foodservice brands have begun using polypropylene cups. PP cups and containers have an increasing market share and can be expected to bring added value into the recycling system whether it is sorted into PP bales or increases PP content in mixed bales, which could result in higher prices. If more PP were to enter the curbside stream there is greater incentive and logistical rationale to sort into a PP bale, which has higher market value and increasing demand.

Appendices

- FPI: Food Residue Study Overview
- RRS, Reclay StewardEdge, and Moore Recycling: MRF Material Flow Study Summary
- FPI: Plastic Cups Bale Sort Findings
- Denton Plastics Letter of Support
- Green Rhino Letter of Support
- PreZero US Letter of Support
- EFS Plastics Letter of Support

FOODSERVICE PACKAGING INSTITUTE

Food Residue Overview

FOOD RESIDUE IN FOODSERVICE PACKAGING RECYCLING: Overview of FPI Food Residue Studies

Background

The Foodservice Packaging Institute's Paper Recovery Alliance and Plastics Recovery Group have been working on overcoming barriers to recovery of foodservice packaging, and one of the often-cited reasons foodservice packaging is not accepted for recycling is the concern about increased levels of food contamination.

The Studies

To address this concern, two studies were conducted, to learn whether foodservice packaging (such as take-out containers or pizza boxes) set out for recycling were more contaminated than food contact packaging (such as peanut butter jars or pasta boxes) that has traditionally been accepted at single stream material recovery facilities (MRFs). DSM Environmental Services, Inc., conducted the studies in Boston, MA (Sept-Oct 2013) and Delaware (July 2014).

The process for each study included a sampling of materials between approximately 2,600 and 4,700 pounds of randomly selected residential curbside recyclables collected in different areas of the selected locations. For all recycling samples, corrugated, mixed paper, plastic tubs and lids, aluminum cans and foils/pans, were sorted into two categories, foodservice packaging or other packaging in contact with food (e.g. jars, tubs, cans, and boxes from prepackaged grocery items). The sort team then used a visual rating system to assess and record how much food residue was present on the selected categories, ranking all materials from 1 (clean) to 5 (highly contaminated, containing uneaten food remnants in addition to residue).

The Results

In both Boston and Delaware, the majority of the samples of foodservice packaging was rated as low-residue (1-2). In the Boston study, there was no appreciable difference in contamination rates between foodservice and food contact packaging. The overwhelming

majority of the samples were extremely clean. In the Delaware study, the proportion of foodservice packaging in high residue levels (4-5) was small and virtually identical to that of food contact packaging. Accordingly, the total proportion of items rated low and middle residue levels (1-3) was essentially the same among foodservice and food contact packaging and formed the majority, however some of the foodservice packaging material types showed a slight shift from the low (1-2) to the middle rating (3) when compared to the food contact packaging. While tolerance for food residue will vary by material and market, the levels ranked 1-3 are believed to be consistent with what markets are generally accepting today as part of the mix of commodities process by MRFs.

The studies yielded some additional observations that help to place this analysis in perspective.

1. Recyclables at the Boston study were exceptionally clean overall, which led the sort team to conclude that while the study was representative of the Boston area, it may not be representative of recycling set outs in other cities. In contrast, the Delaware study samples contained a higher proportion of commingled refuse and appeared to have more soiling from compaction and cross-contamination with refuse in the trucks. As a result, it was challenging in some cases to determine if the surface contamination on the items originated in the recycling truck or if it was food residue from the original packaging contents. (For the purposes of the sort, residue on the exterior was assumed to be contamination from the truck, and residue on the interior was assumed to be food residue.)

2. The most meaningful comparison associated with both sorts was probably the plastic tubs, cups and clamshells category. The sample size in both studies was robust, and covered a broad range of contamination levels for both food contact and foodservice packaging. Neither the Boston nor the Delaware study found an appreciable difference between food residue levels in foodservice and food contact packaging in this category.

Contractor's Conclusions

Based on the findings of these two studies, it appears that overall, the mix of foodservice packaging items recycled at curbside has comparable levels of food residue to that found in food contact packaging. Commingling with refuse seems to have a significant impact on the cleanliness of recyclables, regardless of how clean the recyclables were the consumer placed them in the recycling cart.

The studies at Boston and Delaware presented great opportunities to gather useful data on the issue of adding foodservice packaging to recycling programs. FPI would like to thank the City of Boston, Casella, the Delaware Solid Waste Authority, and ReCommunity for participating in the study. *More information on FPI's recovery projects may be found at www.fpi.org/stewardship.*

RRS

416 LONGSHORE DRIVE | ANN ARBOR, MI 48105 | 734.996.1361 | RECYCLE.COM

MRF MATERIAL FLOW STUDY

FINAL REPORT | APRIL 2015

COMISSIONED BY

Carton Council RecycleCartons.com

American Chemistry Council

NAPCOR

APR

FPI FOODSERVICE PACKAGING INSTITUTE

PREPARED BY RRS IN CONJUNCTION WITH:

Reclay StewardEdge Product Stewardship Solutions

MOORE RECYCLING ASSOCIATES INC.

INTRODUCTION

The famous Greek philosopher Heraclitus captured the essence of the recycling industry over 2,500 years ago when he penned the phrase, "Nothing endures but change." The march of packaging innovation and technology, and the persistently changing habits of consumers continue to dictate the changing mix of materials that enters a material recovery facility (MRF). Over the past decade, there has been a continual decline in the once dominant materials including newspaper, glass and metal cans. At the same time, a host of other packaging types have emerged, presenting new recovery opportunities. Recycling programs throughout the country have responded by expanding the list of materials accepted for recycling, notably including a wide range of plastics and cartons. For the MRFs that receive the material, it is not always easy to keep sorting technologies and techniques on pace with this expanding mix.

STUDY OVERVIEW

Packaging companies have an interest in ensuring that the packages they produce or sell their products in have the opportunity to be recycled. The ability to recycle the package can be a consumer's deciding factor in the purchase of a particular product. This, and the desire to minimalize environmental footprints, are the drivers behind the recently completed MRF Material Flow Study.

MRFs are the intersection between consumers, residents and the industrial infrastructure that creates the products and packaging we use every day. To better understand the recyclability of their packaging, five diverse associations – the Carton Council, Foodservice Packaging Institute (FPI), American Chemistry Council (ACC), National Association for PET Container Resources (NAPCOR) and the Association of Postconsumer Plastics Reprocessors (APR) – joined together to study how numerous materials flowed through the MRF. They contracted with RRS, Reclay StewardEdge (RSE) and Moore Recycling Associates to develop a standard methodology and execute it at five MRFs.

KEY CONCLUSIONS

In studying the performance of specific materials through different MRF environments, a number of general takeaways became clear. These conclusions could help to serve as guidelines to improve recovery across the recovery value chain – from residents and municipalities to packaging designers and MRF operators and engineers, and everyone else in between.

AUDIENCE	KEY TAKEAWAYS
Packaging Designers	• Form, material and rigidity have a significant effect on a product's "sortability" in the MRF • Light-weighting of plastics can decrease recovery in a single stream MRF due to loss to the paper streams
MRF Operators	• More equipment steps (disc screen decks or other separation equipment) can improve accuracy of splitting two-dimensional from three-dimensional materials • Properly maintaining the disc screens (cleaning and replacing discs) can significantly reduce loss of containers to the paper stream • Minimizing compaction to maintain the form/shape of incoming material improves separation • Continually training sorters to recognize a wide range of acceptable packaging is of growing importance
MRF Equipment Designers	• Further research and development is needed to improve consistency of behavior of non-bottle plastics in the MRF • Further testing and refining of optical sorter programming is needed to effectively optically sort a wider range of packaging
Municipalities	• Regular communications with local MRFs is critical to understanding behavior of materials currently accepted and identifying additional materials that could be added • As the list of acceptable materials grows, continual education for residents is essential to keeping contamination to a minimum • For single stream programs, education to the consumer to not crush materials can improve their recovery
Recycling Industry	• Continually evaluate and match MRF product quality and end market capabilities to ensure true recovery

ABOUT THIS REPORT

This study examined the behavior of numerous individual products in the MRF, yielding data on cups, clamshells, containers, domes/trays, bottles, tubs, lids, gable-top and aseptic cartons, and other materials. Funders of this study have gained a greater awareness of the opportunities and obstacles regarding the recovery of each of these materials and will apply this new knowledge to increase recovery.

While the detailed data on each material are not presented within this report, key findings regarding material flows, sorting technologies, and other sorting and design related considerations are explained, along with the study's methodology.

STUDY METHODOLOGY

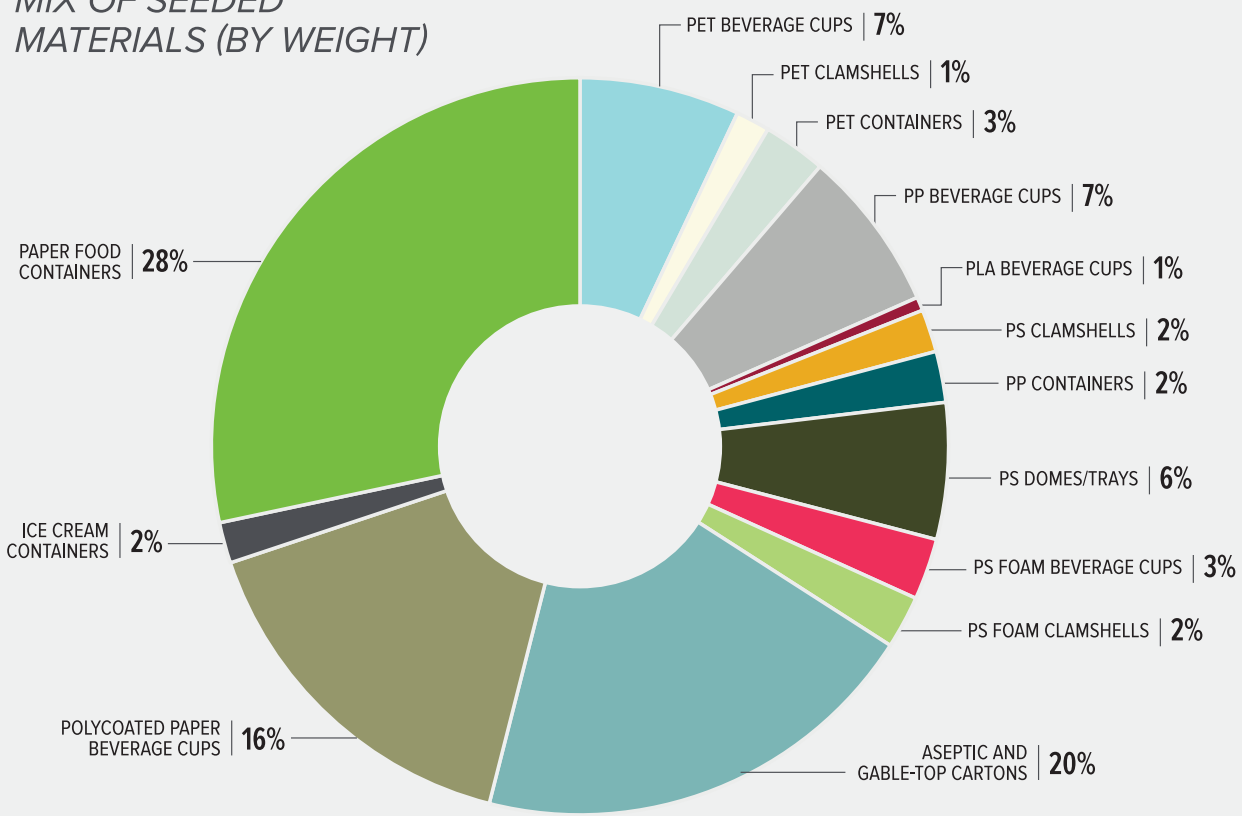
There were three stated goals of the study:

1. Learn how materials similar to the test samples and other study materials would flow through typical MRF environments;
2. Determine which of the study materials, not currently accepted by MRFs, could potentially be recycled using existing MRF infrastructure; and
3. Start to develop an understanding of what sort processes could be modified to allow effective recovery of sample materials

The study focused on a broad range of materials, many that are currently widely accepted and some that are very rarely included in recycling programs. Materials that are not commonly accepted for recycling were brought in and added, or "seeded", to the normal stream received by the MRF. To simulate a realistic recovery scenario, care was taken to add materials at levels that corresponded to their relative prevalence in the marketplace. In other words, more common materials were seeded in larger amounts (by weight) than less common ones.

The plastic materials studied included cups, clamshells, domes/trays, bottles, tubs, lids and other containers. Each was classified by resin identification code and in some categories including containers and tubs, by size as well. The paper products studied included cups, ice cream containers, gable-top and aseptic cartons, and take-out food containers. Figure 1 shows the representative mix of materials that was seeded.

FIGURE 1
MIX OF SEEDED MATERIALS (BY WEIGHT)



In each of the five MRFs that served as test sites for this study, a standard methodology was applied to analyze the flow of materials. This methodology was, in essence, quite simple and could be replicated for other materials or repeated in other MRFs.

- The MRF set aside enough inbound recyclable material to run their facility for 3 hours (between 30 and 100 tons). This represented the average material that the facility processes on a day to day basis.
- The study team worked with the MRF staff to mix the seeded packaging into the inbound material. In each facility, the seeded materials represented about 1% of the incoming stream by weight.
- Sort staff was trained on how to handle the seeded materials. In general, the materials were allowed to flow where they naturally did within the facility and sorters were instructed to not pick and dispose of the seeded materials as residue. However, each seeded package was given one or more target commodity streams and if, for example paper beverage cups flowed to the container line, the sorters were directed to positively sort them to the carton bale and if they flowed to the paper line they were allowed to stay in the mixed paper bale. Seeded materials therefore flowed to existing MRF products – new product grades were not produced for the seeded materials.
- The facility processed the material for 3 hours. During the processing, video cameras were set up to monitor the flow of materials and the actions of the sorters.
- Random samples of the main products were taken either as loose samples or from random bales. The target sample weight was about 600 pounds for each of the products and, where possible, multiple samples were taken of each product or the majority of the product was sorted.
- Each of the samples was sorted into 104 categories. The plastic sort categories were chosen to match other studies commissioned by ACC, APR, NAPCOR, and others.

Ideally, tests were run during a time that the facility was not planning to operate, so as not to hinder normal operations. MRFs operate on extremely tight timelines, and without careful scheduling a study could easily create problematic disruptions.

DATA ANALYSIS

Based on the data collected, two analyses were performed. The first was characterizations of each of the product streams. These were completed for each of the samples of a single product and then averaged to get the product characterization. Product characterizations showed how much of that stream was composed of each sort category. An example is shown in Figure 2. The product characterizations are important for end

The MRFs at which this study was conducted were chosen to represent the wide diversity of facilities that currently process recyclables nationwide. Here are some of their key descriptors and differentiators:

- 1 dual stream and 4 single stream facilities
- Throughput range (tons per hour): 10 tph – 35 tph
- Four different equipment manufacturers
- Number of optical sorters ranged from 0 – 5
- Varying combinations of disc screens and other mechanical separation equipment

PRODUCT CHARACTERIZATIONS WERE CALCULATED FOR THE FOLLOWING STREAMS:

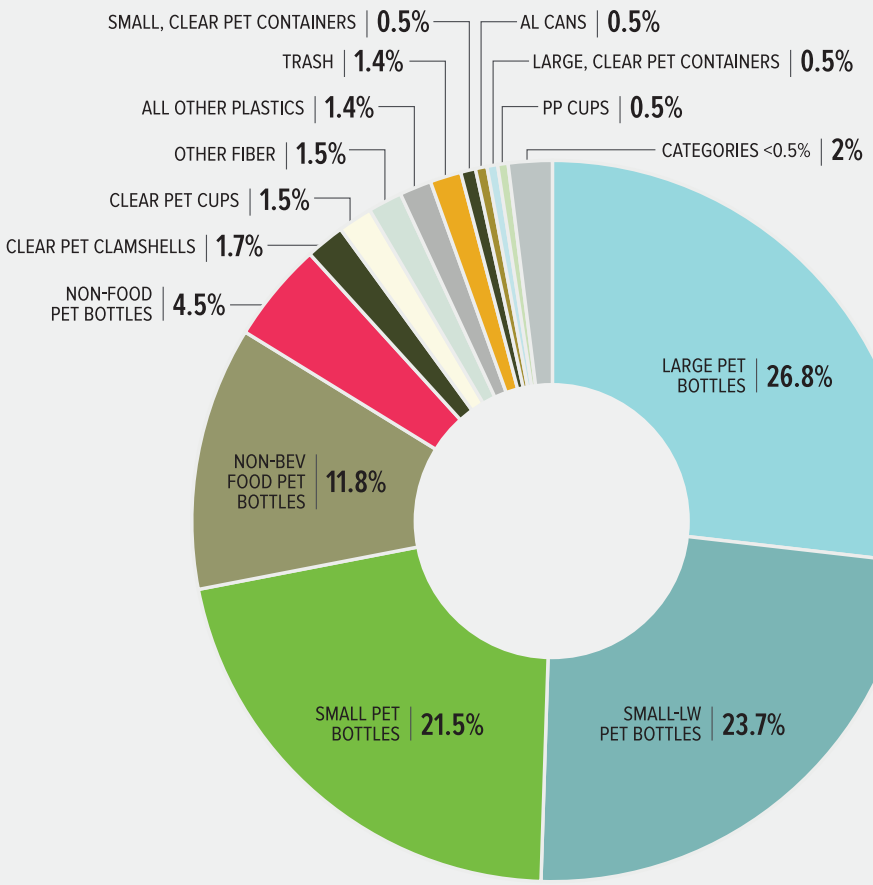
Mixed Paper	Mixed Paper/ Newspaper[1]	cHDPE
Newspaper	PET	nHDPE
Cartons	Mixed Plastics[2]	Residue

1 Some facilities only marketed one grade of paper
2 Also included a HDPE/PP Tubs and Lids grade

markets to understand the quality and composition of a MRFs products. For this study, it was important to see if the addition of seeded materials would increase contamination of existing product streams.

The second analysis used the characterizations to determine the destination of each of the study materials. For example, if 10,000 paper beverage cups were introduced into the MRF, how many would end up in the mixed paper, how many in the carton bale and how many in the residue and other categories. This analysis was the key to understanding how the materials flowed in the MRF environment. Examples of this analysis are shown in the Results section.

FIGURE 2
EXAMPLE PRODUCT STREAM CHARACTERIZATION: PET, AVERAGED ACROSS ALL 5 MRFS



RESULTS

While a diverse set of MRFs was chosen for the study, the results presented here are specific to the MRFs studied, as different results can be achieved by modifying equipment layouts, operating protocols and material streams.

Key findings are grouped by type of MRF, type of sortation equipment and material form and prevalence.

DUAL STREAM SYSTEMS

Two types of MRFs were included in the study: one dual stream and four single stream. While only one MRF was dual stream, one comparison about the difference between dual and single stream systems can be made.

Dual stream systems, which are declining nationally in favor of single stream systems, require residents to separate paper materials from metal, glass and plastic containers. As will be highlighted in the next section, dual stream systems offer the advantage of reducing loss of plastics and other containers to the paper streams. On the other hand, as the material mix has expanded to new packaging types, it isn't always well understood to by residents in which stream they should be included. For MRFs, it is more difficult to sort these containers from the paper stream than it is from the container stream, making this a real obstacle.

SINGLE STREAM SYSTEMS

While single stream systems allow for easier communication to consumers about how to recycle (and simplify collection systems), the difficulty in separating the materials is passed

onto the MRF. One of the key observations in this study is that there are wide variations in how effective single stream facilities are in separating paper from the containers. To accomplish this separation, single stream facilities use a series of disc screens and other equipment that all utilize the difference in shape between paper and containers. Flat materials (generally 2-dimensional) will travel to the top of the screen and to one series of conveyors, while bottles and other containers (generally 3-dimensional) will either fall through the screens or tumble to the bottom to a different series of conveyors.

There are numerous factors that affect the ability of single stream equipment to accurately separate the 2D and 3D materials. They include equipment design factors (such as screen design and angle), operation issues (such as overloading the screens, cleaning the screens, and wet material), maintenance issues (such as wear to discs) and collection issues (such as excessive compaction of the material by residents or collection vehicles). Further, the packaging design itself can also affect the flow of individual materials. All of these variables cannot be evaluated in one study, but general conclusions are possible.

BEST PRACTICES FOR ACCURATE 2D/3D SEPARATION IN SINGLE STREAM MRFS:

- Avoid loading screens past their design throughput
- Clean screens of material that are wrapped around the shafts
- Replace worn and damaged discs
- Minimize compaction of material by residents and collection trucks
- Keep material dry

SCREENS

In this study, plastics separation by screens was examined in depth and the analysis can act as a surrogate for other container material types, such as aluminum and steel. The amount of plastics (including bottles, containers, clamshells and cups) lost to the paper stream varied from 3% to 12%. The two MRFs that experienced a 12% loss of plastics to the paper stream were both medium sized single stream facilities (25-30 rated tons per hour (tph)) that had fewer screens than the larger two (35 tph). After seeing the screening effectiveness data from this study, both replaced worn discs in their disc screens and reported a significant improvement in the 2D/3D separation. The facility that experienced a 3% loss of plastic to the paper stream was a large MRF with an adequate number of screens for the incoming volume and material type (note: this facility was the top performer across the entire study). Interestingly, the facility with 8% loss was similar to the 3% facility, but it had two distinct operational issues that were not normal for their facilities: material was wetter than normal due to heavy snow storms, and space constraints on the tip floor caused by equipment failures resulted in handling of the material significantly more than normal (including driving over it with a loader). These results suggest that a well maintained facility with an adequate number of screens for the incoming volume and material mix, operating under normal conditions can achieve very low losses of containers to paper products.

Note: Both large single stream MRFs, which had better success than the medium single stream MRFs at separating the plastic containers from the paper, were equipped with 4 sets of disc screens: an OCC screen for separating cardboard or "old corrugated containers", 2 ONP screens for separating "old newspapers" and a polishing screen for cleaning up the mixed paper stream. The two medium MRFs had 1 less paper screen each. Depending on the facility, this study indicates that the extra screens can help improve the accuracy of the 2D/3D separation in single stream MRFs.

FORM

The form of a package had a strong influence on the loss of packaging to the paper streams. As can be seen in Table 1, the plastic clamshells had a much higher likelihood of flattening and moving with the paper streams. The rounder materials (including bottles, cups and containers) all had much lower loss rates, and less than 5% was lost at the top performing MRFs, Small, lightweight water bottles were more likely than other bottles to move with the paper with a loss rate of 15%. The cups, containers and clamshells still enter the MRFs in much lower quantities than bottles. They made up 11% of the plastics stream, even with the seeded materials. Aseptic and gable-top cartons had a higher average loss rate to the paper

streams, although it is interesting to note it was the only packaging type to have one facility with no loss to the paper stream. In all five MRFs, they marketed a Grade 52 for cartons and pulled them from the container line.

OPTICAL SORTERS

Another piece of equipment in MRFs that can help improve separation of materials are optical sorters. Optical sorters can recognize materials based on what they are made of along with their size and shape. All four single stream facilities had at least one optical sorter, and the two large facilities had 3–4. Optical sorter efficiency was difficult to determine from this study because for each optically sorted commodity there were one or more manual sorters for quality control, both on the material that was positively sorted and what was missed. Therefore a manual sorter could remove a PET cup that was positively sorted by the optical sorter into the PET bale or another could mistakenly sort a PP cup that resembled one from PET into the PET bale. However, there were two interesting cases that are worth noting with the optical sorters.

Many of the materials that were tested as part of this study are light weight, meaning a sorter (either human or optical) needs to handle more pieces in order to sort a ton. At the only single stream facility without an optical sorter for the cartons, the manual sorter who normally sorts cartons was asked to positively sort any paper beverage cups and ice cream containers. With the volume of cups and ice cream containers, the sorter was overwhelmed and the manager chose to add a second sorter to that station. This implies that as more lightweight materials are added to the MRF, either more manual sorters will need to be added or optical sorters may be able to help increase the sorting throughput.

Even for a trained manual sorter, recognizing the resin type for each item as it goes by on a conveyor is very difficult. The PP and PET cups that were seeded for the test were both clear plastic and very similar in style. Averaged across all five facilities, approximately 20% of the PP cups were found in the PET bales. This is likely due to manual sorters positively sorting them to the PET stream because they so closely resembled PET cups. As more diverse packaging, including different sizes, shapes, colors, materials and purposes, continues to enter the MRF, improvements in technology and training to keep bale quality high will likely be necessary.

Similarly at one MRF, the optical sorter was set to sort all HDPE and PP and manual sorters then sorted that stream into nHDPE, cHDPE and a HDPE/PP Tubs and Lids grade. The cHDPE bale at that MRF had a much higher percentage of PP (8%) than the other MRFs (less than 2%). This further emphasizes the sorting challenges facing MRFs.

MATERIAL PREVALENCE

MRFs have been designed to separate bottles and cans from magazines and newspaper. During this study, extensive data was collected on the behavior of specific packaging types in the MRF environment. It shows that MRFs are doing quite well with these prevalent materials, although even these materials are not being correctly sorted at 100%. At best, the study showed a recovery of 93% of an individual package type, with much of the loss to other products and not to residue alone. Similarly for small (<1L), regular weight

TABLE 1

LOSS RATE OF PACKAGING MATERIALS TO THE PAPER STREAMS

FORM	AVERAGE LOSS RATE TO PAPER STREAM	LOSS RATE AT BEST PERFORMING SINGLE STREAM MRF
Plastic Bottles	5%	2%
Plastic Cups	10%	3%
Plastic Containers	12%	2%
Plastic Clamshells	29%	12%
Aseptic and Gable-top Cartons	18%	0%

PET bottles and all size cHDPE bottles, results are shown in Figure 3. Compare those figures to results for small (<10") PET non-bottle containers and cHDPE non-bottle containers as shown in Figure 4. Note that for all results, the data from each of the five MRFs was averaged to form a composite of the behavior across all facilities. According to RRS's database, approximately 50% of the material nationally is processed through the largest 20% of MRFs. Therefore, the larger MRFs were weighted more heavily than the smaller facilities when combining the data.

Why do bottles flow more consistently to the proper bale than tubs and other non-bottle containers? There are many likely reasons for these results. The first, and likely most important, is relative amount of material. During the tests, there were greater than 20 times more regular weight PET bottles than small PET containers (by weight). Including all types of PET bottles and both large and small containers, there were greater than 30 times more bottles (by weight). Although not as pronounced, there were still 8 times as many colored HDPE bottles as containers and tubs. Package types that are more prevalent in the stream are more likely to be targeted by manual sorters if they are missed or misdirected by the optical sorters or disc screens, thereby increasing their recovery. In addition, the equipment is tuned to increase the recovery of the

FIGURE 3

DESTINATION OF SMALL, REGULAR WEIGHT (< 1L) PET BEVERAGE BOTTLES (TOP) AND ALL CHDPE BOTTLES

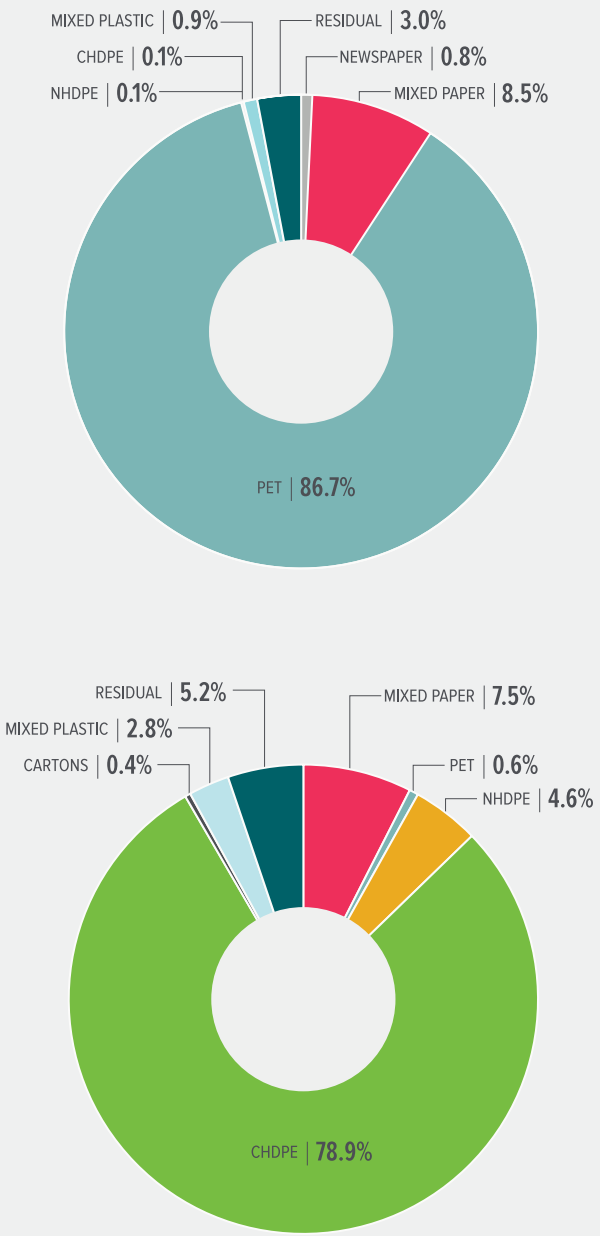


FIGURE 4

DESTINATION OF SMALL PET CONTAINERS (TOP) AND CHDPE CONTAINERS (ALL NON-BOTTLE CONTAINERS & TUBS, < 10" DIAMETER)

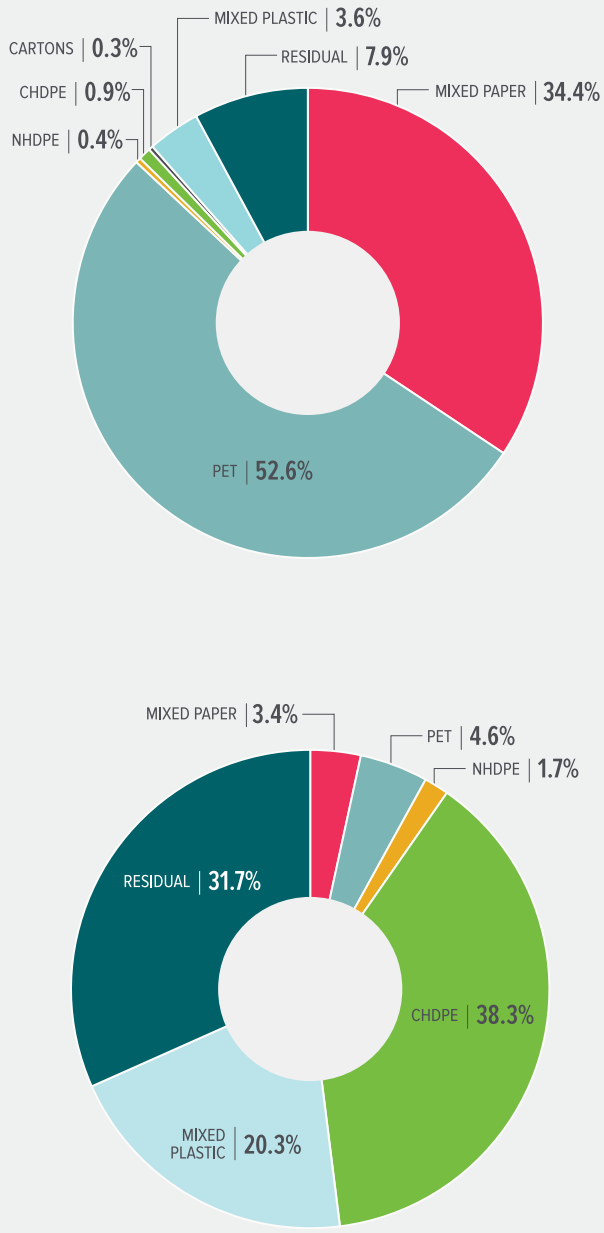
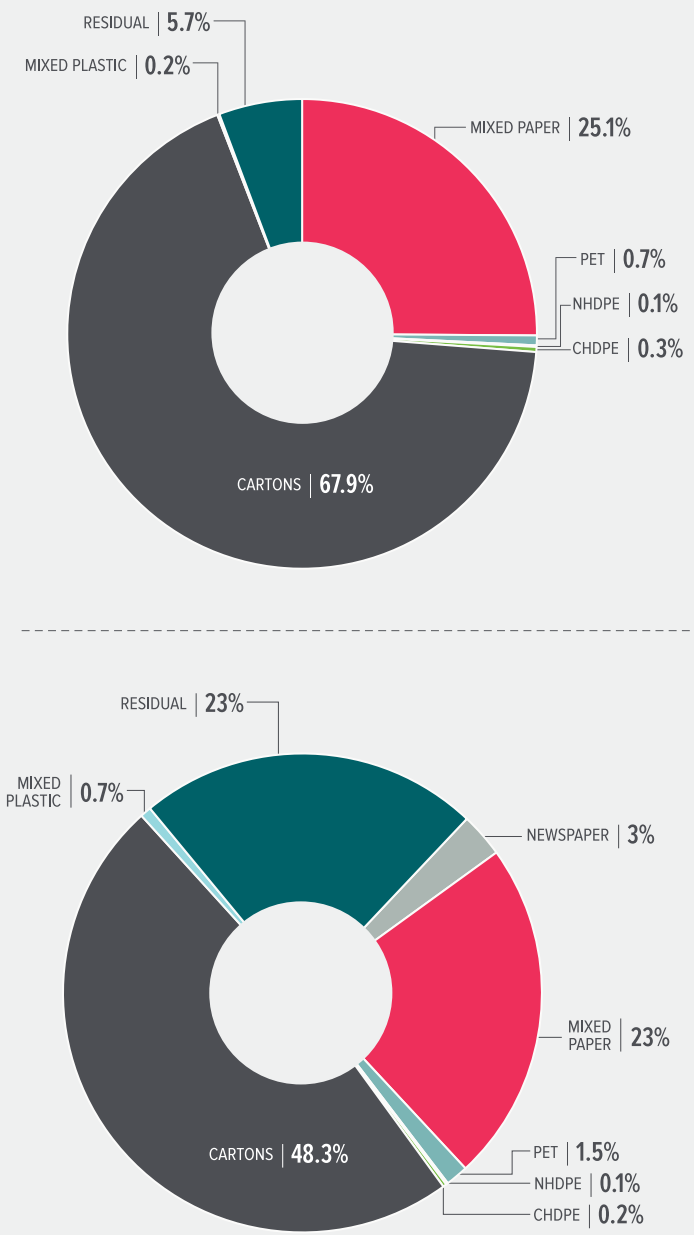


FIGURE 5
DESTINATION OF CARTONS (TOP) AND PAPER BEVERAGE CUPS



most common materials and may not perform as consistently on less common package types.

Secondly, to target the PET and cHDPE non-bottle containers would take two different strategies. The majority of the PET containers not in the PET bale are lost to the paper stream. However, very little of the cHDPE containers were in the paper stream, but most of the loss was to the residue stream, likely because they were not captured from the container line either by the optical or manual sorters. Finally, the size and shape of the containers can be quite varied in comparison to the bottles, with many containers being flatter and having open tops, which reduces the ability to hold the shape during handling and sorting. This will continue to cause less consistency on the disc screens and other equipment.

ADDING NEW MATERIALS

The study also specifically assessed the MRF "sortability" of some packaging materials that are not currently accepted extensively by recycling programs nationwide but are in fact growing in many communities, including: paper beverage cups, ice cream containers and polystyrene foam cups and clamshells. Figure 5 compares the behavior of aseptic and gable-top cartons to paper beverage cups.

As one example, the paper beverage cups had a strong tendency to flow to the container line (similar to cartons and plastic cups). A higher percentage were lost to residue which, based on review of the test setup and sorter training, was most likely from the container line. This could be due to manual sorters being less familiar seeing them or being overwhelmed when the optical sorter didn't catch them. Further study could be done to better understand the effectiveness of optical sorters on different types of cups and if programming could be improved to recognize them.

CONCLUSIONS

This study demonstrates the power of examining a material's inherent behavior in a MRF environment. Understanding how that material will flow allows for informed, operational actions to maximize recovery of that material. It is a useful exercise, as was done here, to look at not only new materials (that aren't currently accepted) to see which MRF end-products they can be a part of, but also to see how currently accepted materials, both prevalent and not, are being recovered. Recycling is a complicated system of consumer behavior, collection programs, sorting at MRFs and end markets. All stages of the value chain need to be similarly examined to create a full picture of recyclability. As shown in this study, examining and solving material processing challenges at the modern MRF is a necessary step in achieving success for the recycling industry of the future.

RRS

416 LONGSHORE DRIVE | ANN ARBOR, MI 48105 | 734.996.1361 | RECYCLE.COM

Plastic Cups Bale Sort Findings

Background

The composition of bales of recycled materials is constantly evolving as the mix of packaging in the market changes. It is particularly important to understand how our products are captured and recovered through the residential stream and their prevalence in bales marketed by material recovery facilities. To build on knowledge gained during prior studies, between November 2020 and February 2021, FPI participated in an audit of #3-#7 bales to obtain a current snapshot of bale composition.

The RRS-led audit was conducted at Michigan State University's Recycling Center. During the audit, RRS sorted by resin and format. To better enable comparison with previous studies, the methodology was reviewed by the Association of Plastic Recyclers (APR) and other project funders and efforts were made to align with the bale audit methodology utilized by Stina, Inc. (formerly More Recycling) to facilitate comparison with past studies. This paper summarizes findings related to PP, PS and PET cups in mixed plastics bales.

The Study

FPI's goal in participating in the study was to get a better understanding of the prevalence of plastic cups in the mixed plastics bales, as well as breakdown by plastic resin type of the cups in the bales. Note that the study focused on cups rather than other foodservice containers, since other container types are used in multiple applications and distinguishing between foodservice and non-foodservice applications (such as pre-packaged food) is not feasible in the context of a bale sort.

The bale sort included a total of nine #3-#7 (pre-picked) bales from nine North American material recovery facilities located in the Northeast, Southeast, Midwest and Western regions of the US. The sampled bales were further classified into two bale types:

- Pre-picked Rigids Plastics: With Bulky (two of the nine bales)
- Pre-Picked Rigids Plastic: No Bulky (seven of the nine bales)

The Results

Resulting data showed that cups made up a small portion of all the bales sorted, with the *Pre-picked Rigids Plastics: No Bulky* bales averaging just over 6 percent of the total bale weight. The *Pre-picked Rigids Plastics: With Bulky* contained a lower proportion of cups.

The cups were further sorted by resin: polystyrene (PS), polypropylene (PP), and polyethylene terephthalate (PET). The majority (over 60%) of plastic cups found in all #3-7 bales were made of PP. The balance of cups in the bales split between PS and PET.

In comparison to the 2015 data, overall cup prevalence in the pre-picked/no bulky (#3-7) bales was unchanged at just over 6 percent.

In the pre-picked/with bulky (#3-#7) bales, the proportions of cup resins had shifted considerably, with PP the dominant cup resin in the bale rather than PS per the 2015 results. However, due to the small number of pre-

picked/with bulky (#3-#7) bales sorted, it is unclear whether this is representative of a broader trend in that bale type.

This bale sort study shows that plastic cups are still successfully reaching plastic reclaimers, where they can be recycled into new products. By including cups and other non-bottle plastic containers in residential recycling programs, communities can provide a pathway for these cups and containers to be recycled.

Complete results from the Mixed Plastics Bale Sort Study are available to PRG members. More information on recycling of foodservice packaging may be found at www.recyclefsp.org.

Denton PLASTICS

MARCH 17, 2022

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

Re: Request for Information on Oregon Statewide Recycling Collection List

Dear DEQ Technical Workgroup and Rules Advisory Committee,

Denton Plastics, Inc. would like to register support for the inclusion of certain foodservice packaging items on the "Uniform Statewide Collection List". Denton Plastics, Inc. is located in Portland, Oregon and we are an end market for post-consumer materials sourced from Material Recovery Facilities (MRFs). We currently source post-consumer olefins to produce PCR Resin with a capacity of 2 million pounds post-consumer material annually.

We will begin procuring the following MRF grades

- -0- lbs of Mixed Plastic Bales [add detail as needed – e.g. 1-7, 3-7, other...)
- -0- lbs of PET Thermoform Bales
- 600,000 pounds of Polypropylene Bales
- 1,400,000 pounds of Polyethylene Bales

The following foodservice packaging items are acceptable in these incoming bales:

- **Polypropylene (PP) cups and containers,** including drink cups, deli tubs, clamshells, takeout dishes and lids and other PP thermoformed or injection molded containers
- **Rigid Polystyrene (PS) cups and containers**, including drink cups, clamshells, sandwich boxes and other thermoformed containers
- **Expanded Polystyrene (EPS or Styrofoam) cups and containers**, including drink cups and clamshells

As an end market for these materials with expanding demand from our customers Denton Plastics, Inc. wants to encourage the inclusion of these items in the statewide list to ensure an adequate supply to feed our growing operation.

Thanks very much for your consideration. We are happy to provide follow-up information upon request.

Best Regards,

Nicole Janssen,

President,

Denton Plastics, Inc.

Phone: 503-257-9945
Toll Free: 1-800-959-9945
18811 NE San Rafael St. Portland, OR 97230
www.dentonplastics.com

3.17.22

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
Re: Request for Information on Oregon Statewide Recycling Collection List

Dear DEQ Technical Workgroup and Rules Advisory Committee,

Green Rhino Recycling would like to register support for the inclusion of certain foodservice packaging items on the "Uniform Statewide Collection List". Green Rhino Recycling is located in Tigard and we are an end market for post-consumer materials sourced from Material Recovery Facilities (MRFs). We currently to produce PCR PP Pellets with a capacity of 3600 tons post-consumer material annually and a yield rate of 90%. The plant was installed in March of 2022.

We procure the following MRF grades beginning April 2022

- 600,000 lbs per month Polypropylene bales

The following items are acceptable in these incoming bales:

- **Polypropylene (PP) cups and containers,** including drink cups, deli tubs, clamshells, takeout dishes and lids and other PP thermoformed or injection molded containers

As an end market for these materials with expanding demand from our customers Green Rhino Recycling wants to encourage the inclusion of these items in the statewide list to ensure an adequate supply to feed our growing operation.

Thanks very much for your consideration. We are happy to provide follow-up information upon request.

Best Regards,

Steven Green
253-285-8880
Green Rhino Recycling
12700 SW Hall Blvd unit E
Tigard OR 97223

MARCH 20, 2022

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
Re: Request for Information on Oregon Statewide Recycling Collection List

Dear DEQ Technical Workgroup and Rules Advisory Committee,

PreZero US would like to register support for the inclusion of certain foodservice packaging items on the "Uniform Statewide Collection List". PreZero US is located in Los Angeles, CA and we are an end market for post-consumer materials sourced from Material Recovery Facilities (MRFs). We currently source grades A & B of plastic film (LDPE/LLDPE) and mixed rigid plastics (HDPE, PP) to produce the following output: LDPE, PP and PE resins (all 100% certified post-consumer) with a capacity of 60,000 tons annually and a yield rate of at average 80% across the 3 grades.

We are currently procuring the following MRF grades

- 7mm lbs. of Mixed Rigid Plastic Bales (#'s 2-7)
- 5mm lbs. of Mixed Rigid Plastic Bales (#'s 3-7)
- 12mm lbs. of A Grade Plastic Film Bales (#4)
- 12mm lbs. of B Grade Plastic Film Bales (#4)

The following food service packaging items are acceptable in these incoming bales:

- **Polypropylene (PP) cups and containers,** including drink cups, deli tubs, clamshells, takeout dishes and lids and other PP thermoformed or injection molded containers

As an end market for these materials with expanding demand from our customers PreZero US wants to encourage the inclusion of these items in the statewide list to ensure an adequate supply to feed our growing operation.

Thanks very much for your consideration. We are happy to provide follow-up information upon request.

Best Regards,

Hendik Dullinger
VP – Business Development
Hendrik.dullinger@prezero.us
(703) 424-6295

Martin Vogt
President & CEO
EFS-plastics Inc.
5788 Line 84, Listowel, ON, Canada N4W 3G9
519-418-3377 ext. 3101
Martin.vogt@efs-plastics.ca

March 18, 2022

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

Re: Request for Information on Oregon Statewide Recycling Collection List

Dear DEQ Technical Workgroup and Rules Advisory Committee,

EFS-plastics Inc. would like to register support for the inclusion of certain foodservice packaging items on the "Uniform Statewide Collection List". EFS-plastics Inc. has three facilities in North America, including a new facility in Lethbridge, Alberta, and we are an end market for post-consumer materials sourced from Material Recovery Facilities (MRFs). We have been purchasing #3-7 mixed plastic from Oregon MRFs since 2019 to process at our facility in Listowel, Ontario, as our throughput capacity has grown rapidly in recent years. At our new Lethbridge facility, we are sourcing post-consumer olefins (mostly in the form of #3-7 or #1-7 commodity bales) to produce various grades of 100% PCR PP and PE pellets. We currently have a total capacity to process 55,000 metric tonnes post-consumer material annually.

We would like to take this opportunity to highlight how important it is to us to grow the supply of polyolefins (in particular PP) collected from households. As a recycler, we are seeing demand grow for PCR PP and PE over the next few years, and we are looking far and wide to get access to more material. We know there is a large volume of PP and PE that is not being appropriately collected or sorted in the Pacific Northwest and is unfortunately ending up in landfill. EFS-plastics is very eager to continue working with communities and MRFs in Oregon to incentivize them to keep these materials in circulation.

We procure the following MRF grades:
- 25,000 tonnes of #3-7 or #1-7 mixed rigid plastic
- 20,000 tones of Grade A-C and MRF-grade film
- 5,000 tonnes of PP/Tubs & Lids
- 5,000 tonnes of HDPE

The following foodservice packaging items are desirable in these incoming bales:
- Polyethylene Terephthalate (PET) Cups and Containers, including drink cups, clamshells, bowls, trays and other thermoformed containers
- Polypropylene (PP) cups and containers, including drink cups, deli tubs, clamshells, takeout dishes and lids and other PP thermoformed or injection molded containers

The following foodservice packaging items are acceptable in these incoming bales (i.e., we are happy to accept them because we can easily sort them from other materials, and it makes it easier for MRFs to recover more material that we do want.)

- Rigid Polystyrene (PS) cups and containers, including drink cups, clamshells, sandwich boxes and other thermoformed containers
- Expanded Polystyrene (EPS or Styrofoam) cups and containers, including drink cups and clamshells

As an end market for these materials with expanding demand from our customers, EFS-plastics wants to encourage the inclusion of these items in the statewide list to ensure an adequate supply to feed our growing operation.

Thanks very much for your consideration. We are happy to provide follow-up information upon request.

Best Regards,

Martin Vogt
President & CEO

EFS-plastics Inc.
5788 Line 84
Listowel, ON N4W 3G9, CA

519-418-3377
www.efs-plastics.ca

EFS-plastics US Inc.
504 White Birch Rd
Hazleton, PA 18202, USA

Inclusion of Polypropylene Cups on Oregon's Recycling List

Request for Information: Section 22 of Oregon's Plastic Pollution and Recycling Modernization Act (Senate Bill 582)

3.18.2022

Introduction

This letter is a submission to a Request for Information (dated February 3, 2022) issued by the Oregon Department of Environmental Quality to solicit information to evaluate the inclusion (or exclusion) of new materials on statewide Oregon recycling lists. These lists are being developed in accordance with Section 22 of Oregon's Plastic Pollution and Recycling Modernization Act (Senate Bill 582).

The NextGen Consortium, a program of Closed Loop Partners with founding partners Starbucks and McDonald's, offers this letter to provide evidence that supports the inclusion of polypropylene (PP) cups on Oregon's recycling lists – which we understand will be revised on July 1, 2025.

Polypropylene (PP), also referred to as #5 plastic, is a commonly used plastic in packaging, including drink and yogurt cups.

As we outline below, there has been a lot of activity in the last several years to increase recycling of and improve outcomes for polypropylene packaging, including cups. Notably, there are the activities of the Recycling Partnership's Polypropylene Recycling Coalition, of which the NextGen Consortium is a Steering Member.

Support for Including Polypropylene Cups

Formed in 2018, the NextGen Consortium is a multi-year, global consortium that aims to address single-use foodservice packaging waste by advancing the design, commercialization, and recovery of packaging. The Consortium works across the value chain – with brands, municipalities, material recovery facilities (MRFs), and manufacturers – to ensure we provide viable market solutions that scale throughout

the supply chain and bring value to recovery systems. More information about the Consortium can be found here: https://www.closedlooppartners.com/nextgen.

Over the last few years, we have been working to help improve the recycling opportunities for PP packaging, including cups. In addition to our Steering-level membership of the Polypropylene Recycling Coalition, we have engaged several subject matter experts across the recycling value chain and can offer the following perspectives:

- **A growing number of US cities and counties are adding PP packaging, including PP cups, to their lists of acceptable recycling items**. According to the Sustainability Packaging Coalition's 2020-21 Centralized Study of Availability of Recycling, 59 percent of the US population has recycling access for PP tubs and other containers (including cups).[1] This access number is also likely to increase in the coming months as a result of activities taking place in late 2021 and early 2022. As an example, in its first year, the Polypropylene Recycling Coalition's grants to 13 recycling facilities will help increase recycling access by nearly 6%.

- **Reclaimers that purchase PP and mixed plastic bales accept the PP cup.** According to a recent study from RRS, as part of the 2020-21 Centralized Study of Availability of Recycling, reclaimers that represent 90 percent of known PP reclamation capacity, "recover and process all tubs, lids, cups and thermoforms of the same resin type together" and "did not report any formats as "prohibitive" in their systems when recovering PP" (Source: SPC/RRS 2021/22).

- **There is growing demand for recycled PP and material recycling facilities (MRFs) are investing in necessary infrastructure to help meet demand.** There has been broad interest from domestic MRFs to improve and increase capacity to collect and sort polypropylene. To date, the Polypropylene Recycling Coalition has awarded more than $4 million in grants to 13 recycling facilities to increase capture of polypropylene packaging, which will impact roughly 15 million people nation-wide.

- **Demand for recycled plastics far outweighs supply.** According to a report from Closed Loop Partners, "Demand for plastics is strong and growing, yet the supply of recycled plastics available to meet demand is stuck at

[1] In March 2022, SPC added the following guidance regarding PP Cups: "Note of clarification added 3/2022: additional research using both expert interview and bale audits was conducted in 2021 to examine acceptance of PP Cups, Tubs, and Containers. The findings of this research support the hypothesis that a false construct was responsible for a lack of clarity around acceptance of PP Cups in the 2020-21 Centralized Study of Availability of Recycling. The executive summary of the report can be found here." (Source: SPC's 2020-21 Centralized Study of Availability of Recycling)

6%"(Source: CLP 2019). Initiatives, like the ones described above, are helping to address this gap.

Recommendation on Polypropylene Cups

Based on our experience, which we have summarized above, we recommend that polypropylene packaging, including cups, are considered for inclusion on Oregon's uniform statewide collection list. We would be happy to speak with the DEQ to answer any questions you might have about our experience. Contact information follows.

Contact Information

Daniel Liswood
Senior Project Director – NextGen Consortium
The Center for the Circular Economy at Closed Loop Partners
Phone: (office) 646 475 0201; (mobile) 347-266-0952
Email: dliswood@closedlooppartners.com

Recycling Modernization Act

Date: 03/18/2022

Subject: **Statewide collection recycling list** [per Section 22(1)(a)]
Producer-collected materials list [per Section 22(1)(b)]

In 2021, the Oregon Legislature adopted, and Governor Kate Brown signed into law, Senate Bill 582, the Oregon Plastic Pollution and Recycling Modernization Act. The Act requires numerous changes that are intended to modernize and stabilize recycling services in Oregon and further reduce the environmental impacts of certain materials across their full life cycle.

PakTech - An Oregon Based Company

PakTech is an Oregon Corporation focused on manufacturing market demanded products made from 100% recycled materials (rHDPE) and ending up with a product that itself is 100% recyclable. In 2020 alone, we utilized over 22 million pounds of rHDPE (equivalent of over 165 million milk containers) used to create the next generation of recycled products. Since PakTech elected to begin utilizing rHDPE in 2012, we have repurposed over 800 million milk containers in the production of our products, which have been shipped around the globe.

In 1998 PakTech had just over 50 employees and now has 360, fully benefited employees. We pride ourselves on providing our employees a living wage with a benefits package that is top tier for our industry. We truly believe in being a positive influence in our community and in our State.

Through extensive work PakTech has learned how to create the logistics required to locate and assemble the base recycled materials to support our manufacturing process. Unfortunately, these sources are in Vancouver, British Columbia and Los Angeles, California – not in Oregon. This means that we resort to sourcing recycled material that should be readily available in Oregon from areas that have already made the investment in infrastructure necessary to modernize their recycling programs.

PakTech's intent is to have our products materials used in conjunction with DEQ's recommendations for material to include on the uniform statewide collection list, other materials that local governments are obligated to collect for recycling as part of providing the opportunity to recycle, and the list of materials that producer responsibility organizations are required to provide recycling services for.

Recycling Modernization Act

The following information is provided to aid in the evaluation of our product materials for consideration of inclusion for recycling, as part of the evaluation of materials against the criteria listed in Section 22(3) of the Recycling Modernization Act.

PakTech products are made from Recycled High Density Polyethylene (rHDPE)

- Statewide collection and recycling of PakTech products, be it curbside or established collection programs, already aligns with meeting the goals set forth in the Recycling Modernization Act (Senate Bill 582)
- Collection and recycling of PakTech products align with the State of Oregon's statewide recycling rate for plastic packaging goals set for 2028, 2040 and 2050 (Section 27)
- PakTech products are SCS Global Certified 100% Recycled HDPE #2 (High Density Polyethylene)
- Made from 100% Recycled Thermoplastic Polyethylene from Milk, Water, Juice and Other Un-pigmented Household Containers
- HDPE Bottle Grade fractional Melt Resin with a .955 to .965 g/cm^3 Density
- Can be combined with HDPE bottles (detergent and shampoo bottles) in collections to maximize recovery efficiency.
- Can also be combined with other rigid HDPE collections for recovery efficiency
- Made of a MONO plastic being 100% HDPE with no restrictive additives or layers to hinder recyclability
- Free of toxic chemicals
- Clean and free of foreign contamination, which could cause deterioration of HDPE properties through the recycling process
- Product shape is more 3D than 2D as well as being a rigid plastic. Meets criteria established by APR for recyclability.
- Compatible with existing Oregon recycling infrastructure (Does not hinder the recycling process)
- Will not cause problems of entanglement in the sorting equipment like the flexible LDPE rings made by HiCone have been known for
- Recycled HDPE material is very well established as a viable plastic for use in many product categories and end markets such as; Pipe Industry, Building Materials, Flower Pots, Park Benches, HDPE Bottles, PakTech Handles, just to name a few…
- High demand exists for recycled HDPE plastic due to mandates and commitments across organizations and industries to incorporate 25-30% recycled content into packaging products by 2025
- PakTech alone can provide and an end-market here in Oregon for the use of 1,000 to 2,000 tons annually of recycled Mixed Color HDPE and 10,000+ tons of Natural HDPE
- Reprocessors of plastics locally in Oregon are already acquiring HDPE from Oregon's recycling stream and have additional end-markets for collected PakTech products (Denton Plastics, Northwest Polymers, Green Rhino Recycling, Merlin Plastics, etc.)
- Promotes recycling of plastics to reduce fossil fuel consumption and keep out of the environment
- Promotes circularity by keeping the material in use over and over again

Recycling Modernization Act

We believe that realizing a sustainable world means that we all must accelerate the transition to a safe, equitable, and circular economy where people, the planet, and businesses thrive. However, reaching a circular economy for any resource, especially plastics, is a large and complex global challenge.

Google teamed up with AFARA and IHS Markit to bring big data analytics to the plastic pollution crisis. Data suggest that the circularity gap is likely going to grow significantly over the next two decades. Under a business as usual scenario, it is projected that 7.7 billion metric tons of plastics will be mismanaged–landfilled, incinerated or leaked into the environment–between now and 2040. That volume of plastic is equivalent to roughly 16x the weight of the entire human population on earth today!

While there needs to be a portfolio approach that includes plastic reduction efforts, the biggest intervention we need to capitalize on is building better recycling infrastructure. As the world transitions from linear to circular, supply chains need to be rewired and the requisite infrastructure needs to be put in place to ensure these resources are kept in the economy and out of the environment.

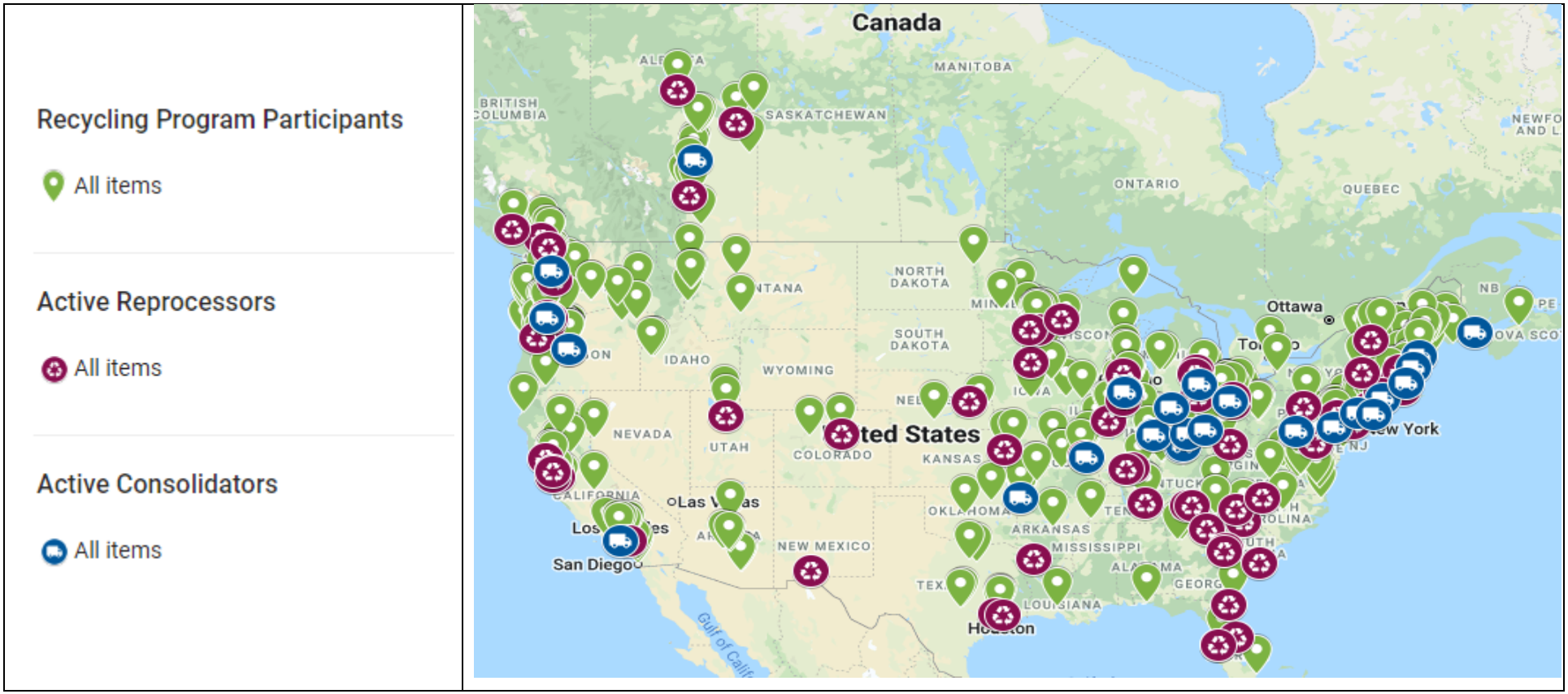
We plea that you accept PakTech handles curbside. Sustainability truly underpins everything we do here at PakTech and this is the missing piece to our circular economy business model. It frustrates us that our clean HDPE product isn't accepted. Our commitment to sustainability led us to launch our own recycling program that has grown exponentially to ensure our products are properly recycled and repurposed as they should be. With that comes logistical hardships and roadblocks connecting recycling partners with Reprocessors along with the quantity of collections. We are optimistic as we see more states accepting our product curbside and this number continues to grow in the right direction. We take pride that Oregon claims to be one of the greenest states in the country but are frustrated by its limited recycling capacity. We ask that you make the right decision to accept our valuable PakTech products for the state of Oregon, our environment and for the future of a circular economy.

Current Recycling Activities with PakTech Products

Due to the restrictions placed on the recycling of plastics, PakTech created its own recycling program to ensure as many of our handles are recycled, repurposed and kept out of the environment as possible, to fulfill our commitment to our customers, ourselves, and to the planet we all call home.

With this program, we have created over 550 recycling partnership programs across the U.S. and Canada that involve hundreds of grocery stores, breweries, markets, and recycling centers to collect and properly recycle our products.

In Oregon alone, over 13,200 pounds or 7 tons of recycled handles have been collected and repurposed into new handles, while others are recycled into a variety of new products like composite lumber, flower pots, park benches and more.



Current Curbside Recycling Activities with PakTech Products

Recyclers across the U.S. and Canada are realizing the benefits associated with the collections and recycling of PakTech Products and are currently being accepted in curbside collections in the following areas.

Curbside Accepted

- All items
  - Cleveland
  - Sonoma County
  - New York
  - Boulder
  - Saint Paul
  - San Diego
  - Skiatook
  - Stillwater
  - Boise
  - Baltimore
  - Downers Grove
  - British Columbia

***SCS Global Services** does hereby certify that an independent assessment has been conducted on behalf of:*

PakTech

1680 Irving Rd., Eugene, OR, US
230 Davidson Avenue, Cottage Grove, OR, US

For the following product(s):

Plastic Packaging:

Packaging Handles – Made With 100% Recycled HDPE

100% RECYCLED CONTENT
POST-CONSUMER HDPE

The product(s) meet(s) all of the necessary qualifications to be certified for the following claim(s):

SCS RECYCLED CONTENT CERTIFIED
Conforms to SCS Recycled Content Standard V7-0 for **100% Post-Consumer Recycled HDPE* Content.** The material quantification and mass-balance calculations are completed on a dry-weight basis.

**Made With 100% Recycled Plastic – High Density Polyethylene (HDPE)*

Registration # SCS-RC-06127
Valid from: May 14, 2021 to May 13, 2022

SCSglobal SERVICES

Stanley Mathuram, PE, Vice President
2000 Powell Street, Ste. 600, Emeryville, CA 94608 USA

Addendum - Further Justification

We already know that plastics are replacing traditional materials, due in large part to their favorable strength-to-weight ratio that allows them to do more with less. We see that in numerous previous studies and market sectors.

Packaging – A study in the U.S. shows that if we were to replace plastic packaging with alternatives, we would dramatically increase the amount of packaging material. Alternatives would require four and a half times as much material by weight and increase the amount of packaging used by nearly 110 billion pounds annually.

Building Materials – Plastics can help save a whole lot of energy over the lives of our homes and buildings. The energy saved by using plastic materials compared to alternative materials is approximately 467.2 trillion BTU of energy a year – that's enough to meet the average annual energy needs of 4.6 million U.S. households.

But despite measurable advances in these and other areas, the often-accepted narrative around plastics is: they are more wasteful and have greater environmental impacts than traditional materials. Is this true? While every material has environmental costs, how do plastics actually compare to alternatives?

In 2014 a study, commissioned by the United Nations Environment Program (UNEP) with Trucost, "Valuing Plastics: The Business Case for Measuring, Managing and Disclosing Plastic Use in the Consumer Goods Industry." That study found that the "total natural capital cost of plastic used in the consumer goods industry is estimated to be more than $75 billion per year." The cost comes from a range of environmental impacts such as effects from marine litter and the loss of valuable resources when used plastics are sent to landfills rather than recycled.

In 2016 the American Chemistry Council commissioned an independent study by the same environmental consulting firm Trucost that looks at the broad environmental costs of using plastics in consumer goods compared to other materials. This new study, "Plastics and Sustainability: A Valuation of Environmental Benefits, Costs and Opportunities for Continuous Improvement," provides that perspective. The report's authors call it the largest natural capital cost study ever conducted for the plastics manufacturing sector.

The new study expands upon the initial study by including transportation as part of the life cycle of products and packaging. Most notably, it compares the environmental cost of using plastics in consumer products and packaging to the cost of replacing plastics with alternative materials.

The findings

When compared to alternatives, the new study found that the environmental cost of using plastics is four times less than the costs of other materials. Substituting plastics in consumer products and packaging with alternatives that perform the same function would increase environmental costs from $139 billion to $533 billion annually.

One of the likely reasons for these findings, as mentioned above, is the comparable strength-to-weight ratio of plastics. Alternative materials such as glass, tin, aluminum, and paper can be viable alternatives to plastics in many consumer goods applications. But a greater amount of these alternative materials typically is needed to accomplish the same objective. Similar to the findings in the packaging study above, this new study finds that alternatives require 4 times more material by mass on average.

In other words, using more material typically translates into higher environmental costs.

As it turns out, plastics are extremely efficient materials. Because they are both strong and lightweight, they allow us to do more with less in the 16 market sectors reviewed in the study… and in just about every aspect of modern living.

Even though plastics have significantly less impact on the environment than alternatives, the study identifies numerous opportunities to reduce that impact. These steps include increasing the use of lower-carbon sources of energy upstream, adopting lower-emission transport modes, developing even more efficient plastic packaging, and increasing recycling and energy recovery to help address ocean litter and conserve resources.

To help reduce plastics leakage into the marine environment, the study also highlighted the importance of expanding waste management infrastructure globally, particularly in Asia where other studies have determined 75 percent of marine litter originates.

The study also called for enhanced environmental leadership by the plastics industry, noting that the industry has “direct influence, or indirect influence via its supply chain management practices, over a significant share of the environmental costs of plastic use in consumer goods sector, and other sectors. Thus the industry is well positioned to play an enhanced leadership role in driving improvements in the environmental performance of the plastics value chain.”

This study represents the clearest and most comprehensive picture to date of the relative environmental costs and benefits of plastics compared to alternative materials. And by providing a path forward to further reduce these relative costs, the study provides insights for corporate decision makers, policy makers, and environmentally minded people into how plastic materials can further contribute to sustainability.

From the invention of plastic in the late 1800s to the introduction of Tupperware® in the 1940s to the latest innovations in easy-dipping ketchup packets, plastics have played an integral role in smart packaging solutions that help us do more with less. Whether it’s your new electronic gadget, your favorite beauty product, or how you store lunch, plastic packaging helps protect your purchases until you’re ready to use them, and that helps to reduce waste and save energy.

PLASTICS
INDUSTRY ASSOCIATION

March 20, 2022

David Allaway
Senior Policy Analyst
Oregon Department of Environmental Quality
Materials Management Program
700 NE Multnomah Ave., Ste. 600
Portland, OR 97232

Dear Mr. Allaway,

I write in response to the request for information relating to criteria for material and product inclusion in the statewide recycling collection list and producer-collected materials list. The Plastics Industry Association represents members across the plastics supply chain—from material suppliers and equipment manufacturers to converters and recyclers. The plastics industry now directly employs nearly 1 million workers in the United States and is an important part of manufacturing in America.

We appreciate the opportunity to weigh in on the process your agency and the technical workgroup is about to begin to evaluate and consider products and materials for their respective lists. We have worked over the past six weeks to solicit the feedback of our members and have admittedly struggled to capture technical information with adequate relevance to the immense scale of products and materials that our industry manufactures. However, we believe the Environmental Quality Commission should take into account a few important considerations:

Recyclability should be focused on the future and should not rely solely on past performance. Evaluation criteria set for the statewide recycling lists is weighted toward current capabilities and past proven end markets. As an industry, we are committed to investing in recycling infrastructure and technologies that takes previously hard-to-recycle items and keeps them in a more circular economy. Additionally, working in public-private partnerships through entities like product responsibility organizations that are part of extended producer responsibility programs, the necessary funding for these advancements can be even more robust.

One example of infrastructure improvement was demonstrated just a few years ago in your region. The Pacific Northwest Secondary Sorting Demonstration Project showed that secondary material recovery facilities can take unwanted residue from primary material recovery facilities and effectively and economically sort it to produce bails of marketable recyclable material. Without these types of investments and capabilities, these products may otherwise be slated for exclusion from the statewide recycling collection list.

Another important research and demonstration project that was conducted and proved the viability of recycling of hard-to-recycle materials is the Materials Recovery for the Future. By upgrading an existing MRF with a flexible plastic packaging recovery system using state-of-the-art optical sorters and peripheral equipment, the capability was proven. These upgrades can be costly, but if together we are committed to modernizing our recycling infrastructure in the United States, these are the projects that should be funded through producer responsibility programs. But to reach the economies of scale necessary to be successful, it will be important that steady supplies of feedstock are maintained and why it is important to look forward and not back when establishing the statewide recycling lists.

1425 K Street NW, Suite 500, Washington, DC 20005
P 202.974.5200 | plasticsindustry.org

New and improving advanced recycling technologies are also proving that an inability to recycle through traditional mechanical means, doesn't indicate a lack of recyclability. In recent years, billions of dollars in investments have been made toward large-scale recycling facilities that will keep previously discarded material from entering landfills. While some of the technologies used in advanced recycling do result in the recovery of valuable molecules for other products, the number one goal of advanced recycling for our industry is greater circularity in the form of a plastic-to-plastic outcome. These new technologies can take items like multi-layer film that is the best option for preserving food and make them recyclable in a way mechanical recycling may struggle to. Recycling material that reduces food waste and contributing to the sustainable management of materials are just two of the benefits promised and proven by advanced recycling technologies.

Furthermore, the Commission must to take into account the growing demands on recycled content. Commitments made by industries and requirements set by governing bodies are only going to increase the need for more post-consumer recycled material. Finding ways to increase the amount of recyclable material getting into the recycling stream is paramount to ensuring these demands can be met and that cost increases don't result in less environmentally friendly products being used instead. Along with fair and equitable recycling funding mechanisms like EPR, our industry supports reasonable and achievable recycled content requirements that will improve end markets for recyclable material and as a result, spur investment in recycling capabilities.

As I mentioned at the beginning, our members want to be as helpful as possible to your agency. When it comes to requests for technical information, please consider us a resource. But with hundreds of thousands of SKUs in our members' catalogs, we had difficulty in determining where to even begin the process of providing you and your colleagues the information that you need to evaluate each product against the criteria set forth in Section 22 of Senate Bill 582. We will monitor the process and stand ready to provide insight where we can to help establish robust and complete statewide recycling lists.

Sincerely,

Matthew Seaholm
Vice President, Government Affairs

1425 K Street NW, Suite 500, Washington, DC 20005
P 202.974.5200 | **F** 202.296.7005 | www.plasticsindustry.org