

# CHAPTER 6 RECOVERY MARKETS

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## INTRODUCTION

### Why we recycle and why we recycle right

**R**ecycling isn't just good for our environment; it's also about economics. If there isn't a market for the material collected at curbside, then recycling won't occur for that material; it's as simple as that.

While the central idea behind recycling — taking something old and turning it into something new — is simple, the devil is in the details. Some materials are turned into commodities used here in the metro region. Other materials are consumed out of state. Still more recyclables are sent overseas to be turned into products that we then, in turn, purchase here at home.

What follows is a basic description of the markets for recyclable materials (both domestic and international) as well as a look at most of the individual materials collected in our curbside rollcars.

## THE CHALLENGE: SENDING MATERIALS TO THE RIGHT PLACE

### Islands in the two-stream

As discussed in the last chapter, in the metro region, we have a two-stream or two-sort collection system for recyclable materials. Mixed paper, plastic and metal go together and glass is separated. Many places around the country have an even simpler system, with glass mixed in with the other recyclables. Our two-stream collection is a trade-off. With everything in one cart except glass, and thus picked up by one collection vehicle, there are massive savings on the collection side of the equation, since fewer trucks and drivers are needed. Also, it is much easier for consumers to put out recyclables. This provides more material for the recycling industry. But this system has led to rising costs for materials sorting which must occur after the materials are collected at curbside. Some have noted that this is akin to attempting to get eggs out of an omelet.

### CREDIT

*Much of this chapter was contributed by Resource Recycling's Executive Editor, Jerry Powell and Recycling Partnership's Dylan de Thomas. Resource Recycling, Inc. publishes business journals on the latest recycling trends, market analysis, research, equipment, and business news for the recycling and waste management industry. Recycling Partnership is a national nonprofit that invests in recycling systems through resources and technical assistance.*

### Why not one-stream?

*Many communities in the U.S. allow residents to place glass in the container with mixed recycling.*

*Our region explored this option but discovered that domestic markets find glass to be problematic.*

*Broken glass ruins paper and metal and causes costly damage to equipment.*

*In an attempt to keep recycling local, the metro area decided to keep glass separate.*

These challenges are met by both increased outreach and signage; through newsletters, flyers, and the large stickers on the lids of roll carts. The challenges are also met by the Master Recycler program, where educated residents are deputized to offer advice and guidance to their friends, families and neighbors.

## Revisiting the concept of contamination

Anything that is collected for recycling in a curbside cart must be sorted before it is sold. With that in mind, let's ask the question: What is contamination? Well, there are two types of contamination:

1. Materials that consumers put in the curbside cart that do not belong (for example, plastic bags).
2. Recyclable materials that Material Recovery Facilities (MRF's) send to the wrong place (for example, plastic in a paper bale, or vice-versa).

Improper source separation and preparation at home and at work not only results in the loss of that material, it may actually contaminate other materials, thus wasting valuable recyclable materials. When Material Recovery Facilities send the wrong materials to a recycling company, this costs the recycler money and usually results in the material being thrown away.

## Sorting it out

While outreach and education is an important way to minimize the first type of contamination, unwanted material will always be a problem. And education will not solve contamination from facilities. New, modern materials recovery facilities (MRFs) are able to lower both of these types of contamination.

With different types of screening processes that do a remarkable job in separating out two-dimensional material (such as paper) from three-dimensional material (such as containers), and optical sorting technology that can separate out different types of plastics by color and/or resin type, modern MRFs have the ability to sort both effectively and efficiently, reducing both types of contamination.

Unfortunately, the majority in our metropolitan region are not this type of facility. Our system is primarily the same sorting process that was originally designed when as much as 95 percent of the recycling was paper and sorting was primarily aimed at cleaning contaminants from the paper. A new infrastructure will require major investment in planning as well as expensive equipment. Both government and business are presently engaged in trying to address this aspect of the recycling industry here.

But, in the meantime, the level of contamination has both local and global implications to the economic sustainability of the recycling industry.

## LOCAL AND INTERNATIONAL MARKETS

**Local recycling markets are dependent on global manufacturing and trade.**

While international markets have been key to the recycling industry almost since its inception, beginning in the late 1990s, the market for these materials, especially in China, grew rapidly. This rapid growth in the Chinese market had everything to do with their emergence as the largest manufacturing nation. This was coupled with a vast improvement of the export infrastructure (ports, piers, the size of westbound shipping lines, etc.). For the metro region, this had important impacts on the local market for recyclable materials.

One advantage this expanded international market had over local markets was its ability to accept material with contamination.

There were a number of reasons China was able to accept dirtier loads of material than local markets could. The first is that low-cost Chinese labor could be utilized to sort imported recyclable materials. China's recycling industry also formed later than it did in the United States and when it was built, there was a good deal of investment. So their sorting technology is sometimes superior to local sorting technology. Finally, China was dependent on the steady stream of recycling materials to lower the costs of manufacturing products.

In other words, until recently we have been able to pass the problem of contamination onto overseas markets which had the wherewithal to sort out the problem.





## The Great Green Fence of China

Even with these two important advantages that the Chinese market enjoyed, the levels of contamination in much of the curbside-collected recyclable materials coming out of MRFs around the region, the country and Europe proved to be too high. Meanwhile, Chinese wages have increased and consumers there are beginning to create an increased level of their own discards, making them less and less dependent on the U.S. and Europe for material.

In 2013 and again in 2017, the Chinese government implemented customs enforcement actions called Green Fence and Green Sword to reduce contamination in imported plastics and paper recycling. Simply put, the Chinese did not want our trash anymore. It was not long after that other countries that received scrap paper and plastic, like India, Thailand, Vietnam and Malaysia, created policies refusing unwanted materials

The increased pickiness of overseas buyers meant that MRFs had to more effectively sort the incoming recyclable materials in order to sell them. Cleaner loads and a need for an alternative did result in increased opportunity for North American companies to compete with China. But it also left a gap in recycling for many materials.

Unfortunately, neither the MRFs nor the US paper and plastics facilities have invested enough in equipment to make US recycling sustainable. Recycling markets consultant Patty Moore stated in May 2017, “I’m really, really concerned about the impact this is going to have on recycling in [the U.S.], because we’ve gotten so used to being able to move that material to export. The U.S. sorting facilities are unequipped to provide the high grade of paper and plastic that China is now demanding.”

By 2019, local communities felt the impact of these international policy changes. In order to meet higher standards, Material Recovery Facilities slowed down their sorting lines, increased the number of people sorting materials; one even invested in optic and mechanical sorting. These changes made the cost of recycling go up. Some rural communities in Oregon deemed it more cost efficient to discontinue recycling collection as it became more expensive to recycle materials than to throw them away. The Metro area cities opted instead to raise the rates for collection in order to pay for the higher cost of recycling. The list of accepted materials for all parts of the Portland metro area that was created in 2008 remains the same list.







In June 2021, Oregon passed the Plastic Pollution and Recycling Modernization Act (Senate Bill 582). The Act will overhaul Oregon’s outdated recycling system by building on local community programs and leveraging the resources of packaging producers in order to create an innovative system that works for everyone in Oregon.



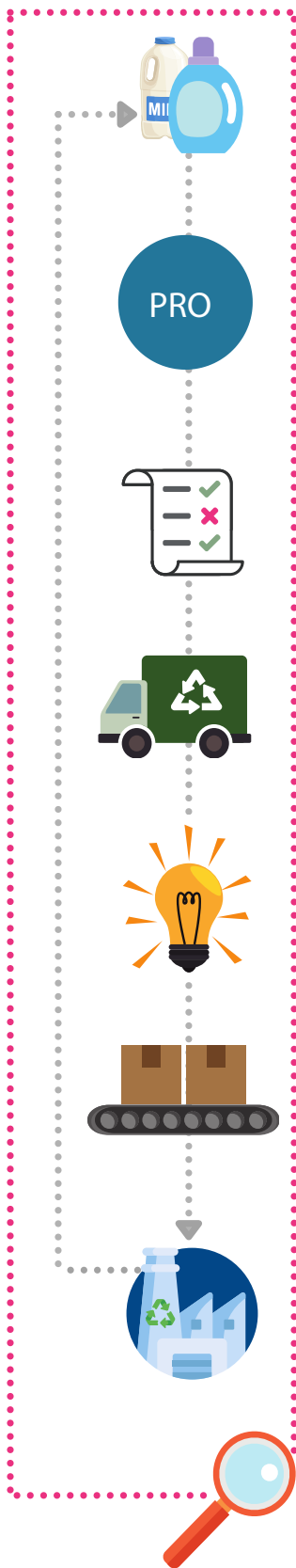
## PLASTIC POLLUTION AND RECYCLING MODERNIZATION ACT

The Plastic Pollution and Recycling Modernization Act updates Oregon’s recycling system by building on local community programs and leveraging the resources of producers to create an innovative system that works for everyone. The new law requires packaging producers to share responsibility for effective management of their products after use. The law went into effect January 1, 2022 and program changes will start in July 2025.

### Key benefits

	<p><b>Shares and scales responsibility across the recycling system.</b> Producers will be brought into the recycling system to fund improvements and expand recycling services. Cost to producers will be based on what materials they use and how much they sell into Oregon.</p>		<p><b>Creates one statewide list of what can be recycled.</b> The uniform collection list will provide clarity to households and businesses about what can be recycled, and create efficiencies in recycling operations across the state.</p>
	<p><b>Increases access to recycling.</b> The new law will provide recycling services to people who didn’t previously have it, such as those who live in apartments and rural areas.</p>		<p><b>Incentivizes sustainable products.</b> Producer fees will be higher for non-recyclable products and those creating more environmental pollution.</p>
	<p><b>Prevents plastic pollution.</b> Ensures collected materials are recycled responsibly and keeps plastic and other trash out of our waterways and communities--both domestically and overseas.</p>		<p><b>Creates accountability to outcomes.</b> DEQ will permit and audit recycling processors, and a Governor-appointed advisory council will review producer program plans, the statewide collection list and educational resources.</p>

## How the Recycling Modernization Act Works



**PRODUCERS** will join and pay a membership fee to a nonprofit Producer Responsibility Organization (PRO) that will fund improvements and ensure that collected recyclables go to responsible end markets. Producers will also be required to meet new recycling goals for plastic packaging and food serviceware.

**PRODUCER RESPONSIBILITY ORGANIZATIONS** will collect producer membership fees and use them to ensure improved and expanded recycling services. Most collection will continue to be overseen by local governments, but PROs will provide services for certain hard-to-recycle materials. PROs will also fund waste prevention grants, and several studies to assess challenges and recommend improvements to improve multifamily recycling conditions, equity in the recycling system, and litter and marine debris.

**ONE COLLECTION LIST** will allow individuals and businesses to recycle the same items across the state, at home and at work. PRO funding will enable collection of the same items regardless of location or distance from recycling markets.

**RECYCLING SERVICES** will be expanded under the direction of local governments, with support from the PROs, especially for rural communities and people living in apartments. The same private collection companies will continue to provide recycling services.

**EDUCATION** about how to recycle will continue to be offered by local governments, along with new programs to reduce recycling contamination. PROs will create accessible educational resources that local governments can use and that meet the needs of diverse communities.

**PROCESSING** of recyclables will be done in facilities that meet new performance standards, including for material quality, reporting, and paying living wages to workers.

**END MARKETS** that can handle the material appropriately — without creating plastic pollution or other harms — can purchase it after sorting and recycle it into something new. Producers and processors will be obligated to make sure materials collected in Oregon reach responsible end markets.

**OVERSIGHT AND INTEGRATION** will be provided by DEQ, with accountability from all participants. DEQ will plan and implement changes required by the new law, and oversee the recycling system and provide enforcement where necessary. PROs, recycling processors and local governments will track and report more information about where our recyclables go and ensure that they are managed responsibly and used to make new products.

## MARKETS FOR INDIVIDUAL COMMODITIES

### Fiber (otherwise known as paper)

Even with the increased digitization of our media consumption and business communications, recovered fiber is still the single largest segment of the curbside bin, making up an average of around 60 percent by weight of the material stream inbound to MRFs.

MRFs previously marketed a number of different grades of paper and paperboard, but now most sell just two: highly valuable corrugated cardboard (OCC) and mixed paper, which combines much of the remaining fiber collected, and includes newspapers, office paper, and other paper products. Some MRFs simply produce one bale, which would include all fiber.

While some material does go overseas, much of the recovered office and newspaper collected curbside in the Metro region is turned right back into paper by Pacific Northwest mills. A key reason for this is the close relationships between many local MRFs and U.S. paper companies, either by ownership or by long-term contractual arrangements. The mills in this region are typically combination mills in that they use a mix of virgin and recovered fiber to make products.

Paper products that are made of mixed materials like cereal boxes, six pack carriers and milk cartons are often recycled into products like toilet tissue.

#### **Contamination Concerns:**

*With fiber, much of the deleterious contamination is either broken glass that can stick to paper (especially if wet) or other two-dimensional material (plastic film or other flat packaging, such as pouches or plastic lids) which is largely why these forms of packaging aren't allowed in the curbside roll carts.*

### Beverage containers

With beverage containers, Oregon has a unique position because of the state beverage container redemption program, or bottle bill. Under the redemption system, a far greater percentage of beverage containers are recovered in Oregon than in parts of the country without such a system.

Not only does this system help recover more beverage containers of all types (PET, aluminum and glass), it helps keep those containers incredibly clean, which makes them more valuable on the open market. With PET containers, it even led to a unique partnership to help recycle this material locally.





In 2013, a group of local investors signed a long-term agreement with the Oregon Beverage Recycling Cooperative, the industry-owned corporation that runs the state's redemption system, to purchase all of the PET containers collected under the bottle bill. The resulting facility, ORPET, is located in St. Helens, Oregon, and it also purchases some materials from local and regional MRFs, as well as redeemed containers from western Canada.

Previous to the building of the facility, a strong export market existed. This is a good example of local infrastructure responding to local markets within our state's recycling system.

Recycled PET is primarily used to make products that would have otherwise been made of polyester such as clothing, pillow stuffing and carpets.

#### **Contamination Concerns:**

*With the bottle bill-collected material, contamination is negligible. The curbside-collected material can be contaminated by dirt, broken glass or even smaller bits of various materials. Also, a PET bale from a MRF may contain other recyclables, such as HDPE (No. 2) bottles. This can reduce the price garnered for the material from downstream consumers.*



### **Aluminum beverage cans**

Aluminum beverage containers, known in the recycling industry as UBCs (used beverage containers) are the single-most valuable commodity, by weight, recovered at a MRF.

Generally, this baled material sells for 50¢ to \$1 per pound (or from 1¢ to 3¢ per can), so the markets for UBCs are robust. Because the material collected via the bottle bill is of such high quality it is typically sold domestically.

Due to the special processing needed to handle UBCs – the top of cans is made of a different alloy than the body – as well as the specific processing needed to delacquer the scrap metal (think of it as paint removal), the local manufacturers able to handle UBCs are few and far between. Our UBCs mostly go to mills in Georgia, Indiana or New York.

There are also markets for other types of aluminum, such as foil or the tabs from cans (both different alloys) but these, too, are specialized.

#### **Contamination Concerns:**

*Same as with the PET containers.*



## Glass bottles

Blessed by the bottle bill and robust recycling industry in the Pacific Northwest (Owens-Illinois off of I-205 and others), **cullet** — as commodity-grade recovered glass is known — has healthy markets here in the metro area. Owens-Illinois sells recycled glass bottles to our local brewers and wineries.

Markets for the glass collected curbside were at one time less robust due to high contamination. Today glass recycling trucks often bring glass directly to a facility called Glass to Glass who uses optical sorting that provides Owens the clean glass needed to make their products.

If not purchased by a glass container manufacturer, other markets include fiberglass manufacturers (for which cullet must be very clean) and for use in concrete. Alternative uses include landfill road base and alternative daily cover for landfills.

### **Contamination Concerns:**

*Glass container manufactures can only use food-grade bottles and jars. Other types of glass such as window panes, Pyrex or candle holders can cause imperfections and ruin glass containers. Glass collected through the bottle bill is more valuable because the scanners only accept food-grade bottles. People frequently contaminate the curbside collected glass with non-food-grade items.*



### TERM

**Cullet:** recycled or waste glass used in glassmaking.



## Other plastics

There are robust domestic and foreign markets for No. 2 high-density polyethylene (HDPE) plastic containers. It is particularly important that HDPE is not mixed with contaminants for it to be useful to make new products. Unfortunately, few to no containers accepted in the bottle bill utilize HDPE. So the steady stream of uncontaminated material that other plastics recyclers enjoy is not available with HDPE. If noncarbonated beverage packaging were added to the bottle bill program, it would greatly increase the chances of a growing local HDPE industry.

There are emerging markets for other containers, particularly for polypropylene (PP, No. 5). For example, the nation's largest HDPE reclaimer in Alabama is expanding into handling PP.

Because of growing markets for these types of containers, there has been an attendant growth of secondary processing facilities, which either sort out the materials that MRFs would have otherwise landfilled or sort a mixed plastic bale.

These facilities, sometimes called PRFs (plastics recovery facilities), have come about due to growth and advances in sorting technology, particularly as that technology has become more readily available and competitively priced on the global market.

All of the efforts surrounding non-sorted plastics previously were overseas where inexpensive labor was employed and where sorting operations were able to supply local markets for resins in applications where quality has fewer issues, such as making drainage pipe, garden pots, parts for toys, etc.

### **Contamination Concerns:**

*Because mixed plastic bales typically consist of the plastic materials that are left over after sorting, they also can be considerably contaminated by unwanted materials. This is why they have typically gone overseas (before Operation Green Fence) or on to secondary processing.*

## Ferrous metals

Households are not large generators of ferrous metal scrap. A single household will likely never produce as much ferrous scrap as when junking a single unwanted car. Despite this small flow of material and few regional mills, much of this material is recycled back into ferrous metal locally.

### Contamination Concerns:

*Ferrous metals do not present much concern in the way of contamination. Magnets in MRFs efficiently and effectively sort ferrous metal. These metals also withstand more contamination than other materials, because they will be melted in extreme heat, burning off most unwanted materials.*



## Plastic bags

While this material is not, and should not be, collected curbside, clean bags are a desirable material. Bags are recycled into many products such as composite lumber that is used to make park benches, backyard decks and fences – even playground equipment. They also can be recycled into new plastic bags.

While thin single-use plastic grocery and shopping bags are banned in the State of Oregon, enforcement will be inconsistent, and other plastic bags still make it into the recycling (for example, vegetable bags from grocery stores or bags for newspapers). They should be kept clean and dry and then taken to depots or retailers, where a large number have take-back bins. Plastic bags from these locations are highly desired by plastics recyclers as they tend to be clean from contamination.

### Contamination Concerns:

*Plastic bags don't belong in the curbside, but many make it in there anyway. Markets for these plastic bags that end up in the curbside containers are extremely limited because of the level of contamination typically found in baled, recovered film from MRFs. Also, plastic bags are often cited by MRF operators as the most-common non-desired material because of how they can clog and damage sortation equipment of all types.*

*For bags returned to retail outlets, a common contaminant is the paper sales receipt left in the bag.*

### TERM

**Ferrous metal:** Metal that contains iron. Ferrous metals include mild steel, carbon steel, stainless steel, cast iron, and wrought iron. Aluminum is the most common non-ferrous metal.





## CONCLUSION

After reading this chapter and touring a MRF, Master Recyclers might be concerned about the future of recycling. Hopefully the opinion of long-time recycling industry consultant, Patty Moore, will help ease concerns as well as provide some hope for how we can shape the future:

### Recycling will thrive again

Recently, we've seen reports of the ruination of recycling. This is nothing new: A quick Internet search shows recycling's death has been predicted whenever scrap prices fall.

Prices are now slowly recovering, yet the doom-and-gloom has not abated. Why? Quite simply, the material mix has changed and MRF design has not kept up with the change. I believe the most pressing issue in recycling today is the lack of MRF separation technology. It's clear we need significant research and development and capital investment into post-consumer material separation infrastructure that reflects the product and packaging mix of today and tomorrow. MRFs are still predominantly built to separate two-dimensional paper items from three-dimensional bottle and container products.

Oregonians are hopeful the Recycling Modernization Act will bring new resources to a much needed comprehensive update that will put Oregon at the forefront of Recycling innovation once again.