

Glass recycling in the United States



▲ The Balcones Resources facility in Austin, Texas. (Photograph provided courtesy of Balcones Resources, 2018)

In his latest dispatch from the United States, Richard McDonough investigates the US glass recycling business and suggests there needs to be a shift in thinking to a more business-oriented model if recycling levels are to improve.

For many, glass recycling is a social good. Glass is a product that can be reused through recycling and kept out of landfills. It's good for the environment. Without a business underpinning, though, glass recycling collapses.

That appears to be what has been happening in a number of communities throughout the United States.

Many municipalities and many recycling firms no longer collect or accept glass products for recycling.

"We have seen a number of cases where waste haulers find collecting glass to be unprofitable," stated Mr Angus Crane, General Counsel of the North American Insulation Manufacturers Association. "Some of these waste haulers attempt to re-write their contracts with local governments to have glass collection removed from the contracts.

"Some even suggest that there is not a market for cullet."

Reading news articles, you would see that several officials blame China and its policies. Not everyone agrees with that assessment.

"China has not impacted our recycling operations," stated Ms. Laura Hennemann, Vice President of Marketing and Communications for Strategic Materials.

"The actions of China are forcing many in the recycling industry to re-evaluate how to process recycled products," stated Mr. Kerry Getter, Chief Executive Officer of Balcones Resources.

"The reality is that the sale of recyclable products – mostly non-glass products – to China through the years camouflaged a lot of poor decisions in the recycling industry. The strong market vitality for many years meant that many could be pretty inefficient and still make money."

Not anymore.

To understand glass recycling, one needs to understand the process.

Recycling process

There are typically three or four layers between a glass product that could be recycled from a residential property and that glass product being transformed into cullet to be re-used as a new glass product.

The first layer includes the local governmental entities, including municipalities, counties, and parishes, that regulate trash collection in their communities. It is these local entities that typically either collect trash directly for their residents or mandate the collection of trash by private haulers.

In many cases, it is these local entities that regulate whether recycling is possible or mandated through the pickup of residential trash. Sometimes, these local entities are following the regulations of their respective states and commonwealths that may mandate recycling of certain products.

The second layer includes the haulers that pick up trash at residential properties. These trash haulers may be divisions of local governmental entities or they may be private businesses. The trash haulers determine how to have the potential recyclable products actually recycled.

The third layer includes the general recycling facilities that separate the

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Glass cullet

recyclable products from the trash that is not recyclable. These recycling facilities may be operated by local governmental entities, by private businesses that haul trash, by non-profit organisations, or by private businesses that focus on recycling. While some of these general recycling facilities have the specialised equipment required to remove contaminants from glass products, many of the general recycling facilities do not have those pieces of equipment.

The fourth layer includes the recycling facilities that focus on specific types of recyclable products, like glass. These recycling facilities typically have the specialised equipment needed to remove contaminants from glass products as well as separate glass by type and colour.

Please note that the processes for glass recycling from commercial sources is similar, though not exactly the same as for residential sources of glass.

For glass recycling to work, there must be an economic value – financial gain

to be earned – by each layer within the system.

If not, the glass recycling system collapses.

In some cases, the costs to recycle glass are more than the costs to landfill the products. So, even though glass might be able to be recycled, the system will encourage a landfill option rather than a re-use option.

Capital investment

If the capital investments have not been made in the equipment to separate glass from other recyclable products and to then separate glass from any further containments, the system also collapses.

Recycling glass because it's good for the environment – because it's 'green' – is not a viable way to look at the glass recycling industry.

Actual out-of-pocket costs are important to consider, but so are cost avoidance expenses – the costs that are avoided by not hauling recyclable

products to landfills and the expenses that are avoided by not paying landfill usage fees.

Single-stream recycling has become commonplace throughout the United States. Through this process, residents place all of the types of products that can be recycled – cardboard, paper, plastic and glass, among other products – in one container.

There are at least two major benefits to this approach: One, it makes recycling easier for the residents by encouraging them to put everything recyclable in one container. Thus, it is presumed that residents are more likely to recycle because the process is simple.

Two, it reduces the capital costs as well as operational costs by using one vehicle to pick up all potential recyclable products rather than having separate vehicles that are specialised for the hauling of each specific type of recyclable product.

While single-stream recycling can appear to be the most efficient option, it may not actually be the most efficient system in reality, particularly for glass products.

By saving those costs upfront, the costs to separate specific types of recyclable products from each other is pushed into the back end of the recycling operations. The problem is that not all recycling facilities have the capability to sort glass from other products.

In most cases, only clean glass – glass free from contamination of other trash – is the cullet used by businesses that use recycled glass.

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▲ A Ripple Glass collection bin.

(Photograph provided courtesy of Ripple Glass)

High and low value

Within the cullet industry itself, there are both high value and low value uses of the product.

The high value uses include cullet being transformed into new glass products. For example, using cullet to manufacture beer bottles and other glass containers.

The low value uses include cullet being utilised as a component in a non-glass product. For example, using cullet as landfill daily covers and in road base for highway construction.

There does not appear to be much of a market for cullet between the high and low value uses.

Because of that, there is a significant difference between the revenue earned for cullet utilised in high value uses versus low value uses. As such, glass recycling firms are not likely to make the needed capital investments or operate facilities in markets that do not have purchasers seeking cullet for high value uses.

An example of such a business is Strategic Materials, the largest recycler of glass in the United States according to several reports.

“Strategic Materials focuses our operations on the high value uses,” explained Ms. Hennemann of Strategic Materials. “It is not financially worth it for us to focus on the low value uses.”

When a customer that purchases cullet for high value uses leaves a market, there are few alternatives available for the affected glass recycling firm. Such a situation affected Strategic Materials in Massachusetts.

Ardagh Group closed its container glass manufacturing plant in Milford, Massachusetts, in March 2018.

The Milford plant had been the largest customer of Strategic Materials in New England. The firm’s recycling facility in Franklin, Massachusetts, provided cullet to the Milford plant

“We closed our Franklin facility in June 2018 primarily due to the closure of the Milford facility,” said Ms. Hennemann. “Our Franklin site was in operation to meet the demand of Ardagh Group in Milford. That site was one of the highest users of cullet in the industry. We had an annual capacity of more than 100,000 tons of cullet at our Franklin facility. The glass was sourced from throughout the region and used by Ardagh Group to manufacture beer bottles in Milford.”

Strategic Materials was not able to find alternative customers that could use that level of cullet production in New England.

In addition to the closure of the Franklin site, Strategic Materials also closed a second facility in Rhode Island in the months after Ardagh Group closed its Milford plant.

Ms. Meg Morris, Past President of MassRecycle, a statewide non-profit coalition of governmental entities, private businesses, and others, said: “Board members believe that the closings of both the Strategic Materials processing facility in Franklin and the Ardagh Group glass bottle production plant in Milford have left a major gap in glass diversion.”

“Even before the closings, Massachusetts’ materials recovery facility (MRF) operators viewed glass as problematic.

“Glass containers are heavier and thus more costly to transport, and MRFs struggled to recycle the glass due to low commodity values driven by limited processing and end markets in New England.

“With the closings, MRFs now generally can only send glass for a lower beneficial use than recycling – alternative daily cover at landfills and for road and construction projects.”



▲ The Ripple Glass facility in Kansas City, Missouri (Photograph provided courtesy of Ripple Glass, 2018).

Fiberglass

An alternative to such low value uses is the use of cullet to create fiberglass insulation.

“Our member firms use cullet to create a number of fiberglass products,” stated Mr. Crane of the North American Insulation Manufacturers Association (NAIMA), a trade organisation representing North American manufacturers of fiberglass and mineral wool insulation products.

“Among the products are insulation for use in houses and commercial buildings, insulation for use in household appliances like ovens and dishwashers, and insulation for commercial pipes,” he said.

The fiberglass industry is one of the largest users of cullet. For Strategic Materials, businesses in the fiberglass

insulation industry are among its largest customers.

According to NAIMA, member firms of the trade association used more than 1.9 billion pounds of recycled glass in the United States in 2016.

“On average, cullet represents about 40% of the glass content of the products manufactured by our members,” Mr. Crane continued. “In some cases, cullet represents up to 65% of the glass content of certain products. We need a steady supply of cullet.

“Cullet has to be clean to be able to be used within the fiberglass,” Mr. Crane continued. “Otherwise, it creates major problems for our furnaces.”

There are benefits to the use of cullet by the fiberglass insulation industry.

Among those is the reduction in the need to use raw materials, including sand and soda ash, to produce fiberglass. According to NAIMA, energy usage is reduced, and furnace lifespans increase by up to 30% due to the decreased melting temperatures and use of less corrosive materials.

The fiberglass insulation industry is also able to use a variety of cullet.

“We’re one of the few industries that can use cullet made from green glass bottles,” stated Mr. Crane. “We can use car windshield glass. Other than ceramic glass and computer screen glass, we’re able to use most types of cullet to manufacture fiberglass.”

Ripple Glass is another recycling firm that supplies cullet to the fiberglass insulation industry and glass container industry. The group, based in Kansas City, Missouri, focuses only on glass recycling.

The company noted that single-stream recycling programmes don’t work well for the recycling of glass. It instead works with firms that have hauling routes that are dedicated to only glass pickups as well as collection bins located throughout several Midwest metropolitan areas.

“When [glass] is mixed with other recyclables, broken glass degrades and contaminates those materials, reducing their utility and causing them to be discarded or ‘downcycled’ into lower-quality products,” according to a statement from Ripple Glass. “What’s more, in most curbside programmes in which glass is collected along with other recyclables, up to half of the collected glass is unsalvageable, and ends up in the landfill. This leaves two options: sorting

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▲ Recycling processing equipment at Balcones Resources in Austin, Texas. [Photograph provided courtesy of Balcones Resources, 2018]

and segregating glass in existing recycling trucks or running dedicated routes for glass. Collecting glass separately like Ripple Glass does results in an up to 98% recovery rate.”

Business model

Ms. Michelle Goth, General Manager of Ripple Glass, said the company sources glass from nine surrounding states, and its end users are within 250 miles of it as well.

Among its local customers are Owens Corning that uses cullet to manufacture fiberglass insulation and Ardagh Group that uses cullet to manufacture new beer bottles.

“I’m impressed by the Ripple operations,” stated Mr. Crane of NAIMA. “Its glass collection system is excellent.”

Another recycling firm, Balcones Resources, based in Austin, Texas, works with upwards of 15 types of recyclable products, including glass.

One of the techniques used by Balcones Resources is dealing with glass at the front end of the recycling process within its facility.

“By taking the glass out of the recyclables in the beginning of the process, you create a product that has monetary value because you minimize the contamination of glass,” stated Mr. Getter of Balcones Resources.

“We made the capital investment for the necessary equipment that could sort all types of recyclable materials, including glass,” continued Mr. Getter.

“The specific piece of equipment that included the mechanical removal process

for glass cost us \$400,000.00. We built that cost into our pricing structure for cullet.”

Mr. Getter explained that the financial side of recycling is critical to the success of recycling.

“We build our pricing based on a market basket of potential recyclable products that come from a specific customer.”

“This market basket includes the percentages of about 15 types of products - cardboard, paper, plastic, glass, and other products. Each of the recyclable products has a specific value, so we create a weighted average based on the level of recyclable products coming from each specific market area.”

Mr. Getter noted that waste streams in each community are different so the market baskets vary from community to community. He also noted that you have to have economies of scale for glass recycling to work well and that glass recycling is difficult to do if you don’t produce enough volume of recyclable products within a market area.

“The glass recycling industry is based on high fixed costs with a variable revenue stream,” stated Mr. Getter. “To deal with this situation, our contracts are written so that we have our operating costs covered through a processing fee and a variable cost structure for the items that are subject to market fluctuations.”

“We share any revenue we generate when we sell recyclable products to other businesses,” Mr. Getter continued. “The generators of the recyclable products receive the lions share of that revenue. They also bear the variable costs if we

do not generate revenue from specific commodities. We also have some fail safe mechanisms built in to deal with down markets. In all of our years of operation, we haven’t had to renegotiate an existing contract.”

Using this business model, Balcones Resources has been able to recycle all of the products that arrive in its facility in Austin. “We have not had to landfill any product,” stated Mr. Getter.

While a number of recycling programmes in the United States no longer collect or accept glass for recycling, others have found glass recycling to be a profitable enterprise.

Overall, there appears to be great potential to increase the level of recycling of glass within the United States. To do so, though, will require a shift from looking at recycling of glass as a social good to one that is based on pure business motivations - making capital investments in efficient processing equipment, implementing contracts that cover fixed costs and account for variable revenue streams, fulfilling market needs for additional cullet in high-value markets, and potentially developing new medium-value markets for cullet. ■

Do you have questions about the glass industry?

Governmental regulations?

Company operations?

Your questions may be answered in future news columns.

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