In the single-stream era, glass tends to get lumped in the contaminant category, but there might be more solutions available for this important material than many realize.

The nuts and bolts

While recycling glass may not garner the same greenhouse gas savings achieved by recycling other materials, there are still tangible benefits of replacing virgin materials with cullet. Container glass is made up of silica (around 70 percent), soda ash (10-15 percent) and limestone (10-15 percent), all of which are mined, with additives and colorants making up the remainder of the material.

According to data from a sustainability report from glass manufacturer Owens-Illinois, for every 10 percent of recycled glass used in the manufacturing process there is an attendant 2 to 3 percent drop in plant energy costs (due to the lower melting point of cullet over virgin materials) and a 4 to 10 percent reduction in GHG emissions, per plant.

Depending on the facility, this recipe can also contain a high percentage of cullet. This cullet must be clean and free of contaminants, such as pebbles or other materials, but also ceramics or non-container glass. Even small amounts of contaminants can ruin the production of new containers at a glass facility. The same is true for the manufacturing of fiberglass, the other primary market for recovered cullet.

Hitting the purity levels required by these manufacturers can
be a challenge for MRFs processing single-stream collected recyclables. Secondary glass processing is therefore necessary to take glass from MRFs and have it be made into a new product.

**Processing innovations**
Glass beneficiation firms such as Carry-All Products, Momentum Recycling, Reflective Recycling and Strategic Materials have considerable investments in areas around the country (see Sidebar 1 for more). These companies are able to sell to both glass manufacturers and insulation companies for use in fiberglass production.

Numerous technological solutions, including optical sortation and air and density separation, are available to clean MRF cullet, and all of the major recovery facility equipment producers (Bulk Handling Systems, CP Group, Van Dyk Recycling Solutions) offer their own glass beneficiation equipment or have partnered with other manufacturers (Machinex with Krysteline Technologies) that specialize in glass cleanup equipment.

There are also numerous equipment manufacturers (Andela Products, BT-Wolfgang Binder, C.S. Bell Co., General Kinematics, Glass Aggregate Systems) that produce stand-alone systems for cleaning glass.

With the challenges of using single-stream-collected glass, different communities around the country have developed alternative ways of collection with some success. Below are some examples.

**Kansas City, Mo.** – Ripple Glass has over 100 drop-off locations around the city, collecting approximately 37,000 tons of glass annually, with a 98 percent recovery rate for the material collected. The overall recovery rate for glass in Kansas City went from 5 percent to 20 percent over the last several years, according to Ripple, which began operating in 2009.

**Portland, Ore.** – In Portland, a “single-stream plus” system is used, with residential collection of container glass collected in a separate bin residents place next to the rollcarts used to collect commingled recyclables. While some glass can still be found in the commingled materials at Portland-area MRFs, volumes are greatly reduced. Oregon also is one of 10 states with a beverage container redemption program. This reality keeps a great deal of glass out of curbside programs across the Beaver State (See Sidebar 2).

**Salt Lake City** – In Utah’s largest city, Momentum Recycling offers separate subscription-based collection for $7 a month, with rollcarts provided by the company. This curbside program is supplemented by almost 60 drop-off containers located around the city. The company is also building a processing facility in Denver, slated to open later this year.

**A glittering example**
One company, Rumpke Consolidated Co., has helped push forward residential glass

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**Sidebar 1: Glass recovery resources**
The Glass Packaging Institute has developed a clearinghouse of the locations of glass manufacturing plants, fiberglass manufacturing facilities and recovered glass processing facilities that feed them. See the list at gpi.org/glass-resource-locator.

Resource Recycling has published numerous glass recycling stories through the years and has created a folder to share those resources with readers. The contents can be seen at tinyurl.com/RR-Glass.

In November 2015, a group of experts and stakeholders from throughout the value stream was convened by the Northeast Recycling Council at its fall forum. The presentations are available at tinyurl.com/NERC-Glass.

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**Sidebar 2: Bottle bill benefits**
One proven way of recovering container glass is to take it out of the curbside recycling program altogether. The beverage container redemption programs in the 10 states that have them have a 40 percentage point advantage of recycling rates for glass containers over non-deposit states (see below), according to data from the Container Recycling Institute. Clean cullet from bottle bill states tends to be the most desired material by end users of recovered glass.

**Beverage container recycling rates in deposit and non-deposit states**

![Graph showing beverage container recycling rates in deposit and non-deposit states](image)

**Source:** Container Recycling Institute, 2013.
collection by taking an integrated approach to glass recovery. The company has a strong regional presence in the Midwest and is vertically integrated – in areas in which it operates, the company controls hauling, processing and disposal, with eight recycling facilities and nine landfills in Indiana, Kentucky, Ohio and West Virginia.

In the early 2000s, as single-stream collection took over, the company found glass was making up an estimated 15-20 percent of materials coming into its MRFs. After some initial success making a fine-grind product from the recovered material, primarily sold into the fiberglass market, the company looked to boost its processing capacity.

In 2010, Rumpke signed an agreement with Owens-Illinois and was given a $500,000 grant from the Ohio Department of Natural Resources. Rumpke ultimately invested in a $4.1 million upgrade to its Dayton, Ohio glass processing operations.

In the wake of that move, Rumpke is able to sell into different markets. Buyers include Owens-Illinois, where the cullet is made into new containers, as well as Owens Corning and Johns Manville, both of which make fiberglass insulation from the recovered material.

Increased industry involvement

Another positive development in glass recycling is the increased engagement of many throughout the recycling and glass industries. Industry players large and small are working to find solutions for the material.

The Glass Packaging Institute (GPI) is working with the Institute of Scrap Recycling Industries to develop new specification for glass coming out of MRFs. GPI is also looking to improve market options by facilitating connections between disparate producers and consumers.

In addition, The Recycling Partnership recently announced Heineken USA as a member of the recycling-boosting group, making glass another focus material. “Glass is a tricky commodity, but I think we’ll be able to dig in with Heineken to find out what best management practices are for improving glass recycling,” Cody Marshall, technical assistance director at The Recycling Partnership, told Resource Recycling when the sponsorship was announced in late 2015.

The Closed Loop Fund has also identified glass as a material to target for infrastructure improvement. While specific investments have yet to be made, the group is looking closely at recovered glass usage in cement, or “glasscrete,” as a large potential future market.

Consumption for growth

The efforts described above will combine with existing initiatives from numerous traditional glass consumers. Supported by sustainability goals, as well as the cost benefits of using cullet, all glass container manufacturers have at least some recovered-glass usage goals.

Dedication to glass recovery from individual companies and industries could also be bolstered by legislative actions. California’s carbon cap-and-trade program and potential extended producer responsibility legislation for packaging in British Columbia and elsewhere certainly have glass recycling repercussions. In such an environment, the future for glass recycling might not be half empty after all.

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