Clear Solutions

Moving Towards Improved Glass Recovery

September 2014
Foreword

Recognizing the growing importance of protecting the environment and conserving valuable energy resources, in December 2008, the Glass Packaging Institute (GPI) announced that its member companies were committed to achieving the goal of using at least 50% recycled glass in the manufacture of new glass bottles and jars by 2013.

This report provides a comprehensive account of the robust efforts taken by the glass packaging industry to achieve this goal. It opens with a discussion of the wide-ranging benefits of glass recycling and the goal metrics established to measure achieving the recycled content rate. It sheds light on the industry’s progress-to-date on its 50% recycled content goal, and an overview of the barriers faced along the way. Finally, recommendations are outlined for continuing to make progress towards reaching the goal.
The Recycling Council of Canada

Table of Contents

EXECUTIVE SUMMARY 04

THE BENEFITS OF USING RECYCLED GLASS 05

- Protects the Environment 05
- Saves Energy 05
- Reduces Greenhouse Gas Emissions 06

ACHIEVING THE GOAL 06

National Partnerships and Initiatives 08
- Recycling Coalitions and National initiatives 08
- U.S. EPA Municipal Solid Waste and Characterization Report (MSW) 09
- U.S. Department of Energy – Study on Industrial Energy Efficiency 10

State Efforts 11
- Beverage Container Recycling Refund Programs 11
- Bar and Restaurant Initiatives 11
- Consumer Research 13

BARRIERS AND CHALLENGES 14

- The Advance of Single Stream Recycling Curbside Collection Programs 15
- Distinguishing Between Collection and Recycling Recovery Rates 15
- Recycled Glass Transportation Economics and Energy Impacts 16

RECOMMENDATIONS GOING FORWARD 17

1. Utilization of the Container Redemption System Optimization Study (CRSOS) 17
2. Build on Existing Programs and Establish New Programs for Collection and Recovery of Beverage Containers 18
3. Implement Glass Improvement Program at Materials Recovery Facilities (MRFs) 19
**Executive Summary**

The Glass Packaging Institute (GPI) and its member companies are making progress on a number of steps to achieve a 50% recycled content goal in the manufacture of new glass food and beverage containers. Recycled content refers only to the recycled glass utilized in the manufacture of new containers. It should not be misconstrued as a recycling, recovery, or a diversion rate for glass containers.

While challenges remain, there are also opportunities. Success in reaching this goal is tied directly to improving the recovery of recycled glass containers:

- Improved recycling of glass containers.
- Working to implement effective recycling programs.
- Better understanding of the final destination of recycled glass collected.

When GPI member companies are able to use increased quantities of recycled glass in the manufacturing process, they achieve significant reductions in both energy use at their plants and related greenhouse gas emissions. This not only provides abundant environmental benefits, but also makes good economic sense.

Since the GPI Board of Trustees approved the initiative to increase the recycled content of glass containers, the industry has seen an increase of 8 percentage points, from 25% to approximately 33%, in use of recycled content for the manufacture of glass bottles and jars.

This increase is the result of diligent and persistent efforts by GPI and its member companies to:

- Examine the effectiveness of current recycling systems.
- Better understand the final disposition of collected recyclables.
- Promote programs that have clearly demonstrated their ability to produce high-quality recycled glass suitable for reuse in the manufacture of new glass containers.
- Develop partnerships with glass recycling companies and communities to improve the quality and amount of recycled glass available for purchase.

Given the growing reliance on the “single stream” collection model to manage the Municipal Solid Waste (MSW) stream (recyclables and trash) in the U.S., GPI commissioned a study to determine how these programs work in conjunction with beverage container recycling refund programs. This study demonstrated that together, these programs are able to:

- Collect more of the targeted beverage container materials.
- Increase the overall recycling rate for all materials.
- Lower overall recycling costs for states and communities if revenues are reinvested back into the beverage container recycling refund program.

This report also includes a section on “Recommendations” to continue the progress made to date toward achieving the 50% recycled content goal. The glass container industry remains dedicated to improving all recycling streams of glass containers, and working with all stakeholders to achieve what we believe to be a common goal … significantly improve the recovery rate for all recyclables.
The Benefits of Using Recycled Glass

One of the distinct benefits of using recycled glass in the manufacturing process is that glass is infinitely recyclable, and can be re-melted into new containers endlessly. Cullet, or furnace-ready recycled glass recovered from the waste stream, can be used directly in the manufacture of a new glass container. There is a robust market for such cullet because new glass containers can include up to 95% recycled content if available. Lower quality recovered glass bottles must go to lower value, single use applications, including alternative daily cover at landfills and as a substitute material for roadbed aggregate. The ability of glass to endlessly give life to new products brings with it many environmental, energy, and health-related benefits.

Protects the Environment

Raw materials used in the production of glass include sand, soda ash, and limestone. Along with minimizing the consumption of these natural resources, using recycled glass in the manufacturing process reduces carbon dioxide emissions released into the atmosphere as a by product. For every six tons of recycled glass used, a ton of carbon dioxide is reduced, improving air quality and helping to address climate change concerns. The use of recycled glass also lessens the volume of waste sent to landfills, which in turn has the potential to save counties, cities, and towns money spent on “tipping fees” (fees paid at the landfill, per ton of solid waste disposed).

Saves Energy

The use of recycled glass in the manufacturing process significantly reduces the energy used at glass plants. Energy usage drops about 2 - 3.5% for every 10% of recycled glass used in the manufacturing process. This occurs because the recycled glass melts at a much lower temperature than raw material ingredients in the furnace, allowing the plant operators to turn down the furnace temperature to manufacture new containers. The reduction of heat within the furnace also extends its life, delaying capital costs incurred with a furnace rebuild. Energy costs at glass plants can constitute a significant portion of the total product cost, so reducing energy use also makes good financial sense.

Reduces Greenhouse Gas Emissions

With the inclusion of more recycled glass in the manufacturing process, and resulting lowered furnace temperature, the release of greenhouse gas emissions are significantly reduced. For every 10% of recycled glass used in the manufacturing process, the resulting greenhouse gas emissions are reduced by 6 - 10%. 4

The following sections provide a detailed look at the industry’s efforts to improve the recovery and recycling rate for glass containers, which in turn, creates the opportunity for increased glass recycled content. We also address the challenges the industry has encountered in pursuit of our goal and specific recommendations for achieving an average of 50% recycled content in the manufacture of new glass containers.

Achieving the Goal

Measuring Our Progress

As an energy-intensive industry, glass container manufacturing plants are always seeking more recycled glass to assist them in complying with existing state and regional clean air requirements. When GPI embarked on this goal in 2008, the glass container industry did not have an aggregate, or an “average,” figure for the percentage of post-consumer recycled glass used to manufacture new glass containers.

Based on existing recovery and recycling reports, along with information provided to GPI independently by member companies, we estimated that the industry had a recycled content rate of approximately 25% in 2008, when our goal was established.

In order to begin calculating the amount of recycled content used in glass manufacturing and measure the progress moving forward, GPI initiated collecting three major sets of data, via a third party consulting firm, to aggregate and report out on the industry’s progress. Reporting companies represent about 93 - 95% of total U.S. industry production. 5

1. Glass containers in tons equivalent that are produced at U.S.-based plants and deemed as shippable to customers (tons packed);
2. Glass containers in tons equivalent that are produced at and shipped from the U.S.-based plants to customers for both domestic consumption and export (tons shipped); and
3. Recycled glass processed by and purchased from third parties or processed in-house and collected via state, municipal, local, and community recycling programs, after serving its intended purpose (recycled glass used).

5 Based on Precision Consulting and GPI estimates.
The chart below illustrates the trend in the glass container industry’s cullet usage from January 2010 through December 2013:

**Glass Container Industry Average Cullet Use (December 2008 - December 2013)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Cullet Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>25%</td>
</tr>
<tr>
<td>2009</td>
<td>28.56%</td>
</tr>
<tr>
<td>2010</td>
<td>29.77%</td>
</tr>
<tr>
<td>2011</td>
<td>31.42%</td>
</tr>
<tr>
<td>2012</td>
<td>31.95%</td>
</tr>
<tr>
<td>2013</td>
<td>33.64%</td>
</tr>
</tbody>
</table>

As shown in the above chart, one year after the goal was established, the percentage of the industry’s use of recycled glass increased from approximately 25 to 28.56%.

Looking at the industry’s average recycled glass use for each year, there is a positive rise in the overall share of recycled glass introduced into the manufacturing batch. While the industry’s average recycled glass use in 2010 was 29.77%, that ratio jumped to 31.42% in 2011.

In 2012, the average cullet use recorded a slight increase to 31.95%, and in 2013, it hit a record high, with an average of 33.64% recycled glass use in the production of all new glass containers.

While the glass container industry did not reach its 50% target by the end of 2013, it is moving steadily towards achieving its recycled content goal, and continues on a certain path to increase the share of post-consumer recycled content in the glass container manufacturing process.
National Partnerships and Initiatives

Recycling Coalitions and National Initiatives

GPI has worked over the past several years with numerous stakeholders that have a dedicated interest in recognizing the importance of and securing recycled materials for their respective manufacturing industries.

Many of these efforts are rooted in the collective strength of Washington, D.C.-based trade associations, which have engaged directly with Members of Congress, their staff, and relevant federal agency officials to assess the state of recycling, its importance to the manufacturing industries, and areas where recovery and measurement can be improved. It is also important to note the efforts of other regional collaborations throughout the country to address recycling related issues.

GPI and other manufacturing-based companies and trade associations provided information and made presentations to Members and staff of the Congressional Recycling Caucus, encouraging them to continue their efforts to ensure that recycling is recognized as a key component of manufacturing.

GPI and member companies also led stakeholder efforts and provided guidance to the National Association of Manufacturers (NAM) as it developed and approved their initial reuse of recyclable materials. Importantly, the policy acknowledges the different approaches that each commodity may require to initiate or increase recycled materials. Policies should also recognize, and when appropriate, credit manufacturers for their use of recyclable materials in the manufacturing process.

O-I Forms National Partnership with Glass Recycler, e-Cullet

In an effort to increase the amount of quality recycled glass available for repurchase and reuse by the glass container manufacturing industry, in 2013, glass manufacturer O-I formed a national partnership with glass recycling company, e-Cullet, Inc. The partnership is focused on utilization of advanced technology and equipment to make more recycled glass readily available for use in new bottles and jars.

The initial effort of the “Glass to Glass” partnership will focus on increasing the recycled glass remelted at O-I’s Portland manufacturing facility. O-I’s Portland plant employs about 200 people and produces more than 1 million bottles a day, mostly beer bottles for local craft breweries.
U.S. EPA Municipal Solid Waste and Characterization Report (MSW)

GPI led a regulatory effort to improve the accuracy of national recycling rates for glass containers and other recycled materials. A better understanding of the recycling process (true recovery) of collected recyclables greatly assists the glass container and other manufacturing industries in sourcing and efforts to procure recycled materials for use in their respective manufacturing processes.

This effort began with broad stakeholder discussions with the U.S. EPA, which resulted in the Agency revising its Municipal Solid Waste and Characterization (MSW) Report, the only national report that issues generation and recovery statistics of glass and other commonly recycled materials within the municipal solid waste stream.

GPI’s major recommendations to improve the MSW Report included:

- Tonnage of recyclable materials (aluminum, glass, paper, plastic and steel) diverted by each type of municipal collection system (dual stream curbside, single stream curbside, container deposit, drop-off or any other system).
- Tonnage of recyclable materials that are recovered by manufacturers, broken down by type of material and type of collection system. Manufacturer recovery rate achieved for each type of recyclable material from each type of collection system.
- Tonnage of recyclable materials disposed of in landfills directly after use, broken down by type of recyclable material.
- Tonnage of recyclable material disposed of in landfill, following diversion, sorting, separation, cleaning or any beneficiation, broken down by type of material and type of collection system.
- Tonnage of recyclable materials that go into other identifiable end uses.
- Energy consumed and costs incurred to collect and beneficiate recyclable materials, broken down by type of material and collection system.
Maximizing Utilization of Recycled Glass at Verallia’s* Milford, MA Plant

In 2012, the Verallia glass container plant in Milford, Massachusetts earned the ENERGY STAR plant certification from the U.S. EPA. The Milford plant was one of only three U.S. container glass facilities to earn this designation that year.

The Milford facility’s furnaces use recycled glass to replace virgin raw materials at one of the highest rates in the world—ranging from 80 to 90% depending on the availability of sufficient quantities of high-quality cullet recovered under the Massachusetts beverage container recycling refund program, which has been in place for many years. This improves Milford’s competitive position, while also being in line with Verallia’s commitment to continuously improving its sustainability footprint.

Opening in 1973 with one glassmaking furnace, the Milford plant today is a two-furnace facility. Its 235 employees make approximately 2.5 million endlessly recyclable bottles each day for several well-known beer industry brands. In addition to the high levels of recycled glass use at the plant, after converting to an oxy-furnace in October 2010 (which results in lower energy use at the glass plant, due to the use of oxygen as the fuel component), the plant has been able improve its energy efficiency by more than 20%.

*On April 11, 2014, Ardagh Group announced that it completed the acquisition of Verallia North America. The new company is called Ardagh Glass Inc.

U.S. Department of Energy - Study on Industrial Energy Efficiency

At the beginning of 2013, President Obama signed into law broad-based energy legislation, which included a requirement that the Department of Energy issue a study on improving industrial energy efficiency efforts. This is due to Congress by November 2014.

This study, the first of its kind mandated by Congress, will include statutory language and a review of the benefits of recycling in the industrial energy efficiency process, a section specifically advocated for inclusion by GPI and member companies.

While the forthcoming study and accompanying report to Congress are still in draft form, the glass container industry has requested the following elements that address recycling be included:

• Examination of the current level of recycled material use among energy-intensive industries, and how they may be increased providing for further energy savings.

• Discussion of opportunity for increased use through examination of the existing major recycling collection, processing, and end market systems. Limitation to increased use, such as contamination of recyclable materials that prevents them from being used in the industrial energy efficiency process.
State Efforts

Beverage Container Recycling Refund Programs

As part of the 50% recycled content goal, the GPI Board of Trustees indicated the industry's willingness to look towards and support a variety of recycling collection programs to provide recycled glass for reuse in the glass container manufacturing process.

One of the most successful models in the country, operating in 10 states in parallel with various single stream collection models, is the beverage container recycling refund program. Under these programs, the vast majority of glass beverage containers covered under the programs are recovered, kept separate from other materials, and retain the best chance for eventual repurchase and reuse by the glass container industry for manufacture in a new container. Today more than 65% of all recycled glass cullet comes from these 10 states.

Since 2008, GPI has provided testimony in seven states encouraging legislatures to either create or expand existing beverage container recycling refund programs. As described later in this Report, not only do these programs, in conjunction with other recycling programs, have the ability to recover more recyclable materials overall, but if structured properly, they establish a funding mechanism that allows them to be financially feasible.

Bar and Restaurant Initiatives

GPI and its members have actively supported on-premise bar, restaurant, and hotel recycling initiatives. More than 28% of beverages packaged in glass are sold in restaurants and other out-of-home venues. On average, about 18% of all beverage containers are consumed on premise and glass makes up about 80% of that container mix. These venues are a valuable source for collecting large volumes of high-quality recycled glass.

In 2011, GPI conducted an in-depth survey of bar, restaurant, and hotel glass container recycling programs in eight states (CA, CO, IN, MO, NC, NV, OH, TX) to better understand their effectiveness to-date, economics, and well-established best practices.

Of the surveyed programs initiated by a hauler/recycling collector, all reported that the program was “economically feasible.” One respondent stated that it was “cost neutral,” but they were getting benefits for participating in a program that is a source of pride for the community as all program partners are part of the local economy—from brewery to recyclers and back to glass bottles again.6

During the 2005 legislative session, the North Carolina General Assembly passed House Bill 1518, requiring all holders of Alcoholic Beverage Control (ABC) permits to separate, store, and recycle beverage containers. The law went into effect in 2008 and remains the only statewide on-premise bar and restaurant recycling program in the country.

6 Survey of U.S. Glass Container Recycling Programs for Bars, Restaurants, and Hotels, Glass Packaging Institute (GPI), September 2011.
In the program’s first year, 70 to 75% of North Carolina bars and restaurants were already participating in a recycling program, and adhering to the law. A number of government agencies were charged with ensuring compliance, including the ABC Commission which oversaw permits. The North Carolina Division of Pollution Prevention and Environmental Assistance (DPPEA) provided and offered technical assistance.

As glass is the most prominent recyclable material in bars and other food-service businesses, the law proved to be especially successful in generating post-consumer recycled glass. In 2010, 25,000 - 29,000 tons of recycled glass were diverted through the on-premise bar and restaurant recycling program. This program has seen increases in diversion since its implementation in 2008.

Approximately 10 local businesses have also sprung up in response to the need for targeted recycling collection services, a trend that is expected to continue and grow the recycling industry’s participation in North Carolina’s economy.

Unfortunately, except for the businesses close to the two beneficiator facilities in the state, most of these materials end up in the single stream process and suffer the same high loss in processing resulting in a fairly low yield of recycled material overall.

Ohio Model for Recycling Glass Bottles from Bars and Restaurants

In August 2012, Ohio kicked off a one-year recycling pilot to recover glass bottles from bars and restaurants dubbed “Glass Act.” After collection, some of the recovered glass goes to Perrysburg, Ohio-based glass manufacturer O-I for use in the production of new containers.

The partnering initiative with O-I, Ohio EPA, and the Ohio Department of Natural Resources was motivated by a 2011 study conducted for the Ohio DNR which found that only about one-tenth of the state’s glass containers were being recycled, leaving an estimated 90% of them headed for the landfill. This was largely the result of an inefficient collection and processing system. Ohio manufacturers need around 285,000 tons of recycled glass annually, and they were only using 110,000.

Through Glass Act, the Ohio EPA has worked with industry leaders to develop demonstration projects in nine regions where they have set up Glass Act transfer station sites that are linked to processors. The Ohio EPA also funded up to $1 million in grants to start and/or expand glass container recycling in bars, restaurants, and hotels in Ohio, along with seed money for a statewide campaign to encourage glass bottle recycling.

Verallia*, Strategic Materials, and Green Broad Ripple Initiative

In September 2010, Verallia North America, an Indiana-based glass container manufacturer, began collaborating with several Indianapolis area bars and restaurants, Strategic Materials, Inc., and Green Broad Ripple to boost recycling and recovery of glass containers locally.

The collaboration has proven a “win” for all partners and a model for other communities. It has resulted in the collection of more than 50 tons of glass containers per year, which would have otherwise gone to landfill, and the participating bars and restaurant are able to save on trash removal. After Strategic Materials, Inc. collects the recycled glass and processes it at their Indianapolis facility, it is sold to Verallia’s Dunkirk plant where it’s remelted and formed into new glass containers.

*On April 11, 2014, Ardagh Group announced that it completed the acquisition of Verallia North America. The new company is called Ardagh Glass Inc.

Consumer Research

In 2013, as part of its efforts to better understand and promote consumer recycling behavior, GPI partnered with a leading sustainability research firm–EcoFocus Worldwide Research–to conduct a major study comprised of over 4,000 nationally representative adults to assess knowledge, attitudes, and beliefs about packaging materials and recycling. The study also examined the various factors and barriers that influence consumer recycling.

The findings are reported by the six U.S. Census Regions–Midwest, Southeast, West, Northeast, Southwest and Mid-Atlantic. In addition, there was a strong enough sampling among 12 states to provide useful state-specific information.

The study confirmed that the ability to recycle a product is of importance to a large majority of consumers and it plays a strong role in their purchasing decisions (interest and participation in recycling is even greater in states with refund programs).

There was a clear understanding by some respondents, however, that despite best efforts and intentions, many recycled containers still find their way into landfills. Across each region of the country, approximately 50% of respondents said they would recycle more if they were confident that their efforts yielded less landfill waste.
Barriers and Challenges

The Advance of Single Stream Recycling Curbside Collection Programs

Single stream recycling curbside collection typically is a system where all the MSW materials targeted for recycling, including glass, paper, plastic, and metal, are collected in one bin at residential curbsides, and then sorted at a Materials Recovery Facility (MRF) after pick-up.

Roughly 15 years ago, communities and towns began adopting single stream collection programs to save on manual collection costs and broadly increase recycling. For example, by 2010, 64% of communities had access to single stream recycling, and there were 248 MRFs established to recover these materials. This is a dramatic increase from 2005, when only 29% had access to single stream recycling. This trend is likely to continue. Without question, single stream collection has fostered increased residential recycling. However, all too often recycled glass collected through single stream collection programs becomes too contaminated with other recyclables and non-recyclables in the existing sorting process at the Materials Recovery Facility (MRF) for use in the manufacture of new glass bottles and jars. (See Diversion, Collection and Recovery Rate discussion below.) While some recyclables collected have fared better in this collection process, glass has been the most negatively impacted. Glass recyclers, who supply to glass manufacturing companies, have reported on average a loss of 40 - 60% to lower value, one-time applications.

This cross-contamination occurs throughout the process and results in lower quality recovered glass, rendering it unsuitable for glass container manufacturers. According to the Container Recycling Institute, while 60% of glass from single-stream collection could be recycled into new glass containers or fiberglass, 40% winds up in landfills. Thus, the primary barrier to increasing recovery of recycled glass for eventual re-use in the glass container manufacturing process is the prevalence of single stream recycling collection. Under many circumstances, these collection systems are not supported by effective sorting equipment to achieve optimal recovery of recyclables including, but not limited to, glass.

While glass contamination that results from single stream collection is one of the biggest challenges to increasing glass recovery rates nationwide, GPI and its member companies have taken important steps in working with industry stakeholders to improve collection and recovery practices.

These efforts have focused predominantly on improving curbside practices, including our industry’s promotion of the Single Stream Best Practices Manual and Implementation Guide (2007). GPI and its member companies have initiated stakeholder and coalition discussions with MRFs and the greater recycling hauling and collection industry to discuss glass recycling. GPI has also provided resources, including consumer and industry information on glass recycling, on the GPI website.

Distinguishing Between Collection and Recycling Recovery Rates

Over the past several years, GPI and its member companies have worked to ensure there is a distinction made between the collection of recyclables and actual recycling/recovery of collected materials, which would result in the inclusion of these as part of a manufactured product. Collecting recyclables is only the first step in the recycling process. Understanding the chain of events after recyclables are collected, through the sorting process, and to the final end market better determines a true recycling recovery rate for glass and all other materials.

While recycling recovery rates vary from state to state as well as their reporting methodologies, all of them examine what is picked up for recycling, and do not follow the chain of recycling to the resulting end market. GPI believes that a true recycling rate cannot be known unless the final disposition of the collected recyclable is examined and reported.

GPI President Lynn Bragg testified on draft legislation, based in large part on GPI recommendations to the U.S. EPA on their current MSW Report, to the House Energy and Commerce Committee in June 2012. Committee members at the hearing gave statements supporting the need to improve existing recycling data, and for communities to have the best information possible when choosing a recycling program that is the best fit for their community.
Recycled Glass Transportation Economics and Energy Impacts

As the vast majority of communities with recycling programs in place include glass containers as an eligible component,\(^\text{10}\) conventional wisdom would dictate that the nearest supply of recycled glass would be transported to the closest glass container manufacturing plant. Unfortunately, the contamination of the recycled glass within many recycling programs often makes it unsuitable for nearby glass container manufacturing plants.

Higher levels of contamination in the recycling stream have required glass manufacturing plants to source recycled glass from far away programs and states. In fact, recycled glass will often travel several states in order to reach a glass container manufacturing facility, the result of broader quality issues. Even with glass plant operations currently active in 23 states, some recycled glass will travel through five state lines (or more) to reach a suitable glass container end market.

The cost to transport recycled glass such great distances remains a significant barrier in achieving the overall 50% recycled content goal. According to one recent O-I presentation, the cost to ship recycled glass to the O-I facility in Atlanta, Georgia is $1 million annually.\(^\text{11}\) This figure does not include the cost to purchase the recycled glass itself. The recycled glass used at the O-I Atlanta plant comes from as far away as Michigan, which—as not coincidentally—as we describe in our recommendations, has a beverage container recycling refund program in place. Recycled glass from beverage container recycling refund programs is shipped to glass container plants all over the country.

Increasing the quality of all recycled glass will greatly reduce the need for transportation costs, as more of the glass collected for recycling would be able to supply a steadier and consistent stream to nearby plants. This would also allow for a broader range of in-state communities and cities to see the benefits of having their recycling glass repurchased, rather than paying to have it landfilled.


\(^{11}\) Ann House, O-I, Presentation to the Georgia Recycling Coalition Conference, August 22, 2011.
Recommendations Going Forward

1. Utilization of the Container Redemption System Optimization Study (CRSOS)

GPI strongly encourages policymakers, legislators, recyclers, and other stakeholders to review the recycling system structures identified in the Container Redemption System Optimization Study (CRSO Study) released in February 2014.

The CRSO Study, commissioned in part by GPI and compiled by Resource Recycling Systems (RRS), examined how single stream collection systems and beverage container recycling refund programs can work together. As the 10 states that utilize beverage container recycling refund programs also employ single stream recycling collection programs, GPI understands that importance of how these systems work together.

The CRSO Study focused on two states, Minnesota, which does not include a beverage container recycling refund program and Vermont, which employs both a beverage container recycling refund program and single stream collection throughout the state.

The complete CRSO Study can be found at www.gpi.org/advocacy/recycling-energy-policies. Major findings of the CRSO Study Include:

- **CRSOS Results in Increased Recovery of Material**: CRSOS are estimated to increase statewide recovery by at least 11% over a comprehensive single stream system, and recovery of bottle bill materials by 162%.

- **CRSOS Offer Comparative Cost Structures**: CRSOS can be comparable in cost to single stream if material revenues are kept by the operator and in some cases even if unredeemed deposits are not kept in the system. Because CRSOS reduce the number of containers being processed by a MRF by diverting them to the CRSO redemption system, the CRSOS structure designates that a portion of unredeemed deposits should be refunded to MRFs for reduced material revenue. Even with that revenue reinvestment, CRSOS still show lower costs and stronger financial returns than single stream alone.

- **Redemption Centers Reduce Pressure on Retailers**: Redemption centers reduce the material returned to retail by an estimated 50 - 80% depending upon population density. Reducing the impact on retailers has the potential to reduce the overall cost of a system once it is implemented.

- **CRSOS Systems Employ Sustainable Funding Mechanisms**: If unredeemed deposits are reinvested into the recycling infrastructure, then CRSOS may increase recovery while also creating a sustainable funding source for recycling. Though MRFs and communities experience a reduction in material and thus material revenue, CRSOS experience system-wide funding equality by returning otherwise reduced revenue to MRFs and through those MRFs, to communities. On a cost per ton basis, the CRSOS/single stream combined system is 20 - 30% lower cost if unredeemed deposits are kept in the system and MRFs are kept cost neutral.
2. Build on Existing Programs and Establish New Programs for Collection and Recovery of Beverage Containers

Beverage container deposit states have a much higher recovery rate of clean color-sorted glass, which can be more easily processed and utilized in the manufacture of new glass bottles and jars. Container deposit systems have been among the glass container industry’s best source for recycled glass bottles in the U.S., with glass companies estimating that greater than 65% of recycled glass used in the manufacturing process comes directly from the states with these programs in place.

States with beverage container recycling refund programs also have a much higher recycling rate than states without such programs in place. Specifically, states with these programs have an average recycling rate for all beverage containers of 60%, while those that do not average a recycling rate of 24% for beverage containers.¹²

These programs have so far been adopted by 10 states: Oregon, Vermont, Michigan, Maine, Iowa, Connecticut, Massachusetts, New York, California, and Hawaii. The average redemption rate in these states for covered beverage containers is roughly 82%.¹³

GPI has been a strong advocate for the expansion of container deposit programs. GPI and its member companies have provided testimony and supporting information to several state legislatures on the positive impact beverage container recycling refund programs have on recycling.

In addition to dramatically increasing the level of recycling, consumer deposit systems are also associated with substantial benefits for local economies as they play an important role in yielding jobs, creating new economic activity, and reducing costs for businesses.

A New York study shows 88% of businesses connected to the beverage container recycling industry reported an increase in recovery activity since implementation of New York’s expansion to include water bottles as part of that state’s beverage container refund recycling program.¹⁴

Depending on system parameters and system performance, beverage container recycling refund programs create 11 to 38 times more jobs than a curbside recycling system for beverage containers.¹⁵

¹³ Average of the ten states with beverage container deposit laws as posted on their respective web sites.
¹⁵ Returning to Work, Understanding the Jobs Impacts From Different Methods of Recycling Beverage Containers, CM Consulting, Sound Resource Management Group, December 2011.
3. Implement Glass Improvement Program at Materials Recovery Facilities (MRFs)

MRFs perform a complex set of tasks separating commingled materials from each other. Each material is removed in sequence through either mechanical or manual sorting and is either negatively or positively sorted. A positive sort removes the desired materials from the material being sorted, while a negative sort removes only unwanted materials (contaminants), leaving the desired materials in the system.\textsuperscript{15}

Glass sorted in many of these MRF operations often contain trash and other debris. While having up to 50% unusable material in it, this recycling stream is often marketed as glass, and must be further cleaned up in order to be used in a manufacturing process.

GPI recommends that MRFs reduce the amount of unusable material in the glass stream through an improvement program that would include:

- Mechanical equipment to remove the most problematic materials such as shredded paper and light organics.
- Efforts to reduce moisture during material storage such as bunker covers.
- Education programs to remove food waste and unwanted plastics, such as needles and syringes.
