Recycling Online

We are not through looking at glass – Part 2

by Roger Guttentag

Last month I covered the various reasons why the rate of glass recycling in the U.S. is still so low. In this month's column, my review of online resources will cover how this situation is being addressed with respect to improving access to collection services and expanding market demand for secondary cullet.

Recovering more glass

Fort Collins and Loveland, Colorado (April 2008) – The cities sponsored a report, "Best Management Practices for Glass Recycling in Northern Colorado," that examined the economics of seven glass collection options. It included approaches such as staying with dual collection and implementing various forms of single-stream collection that include glass or handle glass in some form of separate stream. The report's conclusion was that single-stream collection that incorporates all container types was the least expensive option with the greatest diversion potential, provided that the receiving materials recovery facility (MRF) had a sorting system in place to recover and color-separate unbroken glass containers.

Ohio Glass Recycling Study (May 2011) – This report views deficiencies in recycling access or infrastructure within Ohio as the principal impediment to collecting more glass material. It is based on data showing that the installed industrial capacity to process and use recycled glass cullet within the state greatly exceeded recovery levels. One very useful analysis is a diagram showing the in-state mass balance of recovered glass for 2009, including estimated losses from MRF processing that used optical sorting for three-color and mixed-color glass collections. The report also considered five options for increasing glass recovery rates. Four of them would require an enhancement of existing systems, such as bolstering curbside recycling collecting and implementing glass collection programs for businesses with on-site beverage sales. The latter option is being tried through the Marion County Glass Act program, which is supported with funding from the Ohio Department of Natural Resources. Finally, the report estimated that the enactment of beverage deposit legislation would recover an additional 239,000 tons of glass.

GreenBlue – Closing the Loop (2011) – GreenBlue is a non-governmental organization that focuses on how scientific and engineering innovations can be integrated into business practices to help drive sustainability. GreenBlue was awarded a two-year grant from the California Department of Conservation in 2008 for the Closing the Loop (CTL) project, which aims to determine how sustainable design can be merged into current recovery technologies for packaging. The final phase of this work, presented in the CTL Road Map report, describes what policy framework should be considered for achieving higher recovery rates for all packaging materials, including glass.

The map provides a very useful and comprehensive comparative summary of current packing recovery systems in six countries (all located in Europe except Australia and Canada) while briefer summaries are given for two others as well as California. Recycling rates for glass containers for all countries except one (Australia) are in the 60-100 percent range. It could be argued that all the high performing European systems are in densely populated countries, a fact that makes achieving these higher recovery rates much easier. However, Canada shares many demographic and geographic patterns with the U.S. but has much higher packing recycling levels. The common factors shared by countries with higher recycling rates, according to the map are:

- Policies are coordinated on a national level, including extended producer responsibility legislation.
- Financing systems provide stable, long-term support for recycling services and programs.
- Higher investments were put toward efficient, advanced collection and processing infrastructure (due, in large part, to the policy and financing framework put in place that helps to encourage such investment).

Good Practices in Collection and Closed-Loop Glass Recycling in Europe (February 2012) – This report was conducted with the support of the European Glass Container Federation. According to European Union data for 2009, the recycling rate for all glass containers was approximately 67 percent. While this is an impressive achievement in itself, the report seeks to determine how the system can be improved, investigating glass recycling management in Europe and determining best practices. For this reason, the report is an excellent resource for anyone who wants a solid review of European recycling policies as they affect glass containers as well as what has been achieved through those strategies. The report also includes eight detailed case studies that illustrate various glass collection systems. The recommendations that are offered lean heavily toward the use of color separation through depot and bottle-bank collection methods.

Container Redemption Optimization Study (January 2014) – This report was published by the Glass Packaging Institute (GPI) with the intent of stimulating public dialogue on the possible interactions between single-stream and container deposit redemption systems. The study conducts an analysis of two possible models of an Optimized Bottle Bill System (OBBS) based in Minnesota and Vermont. An OBBS would cover all types of carbonated and non-carbonated beverage products and consumers

would return containers to either a retail location or a redemption center, depending on the annual volume of containers that are returned within any specific community. In addition, unredeemed deposits could be used for compensating MRF operators processing single-stream collection streams – because the deposit system would mean a loss of material revenues for MRFs. One of the report's conclusions is that an OBBS can achieve higher diversion rates than a single-stream system by itself at a comparable or potentially lower cost.

Web Address Directory

City of Fort Collins - Best Management Practices for Glass Recycling	tinyurl.com/FtCGlass
GPI – Container Redemption System Optimization Study	tinyurl.com/GPIEnergy
GreenBlue – Closing the Loop	tinyurl.com/GBLoop
Marion County (OH) Online – Glass Act bar recycling	tinyurl.com/MarionGlass
Michigan State University – Towards Broad Use of Recycled Glass	tinyurl.com/MSUGlass
Michigan State University – Recycled Glass and Concrete	tinyurl.com/MSUGlass2
New Mexico Recycling Coalition – Local Use of Glass Guide	tinyurl.com/NMGlass1
Ohio Glass Recycling Study	tinyurl.com/OHEPAGlass
University of Greenwich – New Discovery for Waste Glass	tinyurl.com/UGglass
WRAP – Recycled Content Glass Toolkit	tinyurl.com/WRAPGlass

Using more glass

The New Mexico Local Use of Glass Recycling Guide (May 2013) – This report was published by the New Mexico Recycling Coalition and provides a useful overview of potential uses of recycled cullet, and it looks beyond common uses such as building materials, construction aggregates or paving applications. The guide was created to help communities identify potential use options for recovered glass since the state lacks high demand end markets for this material.

Looking globally, there are two possible pathways that can be followed for increasing recycled glass utilization. The first would be to find a way for existing applications to use more glass cullet. The other approach is to find new uses. The following reports illustrate each approach:

Going Green (May 2011) – The U.K.-based Waste & Resources Action Programme (WRAP) undertook research to determine if the utilization of green glass cullet can be increased by packaging more wines and spirits in green bottles, which can be made with a higher recycled content than amber or flint ones. Trials were conducted in which selected products, where possible, were packaged in substitute green bottles. Consumers who bought these products were then interviewed to determine what effect, if any, the bottle color had on their purchasing decisions. Focus groups were also organized to explore the same issues. The report's conclusion was that this switch in bottle colors had minimal effect on consumer purchasing decisions and could even provide sales bumps once potential customers became aware of the environmental benefits green bottles carried.

Towards Broad Use of Recycled Glass Concrete on MSU Campus (December 2012) – This report describes the results of evaluating pilot applications for replacing Portland cement (PC) in the manufacture of concrete on Michigan State University's East Lansing campus. The report notes that previous efforts to replace PC with recycled glass yielded less-than-satisfactory results due to the use of millimeter-sized particles. An alternative approach was taken by milling the glass to a micro-scale sizing. This enhanced the beneficial chemical reactivity that is required for making concrete. Researchers found up to 20 percent of PC can be replaced by milled glass cullet with a positive impact on concrete durability and strength. Based on these findings, the next step was to use 2,400 tons of recycled glass concrete, which would consume 70 tons of mixed cullet sourced from the MSU campus.

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