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Got Glass?

One state is nurturing recycled glass markets through technology investments, grants, revenue sharing and statewide policies.

by Jim Hill

It's no secret glass container recycling is struggling in many parts of the country. Breakage during collection, budget crises, long distances to markets and low scrap values all conspire to challenge processors and their customers. The California Department of Conservation (Sacramento) and its public and private partners are tackling these issues through technology investments, grants, revenue sharing and statewide policies.

Recycled glass container markets in California operate in a different climate than most states (and we're not talking about sunshine here!). For one thing, California is one of 11 states with a redemption system for beverage containers. But California's redemption system dwarfs other states in volume of bottles and cans that pass through the program, starting with more than 20 billion containers purchased by consumers each year. It covers the traditional beer and soft drinks, as well as water, sport drinks, coffee and tea beverages – nearly all categories except wine, milk and distilled spirits. This means the Starbucks coffee in the glass bottle you bought this morning carried California Refund Value (CRV), and thus an incentive to recycle the thing back into another bottle.

Equally as important, that bottle does not need to travel far to be reborn. California is home to six glass container plants and four fiberglass insulation facilities, which naturally have dramatic implications for recycled glass in the state. Combined, these companies have consumed 600,000 to 700,000 tons of recycled glass, or cullet, each year since the early 1990s.

Recycled glass by the numbers

California's beverage container recycling program requires information gathering at several levels. For instance, program participants – beverage companies, collectors and processors – report container sales and returns directly to the Department of Conservation (Sacramento). The data is subject to audit, which strengthens the reliability of recycling rate calculations and other reports. Certified processors must report the monthly volume and value of scrap glass and plastic purchased. And glass bottle makers and insulation producers must report the amount of cullet used. This data provides valuable insight into statewide market trends.

The goal of California's program is to recycle at least 80 percent of all containers covered by the law. But recycling rates fell across the country in recent years, and California was no exception. Effective January 1, 2004, the Legislature took several measures to boost rates, including raising the CRV to its present four cents (for containers less than 24 ounces), and eight cents (for larger ones); establishing the demand-side market development and expansion grant program; and authorizing a loan guarantee fund for market

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Table 1 California glass collected by program type, 2004

Program type [1]	Tons received	Percent
Collection programs	33,701	5
Curbside programs	304,151	43
Recycling centers	369,460	52
Non-certified	729	0.1
Total [2]	708,041	100

(1) Program types refer to recycler certification categories as defined in law. Glass collected includes CRV- and non-CRV containers, but does not include plate or other non-container glass.
(2) Total is greater than 100 percent due to rounding.

Source: California Department of Conservation, 2005.

development projects.

It seems to be working. The CRV glass recycling rate increased to 56 percent in 2004, up from 51 percent the year before and the first increase since rates started declining in the mid-1990s (the historical high was 75 percent in 1993). The first six months of 2005 posted a 62-percent recycling rate, compared to 59 percent for the same period in 2004, suggesting additional gains for the full calendar year when final data are in.

The increase in recycling rates translates into more glass entering the system. Table 1 shows the total tons of glass collected (both CRV and non-CRV) in 2004 by type of program. More than 708,000 tons were collected statewide.

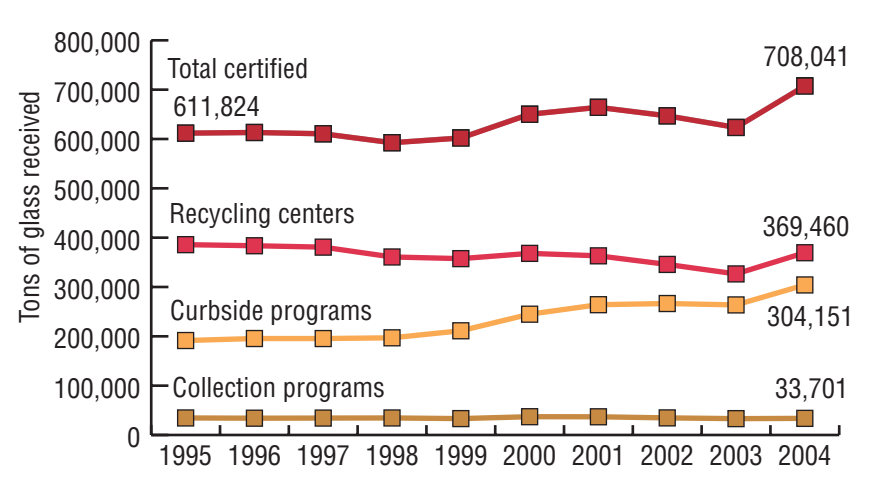
Figure 1 shows the spike in collections in 2004. Both recycling center and curbside programs posted gains, boosting the statewide total almost 14 percent from the roughly 624,000 tons collected the year before.

The proportion of glass collected at curbside has steadily increased in recent years, from less than a third of the total (31 percent) to 43 percent in 2004 (see Figure 2). Conversely, glass containers returned by consumers to certified recycling centers gradually declined during the same period, to slightly more than half the volume recycled in 2004 (52 percent). This trend could reverse as the value of redemption bottles changes. By statute, the CRV will increase again to five cents/10 cents if the overall recycling rate does not reach 75 percent for calendar year 2006.

What's your favorite color?

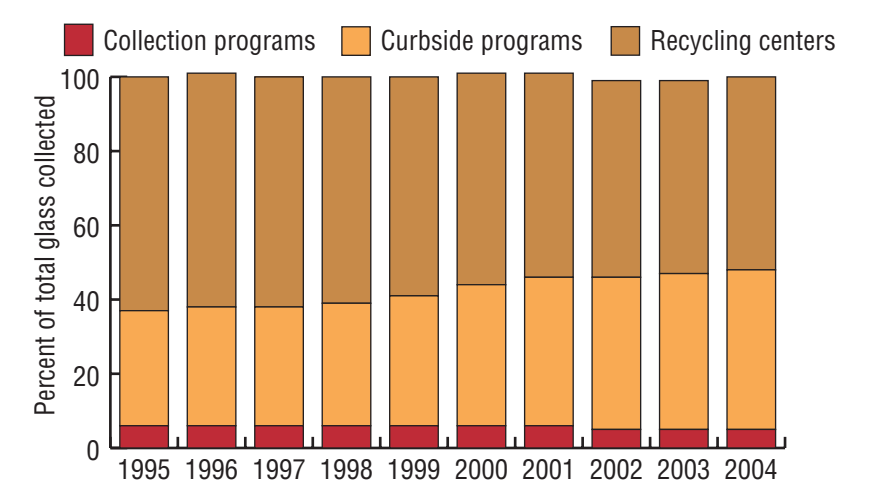
Color is critical to many end-users of recycled glass. Bottle plants typically require cullet to be separated into flint (clear), green or amber fractions. The popularity of single-stream curbside collection though, where consumers place all recyclables in one bin, has increased the amount of broken, mixed-color glass.

Figure 1 California glass collected by program type, 1995-2004



Source: California Department of Conservation, 2005.

Figure 2 Proportion of California glass collected by program type, 1995-2004



Source: California Department of Conservation, 2005.

Figure 3 shows the estimated color breakout for statewide CRV and non-CRV glass purchased by certified processors in 2004. More than one-third (38 percent) was mixed-color. The proportions are estimates because this data comes from processor scrap value surveys and are not independently verified.

Boosting glass markets: The California approach

California encourages glass recycling in several specific ways.

Minimum recycled content. Glass container and fiberglass insulation manufacturers must meet California standards for use of cullet. The law requires container makers in the state to use at least 35-percent cullet in new bottles, or 25 percent if at least half their cullet is mixed-color. A company may ask for a waiver under certain conditions though. For instance, if a manufacturer can document a lack of available cullet or technological barriers that prevented compliance, the department may waive or reduce the percentage required.

Likewise, fiberglass insulation manufacturers must use at least 30-percent cullet. The container standards apply to California companies only, but the fiberglass requirement applies to any company selling in the state as well.

California glass container and fiberglass insulation plants together used about 645,000 tons of cullet in 2004, up from about 619,000 tons the year before. There has been a recent decline in cullet used by California glass container plants, not surprising as two plants have

closed since 2003, but cullet use may be leveling off. At the same time, a new fiberglass plant has meant greater demand for cullet in the insulation industry.

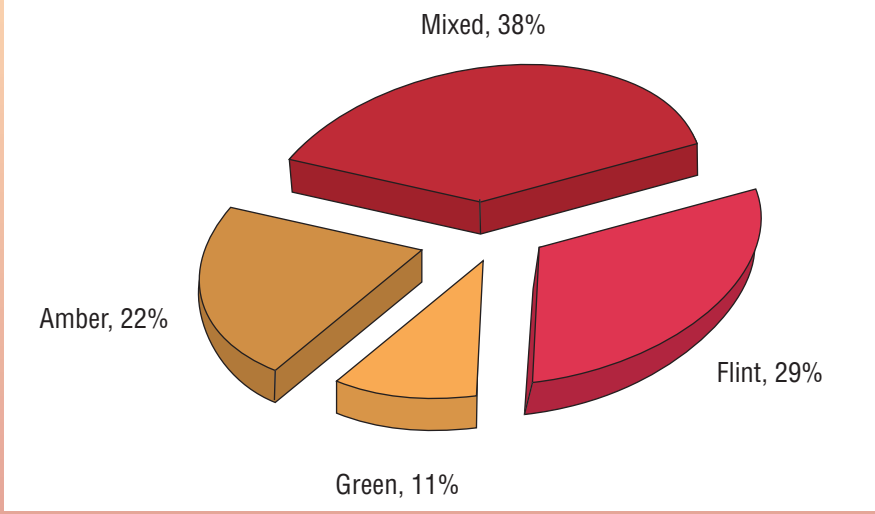
Quality glass incentive payments. To direct more high-quality glass to the container industry, the Department of Conservation pays up to $30 per ton to local jurisdictions or companies that produce curbside-collected, color-sorted glass "substantially free of contamination." The quality glass incentive payment (QGIP) program provides up to $3 million each year for glass sorted into flint, amber or green fractions. In 2005, $2.89 million was paid in QGIP funds for glass collected and color sorted by over 130 separate programs.

Processing payments. A unique producer responsibility element in California's program provides additional support for recycling. Manufacturers pay a special processing fee when the cost of recycling is greater than the scrap value of a material; in turn, these funds pass through as processing payments to collectors to cover the costs of handling these materials. Aluminum has no processing fee due to its high scrap value; plastic and glass, on the other hand, carry the fee. For 2006, certified glass recyclers receive nearly $84 per ton of CRV glass, over and above the scrap value. The monies are intended to help recyclers recover their costs, but there is no legal requirement for how they are used.

Market development and expansion grants. Since 2004, the Department of Conservation has awarded $10 million annually in market development and expansion (MDE) grants to improve processing and end-use markets for beverage container materials. Other grants focus on collection. A number of these address glass:

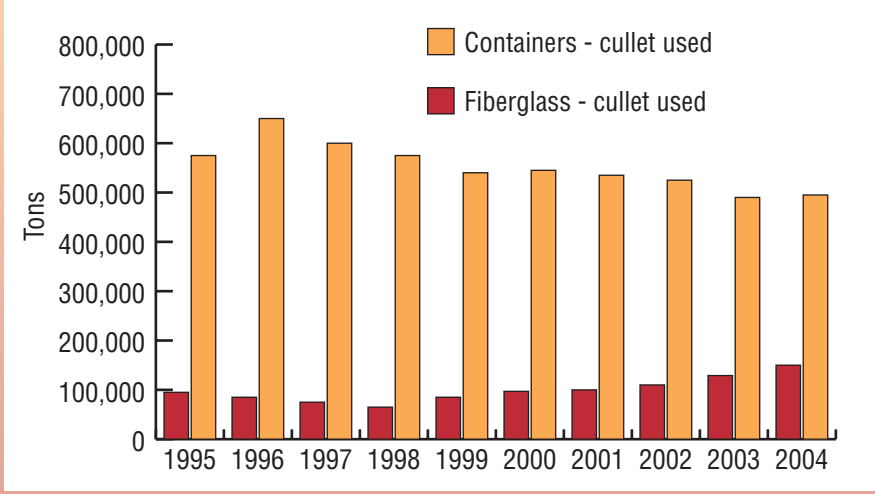
- Several material recovery facilities (MRFs) are installing optical sorters and other glass-cleaning equipment to extract more clean, mixed glass from the incoming stream. Often, this was broken glass that ended up in the residue sent to the landfill.
- Further up the processing chain, the department funded state-of-the-art optical sorting and other equipment to improve production at beneficiation plants in the state – those that produce furnace-ready cullet for containers and fiberglass.
- The Glass Packaging Institute (Alexandria, Virginia), with department assistance, is piloting best practice bar and restaurant recycling, with a goal of producing high-quality cullet from an underused source.
- The Center for Environmental Economic Development (Arcata, California) is conducting technical testing and encouraging California manufacturers to introduce low-value mixed glass into brick and tile manufacturing. CEED also has been training glass artisans to incorporate recycled glass into their work.
- A startup company is engineering a new optical sorter for broken glass that could be faster and more effective than current machines, to reach further into the pile and reduce processing losses.
- The department is sponsoring studies to catalog single-stream collection best practices and to examine the factors that affect processing quality at MRFs. Ultimately, the data should help the industry reduce contamination and improve the bottom line.

Figure 3 Estimated processor cullet purchases by color, 2004



Source: California Department of Conservation, 2005.

Figure 4 Cullet used in California glass containers and fiberglass insulation, 1995-2004



Source: California Department of Conservation, 2005.

Stay tuned

California's glass container markets are in transition. Glass container and fiberglass plants still need more high-quality cullet, and widespread adoption of single-stream recycling continues to challenge processors. You could say the glass is half-full in California. The state has established partnerships with industry and reinvested unredeemed CRV funds (not tax dollars!) into grants, incentive payments and other projects. The efforts could benefit glass recycling for years to come. **RR**

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