



## Understanding Glass Collection Barriers for Commercial Entities in Denver, Colorado

### Abstract

Colorado has a closed-loop economy for glass bottles, yet it is estimated that less than 30% of the glass that enters the waste stream is actually collected for recycling. Commercial properties (bars, restaurants and commercial residences of multi-family unit buildings, e.g.), which have large quantities of glass bottle waste, are disproportionately disconnected from waste collection services that provide recycling options. This can result in glass waste ending up in landfills. Recycle Colorado designed the Glass Collection Pilot project to study the barriers to recycling glass in the commercial sector in the City of Denver.

Recycle Colorado partnered with MillerCoors, Rehrig Pacific Company, Alpine Waste and Recycling (now GFL Environmental), Republic Services and Momentum Recycling -- representing all players in the closed-loop cycle -- to craft a six-month glass-recycling pilot. The glass collection carts were donated by Rehrig Pacific Company. GFL Environmental and Republic Services helped to secure glass-pilot participants. Momentum Recycling transported and processed the glass, and Rocky Mountain Bottle Company (a joint venture with MillerCoors) made new bottles from the glass. Glass was collected in 95-gallon carts at no cost to the commercial businesses. Data on the volume of glass collected was tracked.

Key findings were measured both qualitatively and quantitatively. Qualitative findings expressed the narratives heard from business owners throughout different stages of the pilot. We found the main reasons for not participating or not continuing recycling after the program were cost, space for the cart/dumpster and insufficient volume of glass. Quantitative findings expressed the raw data from glass collected during the pilot. There was a total of 30,535 lbs collected in six months. A total of 13 businesses and 23 commercial residences participated in the program. Three of the businesses acted as community drop-off sites for residential glass collection, two businesses dropped out of the program and one of the businesses and five of the residences were added mid-way through the program in February.

From this pilot project Recycle Colorado found that recycling is a multi-faceted issue that encompasses the business, community and policy work of a city and region. There are actions that each stakeholder can pursue that present different incentives to change traditional waste

culture to be more progressive towards recycling, particularly with closed-loop materials, such as glass. Other entities and individuals are encouraged test this type of pilot and discover other information, barriers and recommendations that could close the gap to landfill diversion.

## Introduction

There is a closed-loop for end-of-life glass bottles in Colorado. There are two large glass bottle manufacturers along the Front Range: Rocky Mountain Bottle Company in Wheatridge and Owens Illinois in Windsor. Both large bottle manufacturers take end-of-life glass bottles and turn them into new bottles. Even though Colorado's bottle manufacturers benefit greatly from using recycled-bottle glass in their processes, Colorado only recycles approximately 30% of glass in the waste stream. Rocky Mountain Bottle Company is able to use up to 70% post-consumer glass to make new bottles. Many of Denver's commercial businesses have barriers to recycling, which means much of their end-of-life glass bottles are ending up in the landfill. The Glass Collection Pilot project was designed to identify and understand the major barriers that Denver's commercial sector faces when deciding whether or not to add recycling to their waste services. Based on the findings of this project, it is our intention that other cities, nonprofits and individuals replicate the pilot as a way to understand their own commercial sector's barriers for recycling, as well as build off the findings to drive solutions that will overcome the cultural, financial and political barriers.

## Methodology

The scope of this pilot project was to spend six months testing the market barriers to glass collection for recycling. Recycle Colorado partnered with key businesses that represent the entire closed-loop system for glass recycling in Colorado. At the end of the pilot, Recycle Colorado worked with other waste collectors, including Waste Management, Waste Connections, Alpine, Republic and Clear Intentions to convert pilot participants to formal recycling customers.

As a state-wide organization, Recycling Colorado chose Denver as the location for this project for several reasons. First, Denver already has recycling and collection infrastructure for residential properties. Second, a report by EcoCycle and CoPRIG showed that Denver's residential recycling rate was 22%, making it 12th on the list of top recycling cities in the State of Colorado ("State of Recycling in Colorado," 2019). This suggested that there may be areas for improvement. Finally, the dense urban setting would allow for faster and more diverse collection for greater analysis.

The focus of collection targeted commercial entities that included bars, restaurants, apartment buildings with eight or more units and other locations that create glass waste. Originally, South Broadway (Alameda to 6th), which hosts a slice of Denver's social scene with bars, restaurants,

and coffee shops was selected for the area of collection. A team of eight volunteers spent two three-hour shifts canvassing the South Broadway businesses offering free glass collection for six months. From there, the focus area expanded out to three other locations that offered similar social settings. The team also reached out to four commercial property management companies.

Glass was collected on Wednesday of each week. The amount of glass collected was weighed at each site and recorded. For analysis the data was categorized into three groups: businesses, residences and community drop-off sites. The data collected was compared by week, month and total numbers, and compared within and across categories.

Engagement with businesses throughout the pilot was done with a combination of in-person, email and phone outreach. Each month was structured to focus on different incentive tactics, such as creating internal systems for team adoption and training, understanding consumer demand through a community survey and subsidizing trash reduction to pay for formal recycling.

Conversion to formal recycling was proposed to participants in April towards the end of the pilot project. The approach for conversation was done by individual accounts and Recycle Colorado acted as a facilitator between the waste collector and the pilot participant.

Finally, a Pilot End celebration party was organized to acknowledge and thank each participant. The party was held at the 'winner' of the program signified by the entity that collected the most glass. Key stakeholders, including pilot participants, community members and city council representatives attended.

## Results

Data for the pilot project was collected in two ways: qualitatively, which reflected the narratives of pilot participants and nonparticipants, and quantitatively, which reflected the tangible glass collected during the program.

### Qualitative

Narratives were collected at three points in the process: (1) canvassing to onboard participants, (2) communicating with participants to understand barriers throughout the program and (3) converting participants to a formal recycling service at the end of the pilot period.

#### Canvassing to onboard participants

The most common responses received from businesses that did **not** want to participate in the program were the following:

- When it gets busy it will be too hard to separate into a different cart.

- There is not enough space for a cart in the alley.
- Glass is not the primary recyclable that we have.
- We already tried recycling and it was too expensive.

Feedback from the commercial property management companies when onboarding demonstrated that residents had expressed interest in access to recycling. However, the following were barriers to joining the pilot:

- We would have to give up a parking spot to place the recycling cart.
- There is no way to collect recycling inside the building.
- We fear the recyclables in the cart will be rummaged through if it is not locked.

### Understanding barriers throughout the program

The most common responses received from businesses during the pilot when asked why glass was not being collected were the following:

- Limited capacity to train all shifts about recycling.
- Could not spare trash carts to be for glass only.
- The cart disappeared from the alley.
- Building owner was not ok with collection.

For the commercial residences, there were several reasons collection was poor throughout the pilot:

- Residents were never made aware of the collection and were not continually engaged throughout the pilot due to restrictions on direct communication channels.
- Trash dumpsters were locked and the glass recycling cart remained unlocked, allowing for extensive contamination.
- Residents produced less glass recycling than other materials, such as plastic and cardboard.

### Converting participants to a formal recycling service

The most common responses received from participants for why they did not want to continue with a formal recycling service were the following:

- We do not have the funds to divert to recycling services.
- We do not have the space to add an additional dumpster.
- Not enough volume to continue.

For commercial property management companies, the largest barrier to continuing with a formal recycling program was the prospect of scaling the program to all properties that they manage.

To overcome these issues, Recycle Colorado facilitated conversations with the various waste collectors and suggested the following creative solutions for businesses to consider:

- For Price Constraints:  
Divert bulky recyclables, such as cardboard, in addition to glass, plastic and aluminum, to reduce your trash and adjust pick-ups to be less frequent and/or in a smaller container.
- For Space Constraints:  
Divert bulky recyclables, such as cardboard, in addition to glass, plastic and aluminum, to reduce the size of your dumpster and fit two small carts where one large dumpster originally was located.
- For Volume Management:  
Share a recycling bin with a neighboring business to increase the volume of recycling and divide the cost.

At the time of this report, there were still 11 businesses and commercial residences in discussion to continue recycling in a formal manner.

### Quantitative

The first month of canvassing businesses was performed in four neighborhoods and with four different residential property management companies. Twelve businesses signed on as a result of canvassing.

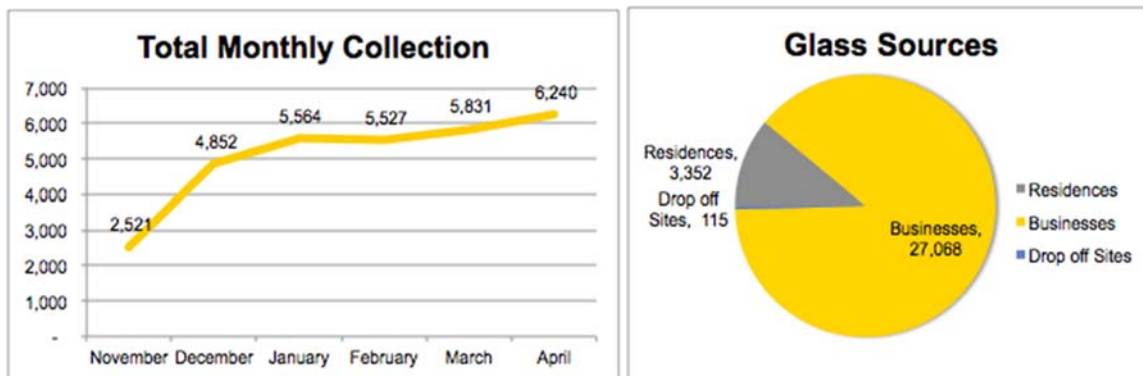
Neighborhood	Doors Knocked	Already Recycled	Carts Placed	Placement Rate
South Broadway	58	13	8	18%
Tennyson Ave	51	46	1	20%
East Colfax	44	10	8	24%
Gaylord Street	34	20	1	7%

Of the four property management companies approached, two companies expressed interest, one of the two signed on and provided 18 separate buildings in which to pilot the glass recycling program. One cart was placed at each site, providing collection for 418 individual units.

Throughout the program there was a reduction of three carts, which was the results of two companies dropping out of the project (no participation and building owner in disagreement with tenant participation). One company reduced their collection from three carts to two. This was balanced by one company increasing their collection from one cart to two. Finally, in February, five new residences and one new company joined the project.

Month	Cart Addition	Cart Churn	Total No. of Carts
November	36	0	36
December	1	1	36
January	0	2	34
February	6	0	40
March	0	0	40
April	0	0	40

There was a total of 30,535 pounds of glass collected throughout the six months. The majority of the glass (89%) came from businesses, which made up 39% of the participants.



### Collection by Pounds

	Most in a Week	Average in a Week	Total for Program
Businesses	350	118.2	27,068
Residences	150	9.23	3,352
Drop Off Site	40	1.66	115

## Conclusions & Recommendations

This pilot project identified a variety of barriers that businesses experience when attempting to include recycling in their establishments. Most barriers were expected (price, spacing) while others were surprising (unwilling to train). It became clear that businesses alone cannot be held accountable for the burden of proactive recycling and thus bringing in community members and policy makers to create unique incentives can make a large difference. The following

recommendations are examples of what policy makers, businesses and community members can do to help in overcoming barriers to commercial recycling.

1. Create opportunities to work with business to create a more accurate collection plan for their trash and recycling. By examining the volume of recyclables and trash that is produced, a business can possibly add recycling and reduce their trash collection without changing the overall cost. There is also the possibility of creating a collective of businesses to share recycling service if they share an alley way or other commonly accessible area. This would reduce the pick-up cost for recycling for each business.
2. Focus on support of policy created to incentivize or require recycling in Denver's commercial sector. What was discovered in the canvassing of businesses was a lack of knowledge and understanding about recycling. If it was something that was voluntary, the discovery was that businesses are too busy with their business to tend to anything that is not required or will not make or save them money. Through the creation of policy, whether incentivizing or requiring, businesses could become more aware and participate in order to be compliant or benefit themselves financially.
3. Identify a building ambassador or person of contact to increase recycling within commercial residences once formal recycling options are available. There was a significant gap in communication for promotion, training and resident feedback during the pilot. Adequate communication could have mitigated the contamination and repetitive problems experienced throughout the pilot. A building ambassador should build a culture of participation and enthusiastically share information and collection data.
4. Create policy to require all waste haulers to provide recycling service when offering trash service to commercial businesses in the greater Denver area. If all trash dumpsters were delivered to commercial properties with the addition of a recycling dumpster or cart, businesses would have the option of diverting valuable recyclable material from the landfill at the onset of waste generation without viewing it as an added cost service. Valuable material, such as post-consumer glass, should not be sent to the landfill when produced in the greater Denver area.

Recycling can be considered synonymous with economic development. By diverting glass back into the manufacturing stream, more jobs are created than if it goes to landfill (9 jobs in recycling to 1 in landfill), less energy is expended by using recycled glass in manufacturing bottles (it melts at a lower temperature than virgin material) and business opportunities are created for entrepreneurs to collect and use the captured material in creating new products.

5. Communities in Colorado can lead the cultural shift by encouraging businesses to adopt recycling practices. A survey performed by Recycle Colorado volunteers asked the general public in Denver 1) if they were more inclined to visit a business that recycled compared to one that did not and 2) if they would recommend a business because they recycled. The responses were a majority “yes” at 80% and 60%, respectively. Community members can also encourage local businesses to recycle through education about the closed-loop cycle for glass in the region.

These recommendations are by no means a comprehensive list. It is the intention of this report to present information. For anyone interested in replicating this pilot or continuing the work spearheaded by this project, please contact Recycle Colorado for guidance and assistance.

## About Recycle Colorado

Recycle Colorado is a registered 501(c)(3) nonprofit organization. We are an action-oriented and member-driven organization that works on projects that are tangible, actionable and measurable related to infrastructure and end markets for material recovery, reuse and manufacturing. We also work to advance both local and state policy that supports keeping valuable material resources out of our landfills.