IMPROVING RECYCLING: AN ANALYSIS OF FORMAL & INFORMAL RECYCLING IN NEW YORK CITY

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Of the Requirement for the Degree
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By
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Improving recycling: an analysis of formal & informal recycling in New York City is dedicated to Sister Ana Martinez De Luco, co-founder of the Sure We Can Redemption Center in Bushwick, New York. Without Ana’s warm welcome into the world of canning, this thesis would not be possible. Many thanks.

Special thanks to Dr. Clara E Irazabal Zurita, who was my dedicated thesis advisor and reader of my thesis; Professor Irazabal provided guidance and leadership through the academic process. Additional thanks to Agustina F. Besada, who provided valuable insight as my second reader and as a young professional dedicated to sustainability and waste management.
ABSTRACT

The purpose of ‘Improving Recycling: An Analysis Of Formal & Informal Recycling In New York City’ is to make policy recommendations for the long-term systemic change to New York State’s bottle bill legislation and the city’s municipal recycling programs. The policy recommendations seek to increase recycling productivity while providing benefits to informal recyclers, commonly called “canners”. As such, this thesis will investigate the New York Department of Sanitation’s public space recycling program and systems of recycling as mandated by the state’s bottle bill; including but not limited to, describing processes of deposit and redemption for bottles and cans. This thesis also includes descriptive analysis of the practice of redeeming bottles and cans for their five cent deposit value.

Through a general quantitative and qualitative analysis of formal and informal recycling systems for bottles and cans, several policy recommendations for legislators at the city and state level are proposed. This thesis has direct implications to the field of urban planning by seeking to remediate environmental and social justice issues and improve urban quality of life. By diverting municipal solid waste from landfills and incinerators air quality is improved and greenhouse gas emissions are reduced.

It is concluded that the public space recycling program is a valuable component of municipal recycling; redemption centers not only need to be “rebranded” but the number of locations should be increased; and finally, the bottle bill legislation should be reimagined and applied to a material that currently has no national market value (plastic bags, textiles, or compost).
INTRODUCTION

In New York City 12,000 tons of municipal solid waste are produced each day. This waste is dumped, burned, and recycled all across the eastern seaboard. Each day, vast quantities of waste are trucked to Pennsylvania and Ohio to be landfilled. Recycling reduces landfilled waste and has long-term ecological benefits. Of the 12,000 tons of waste produced in New York City, only 17 percent is recycled. The New York Department of Sanitation (DSNY) has two recycling programs, curb-side recycling and public space recycling. Public space recycling is the collection of recyclables on the street or in public spaces in the city; it does not include materials collected from residential or commercial units. The city recycling system is a “source separated” system, meaning materials are sorted into two categories: green bins collect paper (newspapers, magazines, and mixed paper) and blue bins collect (metal, glass, and rigid plastics). The DSNY’s Bureau of Waste Prevention, Reuse and Recycling states that “public space recycling is a highly visible way to communicate the message that NYC recycles for people who live, work, or visit New York City” (NYC Waste Less: Public Space Recycling, n.d.). As part of New York State, the city is also responsible for collecting recyclables through the Returnable Container Act, also known as the “Bottle Bill”. The legislation mandates that consumers pay a five cent deposit on all beverage containers that is redeemable at supermarkets and redemption centers.

This thesis will analyze the efficiency and effectiveness of the public space recycling program and the bottle bill deposit-redemption system; in the recommendation section of this thesis several solutions to ameliorate problems and improve the efficiency of the two systems are proposed. The city’s public space recycling program is a formalized system following the same recycling standards as traditional curb-side recycling. The informal processes of recycling are also effective in collecting recyclables from public spaces. New York City has a robust network of informal recyclers, or “canners” as they are commonly called in New York. Canners are motivated by the five cent bottle deposit to collect recyclables from the waste stream. Canners collect from a variety of public and non-public locations, including: sidewalk waste bins, trash bags set out for collection, and bins outside of residential or commercial units. Although the incentives are small and the work arduous, canning has become common practice in the city. Scavenging and gleaning valuables from the waste stream has been part of city life since the New York City was first settled in the 1600’s.

This thesis is an analysis of the formal and informal recycling systems in New York City. Informal public space recycling is conducted by individuals who "glean" recyclables from public trash bins or garbage on the street. The purpose of this study is to make policy recommendations for the long-term systemic change to Bottle Bill legislation. The Bottle Bill has created an artificial economy for the collection of bottles and cans that competes with the national post-consumer products economy. Recommendations seek to increase recycling rates while providing benefits to canners in the informal recycling system.
Waste management has many urban planning implications. Each day, a vast amount of recyclable material goes directly into landfills or incinerators. Enhancing formal and informal recycling systems in the city would have a significant impact on reducing wasted materials and improving urban quality of life, not only for cannars, but for all residents of the city. By improving recycling the city would receive direct and indirect benefits, including: reduction of waste to be landfilled, improved public awareness of recycling, reduction of collection trucks on the road, and increased access to bottle recovery facilities.
DATA FOR THIS THESIS WAS COLLECTED THROUGH SEVERAL INTERVIEWS AND SURVEYS. INTERVIEWS WERE CONDUCTED WITH PROFESSIONALS AND SCHOLARS IN THE FIELD. ONE SURVEY WAS DIGITALLY DISTRIBUTED TO NEW YORK CITY RESIDENTS. A FURTHER, IN PERSON SURVEY WAS CONDUCTED, WITH PEOPLE WHO PARTICIPATE IN INFORMAL RECYCLING. THE SPATIAL ANALYSIS WAS CONDUCTED USING ARCGIS SOFTWARE AND OPEN DATA.

DIGITAL SURVEY

THE SURVEY WAS DESIGNED FOR PEOPLE WHO HAVE LIVED, WORKED, OR GONE TO SCHOOL IN NEW YORK CITY. THE SURVEYqueried about perceptions of formal and informal recycling. The survey was developed using “Google Forms” and was distributed through the author’s email and Facebook. The format was multiple choice and each question had an option for “other” with a field for further explanation. The survey included a single qualitative question, asking for further thoughts or comments on informal recycling in New York City. The survey population was the author’s friends and contacts based in New York City. Participation was requested through email and social media. There were 77 total participants in the survey. The data collected through this survey was not meant to be empirically robust; instead it was intended to provide a further layer of understanding to the research topic.

SURVEY LIMITATIONS INCLUDED A BIASED SURVEY-Population. The author’s contacts in general share an elevated sense of environmental awareness and concern; as a result responses were skewed towards support for recycling. The majority of respondents, 85.7 percent (66 respondents) recycle at home or in their apartment. Of these 66 respondents, 68.1 percent (45 respondents) said they recycled “all the time, it’s routine for me”. The survey results differ from city-wide statistics, because participation in curb-side recycling in the city hovers around 15.1 percent. In 2001, the city hit a peak participation rate of 20.1 percent. (Giambusso, 2015) This means the author’s survey population was unrepresentative of the city-wide recycling habits. To remediate this survey limitation, a further survey would need to be conducted with a far larger sample size and a random survey population.

IN PERSON SURVEY

A FEW IN-PERSON SURVEYS WERE CONDUCTED WITH INFORMAL RECYCLERS, COMMONLY CALLED “CANNERS”. QUESTIONS WERE PREPARED IN ADVANCE OF THE SURVEY WHICH WERE APPROVED BY THE INSTITUTIONAL REVIEW BOARD (IRB). DATA WAS COLLECTED OUTSIDE A SUPERMARKET WITH REVERSE VENDING MACHINES BY SURVEYING WILLING PARTICIPANTS. RESPONSES WERE LIMITED DUE TO LANGUAGE LIMITATIONS, WITH MOST INFORMAL RECYCLERS SPEAKING ONLY SPANISH OR CHINESE.
Interviews

Interviews were conducted with the following professionals and scholars in the field: Robin Nagel, Michael Reiser, Daniella Metello, Ana Matínez De Luco, and Eadoín Quinn. Interview questions were developed in advance of each meeting. Responses were recorded using the author’s iPhone and notes were taken in written form. All results were evaluated and transcribed in a word document. The results of the interviews were only used for the development of the author’s thesis and are not shared for use in other projects. All interview participants were informed that participation was voluntary and exclusively for use in this thesis. The goal of these interviews was to collect evidence, and gain insight into recycling systems and waste management systems in New York City. The professionals and scholars also directed the author to relevant resources and data sources.

Mapping & ArcGIS Spatial Analysis

The spatial analysis was done using the ‘Feature Analyst’ and ‘Network Analyst’ tools in ArcGIS. First a suitability analysis was built using ‘Model Builder’. The first step was to collect and plot all the addresses for the current redemption centers in the city. The addresses were collected through independent research and then geo-coded using CartoDB. Then all the lots were plotted and linked, using ‘Select by Location’, to the corresponding lot in the 2014 New York City Department of City Planning (DCP) MapPLUTO data. Then by looking at the attribute table, the average lot size and average assessed land value were determined for all current redemption centers.

Next all the vacant lots from the 2014 DCP MapPLUTO data. All vacant lots (land use = 11) were selected using the ‘Select by Attribute’ tool. From these lots, all lots that were contained in FEMA’s projected 100-Year Floodplain were removed. Furthermore, the lots that intersected a one-mile buffer from a current redemption center were removed. This yielded the total lots that could be viable for the suitability model. The selected vacant lots were then extracted and turned into a shape file.

From the viable vacant lots layer, two selections were made using ‘Select by Attribute’. The first selection was based on the average lot size, the query used was ‘AssessLand >= 436,342’ and ‘LotArea >= 11,980’ each of these queries yielded two separate layers. These layers became the input data layers for the suitability analysis.
Site Suitability Model 1. Methodology

The following suitability analysis was created using the ‘Model Builder’ tool in Arc GIS. The modeling tool can be used to visualize the process flow from tool to tool (see figure 1).

Each input data layer was converted from a feature to a raster using ‘Feature to Raster’. Then the layers were reclassified using the ‘Reclassify’ tool; the values for each layer were reclassified into six classes using natural breaks (see table 1). Next, the input data sets were then weighted on a scale from one to six, using six distinct weights; six being the most preferred and one being the least preferred.

**FIGURE 1. FEATURE ANALYST SUITABILITY MODEL (ARC GIS)**

**TABLE 1. RECLASSIFYING INPUT DATA VALUES – MODEL 1**

<table>
<thead>
<tr>
<th>Lot Size (Sq ft.)</th>
<th>Class Value</th>
<th>Assessed ($USD)</th>
<th>Land Value</th>
<th>Class Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>11,996 – 57,027</td>
<td>6</td>
<td>448,020</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>57,027 – 131,010</td>
<td>5</td>
<td>448,020 – 1,812,600</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>131,010 – 230,000</td>
<td>4</td>
<td>2,854,350 – 6,273,000</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>230,000 – 359,370</td>
<td>3</td>
<td>6,273,000 – 10,114,200</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>359,370 – 609,800</td>
<td>2</td>
<td>10,114,200 – 19,651,500</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>609,800 – 1,131,352</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
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Then each reclassified raster were put into the ‘Weighted Overlay’ tool, both sets of input data were given a 50% weight. Then the ‘Condition’ tool was used to extract the sites with a value score of six, the most optimal sites as determined by the suitability analysis. The last step was to convert the final raster into a feature, using the ‘Feature to Point’ tool. Using the layer of generated points, the associated vacant lots were found using the ‘Select by Location’ tool. All sites were verified using Google Earth.
MODEL 1  SUITABLE SITES
NEW REDEMPTION CENTERS

- 4435 WHITE PLAINS RD, BRONX NY 10470
  ZONING DISTRICT #1 WITH SPLIT DISTRICT #1B
  BUILDING CLASS V1
  LAND USE 11
  OWNER BLACK
  LOT AREA 16008 SQ FT (143 X 112)
  ASSESSED LOT VALUE $3546.00

- 420 MOIRRS PARK AVE, BRONX NY 10460
  ZONING DISTRICT #1
  BUILDING CLASS V1
  LAND USE 11
  PRIVATE OWNERSHIP
  LOT AREA 22091 SQ FT (161 X 138)
  ASSESSED LOT VALUE $3451.00

- 74 CHARLTON ST, NEW YORK NY 10014
  ZONING DISTRICT #1 WITH SPLIT DISTRICT #1B
  BUILDING CLASS V1
  LAND USE 11
  PRIVATE OWNERSHIP
  LOT AREA 30948 SQ FT (141 X 219)
  ASSESSED LOT VALUE $3275.00

- 176 MYRTLE AVE, BROOKLYN NY 11201
  ZONING DISTRICT C-4 WITH SPLIT DISTRICT #4B
  BUILDING CLASS V1
  LAND USE 11
  PRIVATE OWNERSHIP
  LOT AREA 23255 SQ FT (165 X 142)
  ASSESSED LOT VALUE $3196.00

- 164-26 LIBERTY AVE, QUEENS NY 1143354
  ZONING DISTRICT PA
  BUILDING CLASS V1
  LAND USE 11
  "OTHER" OWNERSHIP
  LOT AREA 166010 SQ FT (169 X 1000)
  ASSESSED LOT VALUE $4448.00

11,980 SQ. FT. // $436,342.00

Site Suitability Model 2. Methodology

The second suitability model conducted followed the same process as the aforementioned suitability analysis. However the input data layers were slightly changed, average lots size was changed to ‘LotArea >= 13000’ and ‘AssessLand >= 300000’. These features were converted into rasters, reclassified into six classes using natural breaks (see table 2), and then weighted using the ‘Weighted Overlay’ tool. Lot area was weighted at 60% and the assessed lot area was weighted at 40%. The objective was to prioritize lot size, because that it the most constraining factor for redemption centers. Finally the conditional tool was used to extract all sites that had a total value of ‘3’ or more, thus the final points represented the satisfactory locations for redemption centers with large lot areas. Unfortunately there were no sites with a final value of ‘5’ or ‘6’.

| TABLE 2. RECLASSIFYING INPUT DATA VALUES – MODEL 2 |
|---------------------------------|---------------|---------------|----------------|----------------|
| Lot Size (Sq ft.) | Class Value | Assessed ($USD) | Land Value | Class Value |
| 11,996 – 57,027 | 1 | 0 – 10,247 | 6 |
| 57,027 – 131,010 | 2 | 10,247 – 29,520 | 5 |
| 131,010 – 230,000 | 3 | 29,520 – 57,570 | 4 |
| 230,000 – 359,370 | 4 | 57,570 – 95,400 | 3 |
| 359,370 – 609,800 | 5 | 95,400 – 153,450 | 2 |
| 609,800 – 1,131,352 | 6 | 153,450 – 288,900 | 1 |
| No Data | No Data | No Data | No Data | No Data |
Network Analyst Model 3. Methodology

The ‘Network Analyst’ tool was used to determine the area, in square feet, covered by each proposed redemption center. The analysis was done at three distances: one mile, two miles, and three miles. A three mile radius seemed relevant because that is the maximum radius the average canner might walk to redeem their materials. For the network analysis the DCP’s LionStreets data was used. The ‘Select by Attributes’ tool was used to extract all streets except ‘Vehicle Only’ streets which were represented by ‘Feature Type = 0’, once selected this data was exported as its own layer and used for the analysis. All properties within the calculation were left at their default settling and not elevation data was needed, u-turns were allowed as the trips would be made on foot. The ‘Solve’ button was used and the polygons for the service area were generated. This was done three times, at each distance. The service area data was then exported as a layer file. Using the attribute table for that layer file, the area in square feet was recorded and used to determine the possible redemption center site with the largest service area. The map on the following page indicates the network analyst results in light red, and existing redemption centers in dark red.
MODEL 3 NETWORK ANALYST AREA COVERED BY CENTER
THE REDEMPTION CENTER LOCATION THAT COVERS THE MOST SQUARE MILES IS: 164-26 LIBERTY AVE.

Spatial Analysis Data Limitations
This project is limited because the analysis does not account for the dynamic socio-spatial factors that determine the locations of redemption centers in New York City. The Pearson study is an example of how geodemographic data can be applied to a ‘Spatial Analyst’ suitability model. Redemption centers are a legalized small businesses venture and are allowed to operate in residential or commercial areas (Sure We Can currently operates in a residential neighborhood). However big businesses and neighbors often fight redemption centers with “Not in My Back Yard” (NIMBY) action. This is because people conflate waste-management with unsafe and unhealthy operations. A more dynamic evaluation of current conditions would have yielded more robust results. Analysis should be enhanced in the following areas: land use, population demographics, density, and average median income. Furthermore a heat map indicating densities of canning areas could be developed and used to inform the placement of new redemption center facilities. It is hypothesized that the densities of canning would be correlated to the densities of residences and commercial units; therefore the Manhattan and parts of downtown Brooklyn would represent areas with the most canning density.
BACKGROUND: TIMELINE OF MUNICIPAL SOLID WASTE & RECYCLING

The history of sanitation in this city starts in 1657 when New York was called Nieuw Amsterdam. The first sanitation law, punishable by fine, declared that “householders were forbidden to throw ‘any rubbish, filth, oyster shells, dead animals... or anything like it’ into the streets or into the canals” (Nagle, 2013). Despite this, the colony was dirty and rank with the stench of rotting garbage. The Dutch relinquished control of the colony to the British in 1664 when it was renamed New-York. Sanitation continued to be an issue for New-York and in 1694 the first tax was implemented to pay for the city’s very first street-cleaning supervisor (Nagle, 2013). However in an era that predated zoning, the city was filthy with the residue of dirty industrial land uses such as, tanneries, breweries and slaughterhouses. As a result the 1700’s were characterized by one traumatic epidemic after the other. Yellow fever, malaria, measles, smallpox, and typhoid riddled the city for most of the 18th century. Disease and filth continued to plague the city well into the 19th century, despite the first zoning efforts, mayoral concern, and a dedicated (albeit corrupt) sanitation workforce.

It is important to note that gleaners were an active part of the city’s early sanitation history. The urban poor scavenged the heaps of trash for reusable materials that could be re-purposed or sold. This is the origin of informal public space recycling in New York City. Scavenging was dominated by woman and children, earning them names such as: rag fairies, guttersnipes, dock rats, river thieves, and street urchins (Nagle, 2013). In the 1800’s the city also operated a system of early municipal recycling, which took place at the city dumping piers. Men were contracted to “trim the garbage scows.” These men were responsible for recovering useful materials from the heaps of garbage on the scows. The found material was then tossed under the docks to be sorted (often by women) and sold to middlemen. The remaining contents of the scow were then dumped into the Hudson River or the bay. It’s important to note that by the time useful materials reached the garbage scow they had passed through many stages of use and reuse; “this is not to say that waste... did not exist, but that it occurred after the material had a long a varied career within the early American household” (MacBride, 2013: 29).

In 1895 the city’s sanitation department was permanently transformed by Commissioner George Waring. He rid the department of corruption and laziness by instilling military prowess to the position. Waring applied military-style hierarchy to the department and clad the city’s sanitation workers in white uniforms and sparkling white helmets. Waring proved himself a success when a sanitation crew cleared the streets of Five Points in two weeks, which was no small task and had never been accomplished before. At the time, the neighborhood of Five Points was an area of high crime and poverty. Waring renegotiated contracts with scavengers and scow companies and included scavengers in the official workforce (Nagle, 2013). In the new system there was no place for “freelance collectors, or ‘trimmers’ as they were called”; instead, the city engaged formal contracts with established scrap-dealing businesses (MacBride, 2013: 32). The business were supported with tax dollars and worked for commission, sorting scrap at specially designated municipal facilities. These facilities resembled the waste transfer stations the DSNY uses today. Waring also eliminated ocean dumping and mandated recycling. The Police Department (Theodore Roosevelt was the
Commissioner at the time), enforced Waring’s recycling laws. “Household waste was separated into three categories: food waste, which was steamed and compressed to eventually produce grease (for soap products) and fertilizer; rubbish, from which paper and other marketable materials were salvaged; and ash, which along with the nonsalable rubbish was landfilled” (NYC Waste Less: History of NYC Recycling, n.d.).

In the recent past, wartime codified recycling into an active part of American culture. During World War I and World War II resources were severely limited, especially the availability of paper-pulp. Textile materials, or rags, could be utilized for paper making. As a result, in 1916, New York City contracted several firms to “rag pick” and also mobilized households to contribute to the supply. As a result a strong economy developed around the recycling of rags, and bids for recycling contracts reached record highs (MacBride, 2013: 33). Again in 1940 domestic demand for recyclables was unprecedented, the wartime constraints produced an economy for any material that could be used for national defense. Unfortunately, the wartime periods produced bubble-economies for recycling. The 1950s marked the beginning of post-war consumer culture in America. In an era defined by consumption, wartime thriftiness was soon forgotten and so was recycling.

What we think of today as contemporary recycling began in the United States in the 1960s with the first environmental movement. The origin of the environmental movement can be traced back to the publication of Silent Spring, an anti-toxics work by Rachel Carson in 1962. The recycling movement grew out of the mid-20th century American culture of consumption, trash and broken bottles lined streets and littered the sidewalks. The American public could no longer ignore the perfuse amounts of waste being generated. Recycling truly blossomed in 1970 with the objective of “cultivating alternatives to disposal” (MacBride, 2013: 3). And in 1980 Republican city councilor Don Sanderson, developed America’s first curbside recycling pickup. It is said that he was inspired by a Girl Scout troop’s door-to-door collection effort. Sanderson later became an advocate for municipal recycling nationwide (Scruggs, 2015). Differentiating recycling from other environmental movements was the active collaboration with businesses, this resulted in the development of common-place municipal recycling practice and a thriving private industry; the recycling industries’ success is reflected through the widespread public support for recycling in general (MacBride, 2013: 4).

By 1987, American was captivated with waste and it was all due to the media circus surrounding Mobro 4000, the “lost” trash barge. The trash barge was loaded in Long Island and then bounced along the East Coast and into Mexico, searching for permission to dock. Local politicians were afraid of medical and toxic waste being unloaded into their jurisdiction, so at every turn the barge was prevented from unloading. The coverage brought exposure to an extremely important issue and sparked national debate about landfill capacity and the need to recycle. Additionally, as the Mobro’s six million pounds of garbage were on display, the public became painfully aware of issues of waste. Between 1982 and 1987, three thousand municipal landfills had reached capacity and closed. The barge became a symbol of America’s growing problem with waste.
The New York State Returnable Container Act, commonly called the “Bottle Bill” was enacted in June 15th, 1982. The bill determined the type of materials eligible for redemption as well as the 5 cent deposit incentive. In 1989, New York City inaugurated its first voluntary recycling program. And in July of that year, the recycling program became mandatory with the implementation of New York City’s Local Law 19 which mandated recycling. Collection began with a handful of districts but by 1997 all 59 districts of the city were integrated into the recycling program. 1997 also marked the beginning of the city’s comprehensive recycling campaigns on TV, radio, newspaper, transit, and outdoor media (NYC Waste Less: History of NYC Recycling, n.d.).

California has always lead the nation in terms of recycling efforts. In 2002, San Francisco adopted the goal for zero municipal waste by 2020 (Scruggs, 2015). This is the first initiative of its kind, and is a hallmark effort across the globe. This means that all waste will either be recycled, incinerated, or composted. Since the 1990’s California has used a single-stream recycling system; this means that bottles and papers are combined in the same bin. The single-stream approach is easier for the user, but requires sorting later in the recycling process. San Francisco continues to lead in recycling, when in 2007 the city ban all plastic shopping bags.

In 2006, state law mandated that New York City to implement a plan for its trash. As a result, the city developed its 20-year Solid Waste Management Plan under the leadership of Mayor Michael Bloomberg (Scruggs, 2015). In tandem to the plan, the city council created Grow NYC’s Office of Recycling Outreach and Education (OROE) to increase participation in the plan; this happened in “response to criticism by Council members that the Department of Sanitation had inadequately promoted recycling efforts” (Scruggs, 2015). In the new plan garbage barges, much like the Mobro, were enlisted to take waste from four new marine-transfer stations and a hand-full of privately owned marine-transfer stations. This innovation to use barge and rail to transport city waste significantly reduced the number of trucks on the road and eliminate 3.5 million miles driven by garbage trucks each year (Hu, 2006). In 2007, the city embarked on the Public Space Recycling Program, undertaken by the DSNY, Department of Parks & Recreation, and the Department of Transportation. The Public Space Recycling Pilot was part of the comprehensive 20-year Solid Waste Management Plan.

Also in 2007, Sure We Can was founded in New York City. The organization represents “canners” (informal recyclers) who earn their income from collecting recyclables. In 2007, there were an estimated five thousand canners operating in the city. Over the years the number has grown. In 2013, the indie documentary Redemption is nominated for an Academy Award; the film showcases informal recycling in New York City.

As of April 23, 2013 the NYC Department of Sanitation (DSNY) accepts more kinds of plastic for recycling. Ridged plastics were accepted along with traditional glass and metals, such as: yogurt containers, plastic cups, and other ridged take-out containers (Grow NYC, 2006).
LITERATURE REVIEW

The first step towards understanding New York City’s systems of recycling is to understand how economies of recycling operate across different municipalities. In a journal article titled *Economies of Scale and Scope: A Cost Analysis of Municipal Solid Waste Services* by Callen, et al. (2001), a cost analysis of all municipal solid waste services was conducted. The findings indicate that there are two major “distinct but related” components in municipal solid waste (here, referred to as MSW): recycling and disposal. These two components represent two separate economies, however “cost complementarities” exist between the two economies. This is referred to as “economies of scope.” If scope economies exist in a city, then the municipality should offer joint incentives for recycling and disposal. The authors use Massachusetts as a case study because the state has had an ‘Integrated Solid Waste Management Plan’ since the 1990’s. Massachusetts faced two major challenges when reaching their recycling goals, these were: residents felt they had no access to recycling, so there was low participation in the programs, there were high transportation costs, and there was insufficient public education. In response, the Recycling Collection Plan was devised to cover the supply side of the market and the Recycling Market Development Plan aimed at the demand side. The state provided the municipality with equipment grants and performance-based grants, and quickly the program became more successful. Anecdotal evidence showed city-wide savings were achieved from reducing disposal of waste. Additionally the researchers concluded that economic findings suggest monopolies (public or private) have lower disposal costs, with private monopolies incurring the lowest possible costs (Callen, et al., 2001).

The Callen, et al. piece proved interesting because it showed a clear incentive for municipalities to have a joint recycling and disposal collection plan. Furthermore, the article illustrates the distinct need for municipalities to receive state provided funding to enhance overall recycling performance. A similar initiative could be made in New York State.

A cost analysis of disposal techniques indicated that location and frequency of collection were important variables; and that backyard pickups are more expensive than curb-side pickups. A cost analysis of recycling indicated that location and frequency of collection do not matter; but recycling increases when provided by a public monopoly (Callen, et al., 2001: 550). Furthermore, higher rates of citizen participation lead to lower average costs for curbside and drop-off recycling. Overall research has shown that recycling unit costs are lower than collection and disposal unit costs. This is a clear economic incentive for cities to recycle. Interestingly the administrative costs of service were not found to be excessively costly for a public monopoly, even though cost per household were higher when comparing a public monopoly with a private one (i.e. a private contractor or firm who collects recycling). Callen’s research indicates that there are product-specific scale economies for MSW recycling. Additionally, economies of scope are present; thus by providing recycling service a municipality lowers the marginal cost of providing disposal services up to 5%. This shows there is an economic incentive for the city to provide both recycling and disposal services (Callen, et al., 2001).
New York City can reduce the overall cost of recycling by increasing participation in the program, this is because the system would be more efficient and more valuable materials would be collected.

The article *Market-Based Incentives and Residential Municipal Solid Waste* by Barbeau et al. (1994) analyzes unit pricing to improve the efficiency of municipal solid waste management and recycling. It is a very simple concept, where “bad” behaviors are taxed while “good” behaviors are incentivized; for example, through a weight-based unit price scheme. The charge fee per unit of recycling would be lower than the charge fee per unit MSW. In this way a city could harness market forces to achieve “higher levels of environmental protection”, however there has only been intermittent success with unit pricing. And often the administrative costs associated with unit pricing are over-burdensome for the municipality (Barbeau, 1994). The concept of unit pricing plays an important role in recycling today, especially in the recovery of paper. A privately-contracted city recycler will receive a set price per ton of paper products collected. In San Francisco, residents are charged for the collection of their MSW, the charge is a unit price based on the volume of the resident’s trash receptacle with larger containers costing more. To incentivize recycling, San Francisco has removed the unit price from recycling collection. San Francisco is discussed in more detail in the case study section of this thesis.

The 1980’s and 1990’s set the stage for awareness around MSW. “Not in my back yard” sentiment also known as “NYMBY-ism” became a common theme in politics. Additionally, in the late 20th century federal MSW regulations grew stricter. This meant that cities adopted “integrated solid waste programs” (ISWPs) nation-wide. Within the ISWPs, recycling falls under “materials diversion” and “source reduction” (the three categories of ISWPs being: disposal, materials diversion and source reduction). Residents over-participate in disposal because of zero private marginal cost, and under-participate in recycling. A unit pricing scheme charges the resident for the type of waste, weight and volume. This strategy implemented along with an aggressive recycling program can be successful in increasing rates of participation. However, if the unit price is too high, people will dispose of garbage and recyclables illegally; as seen in the Nanticoke, Pennsylvania case study (Barbeau, 1994: 696). The degree to which consumers reduce the waste stream will have to do with the degree of incentive and coercion. Overall, unit pricing on the disposal stream must be implemented in conjunction with an aggressive recycling program, otherwise residents will turn to private haulers or illegal dumping (Barbeau, 1994). Unfortunately, New York City has not instated a unit pricing scheme, this is an apparent short-coming; as the scheme would be very effective in diverting waste from landfills and promoting recycling, especially for businesses.

Clearly there is an economic incentive for municipalities to provide both disposal and recycling services, because the total cost of services is significantly reduced when both are provided simultaneously. Additionally, citizen participation is increased if the appropriate incentives are put in place; citizen participation is decreased when regulations become fiscally over-burdensome. Finally, resident participation is increased when the municipality provides a public service and not through a private contractor or hauler. The New York City Department of Sanitation currently provides curb-side disposal and recycling, through a system of public collection and privately contracted collection. As indicated in the Callen, et al. (2001) the benefits of a “monopoly” are lost if the system is split between
multiple service providers (i.e. public and private). This means that New York City’s current system is operating at lesser overall efficiency. Furthermore, Barbeau, et al. outlines the reasons why a unit-pricing schemes are advantageous to a MSW collection system; New York City’s recycling diversion rates would improve significantly if individuals or businesses were being charged for the disposal of their waste.

The Effect of Bottle Laws on Income: New Empirical Results

A paper by Bevin Ashenmiller (2011) details an empirical study of the transfer of income to low income households, of the use of bottle deposit laws to promote consumer recycling. The author describes this as an “unintended consequence” of bottle bill legislation. There are eleven states that participate in bottle deposit laws: Oregon, Delaware, Vermont, Massachusetts, Maine, New York, Michigan, California, Iowa, Hawaii, and Connecticut. These states apply a deposit-refund system to the purchase of beverage containers, in New York the deposit value is five cents.

A bottle law is one of the only examples of environmental protection policy that takes advantage of a unit-price system. The way it works is by combining a classic Pigouvian tax with a refund policy. A Pigouvian tax “requires a consumer to pay a fee at the time of disposal that is equal to the marginal damage caused by the disposal” (Ashenmiller, 2011: 60). A Pigouvian tax is commonly called a “sin tax.” A Pigouvian tax creates an incentive for consumers to dispose illegally, whereas a deposit-refund system creates an incentive for the proper disposal of bottles and cans, simply because it puts a “bounty on trash”. A deposit-refund system “is the most efficient way of internalizing the external costs of waste disposal.” Bottle laws mandate that the consumer pay a deposit when they purchase a beverage container, the consumer then receives a refund when they return the container to a recycling center; if the consumer chooses not to participate in the refund, the effective result is that the deposit becomes a tax (Ashenmiller, 2011: 60).

Bottle bills provide a way to reduce post-consumer waste and also increase the income for low wage people. Even though most environmental taxes are mildly regressive, the bottle bills have the potential to increase the earnings of very low wage people. If the deposit amount is set high enough, “harvesting recyclable becomes viable employment for low income households.” However, the deposit amounts are usually very low, this means that only the lowest wage earners will recycle. Those people recycling for cash need to those who have low income wages; this means that recycling for cash tends to be done by the severely destitute. However, the author also observed individuals supplementing their household income by recycling for cash. Ashenmiller’s study shows that low-income households are more likely to participate in the law’s deposit-refund system than high-income households (Ashenmiller, 2011: 62). This indicates that bottle bill legislation is flawed, as it does not adequately motivate the middle class to recycle (the intent of the bill). Instead, low-income households actually recycle more materials than they originally purchased. The overall effect of bottle bill legislation is that people falling into the lowest income bracket receive meaningful increases to their wages through the deposit-refund system; the bottle legislation “provides a significant income transfer to a small number of households that are difficult to
support” (Ashenmiller, 2011: 64). The Ashenmiller article shows that by supporting redemption centers, and by proxy the Bottle Bill, the city is providing aid to an extremely vulnerable population that is otherwise hard to reach. There are social services in place to provide welfare to extremely low-income citizens, but some people are excluded from the system, for example un-documented immigrants. The Bottle Bill creates an economy for the invisible members of society to subsist.

**The Informal Recycling Sector In Developing Countries**

Informal waste picking is common throughout all cities, representing about 15 million individuals across the globe. Waste picking is predominantly visible in the world’s developing countries, countries that have developed some of the best precedents for organizing waste pickers. Waste pickers represent the urban poor’s most vulnerable groups, “recent migrants, the unemployed, the disabled, women, children, the elderly” (Medina, 2008: 1). In an article by Martin Medina (2008) entitled ‘The informal recycling sector in developing countries: organizing waste pickers to enhance their impact’, it is stated that “studies suggest that when organized and supported, waste picking can spur grassroots investment by poor people, create jobs, reduce poverty, save municipalities money, improve industrial competitiveness, conserve natural resources, and protect the environment” (Medina, 2008: 1). Organization can be achieved using three models: microenterprises, cooperatives, and public-private partnerships. Without organization the system of materials recovery is challenging for waste pickers as recycling industries require large volumes of material. First the material is collected by the waste picker and sorted; the waste picker then sells the material to a middle man, who cleans and further sorts the material; the middle man sells it to a scrap dealer who then in turn sells it to an industrial recycler. During this process waste pickers do the majority of the labor but receive the least amount of pay. By getting organized waste pickers can cut-out the middle man and enhance the ability to bargain with industries (Medina, 2008: 1).

Cooperatives allow waste pickers to enter into direct contracts with industries or grant agreements with donors. Cooperatives are also able to fight legal constraints and can change unfriendly laws, policies, and regulations. In fact, in Brazil waste picking is recognized by the government as an occupation; as a result they can voice their opinions at a local, state and national level. Cooperatives allow for waste pickers to enter into formal contracts with businesses, industry, and neighborhood associations to gain access to source-separated recyclable materials. This is extremely beneficial to waste pickers because it frees them from waling several miles a day in search of material; additionally “by taking their work out of dumpsites, it also greatly reduces health risk from contact with waste” (Medina, 2008: 2). Furthermore, working as part of a cooperative, and sometimes even wearing a uniform, boosts moral and pride. In a survey conducted by Medina in 2008, in six Latin American countries more than 90 percent of waste pickers reported they liked what they did and considered it “decent work”. Furthermore, national associations of waste pickers exist in Argentina, Columbia, India and Uruguay⁴.

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Government support is paramount to the formation of waste picker cooperatives. The first step is to legalize waste-picking activities, specifically at the national level. Further government steps include: estimating the number of people involved and the economic impacts; consulting waste pickers and key stakeholders to design waste management systems that are inclusive, socially desirable, economically feasible and environmentally sound (Medina, 2008: 3). It is beneficial for municipalities to embrace waste picker because it lowers the overall costs of recycling. Municipalities benefit because the overall volume of waste is reduced saving on costs for collecting, transporting, and disposal. Informal recycling also improves industrial competitiveness because recycled materials are less expensive than virgin materials and recycled materials require less energy to obtain, so it lowers the industry’s operating costs. As an example, waste paper collected in Mexico is seven times cheaper than imported wood pulp (Medina, 2008). Clearly, there are many advantages for municipalities to recognize informal recyclers as a formal and integral part of urban operations. Forming cooperatives and associations allows for waste pickers to make contracts with local businesses and source material more efficiently, reducing the intensity of labor and reducing the safety hazards associated with informal recycling. Furthermore, associations and cooperatives allow waste pickers to take pride in their work.

Organized & Informal Recycling: Social Movements Contributing To Sustainability

In the paper ‘Organized and informal recycling: social movements contributing to sustainability’ written by J. Gutberlet (2008), the author outlines inclusive resource recovery and its contribution to global sustainability. The author outlines how “gathering, separating and selling recyclables has become a survival strategy for the excluded population in most cities;” and despite the potential for integration, very few cities around the world “have incorporated recycling cooperatives and associations” (Gutberlet, 2008). Inclusive resource recovery reduces waste sent to landfills, builds citizenship and contributes to community.

In order for waste management systems to be truly inclusive and for waste pickers to participate in policy-making, more than consultation is required. What is required are transparent democratic processes, forums for deliberation and genuine participation from different stakeholders. In the UK, community advisory committees were formed to specifically evaluate the waste management systems at the local level. In the Philippines and India, deliberative public-private partnerships allow for greater public participation in policy formation and have become a new form of local environmental governance. These forms of participation can be summed up as forms of co-governance. Gutberlet outlines co-governance, saying that interacting parties (groups and stakeholders) must have something in common to pursue. In the case of inclusive waste management systems, that goal can be to reduce overall operational costs (Gutberlet, 2008).

Social and solidarity economies are general terms used to describe the overarching concepts of social entrepreneurship. In these systems social justice issues and values are highlighted: cooperation, redistribution, solidarity and reciprocity. Solidarity economies are “designated production, distribution and consumption modes that contribute to the democratization of the economy based on citizen
commitments” (Gutberlet, 2008). The most effective way to achieve the goals for social and solidarity economies are to create solidarity networks. Solidarity networks value the local and creative workforce and share assets and strategies. Networks are paramount to organizing informal recyclers into efficient and powerful cooperatives.

Finally, employing a system of co-management is another strategy for creating inclusive waste management systems. This means, sharing responsibilities between government agencies, users, and stakeholders for the well-being of the resource. This method is used to prevent overexploitation and to regulate fair access, basically what is needed is a system of shared understanding between government regulations and community regulations. Co-management is “participatory rather than hierarchical; decentralized instead of centralized; and the process happens through active participation of the different parties in public policy making rather than just consultation” (Gutberlet, 2008). The governance strategies outlined by Gutberlet indicate that government recognition and support is paramount to developing inclusive waste recovery systems and key to organizing the informal.

Gutberlet’s system of co-management can be applied to improving New York State and New York City’s application of the Bottle Bill. Co-management relies on the participation of different stakeholders at different scales, through active participation. Currently, the State applied a blanket legislation with no support or tailoring at the local level. If the New York State Department of Environmental Conservation (DEC) and New York City’s Department of Sanitation (DSNY) had discussed the application of the Bottle Bill, perhaps there would have been less competition between markets.
CHAPTER 1: REVIEW OF PUBLIC SPACE RECYCLING

New York City has the heaviest pedestrian traffic flow in the entire county (Navarro, 2011). As a result it makes sense for the city to provide pedestrians with a place to put their trash, and of course their recycling. The city has 25,000 public wastebaskets. In comparison, the number of public recycling bins is insignificant: in 2007 there were 160 DSNY public recycling bins, in 2011 there were 500, and today in 2015 there are nearly 3,000 (Navarro, 2011). Over the past eight years, one can see the steady increase of public recycling receptacles as well as the growing acceptance of the program.

A New York Times article written in 2011, chronicles the upset around the lack of public recycling. A 52 year old tourist from California said “she had wanted to throw away a plastic water bottle during a walk to the MoMa from her hotel near Grand Central Terminal – some 15 blocks – but could not find a recycling bin along the way”. She is quoted saying: “When you ask people, they give you this blank stare. ‘Recycling?’” (Navarro, 2011). Fortunately, since 2011 the city has made significant improvements to its public recycling endeavors.

The Public Space Recycling Program (“the program”) was implemented in response to the 2006 Comprehensive Waste Management plan for New York City, passed by the City Council and Mayor Michael Bloomberg. In 2007 a pilot program was designed to evaluate the feasibility of public space recycling in city parks and transit hubs, with an overall goal to divert waste from landfills. The pilot results proved successful and the program was expanded under the Bloomberg administration. The pilot put public recycling bins in parks and transit hubs, only after was the program expanded to included bins on public streets. The program receptacles are designed to convey a clear message in accordance with the city’s existing recycling efforts; with separate collection of paper (green bins) and metals, glass and plastic (blue bins). A pair of blue and green bins are placed in strategic locations in parks, transit hubs, and on the street. Public space recycling on the streets was implemented in phase II, after the pilot program results were evaluated (Public Space Recycling, 2007).

Collection of recyclables and maintenance of the bins adds a “layer of complexity” to the existing waste stream. Additional labor and expenditure is required for public space recycling. Traditionally, before the program, litter baskets consisted of one type of receptacle to be maintained by a staff person of that facility or park. In the past, the receptacle was lined with black bags, emptied when full, and placed in a location for collection by that facilities’ own agency truck fleet. The program however is not so simple and requires operation by the Parks Department, Department of Transportation (DOT) and Department of Sanitation (DSNY). Under the Program the Parks Department staff is responsible for emptying and lining the receptacles placed inside the boundary of the park; and DOT staff are responsible for ferry terminals; and the DSNY staff are responsible for receptacles on the street. Over the week, the Parks and DOT staff collect the accumulated recyclables on site, and then transported the recyclables to a designated collection point operated by the DSNY (Public Space Recycling, 2007). The DSNY provides the public space recycling receptacles, bin liners, and other equipment. The following table summarizes responsible parties for operation of public space recycling; overall, each agency gains an additional operational burden (see Table 1).
Table 1. Public Space Recycling Operations Responsibilities by Agency in NYC

<table>
<thead>
<tr>
<th></th>
<th>Supplying Bags</th>
<th>Emptying Bins</th>
<th>Replacing Bin Liners</th>
<th>Differentiating Material by Bag Color</th>
<th>Moving Full Bags to Collection Point</th>
<th>Collection &amp; processing of Bags</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parks Interior</td>
<td>DSNY</td>
<td>Parks</td>
<td>Parks</td>
<td>Parks</td>
<td>Parks</td>
<td>DSNY</td>
</tr>
<tr>
<td>Park Perimeter</td>
<td>DSNY</td>
<td>Parks</td>
<td>Parks</td>
<td>Parks</td>
<td>N/A</td>
<td>DSNY</td>
</tr>
<tr>
<td>Ferry Terminal</td>
<td>DSNY</td>
<td>DOT</td>
<td>DOT</td>
<td>DOT</td>
<td>DOT</td>
<td>DSNY</td>
</tr>
<tr>
<td>Streets</td>
<td>DSNY</td>
<td>DSNY</td>
<td>N/A</td>
<td>DSNY</td>
<td>DSNY</td>
<td>DSNY</td>
</tr>
</tbody>
</table>


There are two types of public recycling receptacles: the first type was designed and implemented for the 2007 pilot program; the second type was designed and implemented under the program’s expansion (see Figure 2). Green bins, designed for paper, are outfitted with a slot opening. Blue bins, designed for metal, glass and plastic, and are outfitted with a four inch circular opening. Restrictive lids are used to minimize contamination. Not only do restrictive lids limit the type of object that can be placed in the bin, it provides a visual queue to the user that the receptacle is not for trash (Planning for Success, 2013). Furthermore, restrictive lids keep the contents contained, covered from the elements, and out of reach. This is particularly relevant for canners, who might be tempted by the bin’s contents. Once the recycling has been placed in a public receptacle, the contents then belong to the city.

The bins were designed to be coordinated with the existing DSNY recycling initiatives and use the same coloring as the curb-side program. Standard messaging is also used between the public recycling program and curb-side program. Additionally, round receptacles were used to mimic the round waste-baskets used by the DSNY. Round bins are more aesthetic as standalone units. These design elements are important because it improves usability and “branding” of the program.

Costs for the fabrication of the public recycling bins are high. 160 units were designed and built for the pilot program in 2007, 80 green bins and 80 blue bins. The total cost for 160 units and the associated bags was $80,000 (Public Space Recycling, 2007).
Figure 3. Types 1 & 2 Public Space Recycling Receptacles

**Type 1**
Made with heavy gauge steel for the 2007 pilot. Approximate cost = $500 per unit

**Type 2**
Redesigned to be more light weight and visually appealing for the program’s expansion. Approximate cost = $500 per unit

*Seasonal “wear and tear” on NYC’s Public Recycling Units, January – March 2015. By: Olivia Jovine.*
CHAPTER 2: THE “BOTTLE BILL”

Table 2. Bottle Bill Terminology Defined
As described in the 2011 version of the New York State Returnable Container Law

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distributor</td>
<td>Any person, firm or corporation which engages in the sale or offer for sale of beverages in beverage containers to a dealer.</td>
</tr>
<tr>
<td>Dealer</td>
<td>Every person, firm or corporation who engages in the sale of beverages in beverage containers to a consumer for off premises consumption in this state.</td>
</tr>
<tr>
<td>Deposit initiator</td>
<td>The person, firm or corporation that distributes or deals beverage containers in New York State.</td>
</tr>
<tr>
<td>Redeemer</td>
<td>Every person who demands the refund value for the empty beverage containers, but shall not include a dealer.</td>
</tr>
<tr>
<td>Redemption Centers</td>
<td>Any person or business offering to pay the refund value of an empty beverage container to a redeemer, or any person or business who contracts with one or more dealers of distributors to collect, sort and obtain the refund value and handling fee of empty beverage containers.</td>
</tr>
<tr>
<td>Reverse Vending Machine</td>
<td>Automated device that uses a laser scanner, microprocessor, or other technology to accurately recognize the universal product code (UPC) on containers to determine if the container is redeemable and accumulates information regarding containers redeemed, including the number of such containers redeemed, thereby enabling the reverse vending machine to accept containers from redeemers and to issue a scrip or receipt for their refund value.</td>
</tr>
</tbody>
</table>

The New York State Returnable Container Act, commonly called the “Bottle Bill” was enacted in June 15th, 1982. The bill determined the type of materials eligible for redemption as well as the 5 cent deposit incentive. The purpose of the bill is to reduce litter, ease burden on solid waste facilities like landfills, and encourage recycling activity. Under the Bottle Bill all individual, separate, and sealed metal, aluminum, steel or plastic bottles under one gallon became redeemable for five cents (Bottle Bill Resource Guide, n.d.). Under the law, retail stores and redemption centers are responsible for the collection of consumer recyclables through reverse vending machines or counting. If a consumer buys a bottle or can somewhere, the assumption is that they should be able to redeem it at that location; however, this is often not the case. Bottles collected under the Bottle Bill are intended to be refilled, and if non-refillable the materials are sent to recycling. As such, this means that bottles and cans must stay un-crushed and fully labeled throughout the redemption and collection process. This is markedly different than collection through the DSNY which crushes and bails recyclables in the collection process.
The system of redemption in New York State is simple. A dealer (retailer) purchases bottles from a distributor for five cents. Then the dealer passes the cost of the filled bottles to the consumer as a charge. When the consumer seeks to redeem the bottle, the transaction occurs in reverse. The consumer brings the empty bottle to the dealer or to a redemption center and receives five cents, the dealer or redemption center is then reimbursed the five cents plus a 3.5 cent handling fee from the deposit initiator (Bottle Bill Resource Guide, n.d.). Audits by the deposit initiator maintain the integrity of the redemption process. The refund and handling fees must be promptly paid to each dealer or redemption center, in accordance with the regulations at 6 NYCRR §367.5 (c)(4) (NYDEC, 2007).

Under the Bottle Bill’s ‘New York Bottle Bill of Rights’ dealers are mandated to make their beverage containers redeemable to the consumer; it also empowers individuals to make deposits (NYDEC Bottle Bill of Rights, n.d.).

NEW YORK BOTTLE BILL OF RIGHTS
STATE LAW REQUIRES US TO REDEEM EMPTY RETURNABLE BEVERAGE CONTAINERS OF THE SAME TYPE AND BRAND THAT WE SELL OR OFFER FOR SALE

YOU HAVE CERTAIN RIGHTS UNDER THE NEW YORK STATE RETURNABLE CONTAINER ACT:

THE RIGHT to return your empties for refund to any dealer who sells the same brand, type and size, whether you bought the beverage from the dealer or not. It is illegal to return containers for refund that you did not pay a deposit on in New York State.

THE RIGHT to get your deposit refund in cash, without proof of purchase.

THE RIGHT to return your empties any day, any hour, except for the first and last hour of the dealer’s business day (empty containers may be redeemed at any time in 24-hour stores).

THE RIGHT to return your containers if they are empty and intact. Washing containers is not required by law, but is strongly recommended to maintain sanitary conditions. The New York State returnable container act can be enforced by the New York State Department of Environmental Conservation, the New York State Department of Agriculture and Markets, the New York State Department of Taxation and Finance, the New York State Attorney General and/or by your local government.

To report a violation, call 1-877-846-8802 (9am - 5pm M-F)

The New York Department of Environmental Conservation (NYCDEC) Bureau of Waste Reduction and Recycling compiled recycling data for one year from October of 2006 to September of 2007. The results indicated that New York City had a redemption rate of 61.5 percent which was below the average state redemption rate of 66.8 percent (see Table 3).
Table 3. Redemption Rates New York State & New York City 2006 – 2007

<table>
<thead>
<tr>
<th>Location</th>
<th>Deposits Charged</th>
<th>Deposits Redeemed</th>
<th>Unclaimed Deposits</th>
<th>Redemption Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York City</td>
<td>$102,581,308</td>
<td>$63,072,397</td>
<td>$39,508,911</td>
<td>61.5%</td>
</tr>
<tr>
<td>New York State</td>
<td>$311,349,688</td>
<td>$207,914,860</td>
<td>$103,434,828</td>
<td>66.8%</td>
</tr>
</tbody>
</table>

*Includes deposit initiators with domicile out of state, but data shows redemption that occurred in NY State.*

Source: Beverage Container and Redemption Statistics Report by the NYEDC (2007)

In 2009, the Bottle Bill was expanded under legislation called the “Bigger Better Bottle Bill”. The campaign was spearheaded by NYPIRG, the updated legislation was considered an environmental victory for the state. Passing the Bigger Better Bottle Bill was a challenge because of the powerful, well-financed private interests lobbying against the legislation in Albany. Opponents of the bill included Coca Cola, Pepsi and Anheuser Busch. These private interests spent millions of dollars on campaigns to turn public opinion away from the bill. Despite industry opposition, well organized grass-roots public support for the Bigger Better Bottle Bill prevailed (NYPIRG, 2009).

Until 2009, the legislation had not been updated since its conception in 1982, and it desperately needed modernization (NYPIRG, 2009). Most notably, the Bigger Better Bottle Bill required all bottled water and non-carbonated beverage containers (under one gallon in size) to receive a 5 cent deposit. Secondly, the handling fee was increased from two cents to 3.5 cents. The expansion also included additional responsibilities for deposit initiators and distributors. These responsibilities were meant to prevent indiscretion and protect the interests of the dealers and redemption centers who were handling the redeemed materials. The deposit initiator and distributor were required to provide sufficient bags, cartons, or other suitable containers at no cost for the handling and pick up of empty beverage containers that were not redeemed through a reverse vending machine. Additionally under the new law, the deposit initiators and distributors could not require dealers or redemption centers to load the redeemed materials into their collecting vehicle, nor do the dealers or redemption centers need to provide the staff or equipment to do so. Therefore, the burden of collection is on the deposit initiator or distributor. The dealer or redemption center has the right to be present at the count and the count must take place at their formal place of business. These amendments protect the interests of the dealer and redemption centers, and safeguard participation in recycling as outlined by the Bottle Bill and Bigger Better Bottle Bill (Commissioner Grannis, 2009).
Under this law, anyone who sells beverage containers within New York State is required to operate a redemption facility; so why are there not more redemption facilities? The answer is simple, only large-scale chains (ten or more stores) that have at least 40,000 square feet of merchandize on display are required to maintain and operate reverse vending machines. Dealers are exempt if they sell containers of less than twenty ounces packaged in quantities fewer than six; or devote no more than 5 percent of their floor space to displaying beverages. If a dealer’s primary business is the sale of food and beverages (a supermarket) and is less than 10,000 square feet in size they may limit the number of containers to be accepted for redemption to 240 containers per visit, per redeemer, per day. (NYDEC, n.d.) A dealer can further reduce the number of containers accepted for redemption to 72 if they are located within on half mile of a redemption center, provided that the dealer post a sign directing consumers to the redemption center nearby.

The Bottle Bill was amended in 2013, and the amendments were made effective on March 29th, 2013. The amendments improved the implementation of the law and sought to enhance compliance under the Bottle Bill. Most importantly, the amendment adds the provision that prohibits tampering with reverse vending machines. It also outlines that dealers and redemption centers can refuse to accept
crushed containers; this prevents “double redemption”. The amendment also clarifies that all beverage containers must be permanently embossed with “NY 5c”. The amendment also safeguards the process from fraud by requiring all deposit initiators to provide the New York State Department of Environmental Conservation with a report describing the types of beverage containers collected and provide a universal product code (UPC) upon request. Furthermore, through the amendment the Department of Environmental Conservation sought to enhance their regulatory control over mobile and stationary redemption centers; with a focus on registration and permitting.

Additionally, in 2013 further regulations were made in order to prevent illegal redemption of bottles not originally sold in New York State. The law now requires dealers and redemption centers to obtain certain information from persons who redeem more than 2,500 beverage containers, equivalent to $125 worth of five cent deposits, at one time. If an individual redeems more than this amount at one time, information must be filed and sent to the state’s Department of Environmental Conservation (DEC). The redeemer’s information is required, including: name, name of NGO and sales tax-exemption certificate, address, license plate number of vehicle used for transferring redeemable, the redeemers signature and date. There are significant fines associated with redemption fraud. If out of state beverage containers, with no deposit paid, are illegally redeemed in New York State the penalty is $100 per container up to $25,000 for each such tender of containers (NYDEC: Bulk Redemption Form, n.d.). This is why the beverage containers must be clearly embossed and labeled and why redemption centers cannot crush and bail their products.

The illegal redemption of containers not originally sold in New York State is sometimes called the “Seinfeld Problem.” There was a Seinfeld TV Show episode where characters Kramer and Newman loaded an empty mail truck with cans and bottles and drove to Michigan where the redemption price was nine cents; a whole four cents higher than the New York deposit (Einstadt, 2009). The “Seinfeld Problem” became so severe, the 2013 amendment made additional criminal penalties for redeeming out of state bottles and cans. The Bottle Bill makes it illegal to redeem beverage containers not intended for use or consumption in-state (i.e. not baring the embossed with “NY 5c”). If any person willfully violates this law and redeems more than 5,000 illegal containers within a year, they will be guilty of ‘Class B’ misdemeanor. If a person previously convicted of this violation within the past three years, willfully violates the law again they will be guilty of a ‘Class A’ misdemeanor. And any person who willfully violates these provisions on 20,000 or more beverage containers in a year will be guilty of a ‘Class E’ felony.

Who Pockets the Deposit?

Every bottle and can costs five cents. When the dealer buys beverages from a distributor (the deposit initiator) it pays the five cents for each bottle and can, but it can get it back plus the additional handling fee of 3.5 cents. Clearly, it is in the dealers’ best interest to return as many bottles and cans as possible to the deposit initiator. Before the Bigger Better Bottle Bill in 2009, if consumers didn’t redeem their beverage containers the deposit initiator would keep any money left over. The deposit initiators said that these funds were used to pay third-party companies who collected on their behalf and keep their recycling programs running. After the amendment, distributors were only permitted to keep 20 percent of the unclaimed deposits. The remaining 80 percent of the unclaimed deposits go back to the New York State Department of Environmental Conservation. In 2009, that accounted for
$100 million in unclaimed funds. Now, as a result third-party companies and deposit initiators act as the industry “watch dogs” and carefully audit the stream of redeemed materials. Since 2009, it is in the deposit initiator’s best interest to maximize the number of containers returned because they also receive the additional 3.5 cents in handling fees; and only 20 percent of the unclaimed deposits (Einstadt, 2009).

**TOMAR & Third-Party Systems**

TOMRA is a large materials recovery company that operates in North America and operates recovery, transportation, processing and brokerage of processed materials to recyclers. They are committed to the “resource revolution,” which is described as how we obtain, use and reuse resources for sustainable economic growth to improve quality of life. TOMRA is a Norwegian company founded in 1972 when the two founding brothers were approached by a local grocery store that wanted a machine that could retrieve empty bottles. TOMRA started operations in North America in 1985. Today, the company is the largest producer of reverse vending machines and other recovery technologies and collects 35 billion beverage containers with their products every year. This is equivalent to 340,000 metric tons of recycled materials (TOMRA, n.d.). Third-party systems exist because there is a robust global economy for post-consumer materials. For example: if there are 3 billion more middle-class consumers expected to join the global economy by 2030, TOMRA estimates that is equivalent to $2.9 trillion in savings in 2030 for capturing resource productivity potential (TOMRA Investor Relations Report, 2012).

In New York the burden of the Bottle Bill falls heaviest on the drink distributors, because the distributor is responsible for collecting the beverage containers from grocery stores and redemption centers. As a result, many of these distributors hire a third-party to settle accounts and transport the materials. Third-party pickup service providers collect containers from distributors, dealers and redemption centers on behalf of the deposit imitators. These third-parties charge a service fee that is usually contracted based on the volumes collected. TOMRA is one of the largest and most active third-party operators in New York City.

**Reverse Vending Machines & Collection Technologies**

A reverse vending machine collects recyclable beverage containers and provides a paper receipt or script for legal tender. TOMRA leases and services reverse vending machines and boast being the leading corporation in reverse vending, with more than 70,000 installations across more than forty markets (TOMRA, n.d.). In fact, TOMRA represents 65 percent of the total developed RVM market; with companies like Wincor Nixdorf Int. representing only 10 percent of the market, Enviuco Co. representing 5 percent and other companies sharing the remaining 20 percent (TOMRA Investor Relations Report, 2012). Using TOMRA products as an example, the following categories of collection describe the different collection technologies on the market: non-refillable container collection, refillable container collection, and mixed collection. Non-refillable containers are collected with an in-store sorting and compacting machine; and includes the collection of aluminum, steel cans, PET bottles and glass. After being compacted the bottles are transported to the deposit initiator.
Refillable containers are collected, brought to the store, sorted and then accumulated in holding areas or in crates. Refillable containers are usually PET plastic and glass bottles. TOMRA provides two technologies to assist in refillable collection: the ‘Sure Return’ and the ‘True Vision’. The ‘Sure Return’ scans individual bottles and is designed for use by the consumer; the ‘True Vision’ is designed to scan entire crates at one time.

TOMRA reverse vending machines are designed to suit all types of markets with varying demands. However, in general, reverse vending machines are designed to meet any combination of the following factors: weekly container return volume and container mix, desired frequency of container handling, available space, and desired customer service level.

The author uses a ‘Sure Return’ reverse vending machine to redeem plastic bottles and cans.

A canner at work, preparing to redeem at the supermarket’s reverse vending machine. A contracted truck receiving the supermarket’s haul and transporting to a third-party facility. Photos by Olivia Jovine, 2015.
CHAPTER 3: “CANNING” IN NYC

What is canning? Canning is the practice of collecting and redeeming discarded beverage containers from the streets of New York. People who depend on this practice for their primary source of income, or use the practice as a way to supplement their income are called “canners”. Canners generally represent the city’s most vulnerable population. They are low-income people living below the poverty line, often with documented or undocumented immigrant status, canners exhibit low literacy rates, minority racial demographics, and very in age from very young to very old.

Canners are dependent on two systems of infrastructure to redeem the bottle deposit: reverse vending machine infrastructure (aforementioned) and privately owned and operated redemption centers. Reverse vending machines are provided by private companies and mandated by the Bottle Bill. Supermarkets and venues with reverse vending machines often limit the number of beverage containers allowed for redemption in one day, this is meant to discourage canners from congesting their venues with long lines and carts full of bottles and cans. Therefore, canners prefer redemption centers as a means of redeeming their collected materials. Redemption centers are privately operated and have become part of the recycling economy as established under the Bottle Bill in 1982.

Redemption centers are profitable only by a small margin. The centers receive five cents from the deposit initiator for each bottle and if the bottles are sorted by company and type, six to 6.5 cents per bottle. To make a profit a redemption center must turn over a huge volume of materials each year. For example, for Sure We Can to break even, they processed seven million five cent beverage containers in 2014. The proceeds have to cover rent, tax, labor and maintenance fees. Redemption centers also require a large lot area, for storage and processing; thus centers must be located in affordable neighborhoods with low property value. This is why there are no redemption centers in Manhattan, because property values are prohibitively high. Redemption centers also face “not in my back yard” (NIMBY) sentiment from surrounding businesses and property owners; people see the redemption centers as eye-sores, sources of vermin, and magnets for the homeless and destitute. NIMBY sentiment can be fought with proper regulation of the centers as well as increased education and outreach on recycling redemption. There is an opportunity for re-branding redemption centers, as community sustainability and education centers.

Unfortunately, illegal modes of redemption have become common in the city. These illegal operations are unregulated and often take advantage of the canners, giving only three or four cent deposits for their materials (instead of the full five cents). These illegal modes of redemption usually take place off-site in large unmarked tractor-trailer trucks. A redemption center will send a truck out with a small team to count and collect the materials. A designated pick-up location is set on an empty street in an area devoid of redemption centers, and then canners advertise the location by word of mouth. Even though the redemption centers are legal, due to a lengthy registration process, their vehicle operations are often not. This gives the city an opportunity to discourage redemption, with fines upward of $10,000.00 for curb-side pickup of recyclables with a vehicle. Therefore, redemption centers take a risk when they send out a truck, a risk some are willing to take. The mobile redemption centers

take the combined haul to a deposit initiator and redeems the material for the full five cent deposit, plus the 3.5 handling fee, plus the one cent stolen from the canner (for a total of 9.5 cents). Depriving the canners of a single cent have huge economic impacts on the canner. In this way, it benefits canners to have regulated redemption centers. There are not an adequate number of redemption centers in New York City, especially considering that there are no redemption centers in Manhattan or Staten Island and canners’ territory is limited by the distance they can walk. There are 49 redemption centers in the city. The result of having too few redemption centers means that there is an opportunity for illegal redemption centers to form, or for redemption centers to cheat the canners from the full deposit price.

Sure We Can is located at 219 McKibbin Street in Brooklyn, New York. It is New York City’s only non-profit redemption center, co-founded by Ana Martinez De Luco and Eugene Gadsden also known as the “King of Cans”. Sure We Can is describable as a cacophony of recycling, art, gardening and neighborliness. The main area is a large open lot designed for receiving the canners and their products, at the periphery of the lots are the sorting counters. After products are sorted, they are moved to the working area, a large round-ceilinged warehouse, where they are stored for pick-up by the deposit initiator. The community feeling at Sure We Can comes from the canners, there is a sense of family amongst the canners and the permanent staff. Eugene Gadsden “King of Cans” and co-founder of Sure We Can describes some of the challenges canners face in New York City. He says that “I take a lot of pride” in his work as a canner, but “some people look at canners, and think that it is not work, and some people really have respect for it to” (Fawcus, 2013). The King of Cans tries to collect 2,000 beverage containers in one day, which takes him 10 to 12 hours of work and yields him $100. Eugene also explains how canners are often shunned from neighborhoods or looked down on, “[people] say it is ok, but don’t do it in my neighborhood”. Not only do canners face social alienation, they face back-breaking working conditions and long hours. A volunteer at Sure We Can explains how arduous the labor of canning is, “even for a small amount of money, say $30, think how many times someone has to bend over, mush through garbage, in order to come up with a five cent bottle” (Fawcus, 2013). The mission of Sure We Can is to eliminate some of these injustices and improve conditions for canners. Ana Martinez De Luco, co-founder of Sure We Can, formed the canners committee, in 2007 with the help and investments from volunteers. Founding the non-profit, finding the funding and location were challenges. But as Ana said the canners were always very supportive every step of the way. The canners understood the value of having a redemption center like Sure We Can and would deposit their containers and wait for payment later; giving Sure We Can the time it needed to put down its roots and grow (Fawcus, 2013).

The following table indicates the current redemption centers in New York City, compiled from several sources, including: the internet, current redemption centers, and interviews (see Table 4).
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<th>Redemption Center Title</th>
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<td>440 Morgan Ave Redemption</td>
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<td>AGA Redemption</td>
<td>2193 New England Thru, Bronx NY</td>
<td>10475</td>
<td>(718) 731-5368</td>
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<td>Allstate Recycling LLC</td>
<td>65-55 Traffic Ave, Brooklyn NY</td>
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<td>Atlantic Bottle and Can</td>
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<td>Better Bottle Redemption</td>
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<td>Bluestar Redemption</td>
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<td>BRC Recycling</td>
<td>183 Williams Ave, Brooklyn NY</td>
<td>11207</td>
<td>(800) 939-5218</td>
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<td>Bronx Recycling Center</td>
<td>834 St Ann's Ave, Bronx NY</td>
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<td>(718) 402-6400</td>
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<td>Bronx Redemption</td>
<td>1050 Leggett Avenue, Bronx NY</td>
<td>10455</td>
<td>(347) 270-5699</td>
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<td>Brooklyn Bottles &amp; Cans (TD)</td>
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<td>Brooklyn Redemption Center</td>
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<tr>
<td>CASH 4 CANS</td>
<td>2462 Linden Blvd, Brooklyn NY</td>
<td>11208</td>
<td>(718) 678-0166</td>
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<td>Cordial Concept</td>
<td>65-55 Fresh Meadows Ln, Queens NY</td>
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<td>Culver Narrows</td>
<td>990 McDonalds Ave, Brooklyn NY</td>
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<td>D and P Recycle Inc.</td>
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<td>D.R.C. Group Inc.</td>
<td>494 Hunts Point, Bronx NY</td>
<td>10474</td>
<td>(718) 378-3160</td>
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<td>Eldorado Trading Inc.</td>
<td>638 62nd Street, Brooklyn NY</td>
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<td>Elramida Holding Inc.</td>
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<td>Foster Bottles &amp; Cans</td>
<td>5633 Foster Ave, Brooklyn NY</td>
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<td>Foul Redemption</td>
<td>53 East 31st Street, Brooklyn, NY</td>
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<td>Green Apple Redemption Corp.</td>
<td>793 E 42nd Street, Brooklyn NY</td>
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<td>Horizon Redemption</td>
<td>1619 Center Street, Ridgewood NY</td>
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<td>Jamaica Redemption</td>
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<td>Jerome Redemption Center Inc</td>
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<td>New Colony Enterprise Inc</td>
<td>E-Z R 102-17 44th Ave Corona NY</td>
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<td>P and L Recycling Inc.</td>
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<td>ReCycle for Education</td>
<td>200-07 Murdock Ave, St. Albans NY</td>
<td>11412</td>
<td>(347) 455-6891</td>
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<td>Redemption Center</td>
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<td>Redemption Center</td>
<td>497 Hart Street, Brooklyn NY</td>
<td>11221</td>
<td>(347) 715-2541</td>
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<tr>
<td>Sure We Can</td>
<td>219 McKibben Street, Brooklyn NY</td>
<td>11206</td>
<td>(718) 326-3250</td>
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<td>T D Bottle Can Redemption</td>
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<tr>
<td>TDC88 Trading Inc.</td>
<td>18-39 128th Street, College Point NY</td>
<td>11356</td>
<td>(917) 838-0307</td>
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<tr>
<td>Triboro Bottles and Cans</td>
<td>7102 Cypress Hill Street, Brooklyn NY</td>
<td>11385</td>
<td>(605) 371-6890</td>
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<td>United Redemption</td>
<td>1548 68th Street, Brooklyn NY</td>
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<td>United Waste Managers</td>
<td>917 61st Street, Brooklyn NY</td>
<td>11219</td>
<td>(718) 438-5700</td>
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<tr>
<td>Van Wych Express</td>
<td>619D 62nd Street, Brooklyn NY</td>
<td>11220</td>
<td>(718) 833-1882</td>
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Source: Olivia Jovine, 2015
As a job canning is an extremely labor intensive activity, requiring many hours of work and significant physical labor to see returns. The work requires bending, walking, and hauling materials; and is often done early in the morning or late at night before the sanitation crews clear the streets of bags. An entire economy, with public, private and individual stakeholders grew out of the Bottle Bill passed in 1982. But the Bottle Bill reaches far beyond traditional environmental issues; the legislation has had environmental implications and social implications. In an interview with the co-founder of Sure We Can, Ana Martinez De Luco, the social implications of the Bottle Bill and the importance of redemption centers in New York City were described.

Canning in New York City Before 2009

Before 2013 there were very few redemption centers in New York City, simply because it was not economically viable as a business mode. The very first redemption centers was called ‘We Can’ and it operated for seventeen years on 29th street on the West Side of Manhattan, before going bankrupt and closing in 2005. Anna Martinez De Luco’s ‘Sure We Can’ was born because We Can closed; the people who were redeeming their bottles and cans with We Can were in despair because there was no place for them to bring their bottles and cans. At the time the canners were forced to go to super markets to use the reverse vending machines. Unfortunately, supermarkets resisted the canners and did not want them coming into their stores. So, a small group of canners and activists went to the Attorney General’s Office to demand that supermarkets provide adequate infrastructure for redemption as mandated by the law. This was the first action that Anna Martinez De Luco and Eugene Gadson made to fight for canner’s rights. It was progress, but many canners didn’t know English so they were unable to defend the law on a daily basis for themselves. The supermarkets would make canners wait because the canners were not regular customers, the machines were often broken, and canners were only able to redeem $12.00 of products at one time (240 beverage containers). It was inefficient for canners to wait in long lines and then have to carry their remaining products to the next supermarket. Being forced to redeem $12.00 at a time was over-burdensome for the canner. At the time, the conditions for the canners in New York City were very hard. Anna Martinez De Luco describes that the situation produced lot of anger on the side of the canners and a lot of anger on the side of the supermarkets, of course neither party were at fault. The issue arose from the inadequate redemption infrastructure in New York City.3

At that time in the early 2000’s, the only redemption center in the city was DRC Inc. located in Hunts Point and in Brooklyn. After the closing of We Can the canners asked DRC Inc. to arrange a pick-up truck to travel to Manhattan twice a week to service the desperate canners on 29th street and the West Side. DRC Inc. obliged, but cheated the canners by only paying four cent deposits when a full five cents was due. DRC Inc. was also famous for treating the canners very poorly. The canners who used to redeem at We Can were accustomed to the full five cent deposit, so they asked DRC to provide them with the full deposit. DRC Inc. assured the canners that they would, but after two or three weeks they only gave four cents; even for the sorted materials, which were worth more than five cents. This situation illustrates that inadequate infrastructure allows for illegal practices to persist. Because DRC Inc. had a monopoly on redemption they were able to cut-corners. Therefore, it is important that the city’s redemption centers are regulated and supported so a similar situation does not persist. Anna

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described an old Ecuadorian man, eighty years old, who sorted his materials perfectly by different companies, but DRC still only gave him four cents for his work. The old man begged her to help him, because he could not speak English and desperately needed the full deposit to pay his rent. Stories like this illustrate the vulnerability and fragility of those who can. When DRC Inc. was the sole provider of redemption services there was no formality to the pick-up, the canners were forced to wait hours for the pick-up truck. A canner needs to eat, rest, and start picking-up again; thus waiting was a huge loss to the canner, but the canners were desperate and didn’t have a better option. Clearly, adequate and respectful redemption center infrastructure is a necessity.

The Founding of ‘Sure We Can’

Anna Martinez De Luco explained how the abuse of the canners eventually lead to the formation of ‘Sure We Can’. The canners could no longer tolerate the bad payment, the lack of formality, and lack of respect from the redemption facilitator; therefore the canners decided to start their own redemption center. Anna Martinez De Luco and Eugene Gadsen became the founders. They originally thought they could start a redemption center in Manhattan, but the rent was cost prohibitive. In the words of Annd Matinez De Luco, “you cannot make the rent payments with the redemption busyness; there just wasn’t enough money because of the land value.” Furthermore, Sure We Can found a location on Fifth Avenue in Manhattan, but faced adversity from their neighbors who were big business owners with high-end retail; “they were very unhappy about having a redemption center near them and fought against us daily.”

Vehicle Redemption & Servicing Manhattan

The biggest volume of bottles and cans are in Manhattan. To take advantage of this resource, Manhattan is serviced primarily by trucks. In 2009 the law was changed so that the handling fee was increased to 3.5, the economy had also crashed at that time, so for these reasons redemption centers started to open as businesses. Because of this, there are many more redemption centers in the city than there were in the early 2000’s. Some of these redemption centers started to go to Manhattan with trucks, and started to compete with DRC Inc. who had a monopoly on truck pick-up in Manhattan since 2005. There were truck pickups at 50th Street and 11th Avenue, 60th Street and York Avenue, and trucks in China Town.5 Sure We Can also tried to conduct truck pick-ups but found renting the truck and negotiating the papers too cumbersome to proceed. It is necessary to have a redemption center in Manhattan. Before Hurricane Sandy there the Lower East Side Pathmark operated a major redemption center, but the Pathmark was heavily inundated in the storm and unable to reopen (New York Magazine: Jada Yuan, 2013). This thesis recommends the location of a new non-profit center in lower Manhattan to service the borough and meet the demand for canners in the area.

Since last year, the city implemented a regulation that recyclables cannot be collected from the curb with a motor-vehicle. This law, makes it more difficult for redemption centers to utilize mobile pick-ups and service Manhattan because fines are approximately $10,000.00 per violation. There are a lot of restrictions on using a vehicle to pick-up from the curb. Because redemption centers are often

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5 Ana Martinez De Luco.
understaffed and debt-burdened renting a vehicle and registering it with the New York State Department of Conservation often doesn’t happen; therefore a legally operating redemption center may be operating an illegal vehicle, and subject to fines. The city has been fighting redemption for several years now. Cracking down on motorized vehicle collection of recyclables is a way for the municipality to discourage canning without violating the state mandated Bottle Bill. This thesis recommends state support for redemption centers so that the redemption center business owners are able to apply for proper vehicle registration.

**Criminalizing Canning**

The New York Department of Sanitation (DSNY) released a video nearly two years ago, explaining that canning was a crime. The city does not want the canners to remove the valuable materials away from the waste stream, the municipality qualifies canning as stealing. The chair of the Sanitation Committee for Ana Martinez De Luco’s local district, told her “you know Ana, deep in their hearts the DSNY may love you, but on the outside they hate you because of what you do with the bottles and cans.” In 2010, the DSNY analyzed the volumes of recyclables city-wide; the DSNY determined that the volume had significantly decreased due to canning activities. From their research, the Department of Sanitation determined that canners were hitting them on their bottom line. The city has a contract with the SIMS Materials Recovery Facility, the city pays SIMS around $60.00 per ton for a contracted volume of material; if the volume goes down the city has to pay SIMS more money.

Ana Martinez De Luco explained that “it is bad for canners to have the DSNY fight us, and canners don’t understand how it could be stealing; they see what they do as picking-up the five cents the consumer has thrown away.” Furthermore there is a significant error in the DSNY’s logic, the bottles and cans canners collect come from restaurants and businesses where the DSNY doesn’t collect. It is true that the canners also collect from street waste baskets and also the curb-side, however they collect at a far reduced scale as canners are reliant on manual labor alone.

**Perceptions of Canning**

Eugene, a long-term canner and co-founder of Sure We Can, says that the Bottle Bill was not written with the canner in mind, it was written for the consumer. But fortunately as a result, the canner community was born – which is a beautiful thing. Ultimately, those five cents are from the consumer. The five cents give sustenance to a community of canners. Renee, a man who works at Sure We Can, said “we don’t steal anything, those are the five cents that people do not return to the supermarkets. If people keep throwing five cents on the street, then we will keep going and picking it up.” But as Ana explains, five cents isn’t really enough to survive with. A while ago, a senator wanted to increase the deposit from five cents to ten cents; but some long-term canners said that they wouldn’t support it. The canners felt that consumers would value ten cents, whereas they don’t value five cents. A ten cent deposit value would mean ten beverage containers would equal one dollar. The canners think consumers wouldn’t ignore a ten cent deposit and then they would be out of a job.

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7 Ana Martinez De Luco.
There is a perception that many of the canners are homeless, we have 310 or 350 canners at Sure We Can and perhaps one percent of those canners are truly homeless. Seven years ago, the demographics of the city were different. At that time, in 2007, canners were different; nearly 50 percent were homeless, primarily Afro-Americans or Latin American immigrants who suffered from drug addiction, alcoholism or incarceration. But since this time, the demographics have significantly changed in the city, there are more Latin American and Chinese immigrants. Ana Martinez De Luco first noticed a shift when she met an elderly couple from Ecuador who had been brought to America by their children. The elderly couple didn’t want to be a burden to their children so they worked every day canning to pay their rent. Part of the mission of Sure We Can, is to change people’s perception of canners being criminals.

Sure We Can Redemption Center: entrance, storage, and receiving area. Photos by Olivia Jovine, 2015.
CHAPTER 4: CASE STUDIES

Brazil a Case Study Formalizing the Informal

Brazil’s national waste pickers’ movement *(Movimento Nacional dos Catadores de Materiais Recicláveis)* was founded in 2001; the movement set the global stage for innovative approaches to social and economic inclusion of waste pickers. This movement marked the formalization of the informal materials recovery industry in Brazil. The movement utilizes the basic principles of the Social and Solidarity Economy (SSE) concept. This concept refers to enterprises and organizations, in particular cooperatives, mutual benefit societies, associations, foundations and social enterprises, which specifically produce goods, serves and knowledge while pursuing economic and social aims and fostering solidarity. The International Labor Organization (ILO) has a long tradition of supporting these types of SSE ventures and organizations. (ILO, n.d.) There was overwhelming support for this movement with over 1,600 waste pickers represented at the National Congress in 2001.\(^8\) One year later in 2002, the federal government recognized recycled materials collection *(catador de material reciclável)* as an official profession (Van Zeeland, 2014). Brazil embraced the SSE system to enhance their sustainability, save public money, distribute income, and break the poverty cycle for waste pickers.

In 2011, Brazil produced on average 183,000 tons of waste per day; of which 58,000 were recyclable materials. The waste pickers’ movement and Brazil’s waste management plan sought to extract those 58,000 tons from the waste stream before landfiling or dumping. In Brazil, there are vibrant economies of waste at multiple economies of scale. To fully examine economies of waste one must also look at the informal sector. Some world data shows that only 16 percent of all materials produced globally are recycled; but if you consider the informal sector this amount increases to 27 percent in low and middle income countries and 54 percent in high income countries.\(^9\) This shows that waste economies are predominantly informal economies. Even in rich countries waste management is handled by the informal sector.

Brazil recycles nearly 100 percent of its aluminum and 57 percent of its glass. This represents $1.2 billion US dollars in annual savings, but the federal government estimates that if all recyclables were collected from the waste stream the total savings would be $3.2 billion US dollars annually. With today’s current recycling practices, Brazil saves 8 million kWh of energy, 10 million tons of CO\(_2\) and 217 million liters of water each year.\(^10\) These savings are considerable and can set a progressive global standard. The United States can learn from Brazil’s precedent. Clearly there are social and ecological benefits to increasing diversion rates on a national scale.

Waste is a social issue, and represents many jobs; in fact, one percent to five percent of all urban employment is related to solid waste management formally and informally.\(^11\) The discourse around

\(^{8}\) Daniella Metello, Lecture. The New School, New York City. (March 4\(^{th}\), 2015)

\(^{9}\) Daniella Metello.

\(^{10}\) Daniella Metello.

\(^{11}\) Daniella Metello.
waste is primarily environmental, but waste is not just an environmental problem, it is ultimately a social problem. Brazil has been fighting against poverty for the last twelve years, and with the election of the progressive president Luiz Inácio Lula da Silva in 2003 this fight became a priority. The president launched a campaign against extreme poverty; which included $28 million US dollars in funding, created 49 million jobs, and increased the minimum wage. Part of Lula’s attack on poverty was to address the issue of waste pickers as they represent the lowest of the low-income; and are an incredibly vulnerable population. Waste pickers are the people who work on the streets or in the open dumps. On average the income for waste pickers is $228 US dollars a month, which is less than half of the regular Brazilian income. Furthermore, waste pickers have very little access to basic education and exhibit high rates of illiteracy. In New York City, canners represent a similarly vulnerable population with limited language skills. The issue of waste picking received national attention in Brazil because of the magnitude of the issue. Because the United States is a developed economy, the informal economy around waste is significantly fewer people making the magnitude of the challenge less impressive.

The national waste pickers’ movement all started with a commitment made by the president and the federal government. The federal government supported the national waste picker’s movement by: supporting the organization of civil society (the National Movement), providing a legal framework, giving public support to the waste pickers and permission to organize themselves. The foundation of the movement was a strong legal framework, which started in 2001 with the recognition of the national waste pickers’ movement. In 2002 waste pickers were recognized as a formal profession. In 2003 the Inter-Ministerial Committee of Social Inclusion of Waste Pickers was established and operated by eight executive working groups. The eight executive group represent national banks, companies, and government officials. This group helps waste pickers organize into SSE cooperatives. After organizing the cooperatives the Inter-Ministerial Committee of Social Inclusion of Waste Pickers helps the waste picker cooperatives organize networks. Networks are very important for the cooperatives to survive the free market. In 2007 Brazil’s bidding laws were changed to allow the municipalities to hire waste picker SSEs directly, without the traditional bidding process. This was crucial since it meant the waste picker SSEs would not have to compete with private companies in the bidding process. Then in 2010 the federal government passed a new National Management of Solid Waste Plan, this new plan formally recognized waste pickers as an integral part of waste management.

The Inter-ministerial Committee helps the waste pickers’ found their cooperatives and then helps to establish networks between the cooperatives. Of Brazil’s 800 waste picker SSE, 685 are networked. Networking is crucial to the survival of the waste picker SSE in the free market. The federal government also supports the waste picker cooperatives by giving out $200 million US dollars in infrastructure (including: conveyer belts, scales, compressors) training, communication skills, and busynes plan consulting. Additionally, the federal government encourages the local municipal governments to support the waste picker cooperatives. The federal government gives them infrastructure, training, and a business plan. The local government must also provide them with some infrastructure.

New York City can learn from the system of co-management displayed by Brazil and the local municipalities. In fact, the operation of cooperatives with federal and city support informed a major

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12 Daniella Metello.  
13 Daniella Metello.
recommendation in this thesis. Networking is a similarly important strategy that can be applied to redemption centers that operate in the city, instead of forming SSE cooperative networks the redemption centers can form supportive alliances to promote fair treatment by deposit imitators. Furthermore, instead of national support funnelling down to the local level; the New York State Department of Environmental Conservation, the state agency responsible for the Bottle Bill legislation could support the redemption centers with their infrastructure and regulatory needs, very much like the Inter-Ministerial Committee does in Brazil.

Waste picker cooperatives have proven to be efficient systems of materials recovery. Brazil’s municipalities can do their solid waste management through a public service, public bidding process, or hire a waste picker cooperative directly. Data shows that waste picker cooperatives are more efficient than private companies. Using a private company the cost of recycling was $195 per ton and with a waste picker cooperative the price was $35 ton; therefore public funds were saved when working with waste pickers. In the cooperative structure there are two sources of income for the waste pickers: the payment from the city for their service, and also the sale of materials. Therefore the waste pickers are very concerned with the quality of material they collect. As a result, waste pickers form relationships with the businesses, restaurants, and homes that they collect materials from; closely monitoring the materials from the source and guaranteeing the quality of the service they provide. The reason waste pickers can be as effective and efficient as they are is because they operate within the free-market; unlike in the United States where waste pickers operate illegally within the formal economy, or specific to the collection of bottles and cans – operate within the artificial Bottle Bill economy.

There are some challenges to the SSE system in Brazil. The first challenge comes from the free-market, big companies have strong economic interests because waste is a very big business in Brazil. As a result, sometimes the smaller waste picker cooperatives have to compete with these big companies. Secondly, there is also a problem with the public’s participation in recycling, if society doesn’t contribute to the national recycling initiatives many valuable commodities are sent directly to landfills and dumps. New York City faces a similar challenge since participation in municipal recycling is severely low.

Sustainable development is defined by three pillars: economics, society, and the environment. Sustainable development is recognized on the world stage, especially in the context of the 2015 UN Sustainability Goals. When sustainable development goals are combined with the SSE model for community-based employment schemes, a very powerful global model is formed. The world’s urban and industrialized countries generate 1.3 billion tons of solid waste each year. Global initiatives need to be made to curb the mass consumption of resources and mass production of waste. Each country, as Brazil has done, has an obligation to think creatively and holistically about their waste management plans; because as highlighted with the Movimento Nacional dos Catadores de Materiais Recicláveis waste is not just an environmental challenge, it is also a social challenge.
San Francisco’s Zero Waste Case Study

In terms of recycling alone, San Francisco is America’s most progressive city. Most cities in the United States consider a 30 percent diversion rate from landfills a success, but in San Francisco this rate has been surpassed at 80 percent (Hower, 2013). The city is striving for zero waste by 2020. This means that the city will send zero discarded materials to landfills or incinerators. This will be achieved by preventing waste, reducing and reusing materials first, and recycling or composting materials. In San Francisco over half of what is currently going into the black landfill bins can be recycled in the blue or green recycling bins, this means with a little education and outreach the diversion rate would increase from 80 percent to 90 percent without any additions to city infrastructure. To achieve 100 percent zero waste, San Francisco will advocate for state legislation and partner with producers to develop products that can be easily recycled and reused, including take-back recycling (SF Environment, n.d.). Take-back recycling is what is often seen in Europe, where beverage containers are saved and returned to distributors for refill.

The city of San Francisco employs the “fantastic three” program, a term used to refer to the easy-to-use three bin system for waste collection. Each resident and business has a blue bin for recyclables, a green bin for compostable, and a black bin for landfill-bound material. In order to achieve the ambitious zero waste goal public and private partnerships were formed. San Francisco partnered with Recology, the city’s refuse hauler. There is no competitive bidding for Recology’s contract with the city because ‘The Refuse Collection and Disposal Ordinance’ adopted in 1932 established a primary holder of permits; this allowed for a city-regulated utility model (SF Environment, n.d.). The Department of Environment is responsible for outreach, education, policy making and policy compliance. The Department of Public Works oversees the refuse rate setting process and helps set residential and commercial rates. The Department of Public Works and Department of Public Health are responsible for enforcing adequate refuse service laws. The city’s businesses and residents are responsible for participation in the program.

The ‘Mandatory recycling and Composting Ordinance’ went into effect on October 21, 2009. This law requires all residents and businesses to properly sort, separate, and recycle all materials into the bins provided to them. The Department of the Environment checks compliance through their Green Jobs Team. The team conducts extensive, multi-lingual, door-to-door outreach for all residents and businesses in the city; and also, the team checks residential curbside bins throughout the city. If materials are found in the wrong bin, a tag is posted on the resident’s bin that indicated their error and how to correct it. The team returns the next week, to check that the resident has corrected the error (SF Environment, n.d.). New York City can learn from San Francisco’s extensive outreach and education initiatives, especially since land lord compliance and residential participation in recycling is only at 15 percent (Grow NYC, n.d.).
The “trash inspectors”, more formally called Municipal Cart Auditors, are part of the Green Jobs Team. This form of trash inspection is the first of its kind in the city and has been in operation for nearly five years as part of the Zero Waste 2020 initiative. The crews work early in the morning or late in the evenings when the streets are relatively quiet and before the trash collection trucks make their rounds. Each household’s participation and accuracy is recorded and entered into a city database, the database is referenced to determine which households require more outreach (Boyer, 2013). Currently no fines are issued for poor compliance, although the government had entertained the idea of a $1,000.00 dollar fine; this met strong political backlash with sentiments like “Big Brother peeking into people’s trash”. However there are financial incentives for San Franciscans to comply with Recology’s collection system. In 2013 Recology increased their rates for collection of all three bins, but residents who opt to downsize their black trash bin pay a reduced fee. A typical household in San Francisco with three 32-gallon bins pays $34.08 per month for collection. If a household switches from a 32-gallon black bin to a 20-gallon black bin, their monthly rate will be $24.68 which is a $9.40 savings. James Slattery, the city’s assistant coordinator with the Department of Environment and head of the municipal cart-monitoring program, was quoted saying: “Our approach has really been focused on outreach and education … I think people were concerned that there were going to be tickets or penalties or fines, and that has not been out approach” (Boyer, 2013).
The zero waste program is entirely funded through the revenue generated from the collection rates charged to customers. As described by Barbeau et al., there are many benefits of having a unit-pricing scheme; as illustrated in this case study, San Francisco utilizes a unit-pricing scheme to fund the other elements of the municipal solid waste program. The revenue allows San Francisco to pay for material collection, procession, disposal, hazardous waste collections, all outreach and marketing materials, and some municipal programs. By instating a unit-pricing scheme San Franciscans are motivated to participate in recycling not because there is an artificial “bounty on trash” but because there is a traditional Pigovian tax in place (Ashenmiller, 2011: 60). Although recyclables are a little more expensive to process than typical municipal solid waste, the materials generate a source of municipal revenue as well. Recyclables are processed, baled and sold to market. The organic waste collected is also a valuable product as it is processed and transformed into nutrient-rich compost at a composting facility outside of San Francisco. Landfilling waste actually cost the city money, and there is no return on investment. The landfilled wasted is charged by weight and then dumped into a landfill. Because New York City does not charge their resident’s for landfilling their waste, a significant amount of public funds is spend with no ability to make a return on the investment. Implementing a unit-pricing scheme on waste removal would eliminate this issue.

The zero waste program and the city’s municipal waste collection system creates jobs. Recology has 1,050 employees in San Francisco (not including corporate headquarters or the composting facility located outside the municipal boundary). And the Department of Environment’s Green Jobs Program has many training programs and green employment opportunities; but specifically for zero waste, the department employs 20 local residents for outreach and municipal cart-auditing. These 20 local residents are mandarin speaking or Spanish speaking residents who require entry level positions and training before entering the job market (Boyer, 2013). Job creation in the municipal solid waste sector is an important opportunity for New York City. An opportunity to hire canners as municipal cart auditors is discussed in further detail in the recommendations section of this thesis. Auditors are important because in San Francisco, as in New York City, the city’s most notorious recycling “laggards tend to be owners of apartment buildings” (New York Times: Wollan, 2009). The ‘Mandatory recycling and Composting Ordinance’ is mainly focusing this new law at multitenant buildings, because currently “only 25 percent of those building owners provide recycling for renters” (New York Times: Wollan, 2009). With a dedicated team of recycling educators, New York City’s landlords could be motivated to enhance recycling compliance through audits, fines and educated through outreach.

Furthermore, when the nation is looking at complex solutions for climate-change, urban planners and policy makers should not overlook the importance of simple things like increasing the recycling rate and composting (New York Times: Wollan, 2009).
RESULTS & FINDINGS

Public Space Recycling Program

In an interview with Michael Rieser, the Staten Island Recycling Outreach Coordinator at Grow NYC, it was made clear that the NYC Public Space Recycling Program, though flawed, was key to public participation and perceptions of recycling in the city. Grow NYC was established 40 years ago under Mayor Lindsey’s office as a nonprofit group. Since 2007, with the establishment of the Office of Recycling Outreach and Education (OROE) at Grow NYC, city-wide participation in recycling has been fostered. Integral to this is the Public Space Recycling Program, as Mr. Reiser said, without it “people on the street would have no place to recycle, they would be forced to throwaway bottles and cans” that would be counter-productive for the city’s recycling messaging. When asked how valuable the Public Space Recycling Program was, it was clear that Mr. Reiser wouldn’t discount the program’s strong public messaging. It is valuable because it promotes recycling in every aspect of a citizen’s life, not just at home or at work, but on the streets. Of course, the program could be improved. Especially since there is a lot of contamination, specifically with the metal, glass and plastic receptacles. Regardless, the city must “walk the walk” and embrace recycling in all aspects of urban life. Mr. Reiser agreed that there should be more Public Space Recycling Receptacles on the streets, but noted that if a business or institution wanted a receptacle the DSNY would provide them with a unit upon request.14

Funding for the Public Space Recycling Program comes from the City Council, but the DSNY provides the oversight. When discussing this with Mr. Reiser and Dr. Nagle, both mentioned that the additional burden of oversight and collection was an area of contention for the DSNY. On one hand, Public Space Recycling provides additional routes and additional jobs for the sanitation force. On the other hand, the Public Space Recycling units are cumbersome and unwieldy. Unloading the bins into the truck requires a four-step process: opening the side panel, removing the bin from the bins, unloading into the truck, and then replacing the bin inside the unit; this is significantly more difficult when compared to the simple two-step unloading process for city waste baskets. Furthermore, in inclement weather the metal doors on the side of the Public Space units become jammed or frozen in snow conditions. Despite the obvious limitations of the program, Public Space Recycling is an integral part of recycling messaging in New York City.

In the qualitative portion of the digital survey on perceptions of recycling, three respondents expressed a desire for more public space recycling bins. Respondents said, “I think by adding more recycling bins and making them much more accessible, the city could increase recycling and reduce litter.” Another respondent said, “more public recycling bins would be a huge improvement”, and commented on the lack of public space recycling in the subway. Bins in the subway system would technically be in the preview of the MTA, however it is an important component of public space recycling in a city heavily reliant on its subway system. Finally, a survey respondent said: “there are so few recycling bins on the streets that it is hard to recycle! I wish there were more around!” This response clearly indicates that increase public space recycling would be well received.

14 Michael Reiser, Interview. (February, 26th 2015)
Comingled vs. Source Separated Recycling

New York City’s infrastructure is designed for a source separated system. On the street you have four city systems: curbside pick-up of residential trash, curbside pick-up of residential recycling, public space pick-up of trash, and public space pick-up of recycling. There are three to four types of city trucks deployed to collect these materials, and there are three different municipal destinations for each type of material. These destinations depend on separation at the source. If the system was comingled, a designated separation and sorting facility would be required. This would require additional infrastructure, operating costs, and a designated labor force.

Table 5. Municipal Infrastructure

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Destination(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>Pratt Industries, Inc. Recycling (SI)</td>
</tr>
<tr>
<td>Metals, Glass &amp; Plastic</td>
<td>SIMS Municipal Recycling Facility (BK)</td>
</tr>
<tr>
<td>Municipal Solid Waste</td>
<td>Municipal Transfer Stations – to be sent to various landfills, incinerators, &amp; the Newark Waste to Energy Plant (NJ)</td>
</tr>
</tbody>
</table>

Source: Olivia Jovine, based on interview with Michael Reiser. (February, 2015).

The existing system is designed to optimize transportation of waste, by utilizing barges and therefore reducing truck trips. The recyclable materials are collected, brought to a marine transfer station, loaded on to barges, and then transported to a facility in Staten Island or Brooklyn; it is important that there are very few impurities when loaded onto the barges. Paper loses most of its value in a comingled system, because it is easily spoiled with exposure to moisture. All paper products are sent to the Pratt Industries, Inc. in Staten Island, where the paper is processed and turned into post-consumer paper products, most notably pizza boxes used by many of the city’s restaurants. The SIMS Municipal Recycling Facility is located on the 30th Street Pier in Brooklyn, New York. Because of its waterfront location, it allows for materials to arrive at the facility by barge, displacing 150,000 annual truck trips (SIMS, n.d.). The new SIMS facility represents $48 million of city investment funds and $46 million of SIMS Metal Management investment funds (SIMS, n.d.). As a result of this significant investment, it makes sense for the city to support a system of single source separation that allows for the continued utilization of the SIMS facility.

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15 Michael Reiser, Interview. (February, 26th 2015).
The Bottle Bill & Informal Recycling in New York City

Michael Reiser commented on the thoroughness of the city’s municipal waste system and its effectiveness at all economies of scale. In comparison recycling established under the Bottle Bill is “extraordinarily expensive and inefficient”.16 Firstly, many of the beverage containers collected are designated for refill, this means the containers cannot be crushed and bailed. However, very few deposit initiators actually refill their bottles. Because the “cans are kept in an intact form, through a whole separate infrastructure” it is more energy intensive than the municipal system which is designed to operate at larger economies of scale. There was a shared sentiment amongst interviewees regarding the legislation; “there are some benefits of the Bottle Bill, but it is not an efficient system”.17

The deposit initiator needs to verify that the bottle and cans returned to them are in fact their products and were for sale in New York State. This is inefficient. Some states, like California collect redeemed materials by weight. This would streamline the process and improve the environmental efficiency of the Bottle Bill. In 2009, when the Bigger Better Bottle Bill was launched, companies like Coca Cola and Nestle (deposit initiators) fought against it using environmental lawyers to fight their battles.18 The reason was, they wanted to change the law to make it more like California’s. But according to Ana Martinez De Luco, the deposit initiator’s true motivation came from the fact that they didn’t want the responsibility for processing the deposits. There are countries, like Germany and Canada, that don’t allow one-way containers to be sold. The big world-wide distributors are forced to only sell beverages in refillable containers. Ana Martinez De Luco has deems refillable containers as a potential solution to the environmental challenges and social challenge she is confronted with every day, “this would be the wisest solution to the environmental problem while also preserving the role of canners and redemption centers.”19

SIMS Recycling vs. Informal Recycling

The SIMS Materials Recovery Facility (MRF) was built under Bloomberg in 2002. At the time, the mayor thought he had a bad deal on recycling and that the city wasn’t able to negotiate a decent price. The city wanted to have a long term contract with a company that they could considered their partner. The city and the New York City Economic Development Corporation (NYCEDC) developed a plan and released a bid. Hugo New won the contract, several years later the company merged with SIMS giving it the identity recognized today. SIMS won a twenty year contract with the city and land owned by the EDC. After twenty years (in 2024) the city will reevaluate the contract and determine if the renew the contract. SIMS receives the city’s “blue bins” that means all metals, glass and plastic. The materials are received and sorted into sixteen different categories. The materials are bailed into 1,000 pound pallets and shipped to recycling factories on the east coast, mostly traveling by barge. A recycling factory will turn plastic bottles into plastic pellets, which are then sold to a manufacture who can produce a new bottle from the pellets. SIMS also serves as a transfer station for some of the city’s paper, but does not process the paper.

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16 Michael Reiser, Interview.
17 Michael Reiser, Interview.
19 Ana Martinez De Luco.
Back in 2002 recycling diversion rates were at 21 percent. Unfortunately, later that year Bloomberg put a temporary suspension on the recycling of metal, glass and plastic. Bloomberg did this for actuarial reasons, to close the city’s $5 million budget gap; however in reality the estimated savings were around $50 million (McShane, 2012). Following the 18 month suspension the city’s diversion rate was abysmal, the city is still recovering its rate. Now the city’s diversion rate hovers somewhere around 15 percent, which is far below the 21 percent prior to Bloomberg’s ban. There was another big drop in diversion rates in 2005, with the expansion of the Bottle Bill. Eadaoin Quinn, the education and administrative coordinator for SIMS recycling, said that by looking at the tonnage reports one could observe a noticeable decline in materials. The most valuable things: the cans and bottles, were getting separated out of the waste stream. However, this didn’t mean the materials weren’t being recycled, it meant the materials were not being registered on the city’s tonnage reports. The city assumption was that redemption centers and illegal recycling operations were capturing the recyclables.

SIMS gets 1,000 tons of metal, glass and plastic material per day. That is nearly 21 thousand tons per month and 252 thousand tons per year. A lot of bottles and cans are needed to achieve that kind of tonnage. Eadaoin Quinn said she didn’t know how many individual bottles and cans comprised one ton of material, but doubted that redemption centers could generate such large quantities. Ana Martinez De Luco said that her redemption center received 7 million bottles and cans in 2014, collected by 320 canners. There are about 40 redemption centers in the city, if they all operated at the same level, a total of 280 million pieces would have been redeemed in 2014.

\[
12 \text{ grams} \times 7,000,000 \text{ bottles} = 84,000,000 \text{ grams} = 92.6 \text{ short tons (US)}
\]
\[
12 \text{ grams} \times 280,000,000 \text{ bottles} = 3,360,000,000 \text{ grams} = 3,696 \text{ short tons (US)}
\]

The average PET plastic water bottle weighs 12 grams. In a rough calculation that means Sure We Can redeemed a little over 92 tons of materials; all redemption in the city would have redeemed approximately 3,696 tons of material per year. This is nothing when compared with SIMS 1,000 tons a day. This begs the question, is the canning really effecting the city’s bottom line? Municipal recycling is not cheap, especially at the municipal wide scale. The cost to recycle glass, metal and plastic is around $240 per ton, paper recycling is around $87 per ton and trash disposal is around $230 per ton (McShane, 2012).

The Bottle Bill created a false economy. Five cents for a bottle is a completely arbitrary number, in fact SIMS typically sells bottles for ten cents a pound. Informal recycling operates in a false economy with inflated rates; meanwhile all other large scale recyclers operate under the national rates. The problem herein lies: as a result of the false economy individuals can turn a profit on redemption, which was not the intent of the bill. According to Quinn, redemption centers as businesses are not fair as they are not selling materials for the nationally standardized rates. Another area of concern for Quinn was that the Bottle Bill opened up new opportunities for crime in the city’s waste management. Organized, large-scale, illegal redemption operations are being cracked down on. As previously mentioned in this thesis, the operation of a motor vehicle for the collection of materials is strictly prohibited. She said, the city is really proud of having gotten the “mob out of garbage, which has been such a huge challenge over the last century”. The city oversees waste management and ensures that there are no illegal operations involved. The false economy and the involvement of illegal redemption makes the city nervous.
When discussing the potential for a cooperative structure, Eadoan Quinn agreed that an association would be a better fit. Cooperatives make sense in the Brazil case study as the waste pickers are competing fairly and selling their materials at national rates. There is no artificial economy for bottles and cans in Brazil, and as a result the waste picker cooperatives are not only providing a better service than some private firms, they are also providing their workers with recognized professional status, something that could never happen for waste pickers in New York City. The city could not officially recognize “canning” as a profession as it is far too dangerous and provides far too low a wage to be supported. The city would have to turn the Manners into official DSNY employees, but unfortunately the demand for sanitation jobs is already oversaturated.²⁰

Ana Martinez De Luco, surveying the Sure We Can storage facility. Photo by Olivia Jovine, 2015.

²⁰ Interview with Eadoan Quinn, SIMS Materials Recovery Facility (March 25, 2015)
Perceptions of Recycling Survey Results

To gauge perceptions of formal and informal recycling a digital survey was conducted. Of 77 total respondents all had at one point lived, worked, or gone to school in New York City; and 84.4 percent currently lived, worked, or are going to school in the city. The majority of respondents, 85.7 percent (66 respondents) recycle at home or in their apartment. Of these 66 respondents, 68.1 percent (45 respondents) said they recycled “all the time, it’s routine for me”. The survey results differ from city-wide statistics, participation in curb-side recycling in the city hovers around 15.1 percent. In 2001, the city hit a peak participation rate of 20.1 percent (Giambusso, 2015). This means my survey responses are skewed towards pro-recycling behavior. The author hypothesizes that her friends and contacts in the city are conscious and aware of environmental issues in the city, therefore her survey population was not unbiased.

Do you recycle in your home or apartment?

<table>
<thead>
<tr>
<th>YES</th>
<th>86%</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>13%</td>
</tr>
</tbody>
</table>

10 Responses 66 Responses

If so, how often?

- Whenever I have recycling: 9 Responses
- It’s hard to say: 5 Responses
- Other: 2 Responses
- All the time: 45 Responses

Of the 77 respondents 83.1 percent (64 respondents) used city recycling bins provided on the sidewalks; 14.3 percent (11 respondents) did not use the city public space recycling bins. This shows that the majority of the survey population not only recycles at home, but also recycles in public. There is good participation in the public space recycling program. It also indicates that expanding the public space recycling program would be well received by this survey population.
Have you ever used city recycling bins provided on the sidewalk?

<table>
<thead>
<tr>
<th>YES</th>
<th>83%</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>14%</td>
</tr>
</tbody>
</table>

11 Responses 64 Responses

If so, how often?

- It's hard to say: 25 Responses
- Other: 5 Responses
- Every day: 2 Responses
- Once a week: 1 Responses
- Whenever I have recycling: 32 Responses

In response to questions about informal recycling, or “canning” in NYC the majority of respondents were aware and not adverse to the collection and redemption of bottles and cans. Of the 77 respondents 94.8 percent (73 respondents) had noticed individuals collecting recycling by sorting through bins or bags on the street; only three respondents were unaware of this practice. The majority of the survey respondents were not bothered by this activity, with 64.9 percent (50 respondents) saying that “informal recycling activity does not bother me.” The majority of respondents did not know that informal recycling (canning) was illegal. This is interesting because it indicates that the Department of Sanitation’s campaign against canning has not been widely viewed or received. It also means that the common citizen is not aware of the adversity canniers face on a daily basis; this means they might not be as sympathetic to the canniers predicament. One way of increasing support for canning and redemption centers is through understanding the full burden these individuals and the small businesses that keep redemption afloat in the city. 77.9 percent (60 respondents) did not know it was illegal; 11.7 percent (9 respondents) were aware that it was illegal; the other 9.1 percent answered “other”. The majority of respondents did not think the activity should be illegal, with 72.7 percent (56 respondents) saying it should not be illegal. 7.8 percent (only 6 respondents) said that it should be illegal; the remaining 6.5 percent answered “other”. If the majority of average citizens do not think the activity should be illegal, this indicates that the city should not criminalize the practice of canning.
Have you ever noticed an individual collecting recycling by sorting through bins or bags on the street?

- **YES** 95%
- **NO** 4%

3 Responses | 73 Responses

Informal recycling activity …

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>100.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bothers me.</td>
<td>5</td>
<td>6.6%</td>
</tr>
<tr>
<td>Does not bother me.</td>
<td>50</td>
<td>65.8%</td>
</tr>
<tr>
<td>Other</td>
<td>12</td>
<td>15.8%</td>
</tr>
<tr>
<td>I don't have an opinion.</td>
<td>9</td>
<td>11.8%</td>
</tr>
<tr>
<td>Total Respondents</td>
<td>76</td>
<td></td>
</tr>
</tbody>
</table>

Did you know that it is illegal to collect recycling in this way?

- **YES** 95%
- **NO** 4%
- **OTHER** 9%

7 Responses | 60 Responses | 73 Responses

In your opinion: do you think this activity should be illegal?

- **YES** 8%
- **NO** 73%
- **OTHER** 7%

5 Responses | 56 Responses | 5 Responses
The purpose of the survey was also to determine participation in canning. Did the digital survey population also participate in the redemption of bottles and cans? Of the 75 responses to this question: 32.5 percent (25 respondents) had recycled bottles and cans for cash and 64.9 percent (50 respondents) had not; two responses were ungiven. This indicates that the majority of respondents recycle using the city’s curb-side recycling program and do not use redemption centers to redeem the 5 cent deposit on bottles and cans. An unasked survey question that would be valuable for the further development of this thesis would be: at what price would you as the consumer make the effort to redeem bottles and cans; five cents, ten cents, fifteen cents, twenty cents or higher? According to many canners, increasing the deposit price to ten cents would encourage the average consumer to redeem their bottles and cans. There are other factors besides the deposit price that effect a consumers willingness to redeem bottles and cans, the qualitative responses in the survey shed some light on the cultural perceptions associated with redemption centers.

Have you ever recycled bottles or cans for cash; either at a local deposit-center or recycling facility?

<table>
<thead>
<tr>
<th>YES</th>
<th>65%</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>33%</td>
</tr>
</tbody>
</table>

50 Responses 25 Responses

As seen from the above mentioned results, the survey respondents favored recycling and supported formal and informal modes. Because 86 percent of survey respondents say that they recycle at their home or apartment, but only 33 percent indicated that they had ever redeemed bottles and cans for cash indicates a disconnect between the two programs. Pro-recycling behavior, the five cent cash deposit, and the availability of redemption infrastructure at most supermarkets over 40,000 square feet still was not enough to motivate the consumers to redeem. There is something else going on here, there is a cultural variable that may be affecting people’s willingness to redeem beverage containers. To conclude the survey, qualitative comments were collected regarding informal recycling in NYC. 31.2 percent of respondents provided a comment, with responses ranging from a few words to a full paragraph. The qualitative responses indicate what some of the cultural variables are. Several respondents expressed concern that redemption centers were dangerous. One respondent said, “recycling centers tend to be dangerous locations” the respondent commented that they did not feel comfortable with recycling centers in “residential areas.” This is a perception of fear, survey respondents did not outwardly express why they had fear, but it can be assumed that it is a fear of waste, fear of homelessness, and fear of people who are from different socio-economic strata then they are. Furthermore, survey respondents said that “supermarkets or redemption centers that offer bottle deposit should have staff on hand to increase the safety of these facilities” this means that the respondent is discouraged from redeeming because they feel the facilities are unsafe. There is a clear perception of danger associated with redemption facilities, unfortunately this stems from deeper sociological perceptions of waste. It is human nature to associate waste, and the people who work with waste, as dangerous. Another survey respondent said, “I mostly find it troubling because the "informal recycling" is actually just people going through other people’s trash. It makes me nervous that they might be looking for not just bottles and cans but credit card and bank info as well.” This speaks to a fear of the canners, not just a fear of the redemption centers or redemption facilities. This fear is more difficult to overcome, and unfortunately speaks to larger urban-sociological challenges.
However, there are certain canning practices that can be amended to make the average citizen less fearful. A respondent said, “It feels like a violation of personal space, especially when it’s done in a trash area that’s behind a closed gate (meaning that they are trespassing on top of rummaging through someone's trash) and as a young woman coming home late at night it makes me feel less safe that any form of illegal activity is happening on my street.” Canners should not be trespassing. Or they should be appropriately welcomed onto a property; they are in fact providing a service. If they are accessing recycling from a private property, the superintendent of a building should arrange a time for them to make a supervised pick-up. Furthermore, if canning was a more visible and commonly talked about practice, tenants would not be as nervous. If it was more widely talked about, a note to tenants or a sign posted near the building’s trash room announcing the relationship with canners could help this situation. Each situation will be different, it is impossible to hypothesize solutions for each case; however, the important take away, is that there needs to be a wider and more open discussion of canning in New York City. If people had more information and awareness perceptions of fear would be eased.

Four respondents expressed concern that formalizing the informal would put those dependent on canning at risk, the canners would lose their source of income and be phased out of the system. This is a reasonable concern. The recommendations of this thesis aim to add a layer of formality to canning without totally formalizing the system and turning canning into a city system. The value in canning is that it provides a source of income to those who do not fit in the traditional job market. Formalizing the system would eliminate all the positive aspects of informality. A respondent stated in their qualitative answer: “If you formalize...you take away the income from those who clearly need it, these are the people who are having trouble getting jobs to begin with, or need to earn more money on their own schedules.” Therefore to make canning “an actual job, and you remove their income, which is necessary for many of those who participate in canning.”

The survey respondents also supported several additions to the existing recycling infrastructure in New York City. The survey question was designed to allow multiple answers from each respondent, resulting in 210 total responses for the question. The following percentages are calculated out of 210 responses.
### Table 6. Survey Respondents Recycling Infrastructure Wish-List

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>More recycling bottle-deposit centers</td>
<td>51</td>
<td>24.3 %</td>
</tr>
<tr>
<td>Single stream recycling</td>
<td>60</td>
<td>28.6 %</td>
</tr>
<tr>
<td>PR &amp; posters about recycling on the subway, etc.</td>
<td>41</td>
<td>19.5 %</td>
</tr>
<tr>
<td>Formalize informal recycling by creating recycling jobs</td>
<td>53</td>
<td>25.2 %</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>2.4 %</td>
</tr>
<tr>
<td><strong>Total Responses</strong></td>
<td><strong>210</strong></td>
<td><strong>100.0 %</strong></td>
</tr>
</tbody>
</table>

*Source: Olivia Jovine, Digital Survey 2015*

Survey responses indicate that the top three additions to the current system are: the introduction of single stream recycling to the city; formalizing the informal by creating jobs; and more recycling bottle-deposit centers in New York City. Generally, there was overall support for all suggested categories. For the further development of this thesis respondents should be asked to rank the suggested categories on scale from one to 5, to determine levels of support.
CONCLUSION & RECOMMENDATIONS

When the Bottle Bill was enacted in 1982 legislators were trying to remediate an environmental problem, however the implications of the bill were not only environmental but social. The Bottle Bill created an artificial economy for bottles and cans in New York State. When the Bottle Bill was enacted, legislators thought the deposit law would motivate consumers to redeem their recycling. After all, if consumers did not redeem the deposit they were essentially being taxed at five cents per beverage container. Unfortunately the Bottle Bill does not provide enough financial incentive for the average consumer to comply. However, low-income citizens whose employment wage is less than their recycling wage are able to subsist on the artificial Bottle Bill economy. For canners, five cents is enough to sustain daily life. As a result, those far below the poverty line have become responsible for picking-up where the consumer has left off. As aforementioned, the amount earned redeeming bottles and cans is not enough to truly maintain a decent quality of life. Canning is dangerous, labor intensive and receives no respect or recognition from society at large. The Bottle Bill was created to solve an environmental problem; an unforeseen consequence was that it created a social problem. There is some good that comes from the Bottle Bill, the artificial economy creates jobs for canners; but because it is an informal economy, canners are forced to work unprotected and in dangerous conditions.

Ultimately the Bottle Bill was “lazy legislation.” A deposit law only works for a material that does not have a market value. There is already a robust national economy for the recycling of metals, glass and plastic. Currently, there is a national market price for post-consumer aluminum, glass and PET plastics. The artificial market created under the Bottle Bill competes directly with the national market. Unfortunately, the system of redemption through canning will never be able to perform at the economy of scale necessary to be competitive at national market rates. In the current system redemption centers are prohibited from crushing and bailing their products. This means that the redemption centers are not able to recycle efficiently. This is because the volume of materials collected is significantly reduced due to storage limitations. Bags of bottles and cans are unwieldy and difficult to store, this is one of the largest challenges for redemption centers.

Furthermore redemption centers and canners are often criminalized because New York City is concerned about large-scale organized diversions of valuable materials from the waste stream. If bottles and cans are collected from curb-side recycling the canner is technically stealing from the city, because those materials do not go to SIMS where they are needed to honor the municipal contracts. Even though canning is illegal the city does not discourage canning on a strictly individual basis. However, canning by an organized, illegal group with a vehicle is actively discouraged by the city through a system of fines. As such, five suitable locations have been identified using ArcMap GIS software. Increasing the number and accessibility to redemption centers will limit the opportunities for illegal activities, namely unlicensed mobile redemption centers to operate in the city. The most suitable location for the new redemption facility was 164-26 Liberty Avenue in Queens, New York. This location was selected because it has the widest area of accessibility on foot. Therefore it can provide the widest possible benefit to canners.

The top five suitable sites are: 4435 White Plains Rd, Bronx; 420 Morris Park Ave, Bronx; 74 Charleston St, New York; 176 Myrtle Ave, BK; and 164-26 Liberty Ave, Queens. These sites represent currently vacant lots that are available for development.
The reason redemption hits the city's bottom line is because there are two systems in place for recycling metal, glass and plastic: the municipal system and the Bottle Bill system, this is not efficient. The municipal system is not only safer; the municipal system operates at a larger economy of scale and is more efficient. Redemption Centers and canners face further adversity from grocery stores who are upset about the additional burden of collecting deposits. Retail locations carry the burden of collecting bottles and cans and are unsupported by the state and the deposit initiator.

In conclusion, recycling under the Bottle Bill does not remedy an environmental problem nor does it provide a long term solution to a social problem. However, by imagining creative forms of a quasi-formalized informal system some social benefits can be realized. Non-profit agencies like Sure We Can create a provide community and provide support to canners, but this is a rare example. Redemption centers are debt-burdened and hardened by adversity. The only way to truly provide benefits to canners is for the government to enhance its social services. Sadly, the best way to take care of canners is through the already established modes of government care: increasing Medicaid, social security, expanding benefits to undocumented immigrants and the homeless. These social needs cannot be remedied by the Bottle Bill. However, there are several possible solutions for improving the Bottle Bill as it is currently established; as well as an opportunity for reimagining the Bottle Bill into a completely independent economy. The following recommendations explore these possible solutions.

**Improving the Bottle Bill**

Recommendations for improving the legislation as it is currently enacted; with a goal towards increased social benefit for canners and recycling efficiency.

**Table 7. Bottle Bill Recommendations Chart**

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Stakeholders</th>
<th>Proposed Funding Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>An Association of Canners</td>
<td>Redemption Centers; Canners; Environmental &amp; Social Justice Action Groups</td>
<td>Charitable Foundations; Each Membership Agency; Redemption Centers</td>
</tr>
<tr>
<td>State Support for the Bottle Bill</td>
<td>New York State Department of Environmental Conservation's Department of Taxation &amp; Finance</td>
<td>Unclaimed Consumer Deposits</td>
</tr>
<tr>
<td>Increased Participation in Recycling City Wide</td>
<td>Grow NYC; Canners</td>
<td>City Council; State of New York</td>
</tr>
<tr>
<td>Educational Campaigns for School Children</td>
<td>Grown NYC; NYC Public Schools; Redemption Centers</td>
<td>City Council</td>
</tr>
</tbody>
</table>

Without totally rewriting the legislation, there are opportunities to remediate the current challenges associated with the Bottle Bill. An ‘association of canners’ could be formed to represent: canners, redemption centers, and social and environmental justice advocates. Ana Martinez De Luco, said that “it would give canners a voice, if you don’t speak the language you are afraid of being cheated. An association would have to overcome the cultural barriers that exist in the canning community between the different language speaking groups.” Starting an association would be a challenge but
with time and trust could be established. As seen in Brazil, cooperatives can also be a solution. But, for a cooperative to form the structure of the economy would have to completely change. SIMS is contracted with the city there is currently no place in the economy for smaller, less competitive Materials Recovery Facilities (MRFs). There is no value to the labor intensive sorting process done by redemption centers, when SIMS can efficiently sort large volumes with state-of-the-art machines. However, the question that must be asked is: who does the city want to benefit? Canning isn’t really about recycling; it is about people’s lives and peoples jobs. And that is what should be protected. Canners need community and support, like what is offered at Sure We Can. A networked association of canners would be the first step towards achieving support city-wide.

An association would a dimension of formality to the practice of canning. An association of canners (networked through all 40 redemption centers in the city) would mean more political clout for the canners, giving these marginalized people a voice. As seen in the Brazil case study, when informal recyclers are given recognition for their work they feel proud of their occupation; it also means the conditions of the centers are improved. An association would give voice to those who need support. By partnering with advocacy groups the association would protect individual canners and redemption centers from the deposit initiators (private companies like Pepsi Cola, Phoenix, etc.). This is especially important for ensuring that all parties comply with the legislation. The advocacy groups and association could act as a “watch dog” entity that would ensure deposit initiators picked-up on time, provided necessary payment, and accommodated all redemption needs as stated under the law. Furthermore an association would enhance political recognition for non-profit agencies like Sure We Can, this would give non-profit groups traction with the Department of Sanitation, Grow NYC and other municipal entities responsible for the management of waste.

The Bigger Better Bottle Bill was passed in 2009, because the amendment allocated the un-redeemed deposit money back to New York State. Before 2009, private beverage companies were keeping millions of unclaimed consumer deposits. Now the money is appropriately returned to the state. When the bill was passed, it said that some of the funds would go back into to the redemption centers; but the state has yet to release any of the funds to help redemption centers. In 2009 redemption centers were ecstatic because they thought their business would benefit from those funds, unfortunately there has been no follow-through. As a result, this thesis recommends that the appropriate action is taken so that redemption centers receive a portion of the funds generated from the consumer’s unclaimed deposits.

New York State receives over $100 million dollars annually in unclaimed deposits and beverage companies also see sizable returns; in fact, nearly 20 percent of all unclaimed deposits are returned to the bottle distributor. The Bottle Bill is state law and demands the operation of redemption centers; however the state provides no financial support for the centers to operate. In 2005, with the expansion of the Bottle Bill the handling fee was increased from two cents to 35 cents. This gave redemption centers the ability to operate and maintain costs as a private for-profit businesses. As a result, redemption centers started to open all around the city. But maintaining daily operation costs, labor costs, and rental costs are an overwhelming burden for redemption centers around the city. In the words of Ana Martinez De Luco, “you cannot make a business out of redemption.” If the state supported redemption centers, more facilities could operate around the city. It would benefit canners to have more redemption centers because it would reduce the distances traveled on foot. As the distance traveled on foot is reduced the efficiency of redemption is increased; it means canners do not
have to wait in long lines at reverse vending machine locations or wait for unreliable truck pick-ups. Funds from the state government could be realized in the form of a tax breaks on property or subsidized rental rates. Redemption centers are providing a service to the state, as mandated by state law. Ideally redemption centers would operate with NGO status to eliminate the issue of redemption centers cutting corners to turn a profit (such as canners of the full redemption value). With funding support, redemption centers could hire canners on a rotating basis to perform a series of tasks for the center: canning, sorting, receiving materials, organizing pick-ups, etc. With the state supporting property costs, the redemption center would be able to break even annually with room to pay a decent salary to staff. Increased funding would also allow for the possibility of increasing staff. Canners working for the redemption center would receive salary and job security, significantly improving their quality of life.

Recycling participation needs to be improved citywide, specifically curb-side recycling participation. A recommendation for promoting participation would be to follow San Francisco’s auditing system. Grow NYC could hire a team of canners to perform municipal waste audits for the city. Canners would be trained and employed by Grow NYC with funding from the City Council. The auditors would record data on participation and accuracy of sorting of the curb-side program. Based on the data collected, Grow NYC could perform target outreach to residents and landlords. The City Council funds Grow NYC, and with state support, could provide additional funding for a team of Grow NYC canners. If the city could operate at a higher rate of diversion the economics of the two competing recycling systems (the municipal system operating at national rates and the Bottle Bill system operating at artificial rates) would balance out. If New York City were operating at a magnified rate, the amount diverted by canning would be rendered insignificant. Especially since it is impossible for canners to operate at the same economy of scale as the city. Poor diversion rates indicated by the SIMS annual tonnage reports are not just an indication that canning has become more prominent, a depression in rates is an indication that the city’s residents are still bad recyclers. New Yorkers display particularly pathetic recycling behaviors, especially when compared to San Franciscans. A solution to this would be to increase Grow NYC’s outreach endeavors; specifically, to target outreach as done in San Francisco. Like San Francisco’s Green Jobs Team, Grow NYC would develop an outreach team for disseminating personalized educational messaging. The city cannot blame the reduction of valuables from the waste stream solely on canning; firstly, canners collect bottles and cans from commercial businesses and trash cans, not only curbside recycling and furthermore, the volumes of recycling collected by canners on an annual basis are not high enough to justify significant losses to city revenue. Therefore, the city is to blame for the poor diversion rate of recyclables through the municipal curb-side system. Similarly, enhancing public space recycling would enforce the city’s recycling messaging. Public space recycling provides a visible reminder, on a daily basis, that New York City recycles. As Michael Reiser described, public space recycling is not without its flaws but ultimately is invaluable. The Department of Sanitation should continue to increase the initiative, as it has been doing under Commissioner Kathrine García.
Finally, to combat the negative perception of redemption centers an educational campaign is needed. Survey results show that New Yorkers perceive redemption centers as dangerous, unsightly and unclean. To combat this negative association with redemption centers the city could foster a new relationship between redemption centers and schools. Instead of a traditional “can drive” students could collect bottles and cans from their homes and classrooms and redeem them at the local center, the deposits earned could then be donated to a charity of their choice. This activity would not only promote recycling, it would forge a new image of the redemption center environment. Students would also learn that beverage containers have value and encourage them to be more proactive recyclers.

Although these are creative and financially feasible recommendations the suggestions are bound to the Bottle Bill legislation as it is written now, thus the recommendations ignore the environmental limitations of the legislation. Therefore the final recommendation of this thesis is to reimagine the Bottle Bill.

![The Five Suitable Sites for a New Redemption Center. Images source: Google Earth.](image_url)

**The Bottle Bill Reimagined**

The Bottle Bill creates a system for recycling bottles and cans that does not motivate the consumer, does not operate at an efficient economy of scale, and captures the labor of the extremely marginalized people putting them in a dangerous and unprotected occupation – “canning”. For these reasons, the Bottle Bill has failed. Therefore, the final recommendation of this thesis is to propose completely removing the Bottle Bill by shifting the legislation to a material that does not have a national market value; that way there would be no competition between the municipality and the state’s beverage container recycling economies.

The legislation should be shifted to the recovery of materials that have no monetary value but would have an ecological benefit if handled correctly. This thesis proposes the following materials: plastic bags, textiles, or compost recycling. New Yorkers discard nearly 2,000 tons of plastic bags every week, currently businesses accept clean undamaged plastic bags for recycling but awareness is low and facilities are poorly publicized (Grow NYC). The average New Yorker tosses 46 pounds of clothing and other textiles in the trash each year; and city-wide residents discard 193,000 tons of textiles every year (Grow NYC). Furthermore, New York City residents throw away 600,000 tons of food waste per year through the residential waste stream (Grow NYC). Clearly, these materials should be diverted from the waste stream. The capture of plastic bags, textiles and compost would have huge ecological benefits and significantly reduce the volumes of waste sent to landfills and incinerators each year. The non-profit redemption centers, the residents of the city, and the canners would all have a new relationship.
to the materials because the “deposit” could be increased from five cents per bottle to twenty five cents per pound (or some similarly high value). By increasing the deposit value, consumers would also be motivated to collect and redeem their materials; a current area of weakness for the bottle bill.

The reimagined Bottle Bill is dependent on the formation of new, non-profit redemption centers. The locations for new redemption centers have been identified through a suitability model, based on lot area and average assessed lot value (see appendix). The non-profit redemption centers would be supported by the city’s Grow NYC agency with funds from the DEC’s unclaimed bottle deposits. The non-profit redemption centers would be staffed by canners, volunteers, and members of the community. Furthermore, a license could be granted to canners for the official collection of plastic bags, textiles, or compost from public space facilities. The city could support this activity because it would not be seen as “stealing from the city” which is how canning is viewed today. In this reimagined system competing economies would not be an issue, as a result canners could be formally recognized but not formalized. This is important because by formalizing the practice of canning the most vulnerable members of the community would be displaced from that system of employment. Therefore, canning should be recognized and supported but not overburdened with regulations. Some canners can be formalized through the proposed Grow NYC training program, or by being employed by redemption centers on a rotating basis. And the city would benefit from enhanced consumer recognition for sustainability and because less waste would be sent to landfills.

The unclaimed bottle deposit funds that enter the New York State Department of Environmental Conservation’s budget can be utilized for the development of the non-profit redemption centers. These funds enter the DEC’s Department of Tax & Finance on an annual basis at an amount upwards of $100 million dollars. The state can allocate a percentage to each region within New York State, based on population. New York City represents 42% of the state’s population, therefore the DEC should allocate proportionately more funds to the city (US Census Bureau). Grow NYC, an independent nonprofit agency founded by the City Council, is responsible for enhancing the DSNY’s recycling outreach and education. Grow NYC would accept the funds allocated from the DEC and manage the distribution to non-profit redemption centers. Grow NYC receives oversight from the City Council but does not have administrative and bureaucratic hurdles like the DSNY, Grow NYC is also committed to recycling messaging, education and outreach; therefore it is a natural fit for the future development of the reimagined Bottle Bill.

Once the state funds have been allocated, each redemption center with non-profit status could apply for Grow NYC ‘Redemption Center Grants’. Grow NYC would also provide communication and guidance to centers about the utilization of these funds. Some possible applications of funds for the redemption centers would be: investments for infrastructure and utility costs, rent or tax subsidies, labor costs, outreach and education costs. Grow NYC currently has initiatives in textile recycling and composting, therefore extending the initiatives to redemption centers would be easy if the funds were in place for the initial capital costs.

The presence of non-canning activity at redemption centers would help transform the image of redemption centers; the centers would become locations for all kinds of ecological stewardship. On this note, it is important that funding is available for education on sustainability awareness. GrowNYC has launched multiple publicity campaigns. However public schools could be encouraged by City Council or the Mayor’s Office to pursue sustainability outreach independently. One such activity could be the aforementioned school sponsored “can drive”. The non-profit redemption centers would be a
center for sustainability, stewardship and community; gardens, galleries, and classrooms would enhance the space and make the center more inviting. The students who participate in redemption will learn from a young age that redemption centers are not dangerous or uninviting, furthermore the activity will teach recycling awareness and responsibility for their waste. In this recommendation, Grow NYC would provide stewardship of the allocated unclaimed deposit funds, recycling and composting awareness, and education initiatives with public schools around the city.

The Department of Environmental Conservation needs to be responsible for holding deposit initiators accountable to their legislation. Deposit initiators intentional delay the picking-up of products from redemption centers. Delaying pick-up has two consequences: the redemption center runs out of storage space and it runs out of cash. According to Ana Martinez De Luco, this is intentionally done by the deposit initiator because they do not want to be responsible for bottle deposits, it is a way of sabotaging the redemption center. Ana said that “other redemption centers run out of space much more quickly than Sure We Can, they also have a lot of loans to pay, therefore by delaying pick-up the deposit initiator hopes to kill redemption.” In the redemption center business, you have to pay for the labor intensive operations and the expensive city rents. In the current system, redemption centers have to call the deposit initiator and insist that the company come and pick-up on time. Sure We Can wrote a personal letter to the Manhattan Beer Company and called, demanding a pick-up otherwise they would be forced to make a formal protest. Eventually, Manhattan Beer Company complied with their request. There are other egregious examples of deposit initiators violating their responsibilities; for example, the Phoenix Beverage Company owed redemption centers pick-ups from as far back as 2012. An association amongst the redemption centers would give more power to fight the big companies. As an example, Sure We Can has used its NGO status to help other redemption centers fight for the money they are owed by Phoenix. However, more than association amongst redemption centers is needed to remediate the chronic violations by the deposit initiators. It is the state’s responsibility to hold the large companies responsible in a top-down system of regulation; preferably though audits and fines.

The Bottle Bill is state mandated law, with clear roles and responsibilities for redemption centers, deposit initiators, and individuals. These laws are currently not being abided as there is not enforcement system in place. As a proposal, I recommend starting a ‘DEC Redemption Center Hotline’ essentially a dedicated state personal responsible for receiving complaints from redemption centers on deposit initiator performance. Data can be tabulated over the course of a year. At the end of the year, deposit initiators that have multiple violations can be issued a warning and a fine. This would provide incentive for deposit initiators to maintain good working relationships with the redemption centers they pick-up from, because it would mean avoiding a substantial fine.

This proposed recommendation aims to tackle issues currently associated with the way redemption centers operate under the Bottle Bill. The recommendation provides the following areas of improvement: bridging gaps in funding by procuring funds from the state; holistic management by Grow NYC; enforcing DEC legislation; enhancing education and outreach for redemption centers. The reimagined Bottle Bill would encourage the removal of ecologically harmful materials from the waste stream (plastic bags, textiles and compost). The recommendation also allows for formal and informal processes to occur, but would ensure only one market price for the materials being recovered. Redemption centers would be reimagined as community environmental centers where the collection and processing of the material would take place, composting, gardening and education would also take place on site. The price of redeeming the new material would be considerably higher than 5
cents, to encourage consumers to participate and also to provide greater benefits to the informal sector workers that would surly evolve under the new legislation. Redemption centers would be supported by the city and state to enhance community environmental awareness and action. The centers would provide a public good, provide community for the collectors of the designated material and foster true urban-ecological stewardship.

In conclusion, recycling under the Bottle Bill does not remedy an environmental problem nor does it provide a long term solution to a social problem. However, by imagining redemption centers as ecological centers for education, community and sustainability it is possible to imagine remediating some of the Bottle Bill’s short-comings. If the State, city, local redemption centers and an association of canners work together – ecological and social injustices can be remediated. Paramount to achieving this goal is a new economy that would be invented around a new material, an economy that would not compete with national rates and would motivate consumers and provide adequate wages to canners.
RESOURCES


Marian R. Chertow, Social Research, Vol. 65, No. 1, GARBAGE (Spring 1998), pp. 31-53


Recycling as Economic Development: We Can Invent Our Future


SF Environment, a Department of the City and County of San Francisco. http://www.sfenvironment.org/zero-waste/overview/goals


The Economics of Municipal Solid Waste


The Economics of Resource Recovery from Municipal Solid Waste


Waste, Industrial Ecology, and Sustainability


Figure 1. ArcMap Suitability Model – Process of Spatial Analysis (Pg. 7)
Original image created by Olivia Jovine using ArcMap Software. 2015.

Figure 2. ArcMap Suitability Model – Areas Removed from Analysis (Pg. 7)
Original image created by Olivia Jovine using ArcMap Software. 2015.

Figure 3. Type 1 & Type 2 Public Space Recycling Receptacles (Pg. 16)

Figure 4. Peter Grannis (Pg. 20)
Image Source: http://www.nypirg.org/enviro/solidwaste/bottlebill/gallery.html

Figure 5. San Francisco’s Municipal Cart Auditors at Work (Pg. 34)
APPENDIX | INTERVIEW & MAPPING

Qualitative Survey Responses ................................................................. Page 63
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Bronx Public Space Recycling ................................................................. Page 70
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SELECTED QUALITATIVE SURVEY RESPONSES

1. More public recycling bins would be a huge improvement, on streets and in the subway.

2. Simply by legalizing the activity and acknowledging that these individuals serve a valuable social function, you legitimize them in the eyes of the public at large. This would empower more people, who fear legal action, to engage in the process.

3. I'm all for formalizing informal recycling but it bothers me that it will take away the livelihood of these people who are already in poverty.

4. The infrastructure for recycling is so limited compared to places I have lived or worked in (Canada and Europe). I see garbage cans overflowing in my workplace and on the streets with recyclable materials.

5. I think by adding more recycling bins and making them much more accessible could increase recycling and reduce litter.

6. There are so few recycling bins on the streets that it is hard to recycle! I wish there were more around!

7. I think creating recycling jobs would lead to problems for homeless people who rely on collecting recyclables as their source of income, and they would be pushed out of their own market.

8. People that recycle on the street generate a source of income for themselves and still help with the recycling process. I'm surprised to hear that this is illegal!

9. I like the idea of adding posters to help make people aware of recycling, but I feel that if informal recycling would be phased out, those people who rely on that extra income would suffer since they wouldn't be the ones getting the new recycling jobs. I also think it is better to keep recycling separate, otherwise separating recycling becomes the responsibility of the city; this would be cost ineffective due to the increase of manpower required to do this which takes away from other programs that need funding.

10. Make it mandatory and easy to use. I use to live in a country where recycling was a norm because of the way the government pushed the legislation into all facets of life. Free recycling cans, all public waste bins have recycling and it was ingrained in the culture through schools. The same is happening now with organics. There needs to be a more centralized and better run system for all of it. NYC seems very far behind and too fragmented in its approach.

11. I mostly find it troubling because the "informal recycling" is actually just people going through other people's trash. It makes me nervous that they might be looking for not just bottles and cans but credit card and bank info as well. It feels like a violation of personal space, especially when it's done in a trash area that's behind a closed gate (meaning that they are trespassing on top of rummaging through someone's trash) and as a young woman coming home late and night it makes me feel less safe that any form of illegal activity is happening on my street.

12. If you formalize canning (what you're calling "informal recycling," you take away the income from those who clearly need it. These are the people who are having trouble getting jobs to begin with, or need to earn more money on their own schedules. Make it an actual job, and you remove their income, which is necessary for many of those who participate in canning. And this adds more people to city payroll. And this not only gives the government permission to, but requires them to go through our trash on a regular basis. No thank you.
13. I have lived on and off in NY for years. Informal recycling does not bother me; in fact the system could be decriminalized and improved by offering small rewards for materials like cardboard and paper at recycling centers.

14. Recycling centers tend to be dangerous locations, and are often located in more residential areas. Supermarkets or redemption center that offer the bottle deposit should have staff on hand to increase the safety of these facilities.

15. I brought cans to a recycle center for cash...when I was 10 years old. Get a job.
REDEMPTION CENTER SUITABILITY MODEL
Selected Sites Based on Average Lot Size & Assessed Lot Value

4435 White Plains Rd, Bronx NY 10470
Zoning District: M-1, Split Zone with CD-3 Overlay
Building Class: V1
Land Use: 11
Owner: Blank
Lot Area: 1,7980 Sq. Ft. (155 x 1147)
Assessed Lot Value: $4,840,582.00

420 Morris Park Ave, Bronx NY 10460
Zoning District: M-1
Building Class: V1
Land Use: 11
Private Ownership
Lot Area: 25,200 Sq. Ft. (200 x 126)
Assessed Lot Value: $663,304.00

74 Charlton St, New York, NY 10014
Zoning District: M-2 with Split District 100
Building Class: V1
Land Use: 11
Private Ownership
Lot Area: 1,510 Sq. Ft. (18 x 156)
Assessed Lot Value: $123,870.00

176 Myrtle Ave, Brooklyn, NY 11201
Zoning District: K-9/C 4 with Split District 83
Building Class: V1
Land Use: 11
Private Ownership
Lot Area: 12,400 Sq. Ft. (120 x 103)
Assessed Lot Value: $389,440.00

164-26 Liberty Ave, Queens, NY 114354
Zoning District: M-1
Building Class: V1
Land Use: 11
Private Ownership
Lot Area: 06,000 Sq. Ft. (200 x 160)
Assessed Lot Value: $11,037.00

Sources: Online 2014, Johnson County, Jax County, City of New York

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Redemption Centers & Public Space Recycling Bins
New York City

Where are these "recycling deserts"?
Overlaying the existing redemption centers with the existing public space recycling bins, one can see that consumers and residents of the city are well serviced by public recycling infrastructure.

However, areas of improvement could be made in the following areas: Staten Island, South Brooklyn, and North-Eastern Queens.

Legend

- Redemption Centers
- Public Space Recycling Bins
Redemption Centers & Public Space Recycling Bins
New York City

Legend
• Redemption Centers with Address
QUEENS PUBLIC RECYCLING LOCATIONS

SITE TYPE KEY
- GreenThumb
- Indoor
- Outdoor
- Subroperfy

DATA SOURCES:
- NYC Open Data/Public Recycling Bin 2014-2016 DMY
- NYC Open Data of the Big Apple/MapUTO 2016 DCP

0 2 4 Miles