Beverage Container Recycling

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Container Recycling Institute
May 29, 2012

Container Recycling Institute:
Striving to make North America a global model for the collection and quality recycling of packaging materials.
AGENDA

- Overview of container deposit-refund in North America
- Where beverage containers are generated
- Recycling economics, generally
- Economics of container deposit-refund
- Different models of container deposit-refund (operational & financial)
- Impact on municipalities
- Compatibility with single stream curbside
- Quality of materials from single stream
- Jobs
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Beverage containers are 5.4% of the waste stream, by weight, but 20% of the waste stream, by energy or GHG.
U.S. States with Container Deposit Laws

50% of all beverage containers recycled in the U.S. come from these 10 states
Canadian Provinces with CDL

Quebec
British Columbia
Newfoundland
Nova Scotia
Ontario
Alberta
New Brunswick
Saskatchewan
Prince Edward Island
Yukon
Worldwide Trend Toward New and Expanded Beverage Container Deposit Laws (Since 2000)

- Total of 45 programs worldwide
- NEW since 2005: Germany, Hawaii, the Northern Territory of Australia, Guam, Estonia, Croatia, Fiji and Turks and Caicos
- Now 6 states have expanded laws (CA, OR, HI, CT, NY and ME)
- OR, NY and CT Expanded in 2009 (water)
- Ontario expanded in 2007 (wine, liquor); Alberta added milk in 2009
Recovery Rates

- California: 82% (includes curbside)
- OR: 75% (2009)
- HI: 76% for 2010/11
- CA, OR and HI have a 5-cent deposit (CA is 10 cents on larger containers)
- Range from 67% in NY (2007) to 97% in MI (10 cent deposit)
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Where are beverage containers generated?

- Consumed on the go
- Bars, restaurants, shopping malls, gas stations, convenience stores, vending machines, schools, sporting events, concerts, fairs, etc.
- Industry estimates that one third of all beverages are consumed away from home (based on location of sale)
- For PET, an estimated 63% are generated away from home (BEAR, 2002)
“Consumers are much less likely to recycle their beverage packages when away from home or at work”

Source: July 2010 Beverage Pulse, “Environmental Concerns: The impact on beverage and package decisions”
Fig 2. Per Capita Beverage Sales, Recycling & Wasting, 1970-2006

© Container Recycling Institute, 2008.
PET Bottle Sales and Wasting in the U.S., 1991-2009

Graph showing the trend of PET bottle sales and wasting from 1991 to 2009.

- **Sold** (blue line)
- **Wasted** (red line)

Yearly data points are marked with dots on the graph.
Container Deposit Return Programs Result in Higher Beverage Container Recycling Rates

Average Beverage Container Recycling Rates
(By Weight)

Source: CRI’s 2008 Beverage Market Data Analysis (using 2006 data)
Ontario Canada: Wine/Spirits out of “Blue Box” .... added to deposit program

<table>
<thead>
<tr>
<th>Wine/Spirits</th>
<th>CY ‘06 Blue Box</th>
<th>07/08 Deposit</th>
<th>2010 Deposit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass</td>
<td>69%</td>
<td>69%</td>
<td>80%</td>
</tr>
<tr>
<td>PET</td>
<td>22.1%</td>
<td>34%</td>
<td>53%</td>
</tr>
<tr>
<td>Tetra/Bag in box</td>
<td>N/A</td>
<td>29%</td>
<td>33%</td>
</tr>
<tr>
<td>Aluminum Cans</td>
<td>44.9%</td>
<td>74%</td>
<td>82%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>67%</td>
<td>77%</td>
</tr>
</tbody>
</table>

- The Beer Store Overall Recycling Rate: 94%
  (for combination of beer program and wine/spirits)
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### $ VALUE OF LANDFILLED MATERIALS

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Price per ton</th>
<th>Value of Existing Scrap Recycling</th>
<th>Value of Scrap Currently Wasted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>$1,300</td>
<td>$910 million</td>
<td>$1 billion</td>
</tr>
<tr>
<td>PET</td>
<td>$640</td>
<td>$325 million</td>
<td>$1.3 billion</td>
</tr>
<tr>
<td>Glass</td>
<td>$25</td>
<td>$68 million</td>
<td>$175 million</td>
</tr>
<tr>
<td>Total</td>
<td>N/A</td>
<td>$1,303</td>
<td>$2.475 billion</td>
</tr>
</tbody>
</table>
“Cost Per Ton” concept is very misleading when used with different mixes of material types

- Ontario Blue Box net costs per ton, based on 2010
- Cost methodology is determined by activity-based-costing, peer reviewed, so that each producer pays their fair share
- Aluminum, PET were at historic lows, and prices have increased dramatically
  - Aluminum -$532/ton (net revenue)
  - PET $1,000/ton
- Glass $118 – 152/ton
- Newspaper $19/ton
- Plastics, laminates and composites can cost up to 20 times as much as other materials
- Collection frequency strong driver of cost
Cost to Recycle in Ontario, Canada
(by category, per ton)

- Polystyrene: $2,257
- PET Bottles: $1,000
- HDPE Bottles: $685
- Aluminum: ($532)
- Old Corrugated Containers: $404
- Steel: $149
- Glass Average: $135
- Other Print: $61
- Newspaper/Mags: $19

Cost to Recycle Per Ton
Figure 3. Recycling Rates of Selected Products, 2009*

<table>
<thead>
<tr>
<th>Products</th>
<th>Recycling Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Batteries</td>
<td>95.7</td>
</tr>
<tr>
<td>Office-type Papers</td>
<td>74.2</td>
</tr>
<tr>
<td>Steel Cans</td>
<td>66.0</td>
</tr>
<tr>
<td>Yard Trimmings</td>
<td>59.9</td>
</tr>
<tr>
<td>Aluminum Beer &amp; Soda Cans</td>
<td>50.7</td>
</tr>
<tr>
<td>Tires</td>
<td>35.3</td>
</tr>
<tr>
<td>Glass Containers</td>
<td>31.1</td>
</tr>
<tr>
<td>HDPE Natural (white translucent) Bottles</td>
<td>28.9</td>
</tr>
<tr>
<td>PET Bottles &amp; Jars</td>
<td>28.0</td>
</tr>
</tbody>
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*Does not include combustion (with energy recovery).

Source: USEPA
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NET Cost of Container Deposit Programs

- Net cost = expenses – revenues (scrap value and unredeemed deposits)
- California, less than ½ cent per container
- Hawaii, 1 cent per container
- Oregon, no external funding
California program

- Aluminum and PET: cost of recycling is less than scrap value (2012)
- Manufacturers make no payments for AL and PET
- California curbside programs receive payments that total over $100 million per year for recycling beverage containers
  - Return of deposit ($81 million in 2010)
  - Processing payments ($9 million in 2010)
  - Curbside payments ($15 million in 2010)
  - Plus scrap value (approx. $30 million in 2011)
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Operational Models

- Return-to-retail only
- Redemption centers only
- Combination of return-to-retail and redemption centers
- Mobile collection sites in rural areas
- Community collection programs (charities, libraries, etc.)
Financial Models

- Single state fund (California and Hawaii)
- Single industry-operated fund (Oregon, Canadian provinces)
- No common fund, each distributor manages their own revenues and expenses (all other US states, some European programs)
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Cost Savings for Municipalities

SAVINGS ON:
- Collection costs for recyclables
- Processing costs for recyclables
- Collection costs for disposal
- Landfill tipping fees
- Litter collection pick-up costs
- Collection from public litter bins
- Storm drain (or waterway) cleanup costs

REVENUE LOST:
- Sale of recyclables (scrap value)
Bottle Bills Decrease Taxpayer Burden

“...it (the Returnable Container Act - RCA) has internalized the cost of solid waste management for beverage containers covered by the RCA...Therefore the taxpayer does not have to subsidize the disposal of empty beverage containers.”

Then-Governor of New York George Pataki
Congressional Research Service, 1993 regarding container deposit-refund and curbside recycling

- “Both systems can serve as elements of comprehensive recycling programs. Neither constitutes a comprehensive program by itself. Neither excludes the use of the other.”
- “Deposit systems skim potential sources of revenue from curbside programs, but they also reduce the operating costs of curbside programs. Local governments would appear to achieve greater diversion of solid waste from disposal at a lower cost per ton if both a bottle bill and a curbside collection program were in place.”
Comparing Curbside Recycling Access and Beverage Container Recycling Rates (1990-2010)

- PET recycling rate
- Glass recycling rate
- Aluminum can recycling rate
- U.S. Population served by curbside programs (Biocycle 1990-1996; AF&PA 1997-2010)
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In the average single-stream collection program, if you collect 100 tons of recyclables at the curb, on average, 75 tons will actually be recycled into new products, and most of the rest will be landfilled.
U.S. (PET) reclaimers reported yield losses ranging from \textbf{24.4} percent for deposit bottles to \textbf{32.2} percent for curbside material. Some non-PET items can be recycled elsewhere, like caps.

Source: NAPCOR/APR
Paper mills that receive materials from single-stream MRFs have contamination rates that are as high as **18** percent.
Single-stream contamination rate of aluminum ranges from 2 to 11 percent.
Single Stream and Glass

- At a SS MRF, even with best practices, container glass recycling is costly and extremely challenging because of breakage and contamination.

![Figure 1: End-Markets for Collected Glass](Source: Strategic Materials)

**Figure 1: End-Markets for Collected Glass**

(Source: Strategic Materials)

- Trash (landfill)
- Glass Fines (end-market: sandblasting, landfill daily cover, road base)
- Recycled (end-market: containers & fibreglass)
Deposit vs. Single Stream Glass
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Returning to Work
Understanding the Domestic Jobs Impacts from Different Methods of Recycling Beverage Containers

By Jeffery Morris, Ph.D., and Clarissa Morawski
for the Container Recycling Institute
December 2011
**FLOW CHART: DOMESTIC LABOR (USA) DIRECTLY RELATED TO COLLECTION OF BEVERAGE CONTAINERS FOR RECYCLING AND DISPOSAL**

**CONTAINER REDEMPTION:**
- Depot
- RVM
- Retail

**WASTE/GARBAGE COLLECTION**
- Transfer

**LANDFILL**

**Primary Processing / Material Recovery Facility (MRF)**
- PET RECYCLING / RECLAIMERS
- GLASS BENEFICIATION
- ALUMINUM CLEANING

**PET RECYCLING / RECLAIMERS**
- PX
- TPA
- MEG
- APLITE
- SILICA
- BORATE
- SODA ASH
- LIMESTONE

**GLASS BENEFICIATION**

**ALUMINUM CLEANING**

**EXPORT**

**VIRGIN PET POLYMERIZATION**

**CURBSIDE COLLECTION: MANUAL AUTOMATED**
- Transfer

**CONSUMPTION:**
- AL; PET; GLASS SOLD/GENERATED (in tons)

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Conclusions

► Improved material quality directly impacts U.S. jobs; clean/separated recyclables more likely to stay in the U.S. for use by domestic manufacturers rather than be exported to foreign markets

► A deposit refund collection system for beverage containers creates many more domestic jobs than curbside collection.
Jobs Calculator

► Input two-letter code for State to automatically calculate the number of jobs that will be created

► User can customize and change certain inputs


► [http://www.container-recycling.org/issues/jobs.htm](http://www.container-recycling.org/issues/jobs.htm)

► Jobs page has CRI Study, “Returning to Work,” the jobs calculator, and links to several other studies on recycling jobs
Beverage Container Litter can be reduced
# Bottle Bills Reduce Litter

<table>
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<tr>
<th>State</th>
<th>Beverage Container Litter Reduced</th>
<th>Total Litter Reduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>NY</td>
<td>70 - 80%</td>
<td>30%</td>
</tr>
<tr>
<td>OR</td>
<td>83%</td>
<td>47%</td>
</tr>
<tr>
<td>VT</td>
<td>76%</td>
<td>35%</td>
</tr>
<tr>
<td>ME</td>
<td>69 - 77%</td>
<td>35 - 56%</td>
</tr>
<tr>
<td>MI</td>
<td>80%</td>
<td>38%</td>
</tr>
<tr>
<td>IA</td>
<td>77%</td>
<td>38%</td>
</tr>
</tbody>
</table>

Hawaii Beverage Containers
As Percentage of Total Litter

Source: Ocean Conservancy International Coastal Cleanup, 2003 - 2010

2005: Hawaii’s CDL program introduced
Hawaii Beverage Containers
As Percentage of Total Litter

2008: 60% reduction three years after implementation!

Source: Ocean Conservancy International Coastal Cleanup, 2003 - 2010
To Get More Information

Just type in: Container Recycling Institute!

Visit us at...

www.container-recycling.org
www.bottlebill.org
(310) 559-7451