How do Cities Collect their Waste and Recyclables?

Presented by:
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Vice President, Gershman, Brickner & Bratton, Inc.

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Established in 1980
Solid Waste Management and Technology Consultants
Helping Clients Turn Problems into Opportunities
Early in my career, I recognized a need to improve solid waste collection. At GBB, I help private and public entities become good environmental and financial stewards.

Terry Schweitzer, Vice President
OUTLINE

MSW in the U.S.

How Does Waste and Recycling Collection Stack Up?

The Costs of Collection

What’s in the News
MUNICIPAL SOLID WASTE (MSW) IN THE U.S.

Infrastructure and Trends
Trash History
MSW Disposal and Recycling

<table>
<thead>
<tr>
<th>Method</th>
<th>Total MSW (million tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recycling</td>
<td>55-77</td>
</tr>
<tr>
<td>Composting</td>
<td>15-21</td>
</tr>
<tr>
<td>Waste to Energy</td>
<td>20-28</td>
</tr>
<tr>
<td>Landfilling</td>
<td>160-224</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>250-350 Million Tons</strong></td>
</tr>
</tbody>
</table>

Source: EPA 2012 estimate and BioCycle 2012 estimate
MSW Disposal and Recycling

Composition of the MSW as generated, before recycling

- Paper & Paperboard, 27.4%
- Food Scraps, 14.5%
- Yard Trimmings, 13.5%
- Plastics, 12.70%
- Metals, 9%
- Rubber, Leather & Textiles, 8.4%
- Wood, 6.3%
- Glass, 4.6%
- Other, 3.4%

Composition of the MSW as disposed, after recycling

- Paper & Paperboard, 15%
- Food Scraps, 21%
- Yard Trimmings, 9%
- Plastics, 18%
- Metals, 9%
- Rubber & Leather & Textile, 11%
- Wood, 8%
- Glass, 5%
- Other, 4%

Source: US EPA, 2014
Historical Generation & Management of MSW 1970 - 2010

### U.S. Waste Management Infrastructure

<table>
<thead>
<tr>
<th>Technology</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer Stations</td>
<td>3,350</td>
</tr>
<tr>
<td>Material Recovery Facilities (MRF)</td>
<td>586</td>
</tr>
<tr>
<td>Curbside Recycling Programs</td>
<td>9,000+</td>
</tr>
<tr>
<td>Mixed Waste Processing Facilities (MWPF)</td>
<td>51</td>
</tr>
<tr>
<td>Composting</td>
<td>2,300</td>
</tr>
<tr>
<td>Anaerobic Digestion</td>
<td>19</td>
</tr>
<tr>
<td>WTE</td>
<td>84</td>
</tr>
<tr>
<td>Landfills</td>
<td>1,908</td>
</tr>
</tbody>
</table>

*Source: GBB Master Waste Collections Database*
Recycling and Material Recovery Facilities

<table>
<thead>
<tr>
<th>MRF Type</th>
<th>Number of MRFs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year:</strong></td>
<td>2006</td>
</tr>
<tr>
<td>Single Stream</td>
<td>144</td>
</tr>
<tr>
<td>Dual Stream</td>
<td>227</td>
</tr>
<tr>
<td>Source Separated, Other Programs</td>
<td>127</td>
</tr>
<tr>
<td><strong>All MRFS</strong></td>
<td>437</td>
</tr>
</tbody>
</table>

*Source: Materials Recycling and Processing in the United States (BERENYI, 2012)*

- Many communities have shifted from dual-stream collection methods to single-stream recycling to reduce collection costs and capture more materials for recycling.
Sample Dual Stream Set-outs
Single Stream Set-outs
Many plastic grades still not accepted in curbside collection programs

Markets for mixed grades weak

‘Avid’ recyclers still throw non-recyclable plastics in the bin, contaminate stream

<table>
<thead>
<tr>
<th>Resin Code</th>
<th>Examples</th>
<th>Accepted for Recycling</th>
<th>Recycling Product Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 PETE</td>
<td>Soda/water bottles</td>
<td>YES</td>
<td>HIGH</td>
</tr>
<tr>
<td>1 PETE</td>
<td>Deli Containers</td>
<td>SOME</td>
<td>WEAK</td>
</tr>
<tr>
<td>2 HDPE</td>
<td>Milk Jugs</td>
<td>YES</td>
<td>HIGH</td>
</tr>
<tr>
<td>2 HDPE</td>
<td>Take-out-containers</td>
<td>SOME</td>
<td>WEAK</td>
</tr>
<tr>
<td>3 PVC</td>
<td>Shampoo bottles</td>
<td>YES</td>
<td>WEAK</td>
</tr>
<tr>
<td>3 PVC</td>
<td>Various tubs and trays</td>
<td>SOME</td>
<td>WEAK</td>
</tr>
<tr>
<td>4 LDPE</td>
<td>Soft sided juice bottles</td>
<td>YES</td>
<td>WEAK</td>
</tr>
<tr>
<td>2 or 4</td>
<td>Shopping and Grocery bags</td>
<td>SOME</td>
<td>WEAK</td>
</tr>
<tr>
<td>5 PP</td>
<td>Various bottles/jugs</td>
<td>YES</td>
<td>WEAK</td>
</tr>
<tr>
<td>5 PP</td>
<td>Margarine Tubs</td>
<td>SOME</td>
<td>WEAK</td>
</tr>
<tr>
<td>6 PS (non-expanded)</td>
<td>CD Cases</td>
<td>NO</td>
<td>WEAK</td>
</tr>
<tr>
<td>7 Other</td>
<td>Various Bottles/Jugs</td>
<td>YES</td>
<td>WEAK</td>
</tr>
<tr>
<td>7 Other</td>
<td>Various tubs and trays</td>
<td>SOME</td>
<td>NONE</td>
</tr>
<tr>
<td>None</td>
<td>Mail order packaging</td>
<td>NO</td>
<td>WEAK</td>
</tr>
<tr>
<td>None</td>
<td>Caps, lids, crates</td>
<td>NO</td>
<td>WEAK</td>
</tr>
<tr>
<td>None</td>
<td>Disposable cups</td>
<td>NO</td>
<td>WEAK</td>
</tr>
<tr>
<td>None</td>
<td>Houseware, toys</td>
<td>NO</td>
<td>WEAK</td>
</tr>
<tr>
<td>None</td>
<td>Garbage bags, wraps</td>
<td>NO</td>
<td>WEAK</td>
</tr>
</tbody>
</table>
HOW DOES WASTE AND RECYCLING COLLECTION STACK UP?
The Industry

- Solid waste collection is the largest segment in the waste management services industry with estimated $50 billion in 2014 total revenues and a 9.4% average gross profit margin.

Data Source: IBISWorld.com
Major Companies

- Waste management companies throughout the U.S. have franchise agreements with counties and cities that allow them to be the exclusive hauler for solid waste, recyclables and green waste.
- Waste Management, Inc. – largest trucking fleet in the U.S. with over 21,000 collection and transfer vehicles.
- Republic Services – Services more than 28,000 communities in the U.S.
Residential Collection Methods

- Manual Collection
- Semi-Automated Collection
- Fully-Automated Collection

Top Residential Service Methods in the U.S.

Source: GBB Master Waste Collections Database
Collection Vehicles
Single Compartment
Collection Vehicles
Dual Compartment
Carts, RFID Tags, etc
Some residents are offered three service options of garbage, recycling, and yard waste collections.

Collection can be weekly or bi-weekly.

Monthly rates can depend on the size of cart desired (32-gallon, 64-gallon, 96-gallon).
Bulk Collection

- Bulky items are usually too large or heavy to place in a trash or recycling bin.
- Most cities provide bulky item pickup services to residential and commercial properties.
Residential Food Waste Collection and Processing Growing

Source: BioCycle Magazine, January 2015

198 communities offer curbside collection of residential food waste

- 19 states
- 2.74 million households
- 739,800 tons in 2014
THE COSTS OF COLLECTION
Collection Cost Elements

- Collection vehicle cost
  - Amortized capital cost
  - Fuel and other expendables
  - Maintenance
- Crew costs
  - Salary
  - Benefits
  - Overhead
- Container costs
  - Amortized capital cost – includes delivery
  - Maintenance
- Yard costs
Cost of Collection and Disposal

- Collection
  - Residential solid waste: $10 - $40 USD$ per month per household
  - Residential recycling: $2 - $4 per month per household
- Commercial waste
  - Charged on a per month per box basis, and may include a separate pass-through cost for disposal charges.
  - 2 cubic yard box serviced once per week = $60 - $140 per month
  - 6 cubic yard box serviced once per week = $130 - $280 per month
- WTE tipping fee $68/ton
- Landfill tipping fee $48/ton
- Costs and revenues affected by:
  - Community size
  - Government structure
  - Politics
  - Facilities used
  - Waste supply agreements
  - Revenue sharing back to customer

Disposal: 30%
Collection - MSW: 40%
Processing: 8%
Collection - Recyclable: 20%

Cost of collection and disposal broken down by service
Best Practices
Reduce Collection Costs

✓ Match service level to the need
  - Twice per week
  - Once per week
  - Once every two weeks
  - Once per month
  - On demand, call in

✓ Large carts for residents to place single stream materials

✓ Local MRF, landfill and/or transfer station

✓ Closed market collection services - provided efficiently by municipality or under long-term contract with private hauler

✓ Pay as you throw charging system or user fees

✓ Sustained and excellent public education program

✓ Supportive public officials

✓ Urban or suburban environment

✓ High avoided disposal costs – Ocean County Landfill tipping fee is $82 per ton

✓ Shared services – economies of scale
Best Practices
Reduce Collection Costs

• There is better technology today – hardware and software
• The public can compete with the private sector
• Controlling who collects should lower costs; set up franchises and/or contract areas
• Charge the customer for service and by each service
• Measure operations efficiency
The Solution: The Smart Truck

- Real Time Data Transmission
- Photographic Proof
- Safe Driving
- Fleet Maintenance
- Onboard Computing
- Scales Integration
- RFID

The diagram illustrates the features of the Smart Truck, including real-time data transmission for monitoring, photographic proof for accountability, safe driving measures, fleet maintenance capabilities, onboard computing for data processing, and integration with scales and RFID technology for enhanced functionality.
WHAT’S IN THE NEWS
“Recycling is in a crisis,” Mr. Steiner said in an interview. “It isn’t profitable for us, and we have to react to that by shutting down plants.”

Wall Street Journal, April 2015

“Once a profitable business for cities and private employers alike, recycling in recent years has become a money-sucking enterprise.”

Washington Post, June 2015
Sharon Kneiss, President of the National Waste & Recycling Association...the trade association that represents the private sector solid waste and recycling industry

“In my discussions with reporters from across the country, it was amazing to me to hear just how surprised so many of them were about the true cost of recycling. Too many Americans think that recycling is free and are under-informed about their role in making recycling both ecologically and economically sound...”

Note: Underlining added for emphasis by GBB
Title: ReCommunity says recycling quality must improve ---

...says “non-conforming materials are inundating facilities nationwide”

Jeff Fielkow, Chief Sales and Marketing Officer published a “QUALITY ALERT”

Note: They operate 32 S-S MRF’s (13% of US total)
Examples of S-S Contamination Issues

Food Waste & Vegetation

Contaminated Material & Food Waste

ONP Screen Jammed w/Plastic Waste

Household Trash, Electronics and Hoses

Source: ReCommunity
The average MSW stream is half recyclables.

- There is economic value in extracting additional recyclables from automated MWPFs.
- MWPFs working in tandem with MRFs could significantly increase landfill diversion.
- Contaminated waste streams, particularly paper and fibers, will affect quality, marketability, and commodity values.
What GBB is Saying

- States keep increasing recycling goals/mandates
- Too much Garbage in single-stream recyclables
- Too many recyclables still in remaining MSW
- Citizens need to be continually educated
- Recyclables collection is expensive
- Recyclable material markets are volatile
- Recycling was never FREE
  - Charges bundled
  - Messaging makes recycling appear FREE
  - Services fees bundled causing issues
  - Service fee formulas and market risk sharing needed more
Thank you!!

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