Public Safety & Environment Committee
Garbage and Recycling Program Review

The City of Fredericton
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Agenda

1. Current State of Solid Waste Management
2. Residential Waste Management Survey
3. Diversion
4. Automated Collection
5. Multi-Unit Residential Recycling
6. Residential Composting Program Review
7. Glass Recycling
8. Recommendations
Current State of Solid Waste Management

- City of Fredericton has:
  - Administered a curbside recycling collection program for the last 16 years
  - Managed leaf & yard waste collection and processing for last 25 years
  - Recognized the importance of continually adapting waste management programs
- City residents noted that current recycling program was well regarded
Current State of Solid Waste Management

• Key Challenges:

  ➢ Low diversion from landfill disposal
  ➢ Limited services in place to address diversion from multi-unit residential buildings
  ➢ No organics (e.g., kitchen waste) management plan
  ➢ Limited funds/financial resources
Current State of Solid Waste Management

• Objective of study was to review the City’s collection programs to identify opportunities for improvements related to efficiency, cost, and diversion.

• Key Questions:
  ➢ What changes do residents want to see?
  ➢ Can we improve diversion?
  ➢ Should we implement automated curbside collection?
  ➢ How much does composting cost?
  ➢ Why is glass not being recycled?
Residential Waste Management Survey

- Survey objective to gauge residents' views on solid waste management services and potential diversion initiatives.
- Survey was deployed online from October 3 to October 31, 2016.
- GHD and City staff also administered the survey in-person at Reagent Mall, Grant Harvey Arena, and Northside Market from October 14 to 15, 2016.
- A total of 844 responses were received.
- The survey has a confidence level of 95% +/- 3.35%.
Survey Results

• 60% of respondents said that the City’s current recycling program was well regarded (“very good” or “somewhat good”)

• 62% of respondents said that the City’s current recycling program did not keep enough material out of the landfill

• 96% indicated diversion was important (“very important” or “somewhat important”)
What are your expectations for the City’s diversion rate?

- Major Improvements: 21%
- Modest Improvements: 25%
- Significant Improvements: 32%
- Status Quo: 5%
- Unsure / No opinion: 4%
- No Response Provided: 13%
Rank the top three waste programs you think the City should consider

- Curbside food waste collection: 3.05
- Eliminate depot system: 3.16
- Promote backyard composting program: 3.52
- Increase promotion and education: 3.54
- Implement automated curbside collection using wheeled carts: 3.90
- Reduce garbage collection frequency: 5.12
- No Change: 5.68

Average Rank
Survey Results

- High willingness to pay (34%) for additional diversion programs or through shifting priorities (27%)
- Residents divided on imposing garbage limits (44% - yes; 42% - no)
- 51% in favour of decreasing garbage collection frequency
- 125 comments that specifically requested a glass recycling program
Survey Findings

• Recycling valued by residents

• High interest from residents to see improvements to City’s program

• Residents interested in:
  
  o Diverting organics and glass from landfill disposal
  
  o Eliminating depot system for multi-unit residential

• Support from residents to pay more or shift priorities to support solid waste programs
Diversion

- Diversion rate was calculated to be 19% based on City’s program
- No standard method for calculating diversion across Canada
- Diversion rate low as compared to other Canadian jurisdictions
Diversion

• The amount of materials that are currently “captured” by City’s recycling programs was estimated at 43%

• Modest increase in diversion can be achieved through greater participation in existing program (e.g., multi-residential) and through promotion and education

• More significant improvements can be made through expanding curbside program to include a source separated organics (i.e., kitchen waste) program
Automated Collection Review

• Trend in Canada to move towards automated cart and arm collection systems

• Standard carts are provided to residents

• Benefits
  o Reduced time in motion
  o Reduced health and safety claims
  o Increased diversion
Automated Collection
# Curbside Collection Evaluation Model

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Current Manual System (Baseline Scenario 1)</th>
<th>Automated Garbage Only (Scenario 2)</th>
<th>Automated Garbage and Recycling (Scenario 3)</th>
<th>Automated Garbage, Recycling, and Organics (Scenario 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collection Method</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garbage</td>
<td>Semi-Automated</td>
<td>Automated</td>
<td>Automated</td>
<td>Automated</td>
</tr>
<tr>
<td>Source-Separated Organics</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>Automated</td>
</tr>
<tr>
<td>Collection Frequency (service weeks per year)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garbage</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>26</td>
</tr>
<tr>
<td>Recycling</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>SSO</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>52</td>
</tr>
<tr>
<td>Efficiency Gain from Automated Collection</td>
<td>---</td>
<td>15% of labour and truck operation time</td>
<td>15% of labour and truck operation time</td>
<td>15% of labour and truck operation time</td>
</tr>
</tbody>
</table>
# Model Results - City Program Costs

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Capital Cost ($2017)</td>
<td>$0</td>
<td>$890,000</td>
<td>$2,620,000</td>
<td>$3,650,000</td>
</tr>
<tr>
<td>Annual Operating Cost ($2017)</td>
<td>$14,000</td>
<td>$56,000</td>
<td>$159,000</td>
<td>$220,000</td>
</tr>
</tbody>
</table>
# Model Results - Collection Costs

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<th>Automated Garbage, Recycling, and Organics (Scenario 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equivalent Annual per Tonne Cost ($2017)</td>
<td>$108/tonne</td>
<td>$106/tonne</td>
<td>$105/tonne</td>
<td>$101/tonne</td>
</tr>
<tr>
<td>Equivalent Annual Cost ($2017)</td>
<td>$1,710,000</td>
<td>$1,680,000</td>
<td>$1,660,000</td>
<td>$1,600,000</td>
</tr>
<tr>
<td>Model Estimated Savings over Current Contract</td>
<td>---</td>
<td>1.7%</td>
<td>2.5%</td>
<td>6.4%</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>$30,000</td>
<td>$50,000</td>
<td>$110,000</td>
</tr>
</tbody>
</table>
Other Potential Curbside Changes

• Objective to divert more materials to recyclable streams

• Policies include:
  o Limiting the number of garbage bags or carts
  o “Pay as You Throw” (e.g., fee per bag or cart)
  o Decreasing garbage collection frequency
Multi-Unit Residential Recycling

- Currently curbside program not extended to multi-unit residential dwellings with 5 or more units

- Three recycling depots setup for multi-unit residents to drop off recyclable materials:
  - Not convenient/not effective at capturing recyclables
  - Issues related to improper sorting, contamination, access, and litter
Multi-Unit Residential Recycling

• No “one size fits all” solution

• The City should consider implementing a bylaw with goal of ensuring all residents have access to the City’s recycling program

• Considerations:
  o Convenience
  o Relationship with property managers/landlords
  o Adequate storage
  o Closure of garbage chutes
Residential Compost Program Review

- Currently no source separated organics (SSO) program
- City has leaf & yard collection and composting program
- Fredericton Region Solid Waste has no plans to implement SSO program
- Current practice is to place organics in landfill and capture landfill gas to generate electricity
Residential Compost Program Review

- Key considerations
  - Feedstocks
  - Collection Infrastructure
  - Processing
  - End Markets
  - Costs
Cost Considerations

- An order of magnitude cost estimate was prepared to develop a composting facility.
- Assumed 5,000 – 15,000 TPY facilities including co-processing biosolids and leaf and yard waste.
- Assumed in-vessel technology due to facility likely being developed in close proximity to residents.
- Order of magnitude cost based on known facility costs and are conservative.
## Composting Technology Costs

<table>
<thead>
<tr>
<th>Processing Technology</th>
<th>Estimate Cost (Operating and Capital)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Windrow</td>
<td>$50-70 per tonne</td>
</tr>
<tr>
<td>Covered Aerated Static Pile (e.g. Gore System)</td>
<td>$70-120 per tonne</td>
</tr>
<tr>
<td>Aerated Static Pile (Enclosed in building)</td>
<td>$80-150 per tonne</td>
</tr>
<tr>
<td>In-Vessel System (Enclosed in building)</td>
<td>$130-200 per tonne</td>
</tr>
</tbody>
</table>
## Composting Facility Order of Magnitude Costs

<table>
<thead>
<tr>
<th>Item</th>
<th>5,000 to 15,000 TPY Composting Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processing Costs (Assumes In-Vessel Technology)</strong></td>
<td></td>
</tr>
<tr>
<td>Capital Cost</td>
<td>$6-15 million</td>
</tr>
<tr>
<td>Annual Processing Costs (Cost Per Tonne)</td>
<td>$95-$100</td>
</tr>
<tr>
<td>Equivalent Annual Cost Per Tonne (20 years at 5% Discount Rate)</td>
<td>$176-$197</td>
</tr>
<tr>
<td>Equivalent Annual Cost</td>
<td>$985,000-$2.64 million</td>
</tr>
<tr>
<td>Tip Fee Savings</td>
<td>-$410,000 to -$905,500</td>
</tr>
<tr>
<td><strong>Net Equivalent Annual Cost</strong></td>
<td><strong>$575,000-1.73 million</strong></td>
</tr>
<tr>
<td><strong>Program Costs</strong></td>
<td></td>
</tr>
<tr>
<td>New Carts and Kitchen Catchers</td>
<td><strong>$1.03 million</strong></td>
</tr>
<tr>
<td>Annual Operating Costs</td>
<td><strong>$61,000</strong></td>
</tr>
</tbody>
</table>
Glass Recycling

- Glass container glass (e.g., jars, bottles, etc.) not included in blue box program
- Bottle refund program available for beer and liquor containers
- City likely generating approximately 300 tonnes of glass that is landfilled annually
Glass Recycling – Why are regions in NB not recycling glass?

• Contacted FRSW, Fundy Region Solid Waste, and Southeast Regional Service Commission

• Generally cited reasons:
  o Limited quantities and impact on diversion
  o High cost to recycle and limited end markets
  o Potentially contaminate other recyclable materials
  o Health and safety considerations
Glass Recycling – End Market/Use Examples

- PEI uses both bottle refund and curbside materials to produce clear stone and fill materials used for local municipal projects.
- HRM curbside materials are used to produce septic field drainage media for local projects.
- A large portion of glass collected from bottle refund and curbside materials in Atlantic Canada appear to be sent to one facility in Moncton, NB.
- End uses for glass cullet include the production of new glass, glass abrasives, and insulation.
**Recommendations**

1. Develop an overall strategy with regards to solid waste management
2. Undertake a residential waste audit
3. Develop a Promotion and Education (P&E) Plan
4. Phase out the drop off depots and replace with a curbside recycling program at multi-unit residential buildings
Recommendations

5. Implement automated curbside collection of garbage

6. Adopt a "pay as you throw" system for new garbage carts that are rolled out as part of an automated curbside collection program

7. Further evaluate other aspects of the collection program with respect to automated collection:
   - Automated Collection of Curbside Recyclables
   - Multi-Unit Residential
8. If the City proceeds with automated collection of garbage, some consideration will need to be given to the collection of leaf and yard waste (e.g., collection period, public drop off at City’s composting facility, grasscycling). These measures will also help improve diversion.

9. If the City would like to further consider the implementation of a SSO program, it should engage FRSW as a stakeholder in the region's solid waste program. The next step would involve completing a Business Case Analysis.

10. Re kick start working with Greener Village to promote backyard composting
What Are Your Thoughts?