Polypropylene Roundtable Discussion

March 20, 2019 | Northeast Recycling Council – Spring Conference
Agenda:

Discussion Overview
Bridget Croke, Closed Loop Partners

Markets: How is the Reclamation Discussion Changing
Stephanie Baker, KW Plastics, Ron Chislow, Buckeye Polymers, Eadaoin Quinn, EFS Plastics

What’s a MRF To Do?
ROI Analysis presented by Jon Powell, Ph.D., Director – Special Projects. Discussion with Tom Outerbridge, SIMS Municipal Recycling

BREAK

Municipality and State Perspective
Chris Coady, The Recycling Partnership

Insights and What’s Next
Bridget Croke and Jon Powell
Markets: How is the Reclamation Discussion Changing

Featuring:
Stephanie Baker, KW Plastics
Ron Chislow, Buckeye Polymers
Eadaoin Quinn, EFS Plastics
What’s a MRF To Do?

Featuring:
Jon Powell, Ph.D., Director – Special Projects
Tom Outerbridge, SIMS Municipal Recycling
How can MRFs see the ROI of producing a PP bale?
Case Example

MRF Characteristics
• 60,000 Tons per year
• 15% residue
• Plastics marketed as: #1 PET, #2 HDPE (N/C), Mixed #3-7 bale
• Existing optical sorters for PET, HDPE
• Other containers manually picked by sorters
• Located within 200 miles of a processor
More than half of Mixed #3-7 bale composition is PP

Source: May 2017 APR Rigid Committee Webinar; APR 2015 National Mixed Rigid Plastic Bale Composition Study
Case Example: Investment Needed

MRF would need:
• a new optical sorter
• likely some reconfiguration of the existing line (conveyors, etc.)

**Investment**

<table>
<thead>
<tr>
<th>Capital</th>
<th>$750,000</th>
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<tbody>
<tr>
<td>Interest Rate</td>
<td>3%</td>
</tr>
<tr>
<td>Term (Yrs)</td>
<td>5</td>
</tr>
<tr>
<td>Total Paid (P+I)</td>
<td>$808,591</td>
</tr>
<tr>
<td>Annual Debt Service</td>
<td>$161,718</td>
</tr>
</tbody>
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* Expected range of investment: $500K - $1M
**Case Example: Impact of Sorting for PP with a new Optical Sorter**

**Tons Recovered**

*Additional investment in solutions for other material types (e.g., colored PET) in #3-7 stream would yield greater recovery and potential for commodity revenue*

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inbound tons</td>
<td>60,000</td>
<td>60,000</td>
<td>-</td>
</tr>
<tr>
<td>PP captured</td>
<td>-</td>
<td>1,720</td>
<td>1,720</td>
</tr>
<tr>
<td>Mixed #3-7</td>
<td>900</td>
<td>-</td>
<td>(900)</td>
</tr>
<tr>
<td>Residue</td>
<td>9,000</td>
<td>8,470</td>
<td>(530)</td>
</tr>
<tr>
<td><strong>Total recovery</strong></td>
<td>51,000</td>
<td>51,530</td>
<td>(530)</td>
</tr>
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</table>

**Value Created**

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
<th>Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commodity Revenue</td>
<td>$16,000</td>
<td>$344,000</td>
<td>$328,000</td>
</tr>
<tr>
<td>Disposal Cost</td>
<td>$(497,000)</td>
<td>$(468,000)</td>
<td>$29,000</td>
</tr>
<tr>
<td>Labor Savings</td>
<td>$-</td>
<td>$30,000</td>
<td>$30,000</td>
</tr>
<tr>
<td><strong>Revenue (Cost)</strong></td>
<td>$(481,000)</td>
<td>$(94,000)</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL BENEFIT</strong></td>
<td></td>
<td>$387,000</td>
<td></td>
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</tbody>
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**MRF would be able to pay back an equipment loan in ~ 2 years**
There are more than 150 MRFs within 200 miles of a PP reprocessor

- 82 MRFs process 25,000 - 200,000 tons per year
- 50 MRFs have 1+ optical sorter

- Investing $19.5M in half (25 MRFs) could recover an additional 80,000+ tons of PP annually
  - 9 lbs of PP/yr for every $1 invested
50 high-potential MRFs within 200 miles of 12 processors
Municipality and State Perspective

Featuring:
Chris Coady, The Recycling Partnership
Insights and What’s Next (Wrap Up)
Key Assumptions

• Mixed #3-7 represents 1.5%-2% of single-stream recyclables processed by a MRF
• PP represents 55% of #3-7 bale (Source: APR 2015 National Mixed Rigid Plastic Bale Composition Study)
• PP represents 20% of end-of-line residue (Source: CLF Portfolio MRF analysis)
• Capture rate of PP from new optical sorter is conservatively estimated at 75%
• PP commodity pricing is consistent with 3-yr national average: $200/ton (Source: recyclingmarkets.net)
• Mixed #3-7 without #5 do not have markets, and therefore would be landfilled
• Disposal cost (landfill tip fees) are consistent with national average: -$55/ton (Source: EREF 2018)
• Labor savings of optical sorter replacing the equivalent of 1 FTE on a sort line (Source: CLF Portfolio MRF interviews)
• Calculations assume inbound volume, freight, and maintenance remain constant, and no significant downtime costs are incurred during equipment installation
Eco-Cycle (Boulder, CO) began sorting for PP, MRP, and PET blended

Before: #1, #2, and #3-7
After: #1 (blended bottles and thermoforms), #2, #5, MRP, #3-7

- The new marketing strategy changed our production of #3 - #7 Plastics from 5 bales per day to ½ bale per day.

- The new plastic marketing program increase the aggregate value of the 3-7 plastics from $35/ton to $233/ton.

- Increasing the recovery value of these material by $33,000 per year.