Non-Bottle Plastics Recycling

Liz Bedard, Director
APR Rigid Plastics Recycling Program
Non-Bottle Plastic Recycling

Review of Presentation

- Overview of APR & Rigid Plastics Recycling Program
- Non-Bottle Plastic Marketplace
- Drivers for Change
- Product Design Activity
- The Future?
Non-Bottle Plastic Recycling

Association of Postconsumer Plastic Recyclers (APR)

- National trade association

- Represents 90% of post-consumer plastic processing capacity in North America.

APR’s overall goal is to increase the amount of plastic material recycled in North America.
Non-Bottle Plastic Recycling

**APR Rigid Plastics Recycling Program**

Membership committee representing 36 rigid plastic stakeholders –

- generators, collectors
- recyclers, reclaimers
- brand names companies
- resin producers
- public policy makers

**APR Rigids Committee Goal** –

"Expand plastic recycling beyond bottles"
Non-Bottle Plastic Recycling

The Association of Postconsumer Plastic Recyclers
Non-Bottle Plastic Recycling Marketplace

Non-Bottle Plastic Recycling – Two Marketplace Activities

- National plastic collection changes
- Non-bottle model bale specifications
PROJECT FOCUS — Trends on how and what plastics are being collected

- Conducted the last six years
- Surveyed each state’s largest city’s plastic recycling education
- Three trends are apparent.....
### Trend #1 - Single Stream Collection Increasing

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Stream</td>
<td>31</td>
<td>34</td>
<td>35</td>
<td>39</td>
<td>42</td>
<td>46</td>
</tr>
<tr>
<td>Dual Stream</td>
<td>8</td>
<td>7</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Source Separated</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Pilot Program(s)</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Drop Off Only</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Subscription</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>48</td>
<td>51</td>
<td>51</td>
<td>51</td>
<td>51</td>
<td>51</td>
</tr>
</tbody>
</table>
**Trend #2** - Moving away from #1 PET and #2 HDPE only

<table>
<thead>
<tr>
<th>#1-2 Collection</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>All #1 &amp; 2 Containers</td>
<td>8</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>#1 &amp; 2 Bottles Only</td>
<td>10</td>
<td>10</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>18</strong>*</td>
<td><strong>15</strong>*</td>
<td><strong>12</strong>*</td>
<td><strong>6</strong>*</td>
<td><strong>6</strong>*</td>
<td><strong>4</strong>*</td>
</tr>
</tbody>
</table>
**Non-Bottle Plastic Recycling Marketplace**

*Trend #3* - Moving towards collecting all #1-7 plastic containers and away from bottles only.

<table>
<thead>
<tr>
<th>#1-7 COLLECTION</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>All #1-7 Containers</td>
<td>16</td>
<td>24</td>
<td>27</td>
<td>32</td>
<td>33</td>
<td>37</td>
</tr>
<tr>
<td>#1-7 Bottles Only</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>#1-7 Containers (w/ some exceptions)</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>TOTALS</td>
<td>30*</td>
<td>35*</td>
<td>38*</td>
<td>44*</td>
<td>44*</td>
<td>46*</td>
</tr>
</tbody>
</table>

*Note: Data for 2012, 2013, and 2014 represents the sum of all categories.*
Over the last two years, *non-bottle rigid plastics* model bale specifications have been developed.

**Goals—**

1. Simplifying communication - generators and reclaimers
2. “Building Better Bales”
## Non-Bottle Plastic Recycling Marketplace

**APR Model Bale Specifications**

### Four Types of Mixed Rigid Plastics Model Bale Specs

<table>
<thead>
<tr>
<th></th>
<th>PET/HDPE Bottles</th>
<th>#3-7 Bottles</th>
<th>Non-bottle Containers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. All Rigid Plastics</strong> (with or without Bulky)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td><strong>2. Pre-Picked Rigids</strong> (with or without Bulky)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>3. Tubs &amp; Lids</strong> (with or without Bulky)</td>
<td>HDPE only</td>
<td>PE and PP only</td>
<td>PE and PP only</td>
</tr>
<tr>
<td><strong>4. Bulky Rigids</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Association of Postconsumer Plastic Recyclers
Non-Bottle Plastic Recycling Marketplace

Polypropylene #5 Model Bale Specifications

- Any whole bottle, container or product, with a #5 PP resin code
- Positive sort from curbside, drop-off or other public or private recycling collection
- Examples include:
  - prescription bottles
  - ice cream tubs
  - microwavable trays
  - battery cases
  - yogurt cups
  - cold drink cups
  - caps
  - dishwasher safe storage containers
  - margarine tubs
  - tofu tubs
  - hangers

VARIATION – “PP w/ Bulky”
- Bulky PP is items greater than 5 gallons (e.g. buckets, crates, waste baskets, toys, and storage bins)
Non-Bottle Plastic Recycling
Drivers for Change

Two Drivers for Change

- Increased Demand for Polypropylene (#5)
- Walmart’s focus on recycled content
Non-Bottle Plastic Recycling Drivers for Change – Demand for PP

*Polypropylene (#5) Postconsumer Recycled Resin (PCR) “Fit for Use” Survey*

APR Recycled Resins Subcommittee
- brand owners
- plastic converters
- plastic reclaimers/recyclers
- resin producers

Addressing the demand side of the non-bottle rigid plastic recycling issue, asking 3 critical questions.........
What type of recycled resins are wanted?

- Brand name companies interested in obtaining polypropylene PCR.

*Polypropylene (#5)* is the largest component of non-bottle rigids.

What is the demand?

What are the desired physical properties?
### Polypropylene (#5) Postconsumer Recycled Resin (PCR) "Fit for Use" Survey

<table>
<thead>
<tr>
<th>Typical applications</th>
<th>Melt Flow Index</th>
<th>Enter your application</th>
<th>Tonnage</th>
<th>Odor</th>
<th>Color</th>
<th>FDA Approved</th>
<th>Unique Criteria</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential PCR usage</td>
<td></td>
<td></td>
<td>Pounds / Year</td>
<td>1) Yes</td>
<td>1) Light color</td>
<td>1) Yes</td>
<td>Open response</td>
<td>1) &lt; 1 year</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2) No more than typical</td>
<td>2) Gray (Blend for darker colors)</td>
<td>2) No</td>
<td></td>
<td>2) 1-3 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3) Dark</td>
<td></td>
<td></td>
<td></td>
<td>3) 3-5 years</td>
</tr>
</tbody>
</table>
Non-Bottle Plastic Recycling Drivers for Change – Demand for PP

Polypropylene (#5) Postconsumer Recycled Resin (PCR)
“Fit for Use” Survey Findings....

• Twenty two responses from Brand Owners & Converters

• Total identified demand was ~1 billion pounds!

  • All identified demand will occur w/in next 3 years, 100MM # in less than 1 year
Non-Bottle Plastic Recycling Drivers for Change – Demand for PP

Polypropylene Postconsumer Recycled Resin (PCR) “Fit for Use” Survey

Survey results were presented in two ways –
1. Physical Properties Demand Table
2. Respondents’ Contact Information

Enables APR Plastic reclaimers to contact respondents – discuss polypropylene postconsumer resins.
<table>
<thead>
<tr>
<th>Typical Application</th>
<th>Melt Flow Rate</th>
<th>Volume</th>
<th>Odor Tolerance</th>
<th>Color</th>
<th>FDA Approval</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spun Bond</td>
<td>4-35</td>
<td>40 - 41 M</td>
<td>* None</td>
<td>Easily Colored</td>
<td>No</td>
<td>&lt; 1 year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 - 21 M</td>
<td>* No more than typical</td>
<td>Easily Colored</td>
<td>Yes</td>
<td>1-3 years</td>
</tr>
<tr>
<td>EBM Bottles (Hot Fill) Juice, Ketchup, Microwave</td>
<td>2-4</td>
<td>2 - 3 M</td>
<td>* None</td>
<td>Easily Colored</td>
<td>Yes</td>
<td>&lt;1 year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 - 4 M</td>
<td>* No more than typical</td>
<td>Easily Colored</td>
<td>Yes</td>
<td>1 - 3 years</td>
</tr>
<tr>
<td>Thermoform Packages Dairy (yogurt) Quick serve Cups, Trays</td>
<td>2-4</td>
<td>114 - 116 M</td>
<td>* None</td>
<td>Easily Colored</td>
<td>Yes</td>
<td>&lt;1-3 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 - 5 M</td>
<td>* No more than typical</td>
<td>Gray/Dark</td>
<td>Yes</td>
<td>&lt;1 year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 - 3 M</td>
<td>* No more than typical</td>
<td>Gray</td>
<td>No</td>
<td>1 - 3 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45 - 49 M</td>
<td>* No more than typical</td>
<td>Easily Colored</td>
<td>Yes</td>
<td>&lt;1 year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 - 5 M</td>
<td>* No more than typical</td>
<td>Easily Colored/Dark</td>
<td>No</td>
<td>&lt; 1 year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 - 7 M</td>
<td>* No more than typical</td>
<td>Easily Colored</td>
<td>No</td>
<td>1 - 3 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;300 M</td>
<td>* None</td>
<td>Easily Colored/Gray/Dark</td>
<td>Yes</td>
<td>1 - 3 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 - 6 M</td>
<td>* No more than typical</td>
<td>Dark</td>
<td>No</td>
<td>&lt;1-3 years</td>
</tr>
</tbody>
</table>
Non-Bottle Plastic Recycling Drivers for Change – Demand for PP

Polypropylene (#5) Market Development Subcommittee

Fifteen Member Subcommittee –

Brand name companies, resin producers, plastic reclaimers, converters

Goal -

“Stimulate the growth of and increase the availability and use of post-consumer recycled polypropylene (#5).”
Non-Bottle Plastic Recycling Drivers for Change – Demand for PP

Polypropylene (#5) Market Development Subcommittee

1. Identify & define end use markets

2. Identify & define the current state of PP recycling
   (volume, type, characteristics, end markets)

3. Identify & understand gaps between supply and demand
ORLANDO, FLA. – America’s largest retailer wants to drive increased use of post-consumer recycled plastic in packaging. And Wal-Mart Stores Inc. is using a pretty aggressive goal to help move the needle.

The Bentonville, Ark.-based retail giant wants to increase post-consumer recycled content in plastic packaging by 3 billion pounds by 2020.
Non-Bottle Plastic Recycling Product Design

Two Product Design Programs..........
Impacting the Future of Plastics Recycling

- APR Design for Recyclability Guidelines
- APR Recognition Programs
Non-Bottle Plastic Recycling Product Design

APR DESIGN FOR RECYCLABILITY GUIDELINES:
An Executive Summary
Technical Guide for Creating Recyclable Plastics

August, 2013

The Association of Postconsumer Plastic Recyclers
How to Use This Guide

This APR Design for Recyclability Guidelines™ Manual is a quick reference tool for bottle packaging designers. It is not intended to be exhaustive, rather it is designed to aid in the design process when considering the recyclability of a bottle or container.

For full guidelines and protocols, please refer to www.plasticsrecycling.org/technical-resources/apr-design-for-recyclability-guidelines.

Innovative designers should also consult the APR Critical Guidance as a next step for learning more. For more information visit the APR’s website at http://www.plasticsrecycling.org/technical-resources/critical-guidance.

- Caps and Closures
- Inks
- Labels
- Colorants
- Additives/Layers/Fillers

The Association of Postconsumer Plastic Recyclers
Inks

GENERAL BEST PRACTICES

- Label inks should firmly adhere to label substrate and not discolor wash water.
- In general, all direct printing other than date coding is known to increase contamination in the recycling process and should be avoided with PET or natural HDPE, and natural PP.
- The APR has developed a testing protocol to assist label manufacturers in evaluating whether a label ink will bleed in conventional reclamation systems. For this protocol, and additional information on inks, visit the APR’s website at http://www.plasticsrecycling.org/technical-resources/testing

FAQ:

Recycling takes a lot of heat. Why don’t the inks burn off?

Answer: It is true that there’s a lot of heat involved in recycling. For example, PET is recycled and extruded into pellets at about 270 degree Celsius. The purpose of that level of heat is to melt the plastic without burning. The recycle process blends and mixes the ink into the molten plastic.

IDEAL

Inks that:
- Are printed on labels that float for PET packages
- Do not bleed onto or stain base resin
- Have passed the APR’s Ink Testing Protocol

*Flakes of a material that are broken off a larger solid body.

Avoid contaminating the recycling stream by:

- Avoiding:
  - Directly printing ink on the container
  - Using inks that bleed in hot caustic water
  - Using inks that sparl

Voice of Plastics Recycling™

www.plasticsrecycling.org
Non-Bottle Plastic Recycling Product Design

**APR Recognition Programs**

- Recognizing recycling compatible packages
- Recognizing recycled resin products
Walmart’s influence will stimulate increase supply of and demand for recycled plastics

Demand for PP (#5) recycled resin will continue to grow

Plastic Recovery Facilities (PRFs) activity will increase in response to above
Non-Bottle Plastic Recycling

Thank you

Liz Bedard, Director
APR Rigid Plastics Recycling Program
1001 G Street, NW
Washington, DC 20001
ebedard18@gmail.com