2015 PET Recycling Rate Report
Register for Upcoming Webinars!

APR Design® Guide for Plastics Recyclability

Web Seminars
- October 18th - PET Recycling Rate Report Overview
- November 7th - All Bottle Recycling Report Overview
Today's Presenters

Kate Eagles
NAPCOR Program Director

Kara Pochiro
APR Communications Director

Resa Dimino
NAPCOR Director of Public Policy

Steve Alexander
APR Executive Director

Rick Moore
NAPCOR Executive Director
Agenda & Acknowledgments

• Deep dive into 2015 PET recycling rate and supporting data
• Jointly released by NAPCOR and the APR
• Thanks to the following data providers, funders, and contractors:
  – PET Reclaimers and Converters
  – Providers of additional market data and perspectives
  – Consulting support from Moore Recycling Associates and HDR
Who is APR?

- International trade association
- The Voice of Plastics Recycling®
- Companies committed to the success of plastics recycling
Technical Authority on Plastics Recycling

- Technical Programs
- APR Design® Guide for Plastics Recyclability
- Test Methods/Guidance Protocols
- Brand Owner Training
- APR Committees
- Communication/Education/Advocacy
APR Primary Goals

Increase Supply
Enhance Quality
Communicate Value

Increase the Value Proposition of Recycled Plastics
Introduction to NAPCOR

- NAPCOR is the trade association for the PET packaging industry in the United States, Canada and Mexico.
- 52 members encompass all facets of the PET value chain.
NAPCOPR Membership 2016

**PET Industry Suppliers**
- American Starlinger-Sahm, Inc.
- AMUT North America, Inc.
- BP
- ColorMatrix
- Erema North America
- Husky Injection Molding Systems
- Krones Inc.
- Muehlstein
- National Recovery Technologies

**PET Container Manufacturers**
- Amcor Rigid Plastics
- Plastic Technologies, Inc.
- Polimetrix
- REPI
- Sidel Inc.
- Sorema Plastic Recycling Sys.
- Sukano Polymers Corporation
- TABB Packaging Solutions, LLC
- TOMRA Systems ASA

**PET Reclaimers**
- BMP Recycling
- CarbonLite Industries, LLC
- Clear Path Recycling, LLC
- Custom Polymers PET
- Evergreen Plastics
- Marglen Industries
- Mohawk Industries Inc.
- Parallel Products
- Peninsula Plastics Recycling
- Perpetual Recycling Solutions
- PetStar
- Plastic Reclamation Partners
- Plastrec, Inc.
- Polyquest, Inc (PQ Recycling)
- QRS Recycling
- Reterra
- Signode
- UltrePET LLC
- Wellman Plastics Recycling, LLC

**PET Sheet / Thermoformers**
- Dart Container Corporation
- Direct Pack, Inc.
- Genpak LLC
- Nu-B, Inc.
- Octal Extrusion Corporation
- Polar-Pak, Ltd.
- Peninsula Packaging Company
- Plastic Ingenuity, Inc.

**PET Resin Manufacturers**
- DAK Americas LLC
- Indorama Ventures USA Inc
- Nan Ya Plastics Corporation
PET Materials Flows in the US

US PET Bottles Available (5,971)

Total US Bottles Recycled (1,797)

Export (424)

US Reclaimer Purchases (1,548)

Clean Flake* (1,044)

Clean Flake Equivalent (296)

RPET Use in Domestic Markets (1,421)

Disposal

Postconsumer Bottle Imports (82)

Non-Bottle PET (93)

Canadian RPET (202)

Other Imported RPET (175)

Fiber (535)

Sheet & Film (347)

Strapping (106)

Food & Beverage Bottles (350)

Non-Food Bottles (60)

Other (25)

NAPCOR

The Association of Plastic Recyclers
2015 PET Bottle US Recycling Rate

1.797 Blbs Bottles Collected

5.971 Blbs Bottles Available

= 30.10%

2014 rate at 30.98%
Volume of bottles sold into the US marketplace:

- Approximate 2.1% growth over 2014 by weight
- Total bottles available – 5,971 MMlbs (2014 was 5,849)
Factors Affecting 2015 Denominator

- Denominator includes domestic virgin and RPET resin sales into bottles, as well as imported resin to bottles
- Volume sales up in water, specialty beverages
- Conversion into PET
Factors Affecting 2015 Denominator

- CSD sales down; lightweight water bottles don’t make up the difference
- Bottle down-sizing (“right” sizing) continues
Factors Affecting 2015 Numerator

- Increase in CA CRV
- Slight decrease in other deposit
- Small decline in curbside/drop off volumes, possibly due to:
  - Reduction in market-driven commercial collections
  - Misdirection of lightweight PET bottles in MRFs
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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>US Reclaimers</td>
<td>642</td>
<td>776</td>
<td>916</td>
<td>1,135</td>
<td>1,329</td>
<td>1,398</td>
<td>1,373</td>
</tr>
<tr>
<td>Canadian Reclaimers</td>
<td>54</td>
<td>44</td>
<td>55</td>
<td>54</td>
<td>47</td>
<td>45</td>
<td>75</td>
</tr>
<tr>
<td>Other Export</td>
<td>796</td>
<td>737</td>
<td>633</td>
<td>528</td>
<td>422</td>
<td>369</td>
<td>349</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,492</td>
<td>1,557</td>
<td>1,604</td>
<td>1,718</td>
<td>1,798</td>
<td>1,812</td>
<td>1,797</td>
</tr>
</tbody>
</table>
2015 Numerator by Purchaser

- US Bottles Collected for Recycling (MMlbs)

<table>
<thead>
<tr>
<th>Year</th>
<th>Exporters</th>
<th>Canadian Reclaimers</th>
<th>US Reclaimers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>0</td>
<td>0</td>
<td>1000</td>
</tr>
<tr>
<td>2010</td>
<td>0</td>
<td>0</td>
<td>1200</td>
</tr>
<tr>
<td>2011</td>
<td>0</td>
<td>0</td>
<td>1300</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>0</td>
<td>1400</td>
</tr>
<tr>
<td>2013</td>
<td>0</td>
<td>0</td>
<td>1500</td>
</tr>
<tr>
<td>2014</td>
<td>0</td>
<td>0</td>
<td>1600</td>
</tr>
<tr>
<td>2015</td>
<td>0</td>
<td>0</td>
<td>1700</td>
</tr>
</tbody>
</table>
### PET Bottle Recycling Rate History

<table>
<thead>
<tr>
<th>Year</th>
<th>Total US Bottles Collected (MMlbs)</th>
<th>Bottles on US Shelves (MMlbs)</th>
<th>Gross Recycling Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>1,003</td>
<td>4,637</td>
<td>21.6%</td>
</tr>
<tr>
<td>2005</td>
<td>1,170</td>
<td>5,075</td>
<td>23.1%</td>
</tr>
<tr>
<td>2006</td>
<td>1,272</td>
<td>5,424</td>
<td>23.5%</td>
</tr>
<tr>
<td>2007</td>
<td>1,396</td>
<td>5,683</td>
<td>24.6%</td>
</tr>
<tr>
<td>2008</td>
<td>1,451</td>
<td>5,366</td>
<td>27.0%</td>
</tr>
<tr>
<td>2009</td>
<td>1,444</td>
<td>5,149</td>
<td>28.0%</td>
</tr>
<tr>
<td>2010</td>
<td>1,557</td>
<td>5,350</td>
<td>29.1%</td>
</tr>
<tr>
<td>2011</td>
<td>1,604</td>
<td>5,478</td>
<td>29.3%</td>
</tr>
<tr>
<td>2012</td>
<td>1,718</td>
<td>5,586</td>
<td>30.8%</td>
</tr>
<tr>
<td>2013</td>
<td>1,798</td>
<td>5,764</td>
<td>31.2%</td>
</tr>
<tr>
<td>2014</td>
<td>1,812</td>
<td>5,849</td>
<td>31.0%</td>
</tr>
<tr>
<td>2015</td>
<td>1,797</td>
<td>5,971</td>
<td>30.1%</td>
</tr>
</tbody>
</table>
PET Bottle Recycling Rate History

- **Bottles on US Shelves (MMlbs.)**
- **Total US Bottles Collected (MMlbs.)**
- **Gross Recycling Rate**

The chart shows the change in the number of bottles on US shelves and the total US bottles collected from 2004 to 2015, along with the gross recycling rate over the same period.
PET Bottle Utilization Rates

- Bottle utilization is USA “bottle only” flake volumes produced as percentage of denominator.

<table>
<thead>
<tr>
<th>Year</th>
<th>Clean Flake Equivalent from Bottle Material (MMlbs)</th>
<th>Bottles on US Shelves (MMlbs)</th>
<th>Utilization Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>622</td>
<td>1,950</td>
<td>31.9%</td>
</tr>
<tr>
<td>1996</td>
<td>877</td>
<td>2,198</td>
<td>40.0%</td>
</tr>
<tr>
<td>1997</td>
<td>578</td>
<td>2,551</td>
<td>22.7%</td>
</tr>
<tr>
<td>1998</td>
<td>588</td>
<td>3,006</td>
<td>19.6%</td>
</tr>
<tr>
<td>1999</td>
<td>611</td>
<td>3,250</td>
<td>18.8%</td>
</tr>
<tr>
<td>2000</td>
<td>619</td>
<td>3,445</td>
<td>18.0%</td>
</tr>
<tr>
<td>2001</td>
<td>660</td>
<td>3,768</td>
<td>17.5%</td>
</tr>
<tr>
<td>2002</td>
<td>613</td>
<td>4,007</td>
<td>15.3%</td>
</tr>
<tr>
<td>2003</td>
<td>667</td>
<td>4,292</td>
<td>15.5%</td>
</tr>
<tr>
<td>2004</td>
<td>803</td>
<td>4,587</td>
<td>17.3%</td>
</tr>
<tr>
<td>2005</td>
<td>959</td>
<td>5,075</td>
<td>18.9%</td>
</tr>
<tr>
<td>2006</td>
<td>1,052</td>
<td>5,424</td>
<td>19.4%</td>
</tr>
<tr>
<td>2007</td>
<td>1,079</td>
<td>5,683</td>
<td>19.0%</td>
</tr>
<tr>
<td>2008</td>
<td>1,124</td>
<td>5,366</td>
<td>20.9%</td>
</tr>
<tr>
<td>2009</td>
<td>1,078</td>
<td>5,149</td>
<td>20.9%</td>
</tr>
<tr>
<td>2010</td>
<td>1,115</td>
<td>5,350</td>
<td>20.8%</td>
</tr>
<tr>
<td>2011</td>
<td>1,052</td>
<td>5,478</td>
<td>19.2%</td>
</tr>
<tr>
<td>2012</td>
<td>1,181</td>
<td>5,586</td>
<td>21.1%</td>
</tr>
<tr>
<td>2013</td>
<td>1,801</td>
<td>5,764</td>
<td>22.6%</td>
</tr>
<tr>
<td>2014</td>
<td>1,262</td>
<td>5,849</td>
<td>21.6%</td>
</tr>
<tr>
<td>2015</td>
<td>1,297</td>
<td>5,971</td>
<td>21.7%</td>
</tr>
</tbody>
</table>

Includes clean flake from US sourced bottles, both domestic and export.
# Clean Flake Production Rates by Collection Source

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curbside</td>
<td>65%</td>
<td>69%</td>
<td>67%</td>
<td>70%</td>
</tr>
<tr>
<td>Deposit</td>
<td>75%</td>
<td>75%</td>
<td>73%</td>
<td>80%</td>
</tr>
<tr>
<td>CA CRV</td>
<td>71%</td>
<td>77%</td>
<td>74%</td>
<td>74%</td>
</tr>
</tbody>
</table>

Note: Clean flake production (material utilization) rates are not true measures of yield due to the impact of fluctuations in inventory and in use of dirty flake vs. bottle bale inputs.
# 2015 Bale Price, East Coast Average

*(picked up)*

<table>
<thead>
<tr>
<th>MONTH</th>
<th>East Coast average low</th>
<th>East Coast average high</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>$.13 / pound</td>
<td>0.16 / pound</td>
</tr>
<tr>
<td>February</td>
<td>.115</td>
<td>0.150</td>
</tr>
<tr>
<td>March</td>
<td>.105</td>
<td>0.135</td>
</tr>
<tr>
<td>April</td>
<td>.105</td>
<td>0.135</td>
</tr>
<tr>
<td>May</td>
<td>.105</td>
<td>0.135</td>
</tr>
<tr>
<td>June</td>
<td>.110</td>
<td>0.140</td>
</tr>
<tr>
<td>July</td>
<td>.115</td>
<td>0.145</td>
</tr>
<tr>
<td>August</td>
<td>.110</td>
<td>0.135</td>
</tr>
<tr>
<td>September</td>
<td>.090</td>
<td>0.120</td>
</tr>
<tr>
<td>October</td>
<td>.050</td>
<td>0.090</td>
</tr>
<tr>
<td>November</td>
<td>.055</td>
<td>0.090</td>
</tr>
<tr>
<td>December</td>
<td>.065</td>
<td>0.090</td>
</tr>
</tbody>
</table>
• Plant utilization for 2015 at approximately 62%, for USA based on total PET “pounds in” of 1,548 million pounds and end 2015 capacity of 2,495 million pounds.

<table>
<thead>
<tr>
<th>Source</th>
<th>Million Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Bales and DF</td>
<td>1,373</td>
</tr>
<tr>
<td>Mexico, Canada, Other Bales and DF</td>
<td>82</td>
</tr>
<tr>
<td>Non-Bottle Material, including thermoforms, strapping, pre-consumer, other</td>
<td>93</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,548</td>
</tr>
</tbody>
</table>
Postconsumer Bottles Recycled / Used by Reclaimers (MMlbs)

- US Postconsumer Bottles Purchased by Exporters: 424
- US Postconsumer Bottles Purchased by US Reclaimers: 1,373
- Postconsumer Bottle Imports: 82

Total US Postconsumer Bottles Used by US Reclaimers: 1,455
Total US Postconsumer Bottles Recycled: 1,797
Postconsumer Bottles Recycled / Used by Reclaimers

Total US Postconsumer Bottles Recycled

Gross Weight Purchases (MMlbs)

- Purchased by Exporters
- Purchased by US Reclaimers

Total Postconsumer Bottles used by US Reclaimers

Gross Weight Purchases (MMlbs)

- Postconsumer Bottle Imports
- Purchased by US Reclaimers

The Association of Postconsumer Plastic Recyclers
Production of PET Flake from Bottles in 2015 (MMlbs)

- RPET Produced by US Reclaimers from Imported Bottles: 69
- RPET Produced by US Reclaimers from US Bottles: 1,001
- Clean Flake Equivalent from US Bottles Exported: 296

Total US Reclaimer RPET Production from Bottles: 1,070
Total Clean Flake Produced from US Bottles: 1,297
Production of PET Flake from Bottles in 2015

1000
1200
1400

Clean Flake Equivalent from US Bottles Exported

RPET Produced by US Reclaimers from US Bottles

RPET Produced by US Reclaimers from Imported Bottles

Total Clean Flake Produced from US Bottles

Total Clean Flake Production from US Reclaimers

MMlbs

The Association of Postconsumer Plastic Recyclers
## Clean Flake Production 2015 (All feedstock MMlbs)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>US Reclaimers</td>
<td>583.8</td>
<td>666.5</td>
<td>685.9</td>
<td>930.3</td>
<td>1,243.4</td>
<td>1,237.7</td>
<td>1,044.1</td>
</tr>
<tr>
<td>Canadian Reclaimers</td>
<td>136.5</td>
<td>124.8</td>
<td>134.6</td>
<td>153.1</td>
<td>173.3</td>
<td>191.1</td>
<td>202.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>720.3</td>
<td>791.3</td>
<td>820.5</td>
<td>1,083.4</td>
<td>1,416.7</td>
<td>1,428.8</td>
<td>1,246.5</td>
</tr>
</tbody>
</table>
Clean Flake Production 2015
(All feedstock MMlbs)

- Canadian Reclaimers
- US Reclaimers

0 200 400 600 800 1000 1200 1400 1600
• RPET demand down about 9 percent in total
• Fiber uses dropped most significantly (102mm lbs/16%) possibly due to low virgin prices driving price-sensitive customers from RPET
• Food & Bev bottle markets steady; Non-Food up more than 5%
• Sheet/Film down 5%, Strapping down 16%
End Markets

- Total package application use slightly down from 2014 at 758 million pounds (vs. 773 million)
- Imported rPET material up over 2014, to approximately 174 million pounds
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<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber</td>
<td>463</td>
<td>422</td>
<td>383</td>
<td>391</td>
<td>344</td>
<td>381</td>
<td>398</td>
<td>512</td>
<td>558</td>
<td>638</td>
<td>535</td>
</tr>
<tr>
<td>Sheet &amp; Film</td>
<td>71</td>
<td>74</td>
<td>128</td>
<td>153</td>
<td>159</td>
<td>195</td>
<td>202</td>
<td>307</td>
<td>315</td>
<td>365</td>
<td>347</td>
</tr>
<tr>
<td>Strapping</td>
<td>131</td>
<td>132</td>
<td>144</td>
<td>137</td>
<td>114</td>
<td>127</td>
<td>120</td>
<td>136</td>
<td>140</td>
<td>126</td>
<td>106</td>
</tr>
<tr>
<td>Engineered Resin</td>
<td>8</td>
<td>9</td>
<td>11</td>
<td>7</td>
<td>10</td>
<td>9</td>
<td>See Other</td>
<td>See Other</td>
<td>See Other</td>
<td>See Other</td>
<td>See Other</td>
</tr>
<tr>
<td>Food &amp; Beverage Bottles</td>
<td>115</td>
<td>139</td>
<td>136</td>
<td>141</td>
<td>203</td>
<td>216</td>
<td>242</td>
<td>276</td>
<td>425</td>
<td>351</td>
<td>350</td>
</tr>
<tr>
<td>Non-Food Bottles</td>
<td>63</td>
<td>49</td>
<td>60</td>
<td>55</td>
<td>65</td>
<td>58</td>
<td>57</td>
<td>50</td>
<td>50</td>
<td>57</td>
<td>60</td>
</tr>
<tr>
<td>Other</td>
<td>13</td>
<td>30</td>
<td>38</td>
<td>31</td>
<td>42</td>
<td>16</td>
<td>21</td>
<td>31</td>
<td>25</td>
<td>27</td>
<td>23</td>
</tr>
<tr>
<td><strong>TOTAL CONVERTER CONSUMPTION</strong>*</td>
<td><strong>864</strong></td>
<td><strong>855</strong></td>
<td><strong>900</strong></td>
<td><strong>915</strong></td>
<td><strong>937</strong></td>
<td><strong>1,002</strong></td>
<td><strong>1,040</strong></td>
<td><strong>1,312</strong></td>
<td><strong>1,513</strong></td>
<td><strong>1,564</strong></td>
<td><strong>1,421</strong></td>
</tr>
</tbody>
</table>

* Includes US & Canadian clean flake production, as well as clean flake imports
RPET Product Categories

- Other
- Non-Food Bottles
- Food & Beverage Bottles
- Strapping
- Sheet & Film
- Fiber

Year:
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015
2015 Recycling Report Summary

- Recycling rate reflects slight decline in curbside volumes; small decrease in deposit program volumes offset by increase in CA CRV
- Challenging market conditions led to soft RPET demand and tight margins
- Reduction of reclaimers throughput led to decreases in postconsumer bottle imports; use of domestic bottles fairly steady
- Supply quality / quantity still of concern
Thermoforms

- Bale comp study: Average 6.4% in curbside, high of 10.5% and low of 4.1%
- US & Canadian reclaimers report buying / processing 66.8 MMlbs (up from 63.9)
- Export down to 21.7 MMlbs
- Total recycled: 88.5 MMlbs (down from 107.8)
- Still a market in transition; overall volumes down, but domestic utilization up
Thermoform Recovery in US & Canada (MMlbs)

- Exported
- Reclaimed Domestically

PET Materials Flows in the US

US PET Bottles Available (5,971)

Clean Flake Equivalent (296)

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The Association of Plastic Recyclers

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