2011 Postconsumer Plastics Recycling in Canada

December 2012

Prepared by Moore Recycling Associates for the Canadian Plastics Industry Association
2011 Postconsumer Plastics Recycling in Canada

Introduction

This is the third year that Moore Recycling Associates has conducted a survey to determine the amount of postconsumer plastic recovered in Canada for recycling. This report shows how much Canadian postconsumer plastic was collected and reclaimed domestically—in Canada or the U.S.—and how much was exported overseas. This study is sponsored by the Canadian Plastic Industry Association (CPIA) and is made possible by the businesses that cooperated by providing data.

Executive Summary

In 2011, a minimum of 268.5 million kilograms of postconsumer (including post-commercial) plastic material was collected for recycling in Canada. As expected, most of that was plastic bottles, and the remainder was non-bottle rigid plastic, foam or film plastic. This represents an increase of 24% over what was reported in 2010.

Postconsumer Plastic Recovered Year-over-Year (kg)

<table>
<thead>
<tr>
<th>Year</th>
<th>Exported</th>
<th>Purchased for processing in Canada or the United States</th>
<th>Destination Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>33,861,693</td>
<td>227,964,334</td>
<td>6,707,288</td>
<td>268,533,314</td>
</tr>
<tr>
<td>2010</td>
<td>34,727,931</td>
<td>177,125,078</td>
<td>5,328,610</td>
<td>217,181,619</td>
</tr>
<tr>
<td>2009</td>
<td>22,168,450</td>
<td>157,173,715</td>
<td>8,762,125</td>
<td>188,104,289</td>
</tr>
</tbody>
</table>

The increase is due to an increase in recovery and continued progress in getting companies to report this data. Overall, 85% of the material reported was reclaimed in Canada or the U.S., and 13% was exported overseas. The destination is unknown for the remaining 2%.

1 Throughout this report the term “postconsumer” refers to used plastics that have served their intended purpose; this includes both plastics used by consumers and commercial plastics used by businesses (also referred to as post-commercial). Commercial materials are usually recovered outside of curbside or drop off collection programs and include items such as totes, pallets, crates, film, and other commercial packaging. This report does not include post-industrial recycling (materials generated in manufacturing and converting processes, such as manufacturing scrap and trimmings/cuttings).
U.S. companies purchased 51.7 million kilograms of postconsumer plastic from Canada for processing in the U.S. The material purchased by U.S. reclaimers combined with the plastic exported overseas resulted in 85 million kilograms of postconsumer plastic leaving the country an increase of 3% over what was reported in 2010. Overall, 66%—more than 176 million kilograms—of Canadian-sourced recycled plastic, and an additional 75 million kilograms of US sourced plastic, was reclaimed in Canada. This is a voluntary survey, therefore this report represents the minimum known to be recovered for recycling.

To obtain the data for this report, Moore Recycling conducted a survey of over 500 companies that are involved in the flow of recycled plastic in North America. These companies are made up of reclaimers, exporters, brokers, Material Recovery Facilities (MRFs) and other handlers of scrap plastic. One hundred and twenty seven of the companies surveyed are Canadian companies. The significant majority of postconsumer plastic material collected for recycling in Canada is handled by a handful of large reclaimers, the rest by medium to small businesses. Non-PET bottle reclamation data was received from 28 reclaimers: 17 of which are in Canada and 11 in the U.S. Data on all plastic material types was provided by 18 U.S. and Canadian plastic exporters. Moore Recycling received PET bottle and non-bottle reclamation data from the National Association for PET Container Resources (NAPCOR). Data gathered in the survey is cross checked with data available from Canadian Provinces. We continue our on-going market research and encourage full participation in the survey in order to provide precise findings in future reports.

According to feedback provided by Canadian reclaimers the supplies are tight for both bottles, and clean, clear film. Reclaimers also noted the issues of bale contamination and finding reasonable priced feedstock. The export market reported the challenges of strong domestic demand in 2011, and noted it is becoming more difficult to market lower quality material to China. Demand and pricing were generally strong throughout the year, primarily driven by the strong interest in—and support of—sustainability goals in Canada.

### Rigid (Bottle and Non-Bottle) Plastic Recovered By Resin (kg)

<table>
<thead>
<tr>
<th>Resin</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>PET</td>
<td>113,648,333</td>
</tr>
<tr>
<td>HDPE</td>
<td>79,325,473</td>
</tr>
<tr>
<td>PP</td>
<td>26,244,748</td>
</tr>
<tr>
<td>LDPE</td>
<td>205,322</td>
</tr>
<tr>
<td>PVC</td>
<td>287,732</td>
</tr>
<tr>
<td>PS</td>
<td>1,018,741</td>
</tr>
<tr>
<td>Other</td>
<td>10,701,099</td>
</tr>
<tr>
<td>Total</td>
<td>231,431,448</td>
</tr>
</tbody>
</table>

This table shows the breakdown of rigid plastic packaging by resin. Resin-specific data for film—which makes up the additional 37.1 million kilograms of postconsumer plastic recovered in Canada in 2011—is not available, but most recovered film is PE (Polyethylene).
The following chart shows the breakdown of material collected by major category.

**Postconsumer Plastic Recovered in 2011 by Major Category (kg)**

The data reported in 2011 represents an increase of 29.3 million kilograms (19%) for bottles, and an increase of 21 million kilograms (70%) for non-bottle rigid plastic. The non-bottle increase is primarily due to more plastic segregated by resin being reported in 2011. The film recycling reported remained about the same with a 1% or 272 thousand kilogram increase. The survey specifically asked for data on foam collected in 2011, thus foam is reported separately from non-bottle rigid recycling for 2011.²

### Bottles

Based on the consistency in year-over-year responses, the increase in plastic bottle collection is primarily due to an increase in recovery. There was a 14.7 million kilogram increase in PET Bottle recycling according to the same set of PET bottle reclaimers responding in 2010 and 2011. A few additional exporters reported PET bottle exports in 2011, but the overall total for export was slightly under 2010. The increase for HDPE bottles (12.9 million kilograms) was

<table>
<thead>
<tr>
<th>Year</th>
<th>Bottles</th>
<th>Non-Bottle Rigid</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>179,747,823</td>
<td>50,930,972</td>
</tr>
<tr>
<td>2010</td>
<td>150,439,320</td>
<td>29,912,342</td>
</tr>
</tbody>
</table>

² Expanded Polystyrene (EPS) was reported as non-bottle rigid Polystyrene (PS) prior to 2011.
reported by the same domestic reclaimers that reported
for 2010. The export of HDPE bottles reported
decreased in 2011. Exports of HDPE bottles now only
make up 2% of all HDPE bottles reported.

PET bottles are the highest volume plastic collected for recycling. In 2011, PET bottle
collection and domestic reclamation capacity were in equilibrium in Canada. The dominant end use
for recycled PET bottles continues to be fiber, followed respectively by food & beverage bottles,
sheet & film, strapping, and non-food bottles. Engineered resin, and other products make up a
small percentage of end uses for recycled PET (RPET).

HDPE bottles are the second highest volume of recycled plastic. HDPE bottle capacity
is estimated at 106 million kilograms for 2011, with an 80% utilization of that capacity. This
represents an increase in HDPE bottle capacity of 29 million kilograms over 2010. The primary end
use for natural bottles is new bottles, according to the Canadian reclaimers that reported. The
primary end use for colored HDPE bottles is pipe. Colored HDPE bottles were also used to
manufacture film/sheet, automotive applications, lawn and garden products and, to a lesser extent,
lumber/decking.

Non-Bottle Rigid Plastic

Non-bottle rigid plastic saw a substantial increase in 2011 due to both an increase in
recovery year-over-year and to some segregated resin material that was likely recycled but not
reported in 2010. That said, the non-bottle rigid recovery represented in this report is conservative.
The majority of the curbside non-bottle rigid plastic recovered is captured (although it is possible
there is more going to the overseas export market than reported), but it is quite likely that non-bottle rigid material from commercial
recovery is under-represented in this report. The majority of non-

<table>
<thead>
<tr>
<th>Year</th>
<th>PET Bottles</th>
<th>HDPE Bottles</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>108,547,368</td>
<td>66,527,789</td>
</tr>
<tr>
<td>2010</td>
<td>93,856,842</td>
<td>53,645,714</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Non-Bottle Rigid</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>50,930,972</td>
</tr>
<tr>
<td>2010</td>
<td>29,912,342</td>
</tr>
</tbody>
</table>

Capacity for processing bottles often overlaps with capacity to process plastic non-bottle rigid plastic and/or film. Thus, adding the bottle, non-bottle rigid and film capacities from this report together could result in double counting some capacity.

2011 Postconsumer Plastics Recycling in Canada
A very conservative estimate for non-bottle rigid plastic reclamation capacity is 50.4 million kilograms per year. Recycled non-bottle rigid plastic is commonly used to manufacture pallets, crates and buckets, as well as pipe. Other uses include automotive applications, various consumer and household products, lumber/decking, fence posts, and lawn & garden products.

**Foam and Film**

For the calendar year 2011, the survey asked for specific information on the recycling of foam plastics. The majority of the foam reported was expanded polystyrene (EPS), which was predominantly from cushion packaging for durable products and some food packaging e.g. meat trays, clamshells, coffee cups. As market demand grows for EPS, it is important to track how much of the material is being recycled. EPS is recycled into fire protection products, crown moldings and decorative frames for mirrors, pictures and wall hangings. The advent of densification equipment to compress foam has enabled efficient transport to markets in Canada, U.S. and overseas. Sources of recycled EPS include companies, depot operations (both municipal and private) and curbside collection programs.

Film, which is primarily PE, is another major plastic recycling category. Curbside and commercial film are the largest categories of recovered film in Canada. Film recycling stayed about the same as 2010. The data reported is conservative, as there are likely significant volumes going export that are not being reported. We estimate the film and bag reclamation capacity in Canada to be 49.3 million kilograms with a 38% utilization of the capacity. We saw growth in capacity for higher quality scrap and a decline for lower grades such as curbside collected film. The major end use for recycled film in Canada is new film & sheet. Additional end uses are lumber and decking, automotive applications, lawn and garden products, pipe, and to a lesser extent pallets, crates and buckets.

**Methodology**

Moore Recycling Associates conducts the Canadian survey simultaneously with the annual U.S. Postconsumer Plastic Recycling Survey. The survey gathered Canadian-sourced data for PET bottle exports, and for the reclamation and export of Canadian HDPE, other bottles, mixed rigid plastic, other resin segregated non-bottle rigid plastic, foam, and film. The National Association for PET Container Resources (NAPCOR) provided the total Canadian-sourced PET handled by either U.S. or Canadian reclaimers in 2011.

To ensure the most accurate information:

- Moore Recycling's markets database is continually updated to include exporters and reclaimers of plastic scrap in the U.S. and Canada;
- An online survey is submitted by email and staff follow up appropriately (email and/or phone) to collect the data; and
- The data is vetted through follow up calls, speaking to other industry contacts and reviewing other sources of recycling industry information, including available provincial data.
Markets Database

Moore Recycling continually updates an in-house database of plastic exporters, processors, reclaimers and key brokers, through work with the American Chemistry Council (ACC), the Association of Postconsumer Plastics Recyclers (APR), the Plastic Recycling Corporation of California (PRCC), the National Association of PET Container Resources (NAPCOR), and the Canadian Plastic Industry Association (CPIA). PlasticsMarkets.org and PlasticBagRecycling.org are web sites managed by Moore Recycling Associates from which we regularly receive requests from new contacts for material and markets. Contacts are also identified through published market databases and conversations with suppliers, such as material recovery facilities (MRFs), and key reclaimers.

Data Collection and Analysis

Moore Recycling uses a web-based, custom-designed survey system to gather data. Although the methodology has not changed since the first report, every year Moore Recycling explores ways to improve the quality and timeliness of the survey. For example, in 2011, we asked more specifically for products recycled as segregated resins / post commercial items (e.g. PET Thermoforms, HDPE injection drums, crates, pallets, PP battery casings) in order to offer clearer direction to the respondents.

An email with a unique link and message is sent to each contact. After an adequate amount of response time has passed, Moore Recycling staff send follow-up emails and make telephone calls to retrieve data. This follow up process can take weeks or months depending on responses. To encourage participation, free advertising on PlasticsMarkets.org is offered to those who respond promptly.

All appropriate data is entered into the online survey tool directly by the company being surveyed or by Moore Recycling staff when the survey is completed over the phone, by email or fax. As it is received, Moore Recycling staff review the data for accuracy and place follow up calls, as needed. After completion of the data collection step, Moore Recycling compiles the data and categorizes it based on the detail reported. The final data totals are reviewed, analyzed, and then reported with as much detail as possible without compromising confidentiality. Describing as clearly as possible how the data is collected, and what is and is not included in the survey, provides readers of this report with the transparency needed to cross reference our results with other industry data.

This is a voluntary survey and the data reported is based on responses received. Without 100% participation, the totals presented represent the minimum amount of plastic recovered for recycling and sold into the marketplace. Only data provided by Canadian and U.S. reclaimers and exporters selling directly overseas is included in the totals reported, unless it is determined that data is missing and substantive information from other reliable resources is available. Data provided by brokers and MRFs is used as reference points to better understand the flow of material.
The 2011 survey captured most of the significant handlers of plastic material in Canada, particularly postconsumer material recovered from the public. Post commercial material can be difficult to track since it is often purchased by companies also handling post-industrial scrap. In Canada, it is often lumped together as Industrial, Commercial and Institutional (I,C,I) and companies have a hard time breaking out post commercial from industrial scrap.

Other than the largest exporters, the players in the export market come and go and frequently change the materials they are purchasing, making the export market a constantly moving target. Receiving responses from exporters in Canada is even more difficult than it is in the U.S., because material often flows through brokers. While the prevailing Canadian opposition to exporting probably lowers the percent of material exported in comparison to the U.S. industry, it is possible some export data was not captured.

Moore Recycling cross-checked the 2011 data with available provincial collection estimates and also referenced Stats Canada’s estimated totals for Canada. If there were large gaps between the survey responses and other industry data, Moore Recycling used these other resources to ensure the results represent a reasonable accounting of postconsumer plastic collected in Canada for recycling.

For 2011, as was the case in previous years, survey responses from exporters and reclaimers reflected a much lower total for curbside film than what the provinces reported as recovered and marketed material. After diligent outreach to contacts and resources, curbside film data was added to the totals to reflect the minimum recovered based on provincial data. Data was only included in destination totals when that information was available from reliable sources.

Survey Categories

The survey requested data for PET bottle exports, and for reclamation and export of:

- HDPE bottles (natural, colored, mixed)
- PP & other bottles
- Commingled bottles
- Mixed resin rigid plastic bale categories (detailed below)
- Other resin segregated non-bottle rigid plastic (which includes post commercial plastic)
  - listed a number of items that have been provided in the past (e.g., PET Thermoforms, HDPE injection—drums-buckets-crates—PP hangers, PVC Flooring, PC CDs)
- Foam: EPS, EPP, EPE, Flexible Polyurethane, Rigid Polyurethane, Other Foam
- Film: Commercial Film, Commercial Mixed Film (mixed color-no postconsumer bags), Curbside Film, Mixed Film (Mixed color, clean PE film including retail collected postconsumer bags sacks and wraps), Clean Ag film, Dirty Ag film, and Other film.

We used the following seven different types of mixed rigid bales containing non-bottle rigid plastic previously identified and assigned names by the APR’s Non-Bottle Rigid Plastic Recycling Program, as well as a few other mixed bale categories.
• **All Rigid Plastic (ARP)** - All **bottles**, AND all household non-bottle **containers** (includes thermoform packaging, cups, trays, clamshells, food tubs), AND all **bulky** rigid plastic (includes carts, crates, buckets, baskets, toys, lawn furniture).

• **Pre-picked Rigid Plastic (PPK)** - All household non-bottle **containers** (includes thermoform packaging, cups, trays, clamshells, food tubs), AND all **bulky** rigid plastic (includes carts, crates, buckets, baskets, toys, lawn furniture). Very few bottles.

• **Bottles & Containers (B&C)** - All **bottles**, AND all household non-bottle **containers** (includes thermoform packaging, cups, trays, clamshells, food tubs). Very few bulky items.

• **Small Plastic Containers (SPC)** - All household non-bottle **containers** (includes thermoform packaging, cups, trays, clamshells, food tubs), with very few bottles and no bulky items.

• **Bulky Rigid Plastic (BRP)** - All **bulky** rigid plastic (includes carts, crates, buckets, baskets, toys, lawn furniture). No bottles or containers.

• **Tubs & Lids (T&L)** - PP, PE non-bottle household containers, including buckets.

• **Olefin Bale (OLF)** - PP, PE bulky rigid plastic, may include PP, PE bottle and/or non-bottle household containers.

We also ask about the following additional categories:

• **HDPE Colored Bottles with PP/PE containers**

• **PP Bale** - PP bottles, containers and bulky rigid plastic.

• **Mixed Clamshell Bale**

• **Other Mixed Rigid Plastic** – a “catch all” category defined on a case by case basis.

• **Mixed Post Commercial Plastic** - a “catch all” category defined on a case by case basis.

• **Mixed Electronic Scrap** – primarily HIPS, ABS, PC.

With the exception of Tubs and Lids bales, for which there is Canadian composition data, Moore Recycling applied U.S. resin breakouts to the mixed-resin rigid plastic bales. Canada is comparable enough to the U.S. to be confident in applying the allocation of the other mixed bales to the data. The breakout for Commingled Bottle bales is based on sales data for bottles by resin. The breakouts for all the other mixed bales listed above are based on a mixed-resin rigid bale composition study performed for APR by Moore Recycling Associates in 2010.
Findings

In 2011, a minimum of 268.5 million kilograms of postconsumer plastic was collected for recycling in Canada. As expected most of that was plastic bottles and the remainder was non-bottle rigid plastic, film and bags and a small amount of foam.

The chart below shows the recovery data reported year-over-year by major category.

**Recovery by Plastic Category (kg)**

<table>
<thead>
<tr>
<th>Plastic Category</th>
<th>2011</th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDPE Bottles</td>
<td>50,930,972</td>
<td>29,912,342</td>
<td>28,131,671</td>
</tr>
<tr>
<td>PET Bottles</td>
<td>37,101,867</td>
<td>36,829,957</td>
<td>27,147,315</td>
</tr>
<tr>
<td>Non-Bottle Rigid</td>
<td>179,747,823</td>
<td>150,439,320</td>
<td>132,825,304</td>
</tr>
<tr>
<td>Film</td>
<td>752,654</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Foam</td>
<td>1,741,314</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

The increases year-over-year represent a combination of increases in recovery of material, and improved response rate.

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5 Foam plastic was included in PS reported as Non-Bottle Rigid in 2009 and 2010. In 2011, foam was asked for separately in its own section.
The increase in the Bottle category is attributable to an increase in recovery of plastic bottles. The majority of the increase was reported by reclaimers that also reported in 2010. Likewise, the majority of the increase in non-bottle rigid plastic was reported by the same set of domestic reclaimers as 2010. The increase is due to both an increase in recovery year-over-year and to some segregated resin material that was likely recycled but not reported in 2010. The non-bottle rigid recovery represented here is still conservative. The majority of the curbside non-bottle rigid plastic is captured in this report, although it is possible there is more going to the overseas export market than was reported. It is likely that non-bottle rigid material from commercial recovery is under-represented in this report, due to the aforementioned difficulty of tracking that material separate from industrial scrap sources. The same set of reclaimers and exporters reported film reclamation or export, as in previous years, with the exception of one fewer exporter, that is now focusing more on post industrial material.

### Bottles

Bottles are collected in Canada through municipal curbside programs, as well as through depots and retail drop off for the beverage deposit systems mandated in most provinces. Each province accepts different types of beverage containers as part of their program and each has a different collection system in place. Moore Recycling estimates that 179.7 million kilograms of postconsumer bottles were collected in Canada. This represents an increase of 19% over 2010. PET and HDPE bottles both had significant increases reported for domestic reclamation with export of these materials either stagnant or decreased.

#### Bottles By Resin

- **PET Bottles** 60.4%
- **PP Bottles** 2.5%
- **HDPE Natural Bottles** 11.3%
- **HDPE Colored Bottles** 25.7%
- **Other Bottles** 0.1%
### Bottles By Resin Year-over-Year (kg)

<table>
<thead>
<tr>
<th>Year</th>
<th>PET Bottles</th>
<th>HDPE Natural Bottles</th>
<th>HDPE Colored Bottles</th>
<th>PP Bottles</th>
<th>Other Bottles</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>108,547,368</td>
<td>20,267,826</td>
<td>46,259,963</td>
<td>4,454,390</td>
<td>218,275</td>
</tr>
<tr>
<td>2010</td>
<td>93,856,842</td>
<td>18,800,084</td>
<td>34,845,630</td>
<td>2,663,522</td>
<td>273,242</td>
</tr>
<tr>
<td>2009</td>
<td>88,133,102</td>
<td>13,263,013</td>
<td>27,692,669</td>
<td>3,475,771</td>
<td>260,749</td>
</tr>
</tbody>
</table>

### PET Bottles

The increase in PET is likely entirely due to an increase in collection, since there weren’t any significant new-responders for 2011 versus 2010. NAPCOR estimates that in 2011, approximately 101.9 million kilograms of Canadian-sourced postconsumer PET bottles were reclaimed in Canada and the U.S.; Moore Recycling estimates that 6.7 million kilograms—or 6% of the PET collected in Canada—was exported overseas, primarily as PET bales but also as dirty flake or as part of mixed bales, primarily to China. In comparison to 2010, Canadian reclaimers purchased 10% more Canadian-sourced PET bottles in 2011.

In the 2011 Report on Post Consumer PET Container Recycling Activity, NAPCOR reports that Canadian buyers purchased 55 million pounds of PET from the U.S., a 25% increase from 2010; reversing the trend of decreased purchases of U.S. PET bottles by Canadian reclaimers.

### Capacity and End Uses

There were four PET reclaimers operating in Canada in 2011. In 2011, PET bottle collection and domestic reclamation capacity were in equilibrium in Canada. NAPCOR reports the dominant North American end use for recycled PET bottles continues to be fiber, followed respectively by food & beverage bottles, sheet & film, strapping, and non-food bottles. The report also states that there was a big jump (11.8 million kilograms) in the use of RPET into bottles primarily driven by Canadian demand. Engineered resin, and other products make up a small percentage of end uses for RPET.  

### HDPE Bottles

Moore Recycling estimates that approximately 66.5 million kilograms of postconsumer HDPE bottles were collected for recycling in 2011, an increase of 24% over 2010. The increase was reported by the same domestic reclaimers that reported for 2010. The export of HDPE bottles decreased in 2011 and exports of HDPE bottles now only make up 2% of the total material reported.

Colored HDPE made up 70%, or 46.3 million kilograms, of the HDPE bottles recovered for recycling an increase of 5% over 2010. Unlike the U.S., packaging milk in natural HDPE bottles is

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6 2011 Report on Post Consumer PET Container Recycling Activity
not prevalent in Canada, which explains why natural HDPE bottles make up only 30% of the total HDPE bottles recycled.

Of the 66.5 million kilograms of HDPE bottles recovered in Canada for recycling, 11.2 million kilograms went to the United States for reclamation, while 53.9 million kilograms were sourced and reclaimed in Canada. Canadian reclaimers brought 29.3 million kilograms of HDPE bottles from the U.S. to be processed in Canada. Although the U.S. increased their purchases of Canadian HDPE bottles by about 7 million kilograms compared to 2010, Canada also increased its purchases of US material by 10 million kilograms and kept an additional 9 million kilograms of Canadian material in Canada.

**Capacity and End Uses**

Moore Recycling estimates the 2011 Canadian HDPE bottle reclamation capacity to be 106 million kilograms per year, an increase of 29 million kilograms compared to what was reported in 2010. We calculate a utilization rate of 80% for 2011. Of the Canadian reclaimers reporting on end uses, the primary end use for natural bottles is new bottles. The primary end use for colored HDPE bottles is pipe. Colored HDPE bottles are also going into film/sheet, automotive applications, lawn and garden products and, to a lesser extent, lumber/decking.

**PP and Other Bottles**

A minimum of 4.5 million kilograms of postconsumer PP bottles were collected for recycling in 2011, up by 1.8 million kilograms from 2010. About 1% of the PP reported was exported overseas. U.S. reclaimers reported buying some Canadian sourced PP bottles in 2011.

Based on the U.S. bale sorts, there is likely a small amount of LDPE, PVC and Other (#7) bottles in the mixed resin rigid bales reported. LDPE, PVC and Other bottles make up only 218 thousand kilograms of the total material reported in this report. About 162 thousand kilograms comes from mixed bales reported by Canadian or U.S. reclaimers. These reclaimers handle the non-olefin (PVC or Other #7) bottles in one of a few ways: either dispose of them, sell them (if a domestic or export market is available) or, in some cases, the material goes to waste to energy facilities.

The survey asked reclaimers reporting mixed rigid bales, if they utilized all material, or if they dispose of, sold or otherwise provided any portion of the reported mixed rigid material to another reclaimer, exporter, broker or intermediate processor. No bottle material was reported as disposed or sold.

**Capacity and End Uses**

Due to limited data sources, information on PP reclamation capacity is not available. In the U.S. and Canada, recycled PP bottles are used to manufacture automotive applications, crates and buckets, caps and closures or items such as lawn and garden furniture.
Non-bottle Rigid Plastic

In 2011, 50.9 million kilograms of non-bottle rigid plastic were reported as reclaimed or exported. This represents a substantial increase of 70% over the volume reported for 2010. Of the non-bottle rigid material reported, 20.5 million kilograms was from mixed resin rigid bales, including electronic scrap, an increase of 4 million kilograms. Only 400 thousand kilograms of mixed post commercial material was reported in 2011. The remaining 30 million kilograms was reported as resin segregated, an increase of 21 million kilograms. This increase is most likely due to both an increase in recovery year-over-year and to some segregated resin material that was recycled but not reported in 2010.

Of the total Canadian-sourced non-bottle rigid plastic collected, only about 11.4 million kilograms was purchased by U.S. reclaimers: primarily segregated PP and some mixed post commercial material. No mixed rigid bales were reported as purchased by U.S. reclaimers.

Approximately 26% of the total non-bottle rigid plastic reported as recovered for recycling was exported overseas in 2011, a decrease of 11% compared to 2010. The decrease is not due to less plastic exported, but to the increase in the volume of non-bottle rigid plastic reported as reclaimed in Canada.

In 2011, plastic segregated by resin made up almost 59% of the non-bottle rigid plastic reported, of that only 13% was reported as exported. The remaining non-bottle rigid data is purchased either as part of mixed resin bales—most from the blue box or other provincial collection programs—as e-scrap or as mixed post commercial plastic.

The following charts show the breakout of sources of the non-bottle rigid plastic volumes reported for 2011.

Non-Bottle Rigid Plastic by Source

Other Mixed Bales* includes data provided as "Other Mixed Rigid Plastic" and any bale categories with less than 200 thousand kilograms reported. These include Bulky Rigid Bales, Olefin Bales, and PP Bales. No data was reported for Colored HDPE bottle with PE & PP and Mixed Clamshell bales.
Non-Bottle Rigid Plastic By Source Year-over-Year (kg)

<table>
<thead>
<tr>
<th>Source</th>
<th>2011</th>
<th>2010</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Rigid</td>
<td>3,859,182</td>
<td>2,203,193</td>
<td>4,995,648</td>
</tr>
<tr>
<td>Pre-picked Rigid</td>
<td>4,088,425</td>
<td>5,769,829</td>
<td>-</td>
</tr>
<tr>
<td>Tubs &amp; Lids</td>
<td>5,003,063</td>
<td>4,961,408</td>
<td>7,856,730</td>
</tr>
<tr>
<td>Bottles &amp; Containers</td>
<td>308,764</td>
<td>45,558</td>
<td>46,149</td>
</tr>
<tr>
<td>Household Containers</td>
<td>-</td>
<td>-</td>
<td>1,983,645</td>
</tr>
<tr>
<td>Olefin (HDPE &amp; PP)</td>
<td>44,926</td>
<td>846,542</td>
<td>-</td>
</tr>
<tr>
<td>PP Bale</td>
<td>171,622</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Bulky Rigid</td>
<td>175,746</td>
<td>1,801,997</td>
<td>2,714,435</td>
</tr>
<tr>
<td>Colored HDPE Bottles with PE /PP Containers</td>
<td>-</td>
<td>15,536</td>
<td>-</td>
</tr>
<tr>
<td>Electronic Scrap</td>
<td>-</td>
<td>1,133,982</td>
<td>19,459</td>
</tr>
<tr>
<td>Other Mixed Rigid Plastic</td>
<td>6,889,802</td>
<td>89,442</td>
<td>-</td>
</tr>
<tr>
<td>Mixed Post Commercial 8</td>
<td>420,359</td>
<td>4,929,072</td>
<td>340,195</td>
</tr>
<tr>
<td>Plastic Segregated by Resin</td>
<td>29,969,083</td>
<td>8,115,783</td>
<td>10,175,410</td>
</tr>
</tbody>
</table>

The source data for mixed rigid material categories may not track as expected because respondents may report materials as a mixed category in one year and broken out as segregated resins in another year. For example, in 2011 what was previously reported as Electronic Scrap reported in 2010 was reported as HIPS and ABS in the segregated resins in 2011.

Mixed clamshell bales were added to the survey in 2011 along with PP Bales, but no Mixed Clamshell bales were reported in 2011.

Tubs & lids programs have been more prevalent in Canada than in the U.S., but as provinces work to collect more plastic, broader mixed resin rigid bale types such as, All Rigid and Pre-picked bales 7 are showing up more consistently in the marketplace. The Other Mixed Rigid Plastic was particularly high this year because one respondent was unable to provide a breakdown of the type of mixed bales that made up the total reported. APR, the trade association for North American postconsumer plastic recyclers, continues to address mixed bale terminology and research to determine the best direction for the industry to pursue non-bottle rigid plastic recycling.

Bulky Rigid bales make up a very large part of the mixed resin bales reported in the U.S., while in Canada, most material collected curbside is packaging. Bulky rigid plastic material—toys, laundry baskets, buckets, crates—are not as widely accepted in Canada. It is possible some bulky rigid plastic is collected in other ways, such as municipal drop off, and may have been reported as resin segregated material. Never the less, bulky rigid plastic (primarily HDPE and PP) presents a significant recovery opportunity because of its large volume and high value.

7 Pre-picked Rigid bales are All Rigid bales that have the PET and HDPE bottles removed.

8 The 2010 report combined Post Commercial material with Plastic Segregated By Resin and they are broken out in the above chart and graph.
PP and HDPE make up 68% of the non-bottle rigid plastic recovered in Canada, an increase of 11% over 2010. The category “Other” makes up 21% of the material reported for 2011. Other is made up of electronic scrap (e.g. HIPS, ABS), other resins from mixed bales, and a fairly substantial amount of other mixed rigid plastic material reported without the information needed to break it down by resin.

There are about 2 million kilograms of non-olefin plastic (PET, PS, PVC, Other) in the non-bottle rigid fraction of the mixed resin rigid bales reported by domestic reclaimers and included above. The survey specifically asked reclaimers reporting mixed rigid bales, if they utilized all material, or if they disposed of, sold or otherwise provided any portion of the reported mixed rigid material to another reclaimer, exporter, broker or intermediate processor. With two minor exceptions, all the reclaimers indicated that they utilized all material they purchased from U.S. and Canadian sources. We did not remove the volume reported as disposed because we could not breakout the amount from Canadian sourced bales versus U.S. sourced bales and it was insignificant: less than 300 thousand kilograms.

Non-Bottle Rigid Plastic Recovered By Resin (kg)

<table>
<thead>
<tr>
<th></th>
<th>PET</th>
<th>HDPE</th>
<th>PVC</th>
<th>LDPE</th>
<th>PP</th>
<th>PS</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>kg</td>
<td>5,100,965</td>
<td>12,797,683</td>
<td>271,105</td>
<td>184,506</td>
<td>21,790,358</td>
<td>272,964</td>
<td>10,513,390</td>
</tr>
</tbody>
</table>

With the exception of Tubs and Lids bales, for which there is Canadian composition data, U.S. resin breakouts, from a mixed resin rigid bale composition study performed for APR by Moore Recycling Associates in 2010, were applied to the mixed-resin rigid plastic bales reported to provide the above resin breakdown.

EPS that was reported as PS in 2010 is no longer in the above totals. See the section on Foam below.
PET Thermoforms represent a great opportunity to increase non-bottle rigid recycling and supply for PET reclaimers in North America. In the 2011 Report on Post consumer PET Container Recycling Activity Report, NAPCOR reported that “2011 saw the first significant amount of PET thermoformed packaging move through the system in the US and Canada”. The report also states, “NAPCOR has made the removal of obstacles to PET thermoform recycling its top priority, not only as a reflection of proper stewardship for PET’s fastest-growing packaging segment, but as a way of increasing feedstock opportunities for reclaimers, and ultimately ensuring more RPET flake and pellet supply to the end-use market”. In 2011, NAPCOR continued that work with public program operators, intermediate processors, reclaimers, and end users and reported “This effort fostered a much better understanding of the technical and logistical issues involved, and ultimately led to the breakthrough on end market options for recycled PET thermoform material that are emerging now in 2011”.

To address one of the potential barriers to successful recycling, NAPCOR worked with the Association of Postconsumer Plastic Recyclers (APR) to develop a testing protocol for the recycling compatibility of adhesives and labels used on PET thermoformed packaging. Testing began in the third quarter of 2011 and is well underway; all labels that conform to the recycling compatibility evaluation protocol are posted on the APR web site.

Capacity and End Uses

A very conservative estimate for non-bottle rigid plastic reclamation capacity is 50.4 million kilograms per year. This capacity is based on either the capacity reported by reclaimers, or—if no capacity was reported—the amount of material the reclamer handled. It is not possible to determine an accurate utilization rate because capacity is often shared across material types (e.g., bottles and non-bottles) and because too few reclaimers reported non-bottle rigid capacity, thus we had to assume capacity based on amount of material purchased.

Please note, this capacity does not include the substantial commercial/industrial scrap grinding and compounding capacity.

Recycled non-bottle rigid plastic is commonly used to manufacture pallets, crates and buckets, as well as pipe. Other uses include automotive applications, various consumer and household products, lumber/decking, fence posts, and lawn & garden products.
Foam

For the calendar year 2011, the survey asked for specific information on the recycling of foam plastics. The majority of the foam reported was expanded polystyrene (EPS), which was predominantly from cushion packaging for durable products and some food packaging e.g. meat trays, clamshells, coffee cups. As market demand grows for EPS, it is important to track how much of the material is being recycled. EPS is recycled into fire protection products, crown moldings and decorative frames for mirrors, pictures and wall hangings. The advent of densification equipment to compress foam has enabled efficient transport to markets in Canada, U.S. and overseas. Sources of recycled EPS include companies, depot operations (both municipal and private) and curbside collection programs.

Seven hundred and forty six thousand kilograms of EPS was reported as recycled in 2011, the majority of that material went overseas. A very small amount of Rigid Polyurethane (just under seven thousand kilograms) was also reported as exported overseas.

Due to the limited number of reclaimers responding for domestic reclamation of EPS, no other information is available.

Film and Bags

In 2011, a minimum of 37.1 million kilograms of postconsumer film and bags were collected for recycling, compared to 36.8 million kilograms in 2010. The same domestic reclaimers and exporters responded with film data in 2011, as did in 2010, with the exception of one exporter that did not report export data for Canadian sourced post consumer film due to a shift in their business to focus more on post industrial material. There continues to be a gap in the curbside film data reported by reclaimers and exporters, and in recycling data from Provinces. In order to report a more accurate total, other contacts and resources were used to vet the available Provincial data in order to use it, along with the survey responses, to report a minimum recovered and marketed for curbside film. As mentioned earlier, the destination of that curbside material is reported where possible, but the destination of a portion of that material is unknown. We are likely missing some export and commercial film data, but we have a very accurate total for postconsumer material recovered and processed domestically.
Clear Commercial Film by far is the most valuable film in the market place. This film is recovered by the commercial sector from transportation and other packaging, and is clean PE film including stretch wrap and poly bags. After Clear Commercial Film, the most valuable film is Commercial Mixed Film, then Mixed Film, which includes retail or depot drop off collected postconsumer bags and film. The bag and film material collected at retail drop offs from the public is much cleaner than film collected curbside and sent through the MRF, but it can also have color and varying consistency in quality, which can reduce the market value. Curbside Film is mixed PE film collected curbside and sorted out at a MRF. Clean Ag Film is from agricultural uses where it does not touch the ground - dry with up to 10% contamination. Curbside Film and Dirty Ag film (ag film that has touched the ground and has up to 50% contamination) are harder to recycle because they require a wash stage or end product that can handle the contamination. Fewer than 5 companies can process curbside film in the U.S. and Canada. Processors of postconsumer material collected through drop off, expressed concerns about contamination from glass (and other
abrasive material) and non polyethylene plastic. Nearly all reclaimers expressed concern about degradable film in the recycling stream.

The same set of domestic reclaimers reported in 2011 as in 2010, with one new reclaimer responding. The data reported shows at least 50% of recovered postconsumer film is being processed by Canadian or U.S. reclaimers. U.S. reclaimers purchased 4% (1.5 million kilograms) of the film plastic recovered in Canada, down by 5% from 2010. Canadian reclaimers likewise purchased 1.5 million kilograms of recovered film from the U.S. in 2011.

A minimum of 32% of the recovered film in 2011 was exported overseas. The main categories exported in 2011 were Commercial, Commercial Mixed Film and Curbside Film; very little material from the other categories was exported according to the survey responders. Historically the export market has been a large competitor for film coming out of the U.S. and Canada. As mentioned, we are sure we have not yet uncovered all of the material that is sold overseas.

The destination of 18% of the film recovered in 2011 is unknown. As noted, this is curbside film known as recovered—primarily based on provincial data—but we were unable to document where this material ended up.

**Capacity and End Uses**
For 2011, Moore Recycling estimates the film and bag reclamation capacity in Canada was 49.3 million kilograms with a 38% utilization of the capacity. The major end use for recycled film in Canada is new film & sheet, whereas in the U.S. lumber and decking is the primary end use due to a few very large reclaimers. Additional end uses in Canada and the U.S. reported in 2011 are automotive applications, pipe, lawn and garden products and some injection molding articles.

**Conclusions**
Postconsumer Plastic Recycling reported for Canada increased by over 51 million kilograms from 2010 to 2011 to 268.5 million kilograms. These numbers are conservative, but the data shows the vast majority of the material collected for recycling in Canada is staying in Canada for reclamation and remanufacture. There are opportunities to improve the quality of MRF bales and the quantity of what is collected in Canada, notably bulky rigid plastic, commercial rigid plastics and commercial film—but overall, the plastic recycling industry in Canada is growing.

**Additional Information**
The Canadian Plastics Industry Association provides resources to communities, businesses and consumers to assist in increasing awareness and education of the recycling of plastic packaging and diversion from Canadian landfills. For information about plastics recycling visit [www.plastics.ca](http://www.plastics.ca). For information on markets for postconsumer plastic visit [www.PlasticsMarkets.org](http://www.PlasticsMarkets.org).
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