



2011 National Postconsumer Non-Bottle Rigid Plastic Recycling Report

Prepared by Moore Recycling Associates Inc. for the
American Chemistry Council

January 2013

Introduction

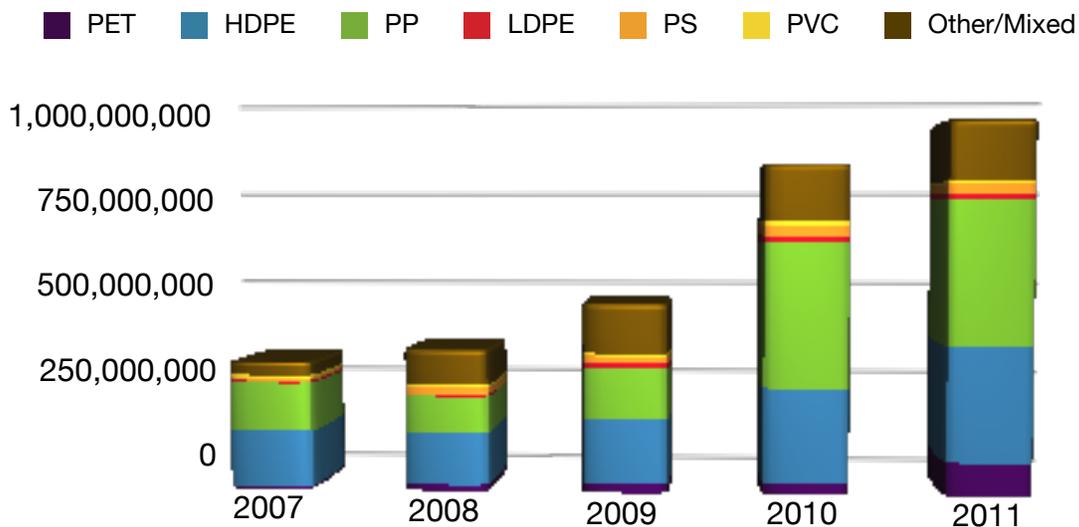
The 2011 National Report on Postconsumer Non-Bottle Rigid Plastic Recycling is the fifth annual report on pounds of postconsumer non-bottle rigid plastics—packaging and non-packaging—recovered for recycling in the United States. Research for this report was conducted by Moore Recycling Associates Inc. for the Plastics Division of the American Chemistry Council.

Executive Summary

A minimum of 934 million pounds of postconsumer¹ non-bottle rigid plastic was recovered in 2011. This represents an increase of 13% over 2010. This increase is due to increased non-bottle rigid collection efforts by communities around the country.

This report documents that more than 61 percent of non-bottle rigid plastic scrap was procured by domestic (U.S. and Canadian) users versus exported off-shore. The report also indicates that plastic scrap prices and demand were consistent throughout 2011.

Non-Bottle Rigid Plastic Recovered Year over Year (by Resin)



¹ Throughout this report the term “postconsumer” refers to used plastics that have served their intended purpose; this includes both plastics that have been used by consumers and plastics that have been used by businesses. Commercial materials are usually recovered outside of curbside or drop off collection programs and include items such as totes, pallets, crates, and other commercial packaging. The EPA defines postconsumer as a material or finished product that has served its intended use and has been diverted or recovered from the waste destined for disposal, having completed its life as a consumer item. According to this definition, a business qualifies as a consumer of those goods. In contrast, post industrial material is defined by EPA as materials generated in manufacturing and converting processes, such as manufacturing scrap and trimmings/cuttings. This report does not include post industrial recycling.

In order to determine an accurate estimate of pounds of non-bottle rigid plastic recovered for recycling in 2011, Moore Recycling surveyed both domestic and export postconsumer markets. The information obtained is based on U.S.-sourced, postconsumer recovery data reported by 25 U.S. and Canadian plastic reclaimers² and 30 exporters. The survey asked for general comments and both exporters and domestic reclaimers reported that 2011 was a “fairly stable” year. Reclaimers provided general feedback that the demand for quality, non-bottle rigid plastic was high in 2011 and finding quality recycled material for use as feedstock continued to be a major challenge. Bale quality was an issue for many respondents, especially for mixed rigid bales. Survey responders also noted a challenge in finding quality material at a cost-effective price.

Plastic scrap prices and demand were steady throughout 2011. Most commodities ended the year at or above the price they started the year. Pricing was steady through the first three quarters of 2012, with the export market showing some weakness in the fourth quarter. Innovation in sorting, processing and the end-products for recycled plastic coupled with increased demand for recycled content in new packaging and products, has allowed opportunities for processing non-bottle, mixed plastic materials, which were once thought to be unusable or only cost effective if exported.

Methodology

Data on recovered postconsumer non-bottle rigid plastic is collected together with data on plastic bottles and film during the Postconsumer Plastic Recycling Survey. For this report, the survey gathers data on both mixed rigid plastic and material segregated by resin. The later is often post commercial material. Post commercial material includes products such as packaging for transport, such as pallets, crates and totes, or material collected through special collection programs, such as battery casings.

To ensure the most accurate information:

- Moore Recycling’s markets database is continually updated to include current exporters and reclaimers of plastic scrap;
- 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.

Markets Database

Moore Recycling continually updates an in-house database of plastic exporters, processors, reclaimers and key brokers. Through work with ACC, the Association of Postconsumer

² Moore Recycling surveys and counts material from companies that wash or extrude unwashed postconsumer material into a clean feedstock or end product.

Plastics Recyclers (APR), the Plastic Recycling Corporation of California (PRCC) and the National Association of PET Container Resources (NAPCOR), and web sites PlasticsMarkets.org and PlasticBagRecycling.org, Moore Recycling Associates regularly receives requests from new contacts for material and markets. Contacts are identified through published market databases and conversations with suppliers, such as material recovery facilities (MRFs), and key reclaimers.

NAPCOR, which conducts a separate survey on domestic PET reclamation, provided Moore Recycling with domestic reclamation data for PET non-bottle rigid plastic.

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, Moore Recycling continually seeks ways to improve the quality and timeliness of the survey. For example, in 2011, we asked survey participants to differentiate with more specificity, products collected as segregated resins (e.g. PET thermoforms, HDPE injection drums, crates, pallets, PP battery casings) in order to improve survey responses and findings.

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 suitable data is entered in 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, the data is reviewed for accuracy and follow up calls are made, as needed. After data collection is complete, the data is compiled and categorized 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.

Survey Categories

For the 2011 survey, we used the 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. The survey asks for segregated resin material, including post commercial. The following mixed rigid plastic bale categories were used:

- 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

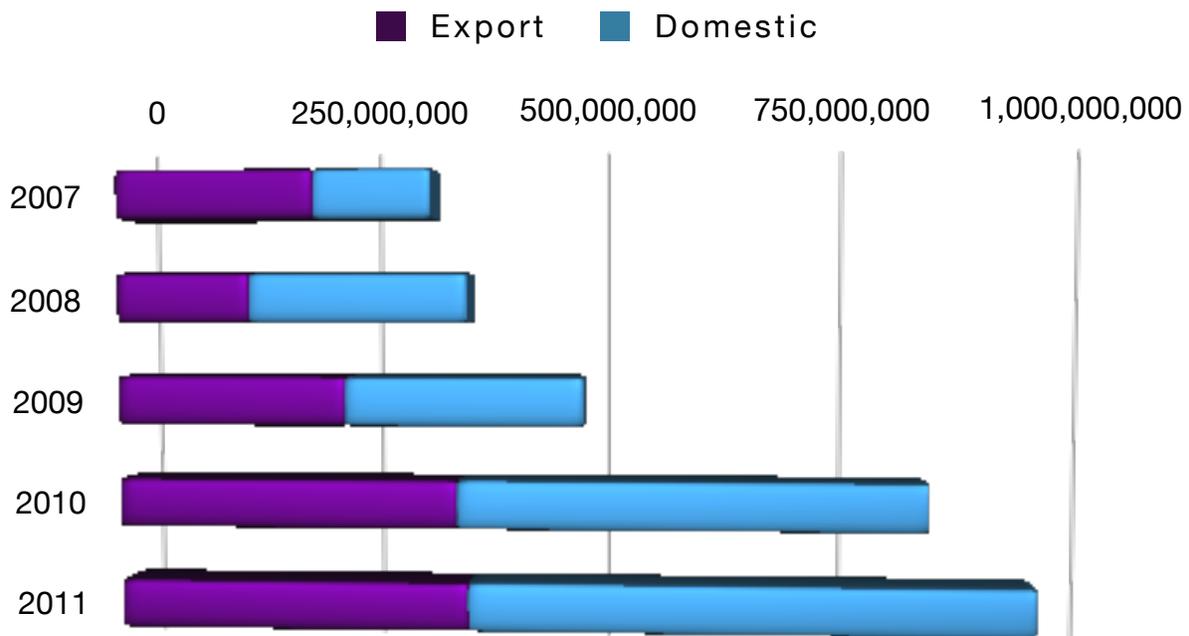
The survey asked for the following additional categories:

- 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
- Post Commercial or Otherwise Segregated Individual Resins - a list of products that respondents have offered in previous surveys (e.g., PET Thermoforms, HDPE injection—drums-buckets-crates—PP hangers, PVC Flooring, PC CDs)
- Other Plastic - meant for plastic segregated by resin, but other than the specific categories we listed above

Findings

In 2011, a minimum of 934 million pounds of non-bottle rigid plastic was collected for recycling in the United States. Approximately 61% of the total material reported—an increase of 4% over 2010—was reclaimed in the United States or Canada, and the remainder was exported overseas, primarily to China.

Non Bottle Rigid Plastic - Domestic Versus Export



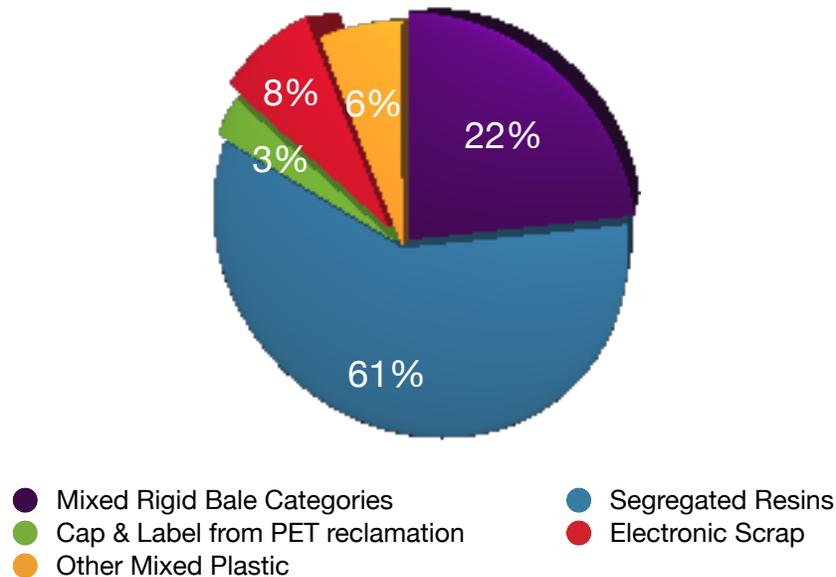
Eighty-five percent of the resin-segregated plastic collected was processed in the United States or Canada. Eighty-one percent of the mixed resin plastic collected was exported offshore to areas—primarily China—where the infrastructure exists to sort scrap and use it for new products.

Postconsumer Non-Bottle Rigid Plastic Recovered

Year	Exported	Purchased for use in United States or Canada	Total
2011	361,527,178	572,400,066	933,927,245
2010	350,869,617	475,783,142	826,652,759
2009	236,104,896	243,115,190	479,220,086
2008	137,132,799	223,642,898	360,775,697
2007	204,040,000	121,400,000	325,440,000

The following charts show the sources of the non-bottle rigid material reported in the survey.

Sources of Non-Bottle Rigid Data



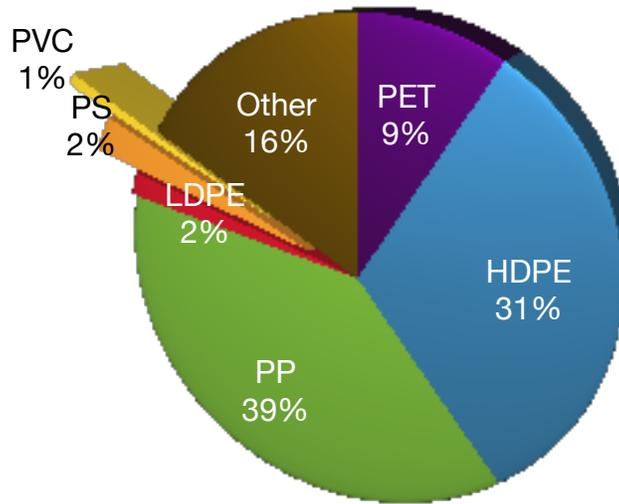
A large percentage of non-bottle rigid plastics collected for recycling was olefin material (HDPE, LDPE, PP). This material generally has the highest value in both domestic and export markets because of the wide range of manufacturing uses and relative ease of processing. Yet, according to responses from the survey, the reclaimers that purchased mixed material containing non-olefin plastics are utilizing both the olefin and the non-olefin portion in their reclamation processing.³

The chart below illustrates the percentage breakdown of the individual resins making up the non-bottle rigid plastic recovered for recycling in 2011⁴.

³ 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.

⁴ The breakdown is based on material reported as specific postconsumer non-bottle rigid plastic resins, as well as percentages applied to each of the mixed rigid plastic categories. The percentages applied to the mixed rigid plastic reported are based on hand-separated bale sorts done in 2010/2011.

Postconsumer Non-Bottle Rigid Plastic Recovered in 2011 (by resin)

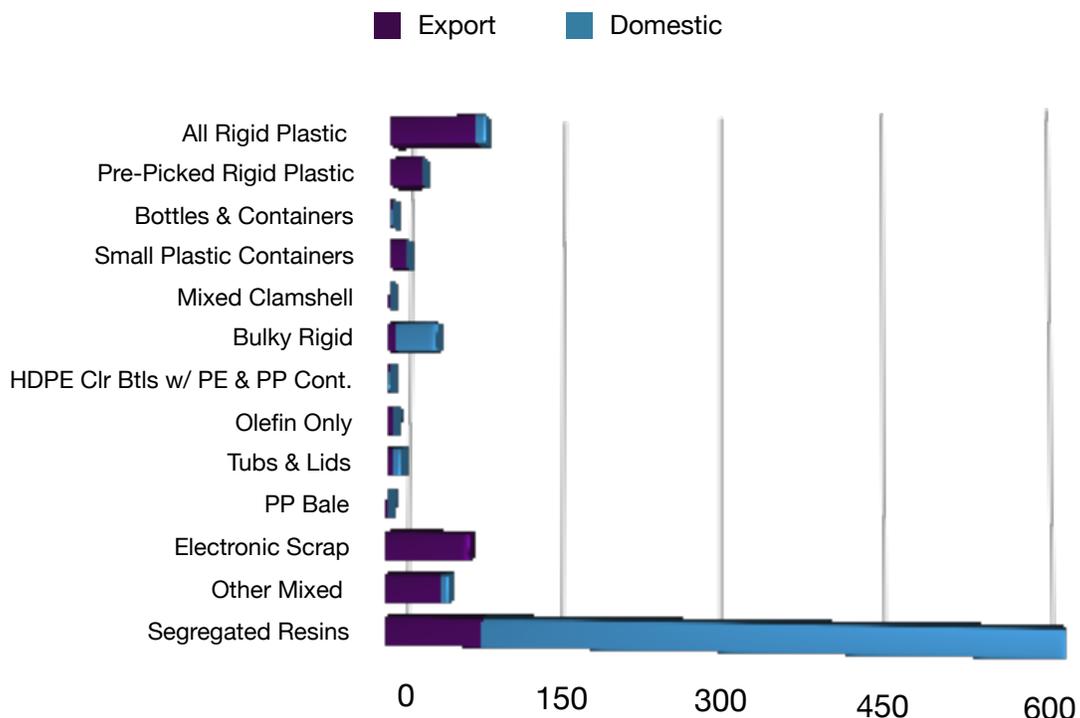


PET	HDPE	PP	LDPE	PS	PVC	Other/Mixed/ Unknown
84,121,665	288,983,213	365,057,782	14,572,973	22,526,420	7,387,805	151,277,386

The “Other” resin category includes three sources. The first is the material reported as “Other Mixed Rigid Plastic” or “Mixed Post Commercial Plastic” without more information on the percent mix or as a specific mix of resins, (e.g., electronic/computer scrap). The second source is material reported as a resin other than one of the six identified (e.g., polycarbonate or ABS). The third source is from the percentage of mixed bales allocated as “other” during the 2010/2011 hand-separated bale sorts (a portion of the material was resin other than Resin Identification Codes #1-6 and a portion in the mixed-resin bales was unidentifiable and was put in the “other” category).

The following chart shows the sources of non-bottle rigid plastic collected for recycling broken out by material exported versus domestic material.

Non-Bottle Rigid Plastic by Source (millions of lbs)



Other Mixed in the chart above includes plastic reported as mixed post commercial.

As noted above, a large portion of segregated resin material (507 M lbs total) is reclaimed domestically. A high percentage of Bulky Rigid bales (84%) are also reclaimed domestically; whereas 81 percent of all other mixed non-bottle rigid plastics are exported overseas where there is capacity to sort by resin.

Collection

Non-bottle rigid plastic is increasingly captured in a variety of ways. Some is collected as part of commercial recycling efforts (e.g., used crates and pallets, or some e-scrap); other material is collected at the community level. Community programs vary widely from curbside to drop-off depending on which materials municipal collection programs accept, and how and to whom MRFs market their materials. There are also special collection programs for items such as e-scrap and battery casings. Some companies have started community-based non-bottle rigid plastic collection programs for their own products or for specific resins. Each of these programs is described in more detail below.⁵

⁵ For more information on the increasing number of communities collecting non-bottle rigid plastics, see Plastic Recycling Collection: National Reach Study

Curbside

MRFs generate wide variations in the quality and types of non-bottle rigid plastic bales—in part because there are many potential combinations of product types and resins in this broad category, and in part because community programs vary widely in their consumer education and their descriptions of which non-bottle rigid plastics they collect. Most municipalities that collect non-bottle rigid plastics accept household containers, and a continually growing number also are adding bulkier rigid plastics, such as toys, lawn furniture, laundry baskets, and other items.

Some MRFs (particularly on the West Coast) sort out the higher value plastic (PET and HDPE bottles) and then bale the remainder of the rigid plastics together. Others mix all rigid plastic together. Yet other MRFs have tailored their sorting operations to meet domestic or local market specifications, generally focusing on the olefin plastics.

Drop-off and Other Types of Collection

Some communities have drop-off collection programs for specific types of products, including e-scrap collection programs. As with most recyclables, monitored drop-off programs allow for more control over what is received and keep material cleaner. In many cities, electronics are banned from being placed in the garbage. These programs provide a designated drop off location for electronic products to be taken for recycling. Electronic scrap—much of it from these types of programs—comprises 8% of the total non-bottle rigid material reported. Most state laws require that lead-acid automobile batteries are recycled and not disposed of in a landfill. The plastic battery casings make up a significant part of the non-bottle polypropylene recycled every year.

Reclaimers that specialize in processing post industrial material often accept postconsumer material from commercial businesses, because the material is usually generated as large quantities of a single resin or product type, and it is typically cleaner than material coming from a curbside stream.

There is a growing trend of manufacturing companies creating community collection programs for their own products or to amass a specific resin that is not contaminated by the curbside stream. These programs typically are mail-back or drop-off programs. For example, Preserve® and its founding partners (Stonyfield Farm®, Brita®) created the Gimme 5 Program, which has collection bins at retail locations (primarily grocery stores) for polypropylene. The Preserve program also accepts polypropylene yogurt cups, Brita® water filters and other used consumer products and packaging made from polypropylene plastic by mail. Companies like Preserve conduct these programs at their own cost as a corporate responsibility initiative and for the supply of raw material. In 2012, the Gimme 5 program added Burt's Bees® as a sponsor and collection grew by 36%.

Marketplace

Domestic Capacity

In the U.S. there is at least 758 million pounds⁶ per year of non-bottle rigid plastic reclamation capacity, which includes washing or using unwashed material directly into a pellet or end product. There is also at least 100 million pounds of non-bottle reclamation capacity in Canada that draws on U.S.-sourced material in addition to Canadian-sourced. It is important to acknowledge that there is a significant amount of grind capacity in both the U.S. and Canada for plastic scrap that is clean enough to be used unwashed, which is not included in the reclamation capacity reported above. This material is often sold as regrind to manufacturers that use it as they would a washed flake or pellet.

Most of the U.S. capacity is for relatively clean—and often larger—PE and PP items. Many of these buyers are seeking bulky rigid materials such as buckets, crates, battery casings, storage bins and hangers. A small portion of the domestic capacity is for making mixed-resin products such as lumber, railroad ties, garden products and transport packaging. There has been some investment, and growing interest, in the capacity to handle small containers such as cups, deli containers and tubs, which generally require separation and washing prior to end use.

2011 Market Value

In addition to the survey, Moore Recycling tracks the non-bottle rigid plastic recycling market throughout the year. Other than non-ferrous metals, plastic scrap has the highest economic value per ton, of the five major scrap material categories (plastic, non-ferrous, steel, paper, and electronics). As noted, export market demand was greater than domestic demand for most mixed rigid plastic grades; except, the domestic market was able to out-compete exporters for high-grade (clean) bulky rigid plastic, especially in the second half of 2011. Pricing and demand for high-grade material is strong because it requires less processing and is therefore less costly to reclaim.

Buyers reported that plastic scrap prices and demand remained strong and steady throughout the year for most grades. Pricing increased in the spring and summer for many grades, but most grades ended at or near the price they began the year.

End-Use Markets

The primary domestic end uses for non-bottle rigid plastics are pipe, buckets, automotive products and other relatively thick-walled injection products such as drums and crates. A growing portion of the material is used to make film and sheet products. As noted, a small portion of the non-bottle rigid plastic collected is used in composite products, such as lumber, pallets and

⁶ Capacity for processing non-bottle rigid plastic often overlaps with capacity to process plastic bottles or film. The annual United States National Postconsumer Plastic Bottle Recycling Report and the annual National Postconsumer Plastic Bag & Film Recycling Report likely report some capacity that is also reported here. Thus, adding the non-bottle rigid, bottle and film capacities from this and the before mentioned reports could result in double counting some capacity.

railroad ties. In addition, a number of companies compound these materials and sell to manufactures that make shapes and forms, or roto-molded products such as tanks, drums and carts. Consumer products like cutting boards, toothbrushes and razors are also manufactured using postconsumer resins.

Conclusion

Non-bottle rigid plastic recycling increased by over a hundred million pounds from 2010 to 2011—to 934 million pounds. This increase is primarily due to the growth in non-bottle rigid collection efforts by communities around the country, as documented by the report Plastic Recycling Collection: National Reach Study published in May 2011. The survey also reported domestic use of postconsumer non-bottle scrap grew by just under one hundred million pounds: more than 61 percent of what was collected, up from 58 percent in 2010.

Additional Information

The Plastics Division of the American Chemistry Council, which provided funding to Moore Recycling Associates to prepare this report, provides resources to assist communities, businesses and consumers in increasing awareness and education on the recycling of plastic bottles, containers and plastic bags and film. For information about recycling non-bottle rigid plastics recycling visit www.AmericanChemistry.com/Plastics. Also, visit the Moore Recycling Associates maintained site www.PlasticsMarkets.org for markets and information on handling guidelines. These and other plastic recycling reports can be found at www.MooreRecycling.com/m_02_00.html.

The 2011 National Report on Postconsumer Non-Bottle Rigid Plastics Recycling has been prepared to provide information to parties interested in the recycling of plastics, in particular non-bottle rigid plastic materials. Facilities developing a recycling process and all entities involved in the chain of collection, processing, distribution, and sale of recycled products have an independent obligation to ascertain that their plans, actions, and practices meet all relevant laws and represent sound business practices for their particular operations. Facilities may vary their approach with respect to particular operations, products, or locations based on specific factual circumstances, the practicality and effectiveness of particular actions and economic and technological feasibilities. This report is not designed or intended to define or create legal rights or obligations. ACC does not make any warranty or representation, either express or implied, with respect to the accuracy or completeness of the information contained in this report; nor does ACC assume any liability of any kind whatsoever resulting from the use of or reliance upon any information, conclusion, or options contained herein. The American Chemistry Council sponsored this report.

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