

2016 United States National Postconsumer Plastic Bottle Recycling Report



The Association of
Plastic Recyclers

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INTRODUCTION

The 2016 edition of the United States National Postconsumer Plastics Bottle Recycling Report is the 27th annual report on plastic bottle recycling. This study is a cooperative effort between the Plastics Division of the American Chemistry Council (ACC) and the Association of Plastic Recyclers (APR), the goal of which is to quantify the amount of high density polyethylene (HDPE) and polypropylene (PP) bottles collected for recycling, as well as the rate of recycling of those bottles. This study includes postconsumer recycling values and comments for polyethylene terephthalate (PET) developed by the National Association for PET Container Resources (NAPCOR) and APR. The reclaimer survey portion of the study, other than for PET, was conducted by More Recycling, formerly Moore Recycling Associates, Inc.

HIGHLIGHTS/SUMMARY FOR 2016

Plastic Bottle Pounds Collected for Recycling in the United States

-) The total pounds of plastic bottles collected for recycling reached 2,906 million pounds in an economically difficult year.
-) The total plastic bottle recycling collection rate was 29.7%, a decrease of 1.4 percentage points compared to 2015.
-) The total pounds of plastic bottles collected decreased by 71 million pounds for 2016 compared to 2015, with decreases for PET and HDPE and an increase for PP bottle resins. The annualized change in pounds of plastic bottles collected for recycling was -2.4%
-) The five year compounded annual growth rate for plastic bottle recycling was 2.1%.
-) PET bottles collected decreased by 44 million pounds for a total of 1,753 million pounds in 2016. The recycling collection rate dropped from 30.1% in 2015 to 28.4% in 2016. The numerator dropped while the denominator rose.
-) Compared to 2015, HDPE bottles collected fell by 31.7 million pounds to 1,112.1 million pounds. The HDPE bottle recycling collection rate dropped to 33.3% in 2016 compared to the 2015 rate of 34.4%. The numerator dropped while the denominator rose.
-) PP bottle recycling collection totaled 36.6 million pounds, an increase of 15.3% over the 2015 total of 31.8 million pounds. The collection rate rose to 20.2% in 2016 compared to 17.9% in 2015 with the numerator and the denominator rising in 2016 compared to 2015.
-) Exports of USA-collected HDPE bottle material rose from 184 million pounds in 2015 to 193 million pounds in 2016. The 193 million pounds represented 17.4% of the domestically collected material with approximately 68% of the exports leaving North America.
-) Compared to 2015, imports of postconsumer HDPE to the United States held steady at 65.4 million pounds in 2016, which combined with lower domestic collection and increased exports resulted in decreased purchases for United States HDPE bottle reclamation plants, down 41.6 million pounds since last year, to 984.1 million pounds.

Plastic Bottle Recycling Overview for 2016

The postconsumer plastic bottle recycling industry experienced a difficult year in 2016 with lower bale prices for bale sellers and lower competing virgin polymer prices for reclaimers. Margins were tight both for bale sellers and for plastic bottle reclaimers.

Recycled natural HDPE bottle bale prices gained very slightly in 2016 while pigmented HDPE bottle bale prices fell compared to 2015 with prices higher in the first half of the year than in the second half. PET bottle bale prices fell throughout 2016 compared to 2015 with some price recovery in the second half of the year. The average price for baled postconsumer plastic bottles fell by 17% for baled bottle plastic (a composite of separate HDPE and PET bales, not a mixed bale) in 2016 compared to 2015 as crude oil fell by 16% with resulting lower virgin plastics prices.

The numerator of pounds of all bottles collected fell 71 million pounds or -2.4%, well below the three year running average bottle collection growth rate of 0.0% per year. Considering the denominator, light-weighting and 'right-sizing' of PET and HDPE bottles continued as has been the case for several years. More of the light-weighted containers were lost into the postconsumer paper stream at the sorting plants. Many consumer products are being sold in smaller bottles as household demographics change. The sales of PET for bottles increased over 2015 while sales of HDPE for bottles increased very slightly. The total for all bottles in the marketplace increased by 202 million pounds, or 2.1% which compares favorably the three year running average bottle marketplace growth rate of 1.3%. Almost all the growth in bottles on store shelves was for PET bottles. 2016 was a positive year for total bottle usage, with a slight increase on a per capita basis.

Sales of virgin HDPE resin for bottles rose by 0.81% and sales of recycled HDPE resin for bottles fell by 5.3% compared to 2015 results. Sales of virgin PET resin for bottles rose by 3.2% and sales of recycled PET resin for bottles and for fiber uses and strapping rose while sales for film uses fell in the same time frame.

Exports of all postconsumer plastic bottle bales continued the long-term trend downward with a decrease of 37.6 million pounds compared to 2015 and a fall to the lowest percentage for total exports in at least nine years. In 2016 20.1% of overall collected postconsumer bottles were exported from the United States. HDPE exports rose slightly in 2016 compared to 2015, to 17.4% of collected material. PET exports fell in both absolute tonnage and percentage of material collected, 21.6%, compared to 2015, and were below values since at least 2005. The export of recycled PP bottles fell in 2016 to 20.6% of that collected. The PP bottle exports were in mixed rigids bales, not discrete bales of PP bottles. The program in China that increases inspections and has seized some recycled material going into China, National Sword 2017, began in February 2017. The previous enhanced inspection program, Operation Green Fence, began in 2013.








The processing of recycled PET bottle material, sourced domestically and imported, fell in 2016 over 2015 by 11 million pounds. The processing of recycled HDPE, sourced domestically and imported, fell by 42 million pounds in 2016 compared to 2015. The processing of recycled PP bottles, sourced domestically and imported, increased by 6.0 million pounds in 2016 over 2015.

-) Bottle resin use per capita gained 1.4% in 2016. The high growth rate seen before the recession has been replaced by a slower growth rate due to continual lightweighting.
-) Bale prices for recycled bottles moved down in the first quarter of 2016 for PET and rose later in the year, but the annual average was still below that for 2015. HDPE natural prices were weak in the first and fourth quarters and higher in the second and third quarters with weakness in the second half of the year resulting in a very slight gain for the year. HDPE copolymer bale prices were strong in

the second quarter, weak otherwise with the second half of the year weaker than the first half resulting in a lower annual price than for the year before.

-) Single stream collection of household recyclables continued growth as it has for many years, generally resulting in higher overall household participation rates and more challenges from contaminated bales of bottles with bale yields as dismal as in recent years. Materials recovery facility, MRF, operations were hurt by falling product prices and no commensurate drop in costs as was seen in 2015. Tension in the reclamation industry continued with increased share of material from single stream collection and more challenging processing requirements. As a continuing example, sleeve labels on PET bottles added to poor bale yields. Conversely, PET thermoforms continued to represent a growing opportunity for additional raw material for recycling processing.
-) California Container Redemption Value redemption centers collected not only PET, but also HDPE, PP, PVC, LDPE bottles and “OTHER” bottles.
-) Plastic bottle recycling continues to be an international business with US-based reclaimers competing effectively in 2016 as they did in 2015, keeping more domestically-generated material in the United States at least on a percentage basis.
-) Active “all bottle” collection, which takes all bottles regardless of resin identification number, continued the collection of LDPE and PVC bottles, although the tonnage continues to be small. We see a small amount of “#7, OTHER”, bottles collected, but we do not have data for the denominators of those bottles. The LDPE and PVC bottles were often exported as part of mixed bales.

The plastic bottle resins, as identified by their ASTM resin identification codes, are:

Plastic Resin Identification Codes						
						
PETE	HDPE	PVC	LDPE	PP	PS	OTHER
Polyethylene Terephthalate	High-Density Polyethylene	Polyvinyl Chloride	Low-Density Polyethylene	Polypropylene	Polystyrene	Other

Source: More Recycling 2017

PET and HDPE bottles comprise 97.1% of the United States plastic bottle market with PP at 1.8% of plastic bottles produced and with LDPE at 0.7% of plastic bottles and PVC at 0.3% of plastic bottles. Together, PET and HDPE are 98.6% of the bottles recycled with PP bottles constituting 1.3% of plastic bottles recycled. Some PP bottles are included with pigmented HDPE bottles for recycling, about 26% of all PP collected. An allowance, based on buyer reports and bale audits, has been included to account for those PP bottles in this report to more properly represent the PP bottles recycled, although not available as discrete PP bottles for recycling.

Although bottles made with the #3 through #7 resins are recyclable, and to varying degrees are recycled, the actual level of recycling is limited by the continuing challenge to reach a critical mass of readily recognizable bottles for economical collection and processing. However, it should be noted that bottles made from resins #3 through #7 make up just 2.9% of the plastic bottle market.

Finally, bottles coded with “#7, OTHER” are included in this report as a discrete category, but are not included in the total for TOTAL BOTTLES shown on Table 1. Bottles coded #7 may include, among others, HDPE or PET or PP resins with barrier layer materials. These bottles are often recycled with the primary resins used in each container. Bottles coded #7 may also be made from resins other than those listed above, such as polycarbonate. No information is available for the denominator for “#7, OTHER”.

Table 1
Postconsumer Plastics Bottles Recycled in
Calendar Year 2016 Compared to Calendar Year 2015 Results [1,2,3,4,5,6,7]
(in millions of pounds per year)

Plastic Bottle Type	Calendar Year 2015			Calendar Year 2016		
	Plastic Recycled [2]	Resin Sales [3,4]	Recycling Rate	Plastic Recycled [2]	Resin Sales [3,4]	Recycling Rate
PET [4]	1797	5971	30.1%	1753	6172	28.4%
HDPE Natural	465.5	1527	30.5%	462.1	1533	30.1%
HDPE Pigmented	678.3	1795	37.8%	650.0	1795	36.2%
Total HDPE Bottles	1144	3322	34.4%	1112.1	3328	33.4%
PVC [5]	1.1	33	3.3%	1.4	33	4.3%
LDPE [5]	3.3	80	4.1%	2.6	72	3.7%
PP [6]	31.8	177	17.9%	36.6	181	20.2%
Other [7]	5.2			4.9		
TOTAL BOTTLES	2977	9583	31.1%	2906	9786	29.7%

[1] These data provide a snapshot of plastic bottle recycling collection trends from the national perspective. The data are useful in identifying national trends and highlighting changes that have occurred from year to year, and may be a useful tool for planning purposes. While national data may be useful as a comparison with local waste characterization and recycling data, significant differences will likely exist from locality to locality, and from state to state. If communities or states are making decisions where precise knowledge of the amount, composition and disposition of MSW is crucial, e.g., where a solid waste management facility is being designed, or for local or state regulatory enforcement, etc., then local characterization of the quantities of individual components generated, recycled and disposed is essential.

[2] Data are based on surveys performed by More Recycling and include bale composition data provided by More Recycling and others.

[3] Based on data provided by the American Chemistry Council’s Plastics Industry Producers Statistics Group. HDPE resin sales include both the virgin and recycled plastic pounds used to produce new bottles. Imports from non-ACC members are not included.

[4] Source: 2016 Report of Postconsumer PET Container Recycling Activity, National Association of PET Container Resources, Sonoma, California

[5] The majority of PVC and LDPE recycled were as part of commingled bottle and container bales

[6] About 4% of polypropylene bottles were deliberately collected for recycling as polypropylene bottles and not mixed material.

[7] Limited data for bottles of other resins are shown. Such material was sold as part of mixed export bale. No denominator values are available. Because of the lack of denominator, the bottles in the “OTHER” category are not included in the TOTAL BOTTLE sum.

The 2016 PET bottle denominator increased by 201 million pounds to 6,172 million pounds compared to the 2015 value. The 2016 PET bottle numerator, not including thermoforms, decreased by 44 million pounds to 1,753 million pounds collected. Many natural homopolymer HDPE milk bottles are pigmented, the usual visual indicator of the use of copolymer, and those bottles are included in the usually pigmented copolymer bottles. The split for recycled HDPE between natural HDPE (presumed to all be homopolymer) and pigmented HDPE (usually presumed to be copolymer) was based on buyer estimates. The “Total HDPE Bottles” values on Table 1 are likely more accurate numbers. In comparison with 2015, the 2016 HDPE denominator (i.e. bottles in the market place) rose by 5 million pounds, or 1.6%. In a tough economic environment, even slight gains are appreciated as more pounds of

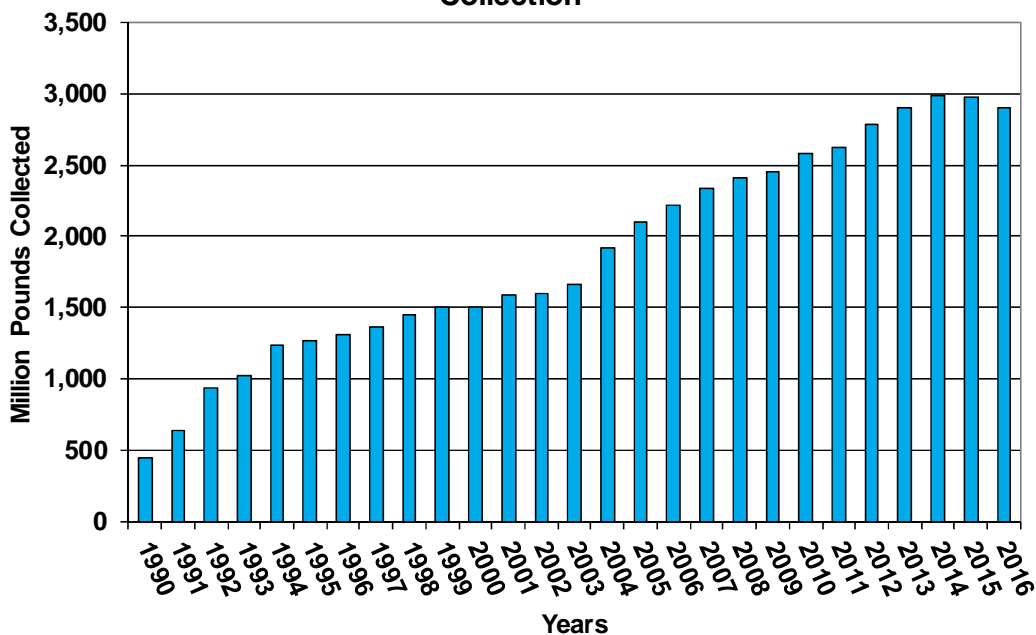
plastic used mean more opportunity to gain economies of scale. The HDPE numerator (i.e. bottles collected for recycling) decreased by 31.7 million pounds, or -2.8%. The collection rate for HDPE bottle recycling fell in 2016 to 33.4% versus 2015 at 34.4% with fewer pounds recycled and the denominator rising slightly. Both natural HDPE and pigmented HDPE recycling rates, as defined, fell in 2016 versus 2015. Overall, HDPE bottle recycling saw a decrease in pounds collected for recycling.

About 5.2% of the total #2 through #7 bottles collected was part of commingled bottles bales. For HDPE bottles the contribution from commingled bottles bales and mixed rigids bales was about 2.3% of the total HDPE bottles collected in 2016. For PP bottles the contribution from commingled bottles bales and mixed rigids bales was about 70% of the total bottles collected. For PVC bottles the contribution from commingled bottles bales and mixed rigids bales was about 100% of the total bottles collected. For LDPE bottles the contribution from commingled bottles bales and mixed rigids bales was about 100% of the total bottles collected.

Domestic processing of postconsumer PP bottles totaled 29.7 million pounds, a 6.0 million pound or 25% increase from 2015. PP recycling collection saw a 4.9 million pound increase in collected material and an increase usage of PP for initial bottles, resulting in an increase in the collection rate for recycling to 20.2% from the 2015 collection rate of 17.9%. Exports of PP bottles as part of mixed bales decreased in 2016 compared to 2015.

In addition to bottles, PP from injection molded closures was also recycled, but that amount is not part of this report on bottles. For information on PP from injection molded closures, please refer to More Recycling’s Non-Bottle Rigid Plastic Recycling Annual Reports.

**Figure 1
Growth in Postconsumer Plastic Bottle Recycling
Collection**



SOURCE: NAPCOR, all years, for PET. For other bottle resins, R.W. Beck, Inc., 1990-2006; Moore Recycling Associates, Inc., 2007-2015; More Recycling, 2016

As shown in Figure 1 the total pounds of postconsumer bottles collected for recycling in 2016 was 2,906 million pounds for #1 through #6 plastic bottles. The change from 2015 was a decrease of 71 million pounds of recycled bottles, or a decrease of 2.4%. This happened with modest increase in plastic bottle resin usage and the low real GDP growth of 1.6% for 2016.

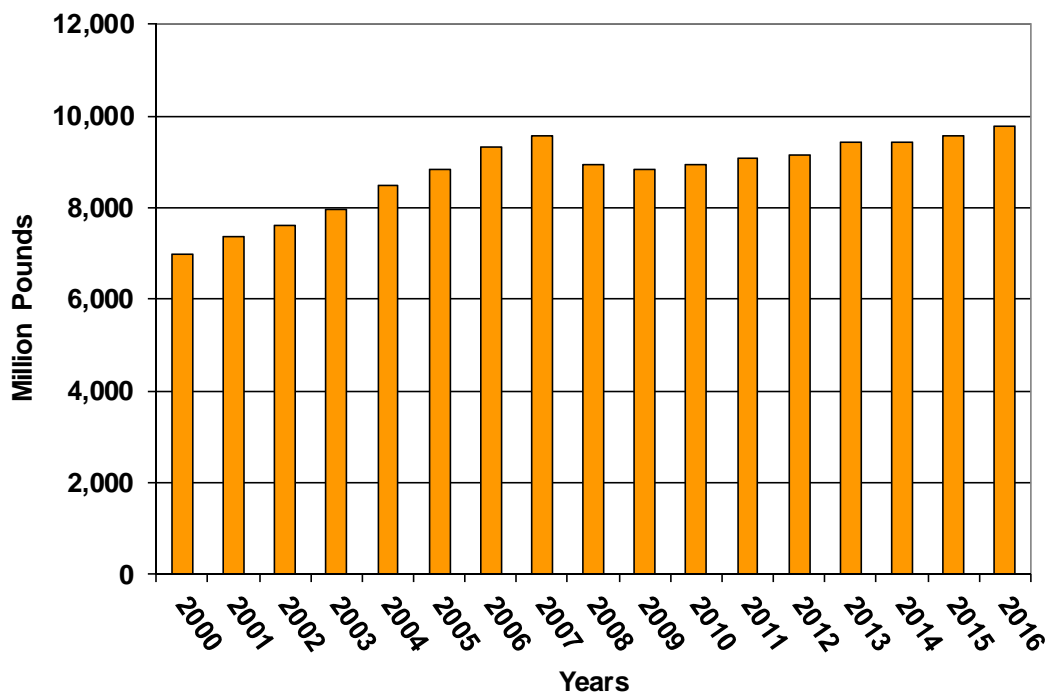
Bottle Resin Sales

The denominator used to calculate the recycling rate is composed of both virgin resin and recycled resin used for bottle making.

Plastic bottle light-weighting continued to occur for all bottle resins. Light-weighting helps companies to meet economic and sustainability goals and is a relentless force in bottle making. Many HDPE bottle applications are using product concentrates which means an increasing number of smaller bottles or fewer bottles made for the total number of uses, such as laundry loads. Recycling is denominated by weight and reduced weight per container adversely affects recycling economics.

The change in total resins used to make bottles resulted in an increase of 202 million pounds, or an increase in bottle polymer production of 2.1%. Use of HDPE to make bottles increased by 5 million pounds, or 0.2%, up from the amount used in 2015. Use of PET to make bottles increased by 201 million pounds, or 3.4%, to an all-time high. The 2016 use of 9,786 million pounds of #1-#6 resins for bottles is an all-time high.

**Figure 2
Resin Used for Plastic Bottles in USA**

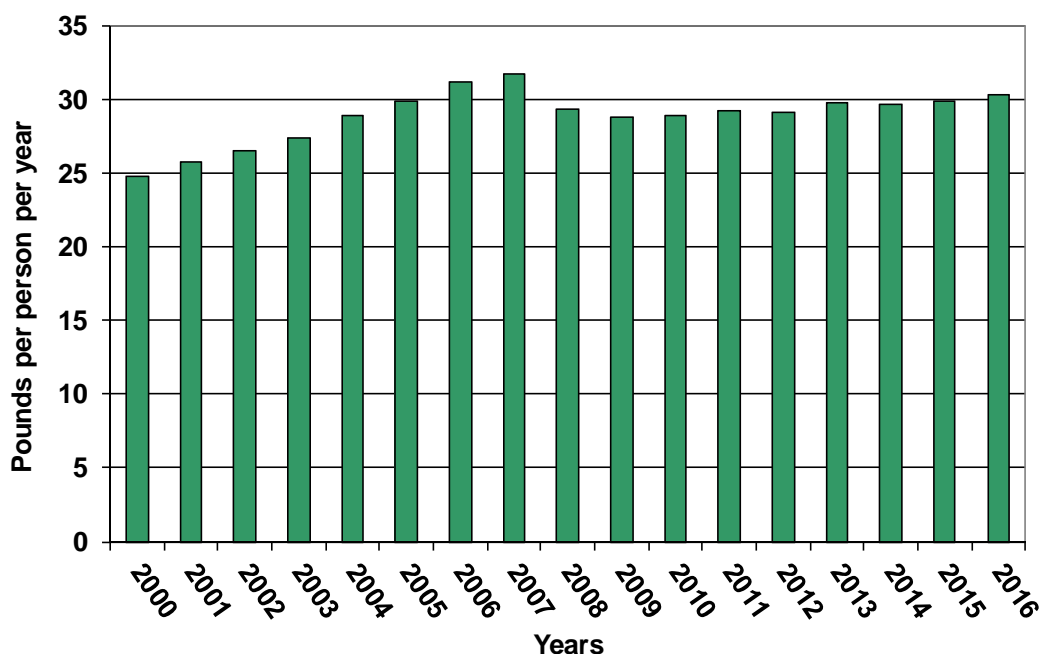


SOURCE: National Postconsumer Plastic Bottle Report, 2001-2016

It is vital for the growth of plastic bottle recycling that bottles are present in the marketplace and consumers appropriately recycle used bottles. The pounds of material in bottles used by consumers shown in Figure 2 include recycled content. Without available pounds of recycled material to be industrial feedstock, plastics recycling may grow in recycling rate, but not in the tons needed for a robust industry. Inability to secure wanted feedstocks has increased reclaimer interest in additional resins and non-bottle items such as PET thermoforms.

Figure 3 shows the United States per capita consumption for plastic bottles since 2000. In 2016 the per capita consumption of bottle resins, virgin and recycled plastic, rose 1.4% compared to 2015 but continued well below the pre-2008/2009 recession levels. This chart shows that use of plastic bottles for more applications is offset by the continuing lightweighting and use of product concentrates with smaller, lighter bottles. The very slow growth in per capita consumption of plastics for bottles signals that growth in supply of bottles must come from more effective collection, not just simple growth in the pool of bottles created.

Figure 3
USA Per Capita Consumption of Plastic Bottles



SOURCE: National Postconsumer Plastic Bottle Report, 2001-2016; US Census

Figure 4 displays the annual quantities of PET, HDPE, and combined PET and HDPE bottle resin processed for recycling in the United States. Other, non-bottle, rigid plastic packaging is not included in the figure.

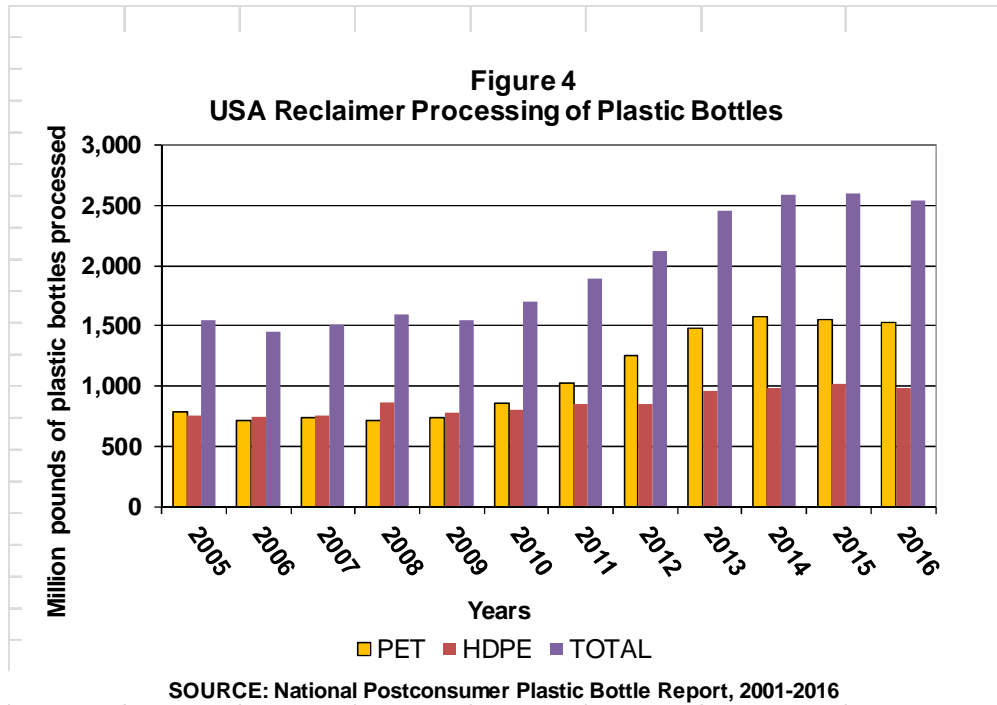
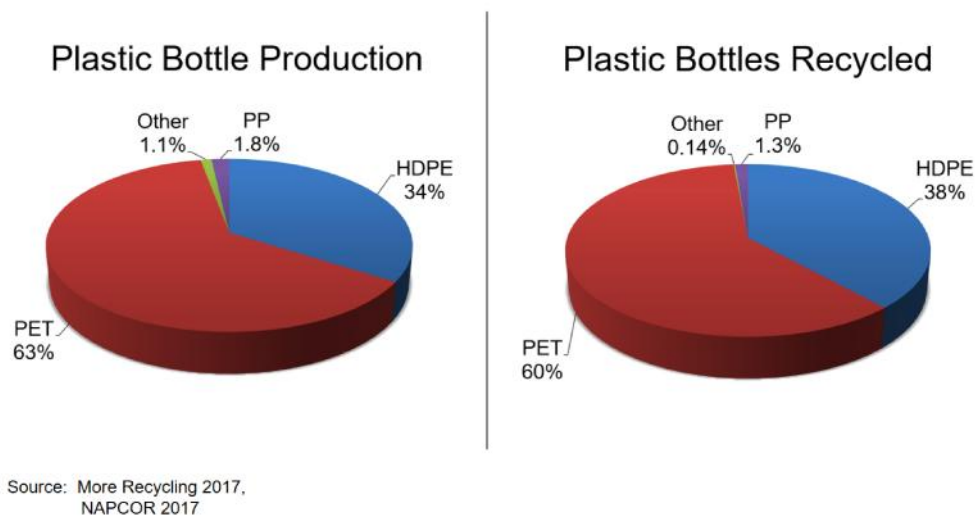


Figure 5 shows PET and HDPE continued to dominate as selected resins to produce plastic bottles: 97.1% by weight of produced bottles were made of PET or HDPE. PET and HDPE bottles also continued to dominate the bottles collected for recycling, collectively at 98.6% and PP at 1.3% of the total bottles recycled.

Figure 5
2016 Plastic Bottles Recycled and Plastic Bottle Production by Resin



Barriers to Increased Plastic Bottle Recycling

As noted for 2005 through 2015, one barrier to plastic bottle recycling is that too many consumers continue to be unaware of the significant usefulness, demand, and value of recycled plastic including HDPE and PET and PP. Data and experience show that plastic bottle recycling can be increased through sustained local education campaigns. Municipalities also need to understand that they can benefit from the sale of bales of bottles, including revenue sharing to fund educational programs and other costs of collection.

Another barrier to increased recycling is lack of sufficient convenient access to recycling collection opportunities for products used away from home. Consumers respond to additional opportunities to be able to recycle such as at public venues, offices, recreational sites, schools, and retail establishments. In a time of low commodity prices, which include plastic recyclables, MRF's that would process the entire municipal waste stream for recyclables, not just a collected stream of recyclable packaging, are still being considered. This business model is still being refined and has not yet developed a successful history.

The impact of fluctuating crude oil and natural gas byproduct prices made for a very tough competitive market for postconsumer plastics in 2016 as it did in 2015. The lower cost of petroleum and petrochemicals impacted the price of virgin plastics and that challenged the competitiveness of postconsumer plastic. The United States refiners' acquisition cost for crude oil fell by 16%, 2015 to 2016. Crude oil prices affect raw material cost for PET, HDPE, and PP.

With the influence of four major factors: the increase in single stream collection of recyclables at household residences, the increased interest to collect more than bottles, the overall reduced quantity of export material, and the extreme economic pressure on the bale suppliers, the quality of available postconsumer bottle material to U.S. reclaimers slumped slightly for HDPE. For PET with an increasing variety of packaging applications, the quality of bales as reflected by bale yields, continued to be a challenge. Use of the APR Design® Guide by packaging designers can help reduce economic and technical barriers to plastic bottle recycling.

HDPE Reclamation Industry Update – Reclaimers' Reporting

-) The number of HDPE reclaimers reporting increased in 2016 as compared to 2015 with 31 companies active at year's end. The number of smaller companies may vary year-to-year as industrial scrap companies change their business plans and start-ups, shut-downs, and acquisitions continue.
-) The amount of HDPE reported processed by the survey of United States HDPE reclaimers fell by 37 million pounds to 992.7 million pounds. While HDPE recycled bottle domestic collection decreased slightly compared to 2015, exports increased and imports held constant to account for the lesser amount of HDPE bottles processed. This value, 992.7 million pounds processed, is slightly different than the 984.1 million pounds of postconsumer HDPE bottles purchased. The processed value reflects inclusion of other pedigree HDPE such as post commercial material in pounds processed and individual company experiences with mixed bales.
-) Eight larger companies, defined as those processing over 30 million pounds annually, processed 80% of the HDPE processed with a slight net annual decrease in the pounds processed.

- J The mid-sized companies held steady in numbers at seven in 2016 and the amount processed in 2016 decreased compared to the amount processed in 2015. Small companies, processing less than 10 million pounds annually, increased in number and decreased in the amount processed compared to 2015.
- J One reclaimer went out of business. Two reclaimers initiated reporting. Several shifted focus related to feedstocks and reallocated resources.

Figure 6
Size Comparison of Domestic Reclaimers of HDPE Bottles

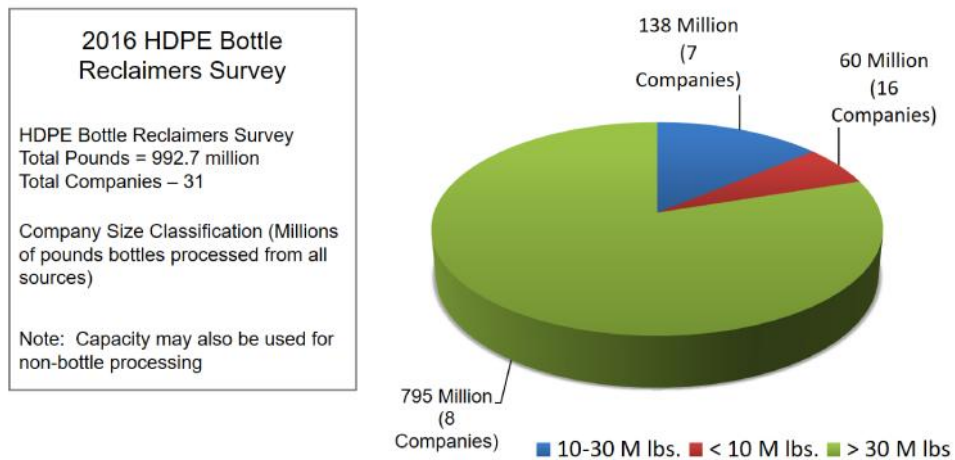
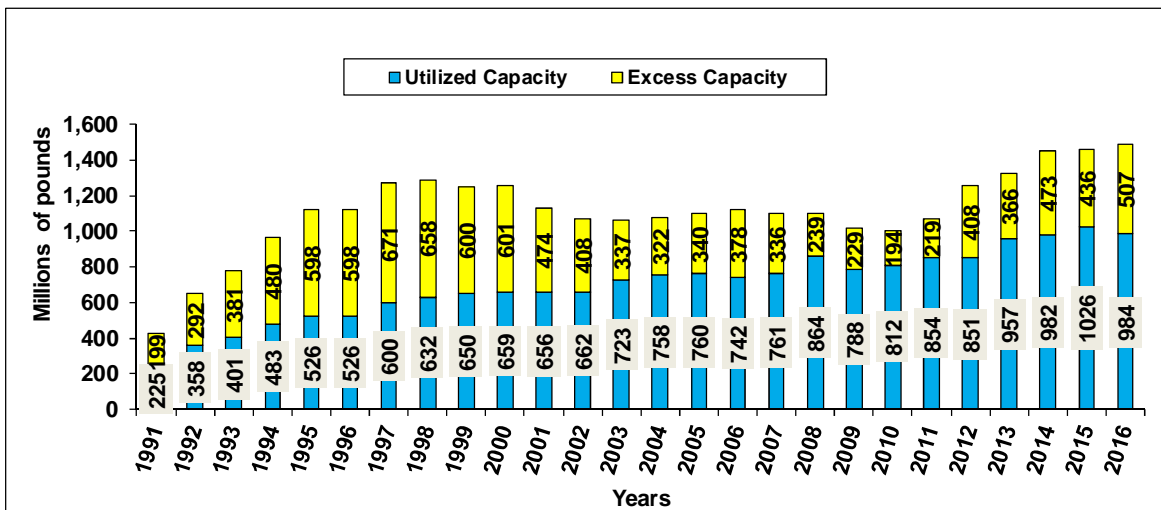


Figure 7
HDPE Bottle Wash Capacity in the U.S.



The figures shown above are estimates and should not be used for business planning purposes. Utilized capacity includes postconsumer material quantities processed domestically only. Capacity is based on 24 hours per day and 365 days per year.

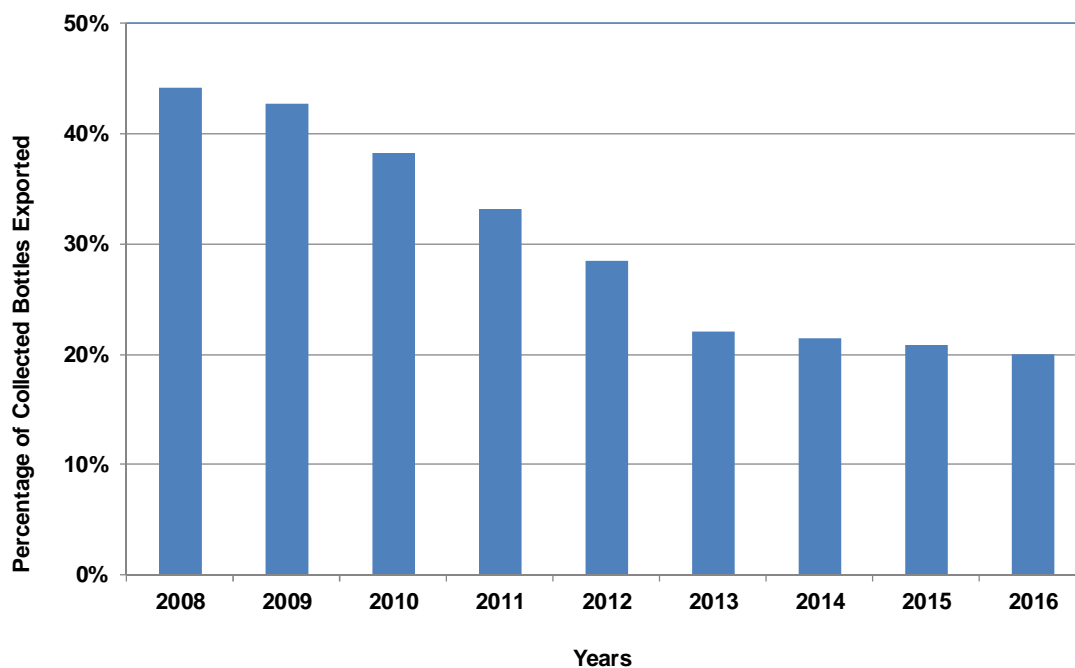
The capacity utilization is shown for the given conditions of hours worked. The capacity utilization for HDPE bottle reclamation, as calculated, slumped to 66% for 2016 as compared to 70% in 2015. Production capacity increased and less production occurred with a net decrease in utilization. The HDPE reclaimers continue to use assets to process non-bottle postconsumer HDPE and PP from varying sources. The total utilized capacity for HDPE bottles fell in 2016 to 984 million pounds, compared to 1,026 million pounds in 2015. The overall USA industry capacity, as calculated, increased to 1,491 million pounds of HDPE postconsumer reclamation capacity.

As reported, USA PET reclamation capacity utilization was about 73%, up from 2015. While somewhat less recycled material being processed, operating capacity was lower than in 2015.

Export and Import Markets

Postconsumer bottles are a valuable commodity and are traded globally. Purchases of USA postconsumer bottles for export continued in 2016. Postconsumer plastic was exported out of the United States as bales of PET, PP, and HDPE bottles; bales of commingled bottles and containers; mixed rigid container bales; and unwashed flake material. A total of 20.1% of collected plastic bottle material of all types was exported in 2016, 582.8 million pounds, compared to 20.8% or 620.4 million pounds in 2015. For context, the exports exceeded 28% of bottles collected in 2012 and before.

Figure 8
Exports of Postconsumer Bottles From the United States
2016



For United States-collected HDPE bottle material, 193 million pounds were exported. This amount represented 17.4% of the total HDPE bottle material collected domestically, an increase of 9 million

pounds since 2015. Of those exported pounds, 32% went to Canada. The trade in bales is not one-sided. USA HDPE reclaimers imported 65 million pounds in 2016, down 1% from 66 million pounds of postconsumer HDPE bottle bales imported in 2015. The imported pounds of postconsumer resin are not included in the totals of pounds collected in the USA and are not part of the totals on Table 1.

2016 PET exports totaled 21.6% of the total PET bottles collected with most exports going to China and Hong Kong. This percentage is less than the experience in 2015, when 23.6% of the United States-collected PET was exported. The Chinese “Green Fence” initiative continued to slow imports into China of postconsumer baled bottles in 2016 as the flow to Hong Kong stayed steady. World exports of PET from the United States were down 10.6% in 2016 compared to 2015.

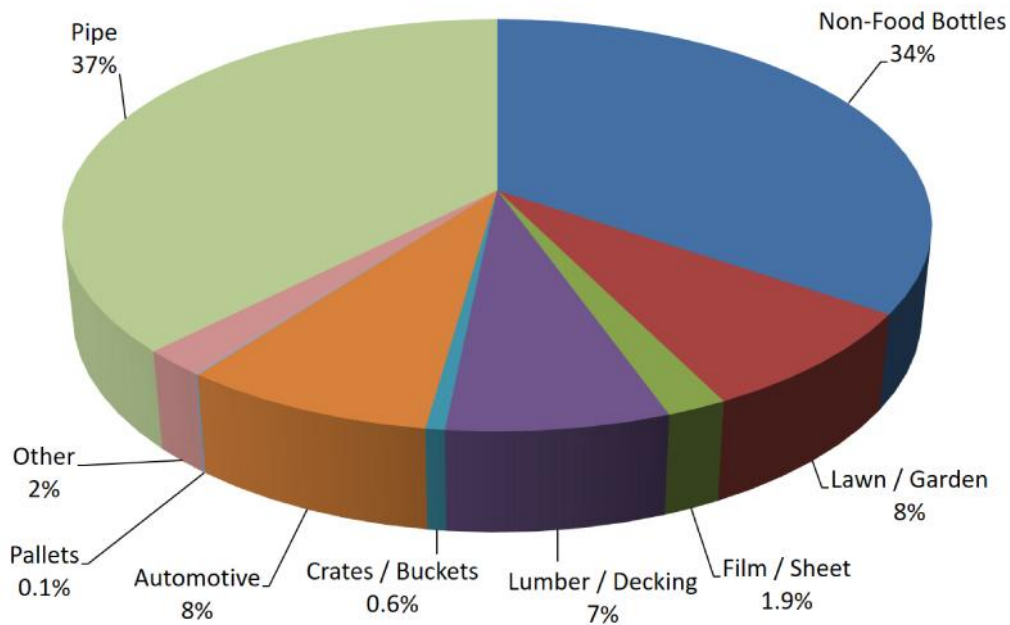
The exports for PP bottles fell in 2016 from 8.9 in 2015 to 7.6 million pounds, most as part of mixed bales. The PP exports fell from 28% in 2015 to 21% in 2016 for bottle material. 45% of PVC bottles were exported, a total of 0.64 million pounds. 88% of LDPE bottles were exported, a total of 2.3 million pounds, mostly in bales of rigid containers. These quantity values reflect updated bale content analyses. 48% of OTHER bottle collected materials was exported.

End Use Markets for Recycled Plastics in 2016

Per the annual survey of postconsumer reclaimers:

-) Natural HDPE postconsumer recycled resin’s primary markets continued to be for non-food application bottles, such as for detergent, motor oil, household cleaners, etc. and for film.
-) Pigmented HDPE postconsumer recycled resin’s markets continued to include pipe, lawn products, and non-food application bottles.
-) Plastic lumber continued to consume a broad range of materials including recycled HDPE, LDPE, mixed rigid containers, and wide-specification virgin resin.
-) PET postconsumer resin retained its traditional markets for fiber, film and sheet, and food bottles. Bottle, fiber, and strapping uses for recycled PET rose in 2016. Sheet & film applications for recycled PET fell in 2016. Competitive economics was a driving force for decreased recycled PET sheet and film usage in 2016.
-) Postconsumer polypropylene bottles uses were not reported for 2016. Anecdotal reports suggest the uses were the same as reported in 2014: pallets, crates, and buckets.

Figure 9
Domestic Recycled HDPE Bottle End Uses 2016



There was some change in the recycled postconsumer HDPE end use markets in 2016 compared to 2015, with new bottles still a major use but declining slightly and pipe applications also declining slightly in tons and percentage. On a percentage basis and tons basis automotive uses along with plastic lumber, decking, and railroad ties and lawn and garden uses increased. The tons for bottles, pipe, and crates/buckets fell compared to 2015. End use markets and usage of material in those markets are as reported by the survey of reclaimers.

The reported yield of postconsumer HDPE bottles to clean product ranged from low-70s to 90 %, depending on raw material and end use. The average of reported yield values of bales to clean HDPE pellets in 2016 was 79.1%, compared to 80.0% in 2015 and 80.8% long term. For PET, the bale yields varied from mid- 60s to mid-70s % depending on source of bottles. The yield situation is different for recycling HDPE and PET bottles. For PET bottles, the labels are not recovered as PET while for HDPE bottles labels may be recovered as HDPE. Contamination in bales of HDPE bottles and PET bottles continued to present an ongoing challenge to reclaimers.

Economic Impact

The estimated value of purchased bales of postconsumer bottles of PET and of HDPE in 2016 was approximately 423 million dollars compared to 508 million dollars in 2015 due primarily to low prices for bales and also to less HDPE and PET reclaimed.

Additional Information

ACC's Plastics Division represents the leading U.S. manufacturers of plastic resins. ACC offers resources to communities that wish to increase postconsumer plastic collection, including some targeted specifically at bottles and rigid plastics, as well as others focusing on plastic films, bags and wraps, and applications such as mattresses that are outside the scope of this Report. A database for the recycling of clean plastic film and grocery/retail bags is provided at www.plasticfilmrecycling.org. Additional resources on plastic recycling can be found at www.recycleyourplastics.org.

The APR develops a wide range of resources available online including lists of buyers and sellers of recycled plastic, model bale specifications and bale gradings, resources to support recycling rigid plastics beyond bottles, a plastics recycling blog, programs to increase demand for recycled plastics, reports, news and highlights, and yearly educational plastics recycling webinar series. The APR Design® Guide for Plastics Recyclability is the most comprehensive industry tool to evaluate the compatibility of plastic packaging features with the current recycling infrastructure and capabilities. Beyond the design guidelines a variety of resources are available to supplement the information including testing protocols and recognition programs. The APR Design® Guide for Plastics Recyclability Training Program brings these resources directly to brand owners and their packaging professionals through customized sessions designed to meet the specific needs of each company. Visit www.plasticsrecycling.org for more information.

More Recycling, formerly Moore Recycling Associates Inc., supported by ACC, APR, and Resource Recycling, manages www.plasticsmarkets.org, a database of buyers and sellers of recycled plastic, open to all market participants. The website also provides other useful information, such as historical scrap prices.

The Association of Plastic Recyclers, with support provided from the plastics industry through the American Chemistry Council, conducted programs for municipal recycling coordinators to educate them on the existing markets for baled bottles, the strong demand for goods, quality considerations, and suggestions for householder education.

NAPCOR provides additional information about PET at its website, www.NAPCOR.com.

Legal Notice

The 2016 United States National Post Consumer Plastics Bottle Recycling Report has been prepared to provide helpful ideas and information for parties interested in recycling plastics. 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. Although the information contained in this document has been produced and processed from sources believed to be reliable, no warranty expressed or implied is made regarding the accuracy, adequacy, completeness, legality, reliability or usefulness of any information, and this information is

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