

2018 United States National Postconsumer Plastic Bottle Recycling Report



The Association of
Plastic Recyclers

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INTRODUCTION

The 2018 edition of the United States National Postconsumer Plastics Bottle Recycling Report is the 29th 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 are available in detail from NAPCOR. The reclaimer survey portion of the study, other than for PET, was conducted by More Recycling.

HIGHLIGHTS/SUMMARY FOR 2018

Overview. Total collection rate was 28.9% with 52 million more pounds of postconsumer bottles collected in 2018 than in 2017. PET and HDPE bottles comprise 97.1% of the United States plastic bottle market, with PP at 1.8% of plastic bottles produced, LDPE at 0.7%, and PVC at 0.3%. Together, PET and HDPE comprise 98.9% of the bottles recycled, with PP bottles constituting 1.1%.

Export is Down. Overall, over 90% of all collected postconsumer plastic bottles were processed in the United States in 2018. This is a significant change from the past. For PET, only 7.7% of material collected in the US was processed outside of the USA—continuing a 10-year trend in postconsumer PET export decline—with only 43% of those total exports leaving North America. For HDPE, exports remained steady in 2018 over 2017, representing 13.9% of the domestically collected material, with approximately 44% of that total leaving North America.

Domestic Processing of PET is Up. The processing of recycled PET bottle material, sourced domestically and imported, rose by 238 million pounds in 2018 over 2017 as the pounds of recycled PET bottle material processed in the U.S. reached an all-time high. The total of all PET processed by US reclaimers—including non-bottle PET material such as thermoforms and other—also represented the highest total pounds processed to date of all recycled PET.

Recycled Resin End Markets, PET and HDPE. The total recycled PET used in domestic end markets was up very slightly. This was due to increased usage in food/beverage and non-food bottle markets, with other major end markets—fiber, sheet and strapping—down slightly over 2017. 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. Markets for pigmented HDPE postconsumer recycled resin continued to include pipe, lawn products, and non-food application bottles. For HDPE overall, new bottles were still a major market, but declined in tonnage; pipe applications gained slightly in tons and percentage of total market. Plastic lumber continued to consume a broad range of materials including recycled HDPE, LDPE, mixed rigid containers, and wide-specification virgin resin.

PET and HDPE Reclaimer Plant Capacity Utilization. Reclaimer plant capacity utilization—measured by total number of pounds processed as a percentage of total recycling plant capacity—was up

this year for PET reclaimers at 80%, reflecting both an increase in total plant capacity in the US as well as an increase in total PET material processed. The capacity utilization for HDPE bottle reclamation rose to 73% for 2018 as compared to 67% in 2017. For HPDE, this was due to a decrease in both production capacity and in material processed, resulting in a net increase in the utilization percentage.

Plastics Resins Market Overview: Plastics usage up in 2018, but lagging GDP over three year average. A total of 9,867 million pounds represented an all-time high for #1-#6 plastic resin use for bottles in 2018, and reflected a rebound in overall resin sales as compared to 2017 and 2016. However, the compounded growth rate for total resins used to make bottles from 2016-2018 was 0.42%, much below the GDP growth rate. The per capita consumption of plastic bottles has been steady for the past six years.

Plastic Bottle Pounds Collected and Processed for Recycling in the United States

- The total pounds of plastic bottles collected for recycling reached 2,852 million pounds in another exceedingly difficult year for plastic bottle recycling.
- The total plastic bottle recycling collection rate was 28.9%, a decrease of 0.4 percentage points compared to 2017.
- The total pounds of plastic bottles collected increased by 52 million pounds for 2018 compared to 2017, with an increase for PET and decrease for HDPE and steady for PP bottle resins. The annualized change in pounds of plastic bottles collected for recycling was a 1.8% increase.
- The five year compounded annual growth rate for plastic bottle recycling was -0.4%.
- PET bottles collected increased by 88 million pounds for a total of 1,813 million pounds in 2018. The recycling collection rate fell from 29.2% in 2017 to 28.9% in 2018. The tons of used bottles collected increased by 5.1%, but the tons of bottles in the marketplace increased more, 6.0%, leading to a slightly lower collection rate.
- Total recycled PET processed in the USA, including all sources, in 2018 was 1,890 million pounds, an increase of 284 million pounds over 2017.
- Compared to 2017, the HDPE bottles recycling collection rate dropped by 3.4 percent. The HDPE bottle recycling collection rate dropped to 30.4 percent in 2018 compared to the 2017 rate of 31.1 percent.
- The total pounds of HDPE processed by USA reclaimers were 899 million pounds, down 54 million pounds from 2017.
- PP bottle recycling collection totaled 30.6 million pounds, a decrease of 1.4% from the 2017 total of 31.1 million pounds. The collection rate dropped to 17.0% in 2018 compared to 17.2% in 2017 with the numerator dropping and the denominator nearly constant in 2018 compared to 2017.
- The total pounds of PP processed by USA reclaimers were 30.3 million pounds, up 1.4 million pounds from 2017.
- Exports of USA-collected HDPE bottle material held constant at 140 million pounds in 2018 compared to 140 million pounds in 2017. The 140 million pounds represented 13.9% of the domestically collected material with approximately 44% of the exports leaving North America.
- Overall, over 90% of all collected postconsumer plastic bottles were processed in the United States in 2018.

- Compared to 2017, imports of postconsumer HDPE to the United States fell to 32.5 million pounds in 2018.

Plastic Bottle Recycling Overview for 2018

The postconsumer plastic bottle recycling industry experienced a third difficult year in 2018 with less growth in pounds collected than in pounds of bottles on store shelves.

The numerator of pounds of all bottles collected rose by 52 million pounds or 1.8%, an improvement compared to the three year running average bottle collection growth rate of -1.4% per year. Package designers continue to decrease the amount of material used by light-weighting and reducing the size of PET and HDPE bottles. Light-weighted containers continue to be at high risk of mis-direction into the paper stream at material recovery facilities. Many consumer products are being sold in smaller bottles as household demographics change with smaller households. The sales of PET for bottles rebounded dramatically compared to 2017 sales while sales of HDPE for bottles decreased slightly. The total for all bottles in the marketplace increased by 324 million pounds, or 3.4%, which is above the three year moving average bottle marketplace growth rate of 1.0%. 2018 was a recovery year compared to 2017 with the highest annual use in pounds of the three resins, PET, HDPE, and PP, for bottles and the second highest per capita use of plastics for bottles in a decade.

Sales of virgin HDPE resin for bottles fell by 0.03% and sales of recycled HDPE resin for bottles fell by 5.4% compared to 2017 results. Overall, sales of HDPE, virgin and recycled, for bottles fell by 0.6% in 2018 compared to 2017. Sales of virgin PET resin for bottles rose by about 4%, adjusted for recycled PET used for new bottles.








In terms of recycled PET resin sold to domestic end markets in 2018, fiber, sheet, and strapping uses fell, while sales of recycled PET resin for bottle use increased—both for food/beverage and non-food categories—for a net increase in total recycled PET sold for domestic uses of 0.6% over 2017

Exports of all postconsumer plastic bottle bales continued the long-term trend downward with a decrease of 136 million pounds compared to 2017 and a fall to the lowest percentage for total exports in at least ten years. In 2018 9.9% of overall collected postconsumer bottles were exported from the United States. HDPE exports rose slightly in 2018 compared to 2017, to 13.9% of HDPE collected material. PET exports fell in both absolute tonnage and percentage of material collected, to 7.7% of collected postconsumer material, compared to 16.4% of collected material in 2017. The export of recycled PP bottles fell in 2017 to 2.5% of that collected. The PP bottle exports were in mixed rigids bales, not discrete bales of PP bottles. A primary reason for diminished exports was China's National Sword program, which essentially stopped importation of postconsumer plastic into China.

The processing of recycled PET bottle material, sourced domestically and imported, rose in 2018 over 2017 by 237 million pounds as the pounds processed reached an all-time high. Including alternative materials, such as thermoforms, equaled total processed recycled PET at 1,890 million pounds. The processing of recycled HDPE, sourced domestically and imported, fell by 54 million pounds in 2018 compared to 2017. The processing of recycled PP bottles, sourced domestically and imported, increased by 1.4 million pounds in 2018 over 2017.

- Bottle resin use per capita rose by 2.7% in 2018. The per capita use of plastic bottles matched the level seen before the 2008/2009 recession.
- 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 for other materials, especially paper, were adversely affected by reduced exports to China. The reclamation industry continued to handle an 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, a major collector of postconsumer bottles, 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 2018 as they did in 2017, importing collected plastic and keeping more domestically-generated material in the United States. International trade in used bottles is not just out of the United States.
- 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 usually exported as part of mixed bales.

The plastic bottle resins, as identified by their SPI/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 2018

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 98.9% of the bottles recycled with PP bottles constituting 1.1% of plastic bottles recycled. Some PP bottles are included with pigmented HDPE bottles for recycling, about 27% 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 deliberate recycling of those resin bottles 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. In 2018 0.31 million pounds of postconsumer polycarbonate bottles were collected for recycling. No information is available for the denominator for “#7, OTHER”.

Table 1
Postconsumer Plastics Bottles Recycled in
Calendar Year 2018 Compared to Calendar Year 2017 Results [1,2,3,4,5,6,7]
(in millions of pounds per year)

Plastic Bottle Type	Calendar Year 2017			Calendar Year 2018		
	Plastic Recycled [2]	Resin Sales [3,4]	Recycling Rate	Plastic Recycled [2]	Resin Sales [3,4]	Recycling Rate
PET [4]	1726	5913	29.2%	1813	6270	28.9%
HDPE Natural	473.8	1541	30.7%	430.8	1500	28.7%
HDPE Pigmented	568.0	1806	31.4%	575.7	1815	31.7%
Total HDPE Bottles	1042	3347	31.1%	1006.4	3315	30.4%
PVC [5]	0.8	32	2.5%	0.5	32	1.7%
LDPE [5]	0.7	70	1.0%	0.8	70	1.2%
PP [6]	31.1	181	17.2%	30.6	180	17.0%
Other [7]	5.3			3.5		
TOTAL BOTTLES	2800	9543	29.3%	2852	9867	28.9%

[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: 2018 Report of Postconsumer PET Container Recycling Activity, National Association for PET Container Resources, Charlotte, North Carolina

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

[6] About 16% 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 bales. 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 2018 PET bottle denominator increased by 357 million pounds or 6.0% to 6,270 million pounds compared to the 2017 value. Looking at the 2016 and 2018 PET bottle denominators, the compounded growth rate from 2016 through 2018 was 0.79%. The 2018 PET bottle numerator, not including thermoforms or other non-bottle PET, increased by 88 million pounds to 1,813 million pounds collected.

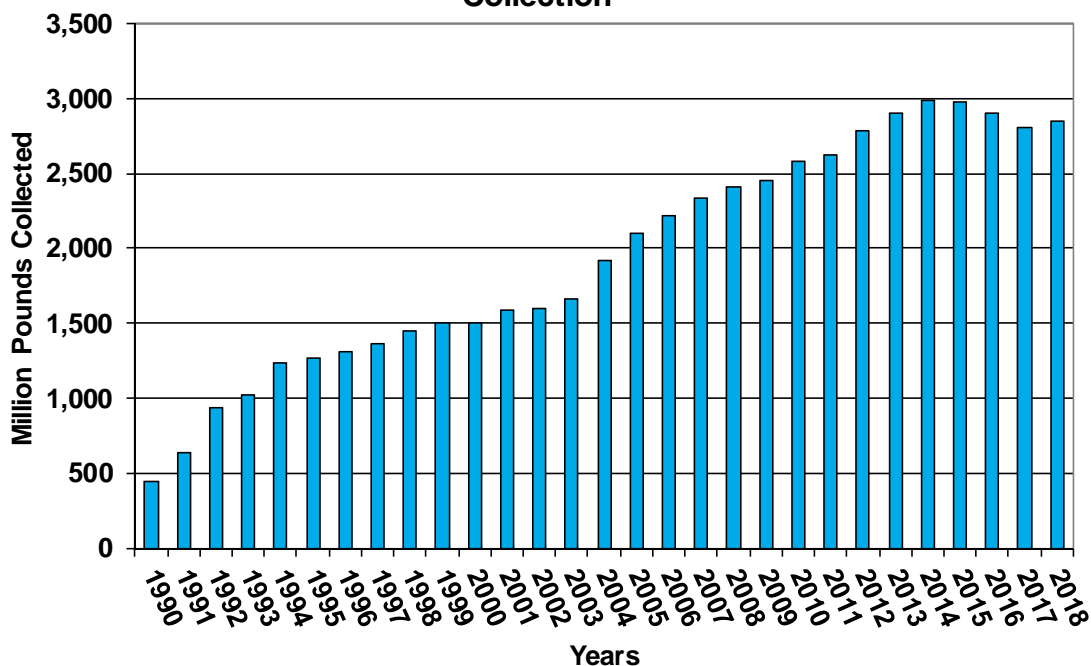
Many natural homopolymer HDPE milk bottles are pigmented, the usual visual indicator of the use of copolymer, and those bottles are included in the usually pigmented copolymer bottles. The split for recycled HDPE between natural HDPE (presumed to all be homopolymer) and pigmented HDPE (usually presumed to be copolymer) was based on buyer estimates. The “Total HDPE Bottles” values on Table 1 are likely more accurate numbers. In comparison with 2017, the 2018 HDPE bottles in the market place fell by 32 million pounds, or -0.9%. The HDPE bottles collected for recycling decreased by 35.3 million pounds, or -3.4%. The collection rate for HDPE bottle recycling fell in 2018 to 30.4% versus 2017 at 31.1% with fewer pounds recycled and the denominator decreasing. The natural HDPE recycling rate, as defined, fell in 2018 while the pigmented HDPE recycling rate, as defined above, rose slightly in 2018 versus 2017. Overall, HDPE bottle recycling saw a decrease in pounds collected for recycling.

About 2.9% 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 1.2% of the total HDPE bottles collected in 2018. For PP bottles the contribution from commingled bottle bales and mixed rigids bales was about 57% 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 30.3 million pounds, a 1.4 million pound or 5% increase from 2017¹. PP recycling collection saw a 0.4 million pound decrease in collected material and a steady usage of PP for initial bottles, resulting in a decrease in the collection rate for recycling to 17.0% from the 2017 collection rate of 17.2%. Exports of PP bottles decreased significantly, dropping from 8.6% in 2017 to 2.5% in 2018.

¹ 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, 2016-2018

As shown in Figure 1 the total pounds of postconsumer bottles collected for recycling in 2018 was 2,852 million pounds for #1 through #6 plastic bottles. The change from 2017 was an increase of 52 million pounds of recycled bottles, or 1.8%. This happened with 3.4% increase in total plastic bottle resin usage and the real GDP growth of 2.9% for 2018.

Bottle Resin Sales

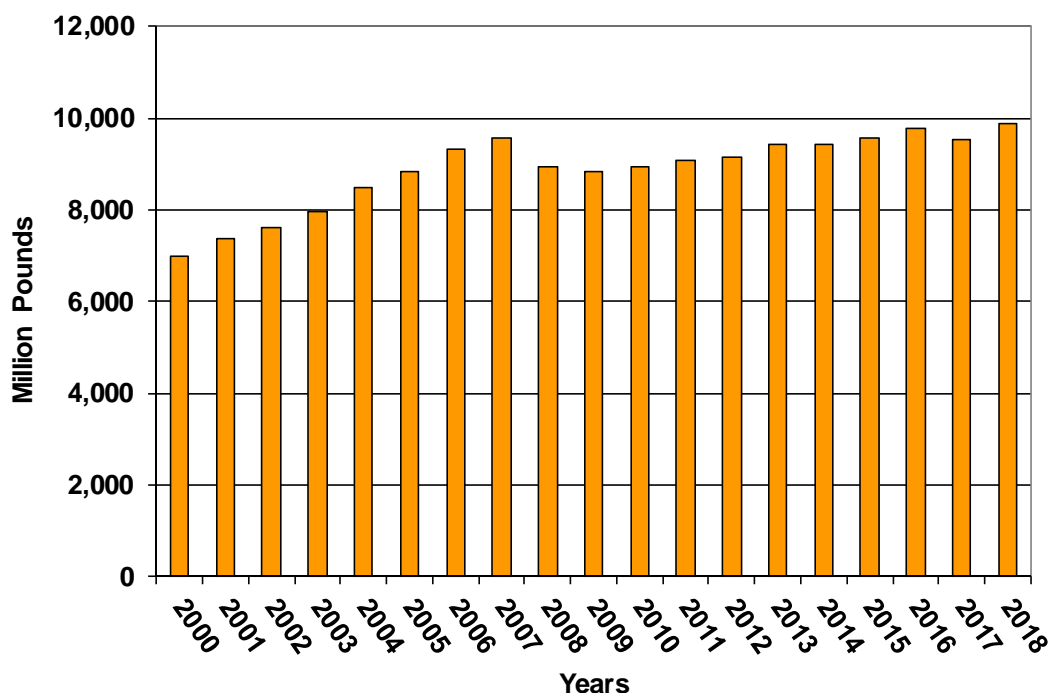
The denominator used to calculate the recycling rate is composed of both virgin resin and recycled resin used for bottle making.

Plastic bottle light-weighting continued to occur for all bottle resins². 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 can adversely affect recycling economics such as the cost of sorting which is incurred per package.

² Lightweighting is the use of less plastic for the same bottle volumetric size.

The change in total resins used to make bottles resulted in an increase of 324 million pounds, or an increase in bottle polymer production of 3.4% from the previous year. In 2017 the use of total resins to make bottles decreased 2.5% compared to 2016. The compounded growth rate for total resins used to make bottles from 2016 through 2018 was 0.42%, much below the GDP growth rate. Use of virgin and recycled HDPE to make bottles decreased by 32 million pounds, or -0.9%, down from the amount used in 2017. Use of virgin and recycled PET to make bottles increased by 357 million pounds, or 6.0%, from a depressed 2017 value. The use of PP for bottles stayed steady. The 2018 use of 9,867 million pounds of #1-#6 resins for bottles is an all-time high.

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



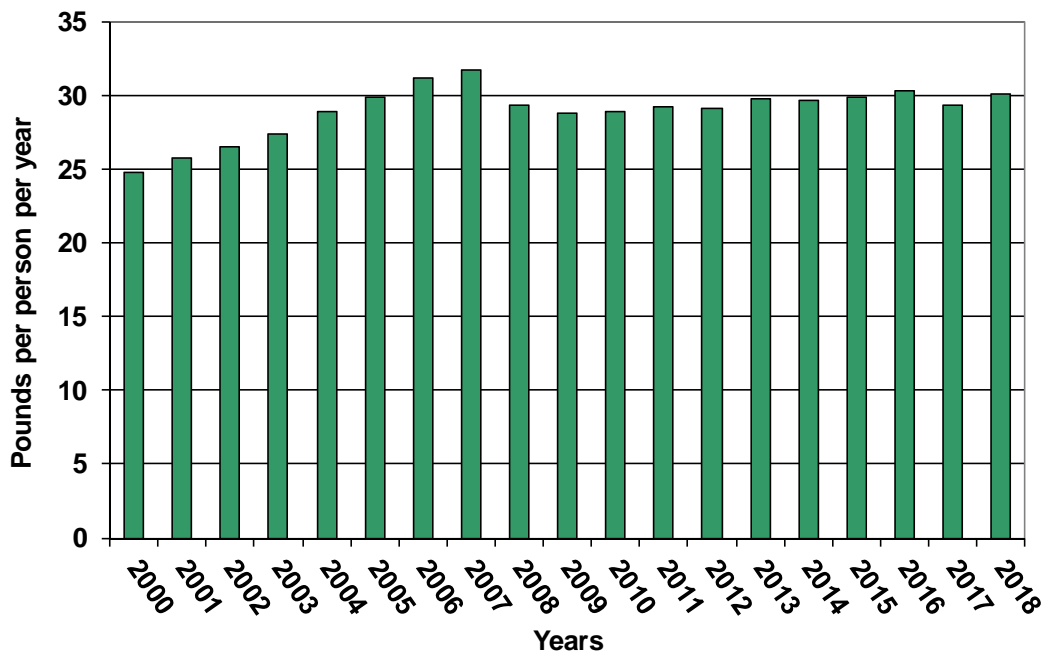
SOURCE: National Postconsumer Plastic Bottle Report, 2001-2018

It is vital for the growth of plastic bottle recycling that enough bottles are present in the marketplace to support feedstock quantity requirements and that consumers recycle used bottles in an appropriate and committed manner. 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, potentially, for PET recycling.

Figure 3 shows the United States per capita consumption for plastic bottles since 2000. In 2018 the per capita consumption of bottle resins, virgin and recycled plastic, rose 2.7% compared to 2017 and was only slightly behind the 2016 value. 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 or conversion to other packaging. The very slow growth in per capita consumption of plastics for bottles

signals that growth in the quantity of recycled of bottles must come from more effective collection, not just relying on per capita consumption growth.

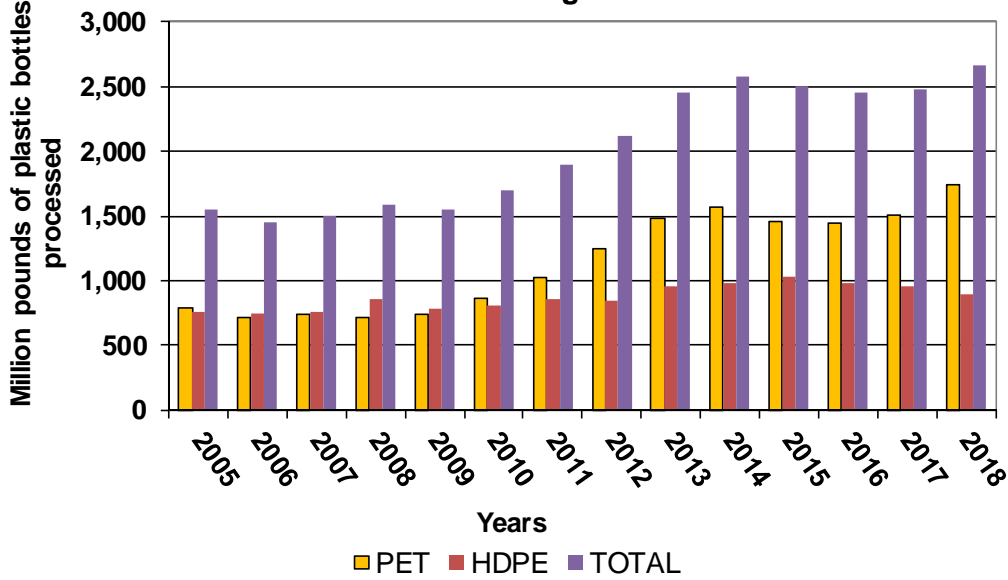
Figure 3
USA Per Capita Consumption of Plastic Bottles



SOURCE: National Postconsumer Plastic Bottle Report, 2001-2018; 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.

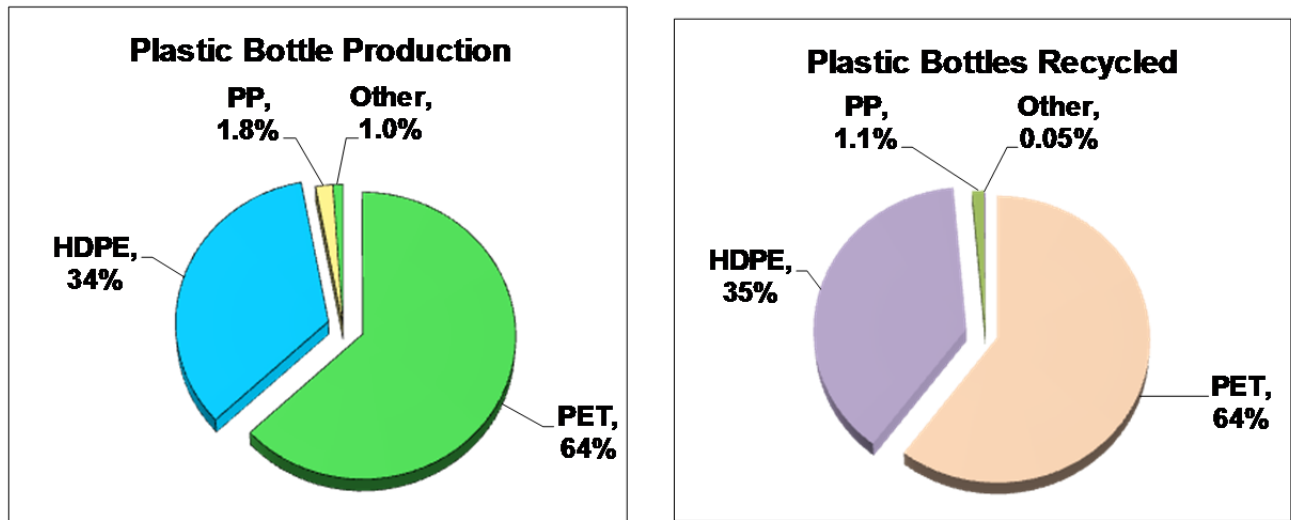
Figure 4
USA Reclaimer Processing of Plastic Bottles



SOURCE: National Postconsumer Plastic Bottle Report, 2001-2018

Figure 5 shows PET and HDPE continued to dominate as selected resins to produce plastic bottles: 97.1% by weight of produced bottles was made of PET or HDPE. PET and HDPE bottles also continued to dominate the bottles collected for recycling, collectively at 98.9% and PP at 1.1% of the total bottles recycled.

Figure 5
2018 Plastic Bottles Recycled and Plastic Bottle Production by Resin



Source: More Recycling, 2018. NAPCOR, 2018

Barriers to Increased Plastic Bottle Recycling

As noted for 2005 through 2017, 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. Consumer confusion about which items are to be recycled is cited in surveys about consumer attitudes. Clear instructions and ongoing education are necessary to maximize collection rates.

Campaigns to eliminate single use packaging hurt plastic bottle recycling. The campaigns tend to focus on litter, not proper solid waste management, and do not include a holistic life cycle approach to decision making. In addition, food safety and hygiene afforded by plastic packaging are overlooked.

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 fluctuating commodity prices, which include plastic recyclables, MRFs that would process the entire municipal waste stream for recyclables, not just a collected stream of recyclable packaging, are still being considered although none has been successfully maintained. Some municipalities have stopped collecting postconsumer plastic packaging, at least in the short-term, as they deal with the loss of export markets for paper and other recycled materials and changes in domestic markets.

The fluctuating crude oil and natural gas byproduct prices had an impact on postconsumer plastics in 2018 as it did in 2017. Crude oil prices rose and fell throughout the year while natural gas liquids prices rose over 2017 levels. As a general matter, the cost of petroleum and petrochemicals favored the economic competitiveness of virgin plastics compared to postconsumer plastic. Crude oil prices and natural gas liquids prices affect raw material cost for PET, HDPE, and PP.

The Chinese government limitations on imports of used plastic dramatically slowed down the flow of recyclable plastics directly to China by the end of 2018 to nearly negligible, disrupting established logistic flows. Exports to other Asian entities increased, but not enough to offset the Chinese restriction. The strong negative effect of the Chinese limitations on imports disrupted total operations in many USA MRFs.

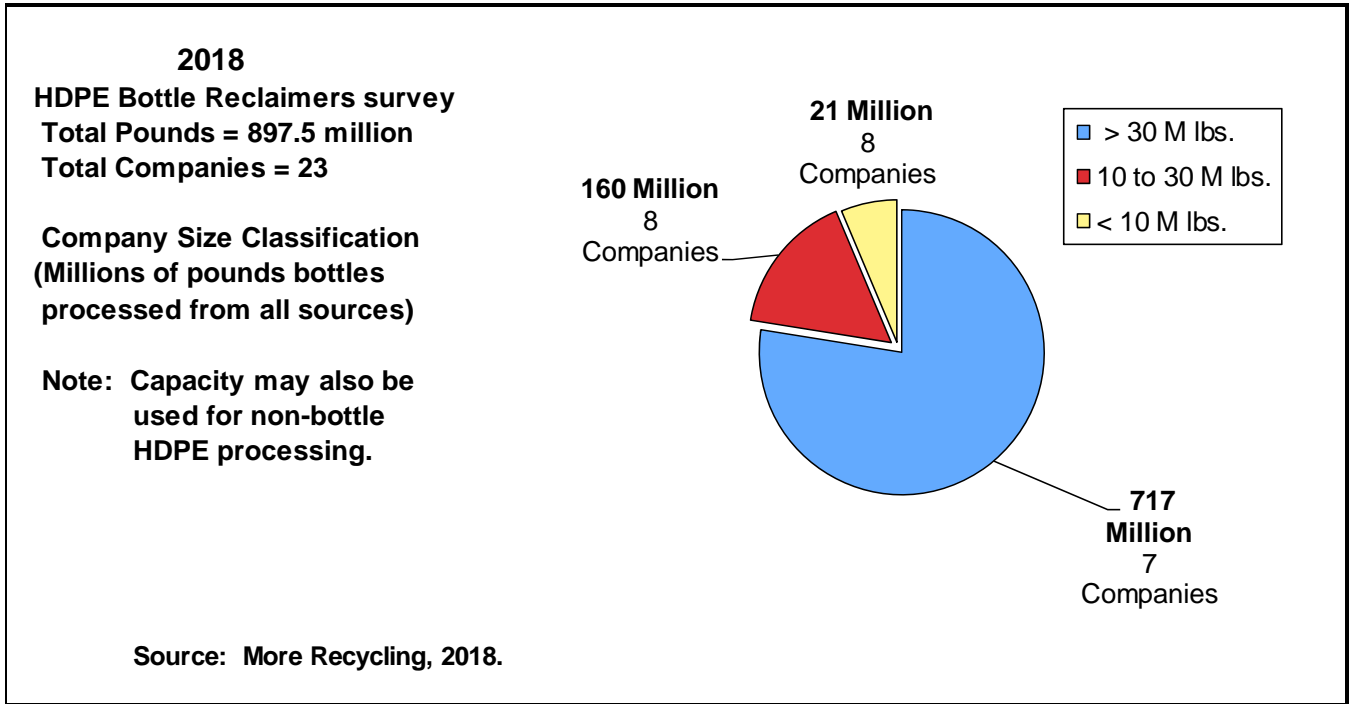
With the continuing influence of five major factors: the increase in single stream collection of recyclables at household residences even as some collection programs shut down; the increased interest to collect more than bottles; the overall reduced quantity of export material, particularly non-bottle items; campaigns against single use packaging; and the extreme economic pressure on the bale suppliers, the quality and quantity of available postconsumer bottle material to U.S. reclaimers dropped for the fourth consecutive year 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 even as the use of recycled PET to make new bottles grew³. Use of the APR Design® Guide by packaging designers can help reduce economic and technical barriers to plastic bottle recycling.

³ For more details on PET recycling, please consult the NAPCOR '2018 PET Recycling Report'.

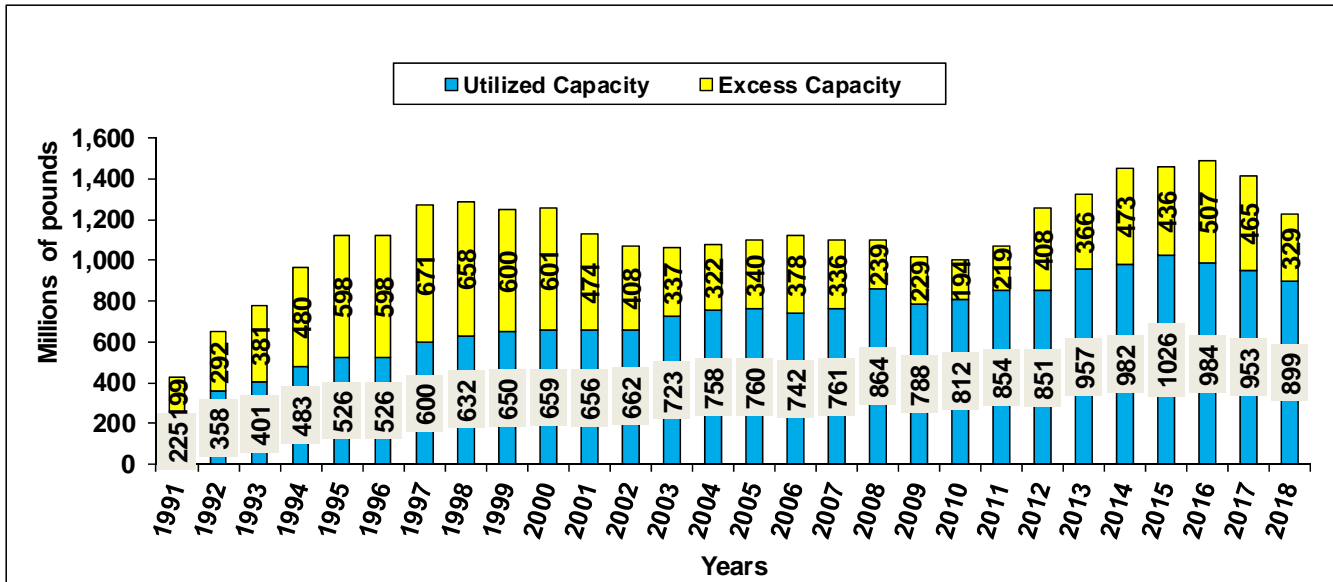
HDPE Reclamation Industry Update – Reclaimers’ Reporting

- The number of HDPE reclaimers reporting decreased in 2018 as compared to 2017 with 23 companies active at year’s end, the same as in 2013. 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. Some companies focused assets to other projects.
- The amount of HDPE as reported processed by the survey of United States HDPE reclaimers fell by 53 million pounds to 897.5 million pounds. While HDPE recycled bottle domestic collection decreased compared to 2017, exports held constant and imports decreased to account for the lesser amount of HDPE bottles processed. This value, 897.5 million pounds processed, is slightly different than the 898.6 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.
- Seven larger companies, defined as those processing over 30 million pounds annually, processed 80% of the HDPE processed with a net annual decrease in the pounds processed as one company fell to the mid-sized company level (those processing 10 million to 30 million pounds annually).
- The mid-sized companies increased in numbers to eight in 2018 and the amount processed in 2018 increased compared to the amount processed in 2017. Small companies, processing less than 10 million pounds annually, decreased in number and decreased in the amount processed compared to 2017.
- Several HDPE reclaimers shifted their focus away from HDPE bottles and reallocated resources to other resins or to postindustrial recycling.

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.

Source: More Recycling, 2018.

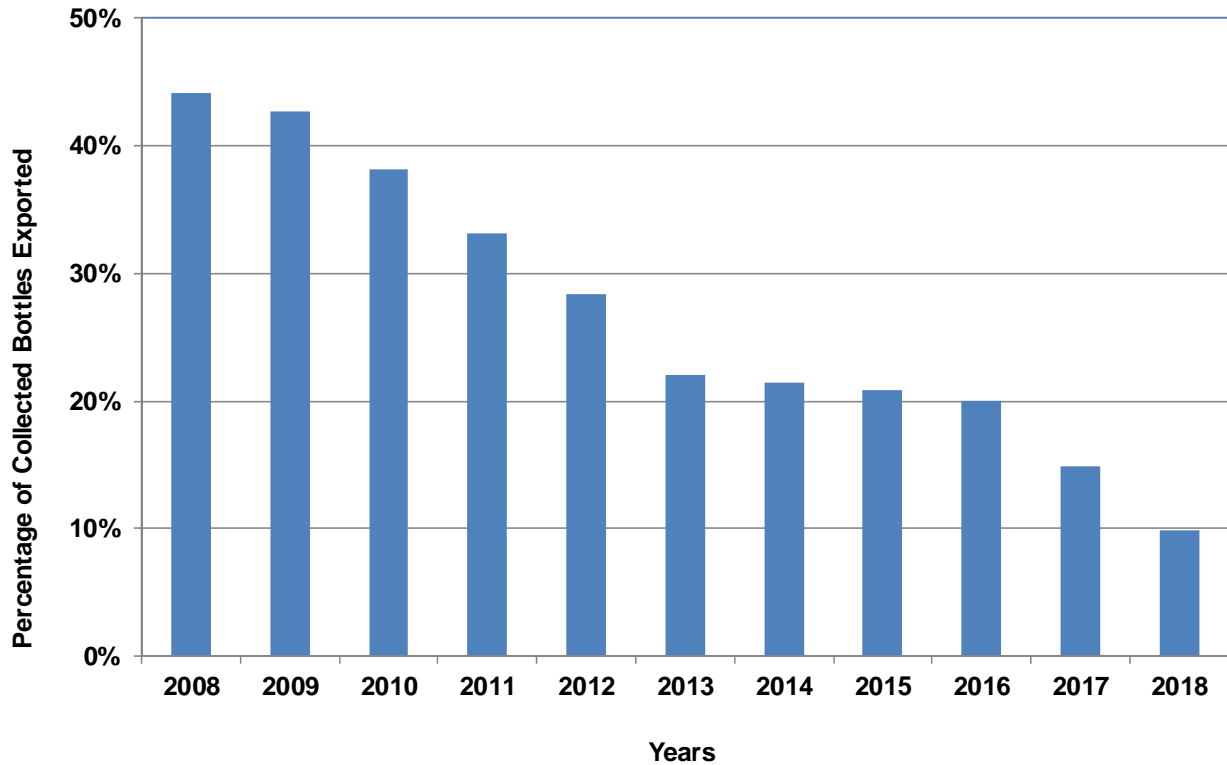
The capacity utilization is shown for the given conditions of hours worked. This is economically favorable. The capacity utilization for HDPE bottle reclamation, as calculated, rose to 73% for 2018 as compared to 67% in 2017. Production capacity decreased and less production occurred with a net increase in utilization percentage. 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 2018 to 899 million pounds, compared to 953 million pounds in 2017. The overall USA industry capacity, as calculated, decreased to 1,228 million pounds of HDPE postconsumer reclamation capacity.

As reported in the NAPCOR ‘2018 PET Recycling Report’, USA PET reclamation capacity utilization was about 80%, up from about 71% in 2017. While more recycled material was processed due to greater collection, imports, non-bottle PET, and reduced exports, operating capacity was higher than in 2017. USA PET reclaimers processed 284 million more total pounds of recycled PET in 2018 than in 2017 for the highest year ever.

Export and Import Markets

Postconsumer bottles are a valuable commodity and are traded globally. Purchases of USA postconsumer bottles for export continued in 2018. 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 9.9% of collected plastic bottle material of all types was exported in 2018, 282 million pounds, compared to 15.2% or 426 million pounds in 2017. For context, the exports exceeded 30% of bottles collected in 2011 and before.

Figure 8
Exports of Postconsumer Bottles From the United States
2018



SOURCE: National Postconsumer Plastic Bottle Report, 2001-2018

For United States-collected HDPE bottle material, 140 million pounds were exported. This amount represented 13.9% of the total HDPE bottle material collected domestically, an increase of 0.7 million pounds since 2017. Of those exported pounds, 56% went to Canada. The trade in bales is not one-sided. USA HDPE reclaimers imported 32 million pounds in 2018, down 36% from 51 million pounds of postconsumer HDPE bottle bales imported in 2017. 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.

2018 PET exports totaled 7.7% of the total PET bottles collected with 57% going to Canada and the rest of the exports going to Asia with some still to China. This percentage, 7.7%, is less than the experience in 2017, when 16.4% of the United States-collected PET was exported. China’s “National Sword” initiative continued to slow imports into China of postconsumer baled bottles in 2018 as the flow to Hong Kong also dropped. Exports to other Asian destinations rose, but did not offset the decrease to China and Hong Kong. World exports of PET from the United States were down 50.5% in 2018 compared to 2017.

The exports for PP bottles fell in 2018 from 2.7 in 2017 to 0.8 million pounds, all as part of mixed bales. The PP exports fell from 9% in 2017 to 2.5% of material collected in 2018 for bottle material. 4% of

PVC bottles was exported, a total of 0.02 million pounds. 47% of LDPE bottles was exported, a total of 0.4 million pounds, mostly in bales of rigid containers. These quantity values reflect updated bale content analyses. 38% of OTHER bottle collected materials was exported.

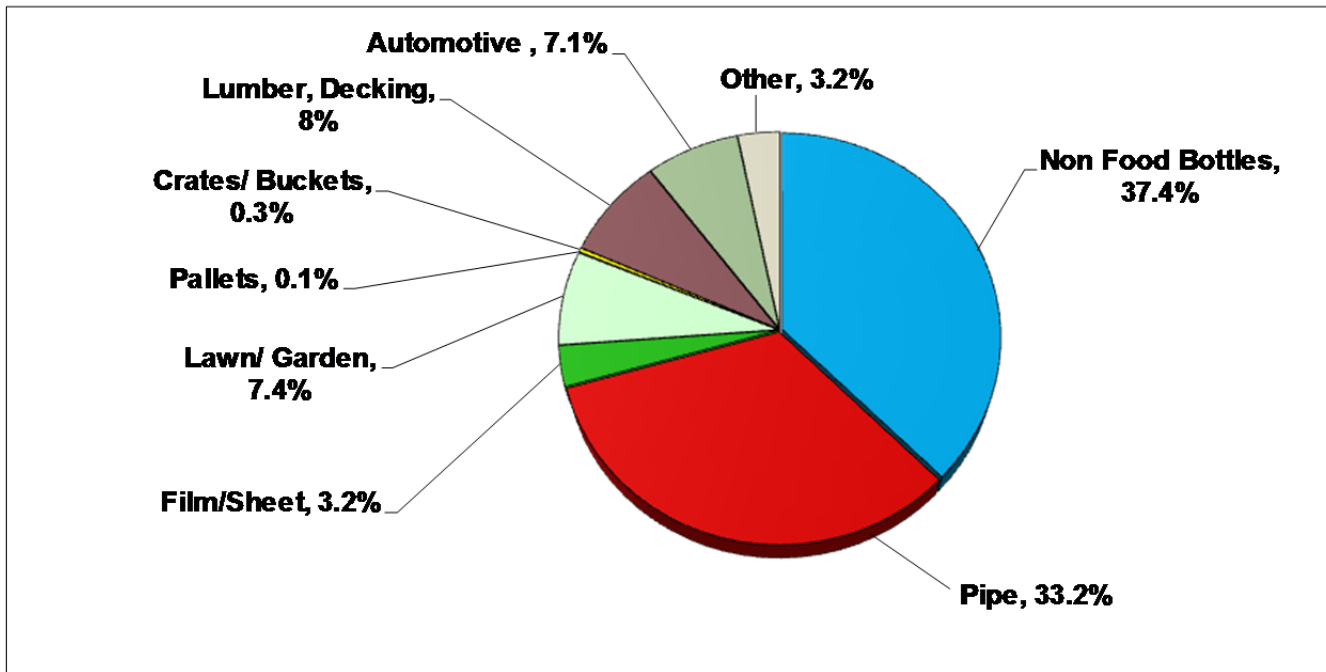
The decrease in exports of postconsumer plastic bottle material proves wrong the myth that ‘most of the collected used plastic bottles are exported’. Over 90% of United States-collected plastic bottles were processed in the United States and product sold in the United States in 2018.

End Use Markets for Recycled Plastics in 2018

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, strapping, film and sheet, and bottles. Fiber, sheet & film, and strapping uses for recycled PET fell in 2018. Food bottle and non-food bottle applications for recycled PET rose in 2018. Total recycled PET for domestic use remained steady, increasing very slightly over 2017.
- Postconsumer polypropylene bottles uses were not statistically reported for 2018. Anecdotal reports suggest the uses were the same as reported in 2014: pallets, crates, and buckets.

Figure 9
Domestic Recycled HDPE Bottle End Uses
2018



Source: More Recycling, 2018.

There was some change in the recycled postconsumer HDPE end use markets in 2018 compared to 2017, with new bottles still a major use, but declining in tonnage and pipe applications gaining slightly in tons and percentage. On a tons basis automotive uses decreased slightly as Other uses decreased in tons and percentage. The tons for lawn & garden, film & sheet, plastic lumber, and decking and railroad ties rose compared to 2017. Some of the volumes listed for ‘other’ were for such as toys, rotomoldings, housewares, and traffic barricades. Other listings also include unspecified markets. 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 low-90s percentages, depending on raw material and end use. The average of reported yield values of bales to clean HDPE pellets in 2018 was 80.3%, compared to 78.9% in 2017 and 80.6% long term. For PET, the bale yields fell to the mid-to-upper 60s percentage. 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 2018 was approximately 527 million dollars compared to 472 million dollars in 2017.

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 continuously works to develop 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. APR, 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.

More Recycling, supported by ACC, APR, and Resource Recycling, manages www.plasticmarkets.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.

NAPCOR provides additional information about PET at its website, www.NAPCOR.com. For more details on the 2018 PET recycling, contact NAPCOR for its "2018 PET Recycling Report" report.

Legal Notice

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