



**Association of Postconsumer
Plastic Recyclers**



2009 UNITED STATES NATIONAL POST- CONSUMER PLASTICS BOTTLE RECYCLING REPORT

INTRODUCTION

The 2009 edition of the United States National Post-Consumer Plastics Bottle Recycling Report is the 20th 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 Postconsumer Plastic Recyclers (APR), the goal of which is to quantify the amount of high density polyethylene (HDPE) and polypropylene (PP) bottles recycled, as well as the rate of recycling. This study includes postconsumer recycling values and comments for polyethylene terephthalate (PET) developed by the National Association for PET Container Resources (NAPCOR) and the Association of Postconsumer Plastic Recyclers (APR). The reclaimer survey portion of the study was conducted by the Moore Recycling Associates, Inc.

HIGHLIGHTS/SUMMARY FOR 2009

Plastic Bottle Pounds Collected for Recycling in the United States

- The total pounds of plastic bottles recycled reached a record high 2,456 million pounds.
- The total plastic bottle recycling rate was 27.8%, up from 27.0% in 2008.
- The total pounds of plastic bottles collected increased by 46 million pounds for 2009 over 2008.
- The annual increase in pounds of plastic bottles recycled was 1.9%.
- The 20 year compounded annual growth rate for plastic bottle recycling was 9.4%.

- PET bottles collected decreased by 7 million pounds for a total of 1,444 million pounds.
- HDPE bottles collected rose by 44.9 million pounds to 981.6 million pounds.
- The HDPE bottle recycling rate rose to 29.2% in 2009 from 29.0% in 2008 with an increase in amount collected for recycling and increase in resin used for bottles.
- Exports of US-collected HDPE bottle material increased to 234 million pounds, 23.8% of domestically collected material with approximately 6/7's of the exports leaving North America.
- Imports of postconsumer HDPE to the United States decreased by 72% to 40 million pounds, which with increased exports resulted in decreased production and capacity utilization of USA reclamation plants.
- Polypropylene bottle recycling totaled 27.0 million pounds, an increase of 27% over 2008 with 48% of the total processed domestically as deliberate PP material, as opposed to mixed material flake.

Plastic Bottle Recycling Overview for 2009

2009 was a year of slow recovery after the 'perfect storms' of 2008. While many PET water bottles became lighter bottles, the slow economic recovery did result in more pounds of HDPE being used in 2009 than in 2008, but less than in either 2006 or 2007. Market trends continued to shift in demand for some beverage packaging. 2009 prices began the year with the same low numbers seen in late 2008. The recovery in price of bales was slow through the first quarter, accelerating in the second quarter, and steady in the last half of the year at about 2/3's of the pre-recession prices. While PET exports of bales decreased modestly, exports for HDPE bales increased. The export of recycled polypropylene bottles fell as more material was recovered overall. An increased amount of polypropylene bottle material was isolated as polypropylene as opposed to being mixed with other resins. The processing of recycled PET, sourced domestically or imported, rose by 22 million pounds in 2009 vs. 2008. The processing of recycled HDPE, sourced domestically or imported, fell in 2009 by 76 million pounds compared to 2008. The processing of recycled PP increased by 9 million pounds in 2009 vs. 2008.

- Bottle resin use grew during the year, but did not recover to pre-recession levels.
- Bale prices for recycled bottles rose through the first and second quarters and then became steady at levels below recent years.
- Single stream collection of household recyclables continued to grow, generally resulting in higher overall household participation rates and more contaminated bales of bottles and lower bale yields.
- California redemption programs collected not only PET, but also HDPE, PP, PVC, LDPE bottles and Other bottles
- Unlike as in 2008 HDPE recycling operations did not use significant imports of material to meet reclamation material demands. Plastic bottle recycling, though, continues to be an international business.
- Active "all bottle" collection increased the percentage of LDPE and PVC bottles dramatically, although the tonnage continues small. For the first time we show a small

amount of #7, Other, bottles collected, but we do not have data for the denominators of those bottles.

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

	PETE	Polyethylene Terephthalate, PET
	HDPE	High Density Polyethylene, HDPE
	V	Polyvinyl Chloride, PVC
	LDPE	Low Density Polyethylene, LDPE
	PP	Polypropylene, PP
	PS	Polystyrene, PS
	OTHER	Other

PET and HDPE bottles continue to comprise over 96% (96.3%) of the U.S. plastic bottle market and about 99% of the bottles recycled. The largest market share of the other resins used to make bottles is held by polypropylene at 2.2% of plastic bottles followed by PVC at 0.8% of plastic bottles. Many polypropylene bottles are included with pigmented HDPE bottles for recycling, about 19% of all polypropylene collected. For this report, an allowance based on buyer reports has been included to account for those polypropylene bottles. So long as the total polypropylene concentration stays below 5% in batches of HDPE recycle, the inclusion is considered benign.

Although 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 but 3.7% of the plastic bottle market.

Finally, for the first time bottles coded bottles with “#7, Other” are included in this report as a discrete category. 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. No information is available for the denominator for #7, Other.

Post-Consumer Plastic Bottle Recycling Collection Results

Table 1
Post-Consumer Plastics Bottles Recycled in
Calendar Year 2009 Compared to Calendar Year 2008 Results [1,2,3,4,5,6,7]
 (in millions of pounds per year)

Plastic Bottle Type	Calendar Year 2008			Calendar Year 2009		
	Plastic Recycled [2]	Resin Sales [3,4]	Recycling Rate	Plastic Recycled [2]	Resin Sales [3,4]	Recycling Rate
PET [4]	1451	5366	27.0%	1444	5149	28.0%
HDPE Natural	430.4	1523	28.3%	457.0	1613	28.3%
HDPE Pigmented	506.3	1713	29.6%	524.6	1752	29.9%
Total HDPE Bottles	936.7	3236	29.0%	981.6	3365	29.2%
PVC [5]	0.4	72	0.5%	2.0	66	3.0%
LDPE [5]	0.4	70	0.5%	1.4	72	2.0%
PP [6]	21.2	186	11.4%	27.0	192	14.1%
Other [7]				1.0		
TOTAL BOTTLES	2410	8930	27.0%	2456	8844	27.8%

[1] These data provide a snapshot of plastic bottle recycling collection trends from the national perspective. The data are particularly 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 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 Moore Recycling Associates, Inc. and include bale composition data provided by Moore Recycling Associates, Inc. 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.

[4] Source: 2009 Report of Post Consumer 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 1/2 of polypropylene bottles were deliberately recycled as polypropylene bottles, about 1/5 were included in commingled and mixed plastic bales, and about 1/5 were included with colored HDPE

[7] Limited data for bottles of other resins are shown. Material sold as part of mixed export bale. No denominator values are available

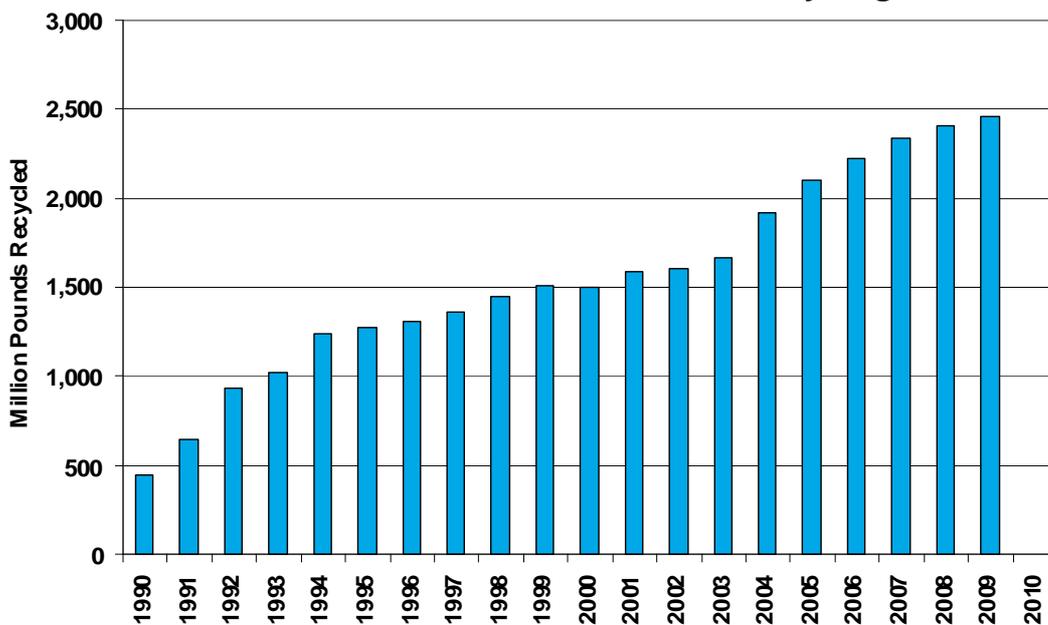
Many natural homopolymer HDPE milk bottles are now pigmented, the usual visual indicator of the use of copolymer, and those bottles become included in the usually pigmented copolymer bottles. The recycled HDPE split between natural HDPE (presumed to all be homopolymer) and pigmented HDPE (usually presumed to be copolymer) was based on buyer estimates. The "Total HDPE Bottles" values above are probably more accurate numbers. In comparison with 2008, the 2009 HDPE denominator (bottles in the market place) increased by 130 million pounds, or 4.0%, but was still approximately 160 million pounds below the totals for 2006 and 2007. The HDPE numerator (bottles recycled) increased by 44.9 million pounds, or 4.8%. Both natural and pigmented HDPE recycling increased in 2009.

About 5% of the total #2 through #7 bottles collected was part of commingled bottles bales. About 1% of the total #2 through #7 bottles was from mixed rigids bales. And about 0.7% of the total # 2 through #7 bottles was from bales characterized as "other bottle" and known

to contain all possible bottles. For high density polyethylene bottles the contribution from commingled bottles bales and mixed rigids was about 5.6% of the total HDPE bottles collected. For polypropylene bottles the contribution from commingled bottles bales and mixed rigids was about 22% of the total. For PVC bottles the contribution from commingled bottles bales and mixed rigids was about 97% of the total. For LDPE bottles the contribution from commingled bottles bales and mixed rigids was about 99% of the total.

Domestic processing of postconsumer polypropylene bottles totaled 17.7 million pounds, a 95% increase over 2008. More polypropylene from injection molded closures was recycled, but that amount is not part of this report on bottles. The deliberately isolated polypropylene bottles for domestic recycling increased by 199% from 4.2 million pounds in 2008 to 12.7 M lbs in 2009.

Figure 1
Growth in Post-Consumer Plastic Bottle Recycling



SOURCE: NAPCOR, all years, for PET. For other bottle resins, R.W. Beck, Inc., 1990-2006; Moore Recycling Associates, Inc., 2007-2009

The growth in total pounds of postconsumer bottles collected for recycling continued in 2009. A total of 2,456 million pounds of plastic bottles are reported as collected for recycling. The change from 2008 was an increase of 46 million pounds of recycled bottles, or an increase of 1.9%. This happened in the face of decreased overall use of plastics to make bottles and the global financial meltdown that started in the fall of 2008 and continued through 2009.

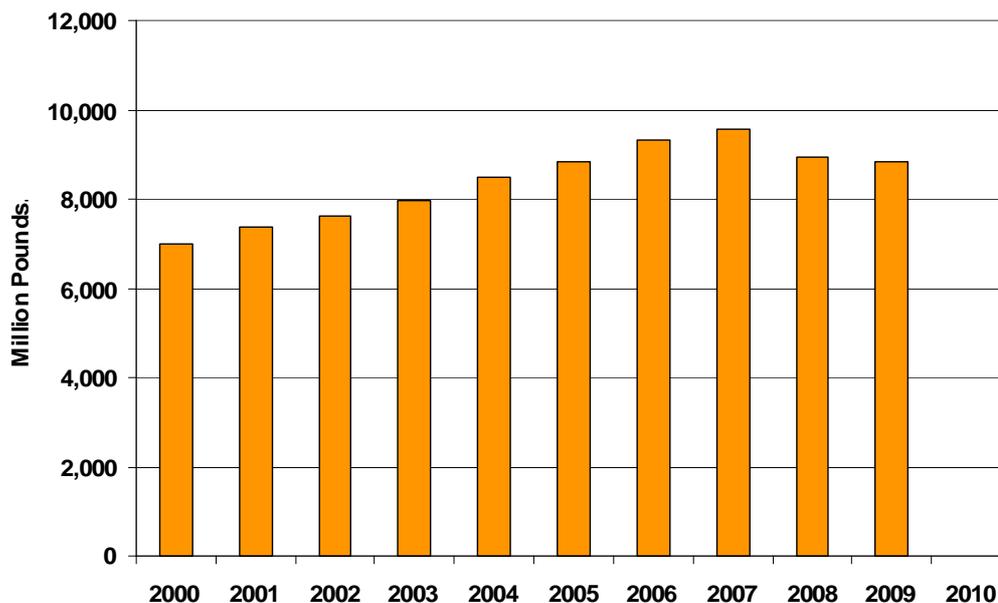
Bottle Resin Sales

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 continues. 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. Light-weighting meets economic and sustainability goals and is a relentless force in bottle making. While lighter bottles are more economically sustainable, recycling is denominated by weight.

The change in total resin used to make bottles was a decrease of 85 million pounds, or a decrease in bottle production of 1.0%, continuing the decline started in 2008. Use of HDPE to make bottles increased by 130 million pounds, or 4.0%. Use of PET to make bottles decreased by 217 million pounds, or 4.0%.

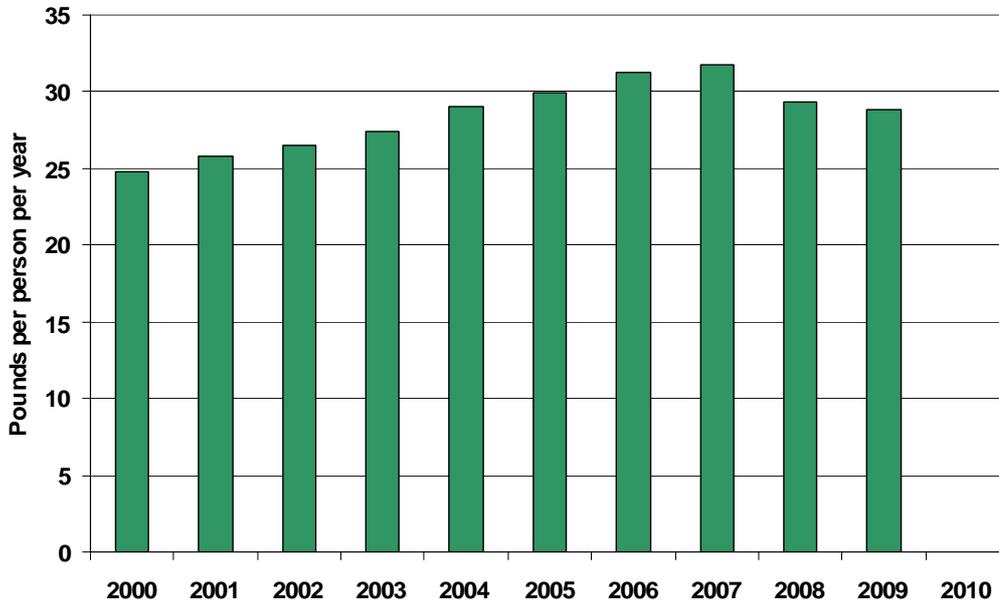
Figure 2
Resin Used for Plastic Bottles in USA



SOURCE: US National Post-Consumer Plastic Bottle Reports, 2001-2009

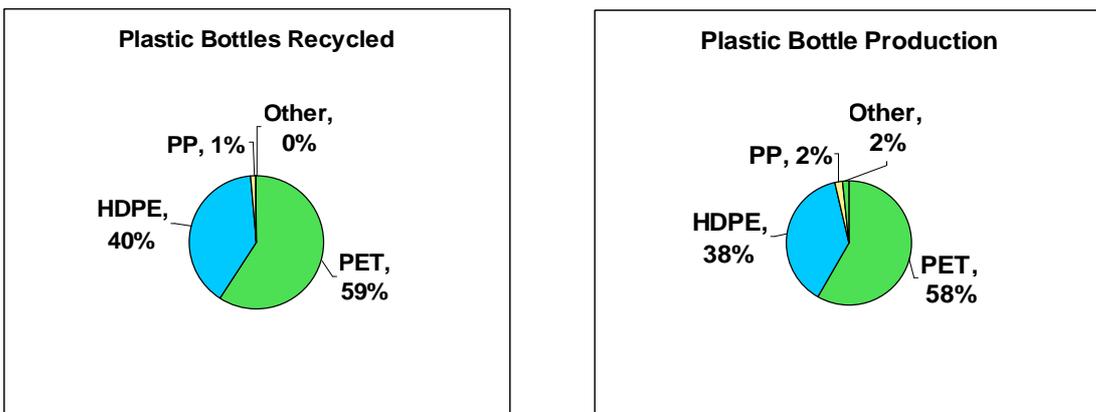
It is vital for the growth of plastic bottle recycling that bottles be present in the marketplace and consumers place bottles in the proper pathways for recycling to happen. The pounds of material in bottles used by consumers shown in Figure 2 include recycled content. Without available pounds of feed material, plastics recycling may grow in recycling rate, but not in the tons needed for a robust industry. The United States per capita consumption of bottle resins, virgin and recycle sourced, in 2009 matched the consumption rate of 2004.

Figure 3
USA Per Capita Consumption of Plastic Bottles



PET and HDPE continued to dominate as selected resins to produce plastic bottles: 96.3% 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 being 98.8% and polypropylene being 1.1%.

Figure 4
2009 Plastic Bottles Recycled and Plastic Bottle Production by Resin



Source: Moore Recycling Associates, Inc. 2009; NAPCOR, 2009

Barriers to Increased Plastic Bottle Recycling

As noted for 2005 through 2008, too many consumers continue to be unaware of the significant usefulness, demand, and value of recycled plastic HDPE and PET. Data and experience show that plastic bottle recycling can be increased through sustained local education campaigns. Municipalities also need to understand that they too can benefit from the prices being paid for bales of bottles, including revenue sharing to fund educational programs and other costs of collection.

Another barrier to increased recycling is lack of sufficient access to recycling collection opportunities for products used away from home. Consumer data continue to show that the public wants additional opportunities to be able to recycle at public venues, offices, recreational sites, schools, and retail establishments.

Again in 2009 the Association of Postconsumer 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.

With three driving influences, the single stream collection of recyclables at household residences and the increased effort to collect more than bottles and minimal specifications for export material, the quality of available postconsumer bottle material decreased. The slippage in bale yields quantifies this, falling in 2009 to 77.9% vs. 80.4% in 2008.

HDPE Reclamation Industry Update

- The number of HDPE reclaimers increased in 2009 as compared to 2008 with 27 companies active at year's end. One company ceased operations. The number of smaller companies may vary year-to-year as industrial scrap companies change their business plans and start-ups and acquisitions continue.
- The amount of HDPE processed by US HDPE reclaimers fell by 76.5 million pounds to 787.6 million pounds. The entire decline in pounds processed came from decreased imported feedstock as domestic use of domestically sourced bales increased.
- The largest companies, processing over 30 million pounds annually, processed 78% of the HDPE processed and held constant in number at nine.
- The mid-sized companies were constant in number and amount processed in 2009 as compared to 2008. Small companies increased the amount processed in this category.
- For HDPE bottle reclamation, capacity utilization, as defined, was 69% in 2005 and 66% in 2006 and 69% in 2007 and 78% in 2008. In 2009 capacity utilization was 77% as the overall capacity fell as fewer pounds were processed.

Figure 5
Size Comparison of Domestic Reclaimers of HDPE Bottles

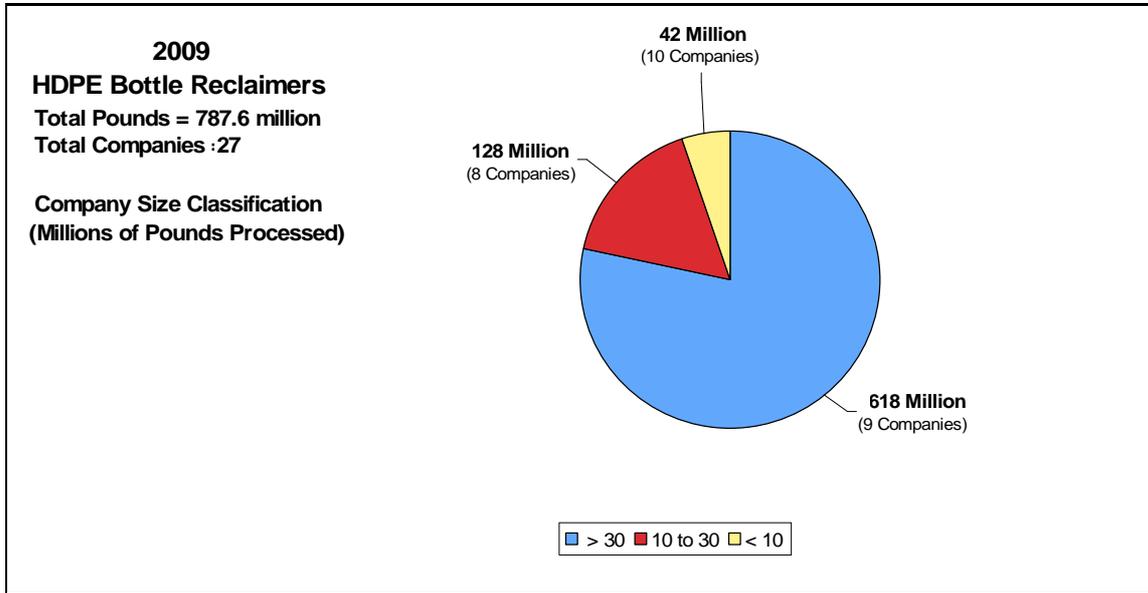
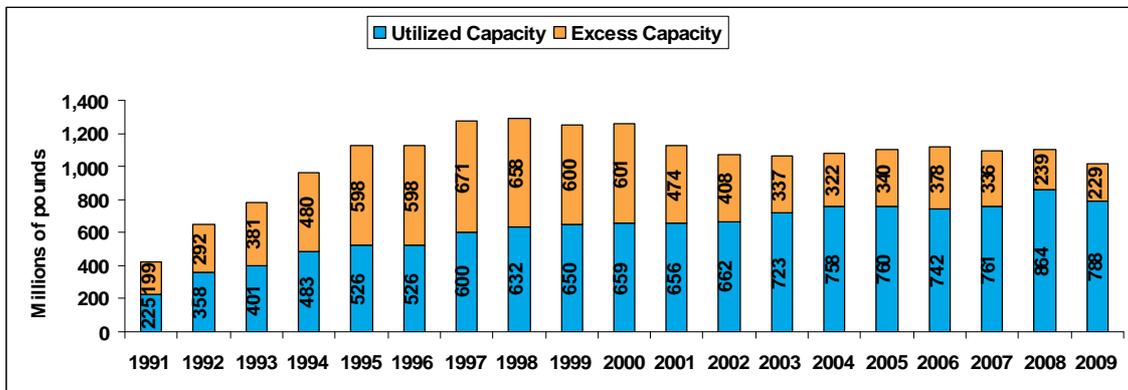


Figure 6
HDPE Bottle Wash Capacity in the U.S.



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 held steady at 77% for 2009 as compared to 78% in 2008. The total utilized capacity fell in 2009 to 788 million pounds compared to 864 million pounds in 2008 when significant imported materials were processed in the USA. The overall industry capacity, as calculated, decreased slightly to 1,017 million pounds of HDPE postconsumer reclamation capacity.

Export and Import Markets

Buying of United States postconsumer bottles for export continued in 2009. Postconsumer plastic was exported out of the United States as bales of PET, polypropylene, and HDPE bottles; bales of commingled bottles and containers; mixed rigid container bales; and unwashed flake material.

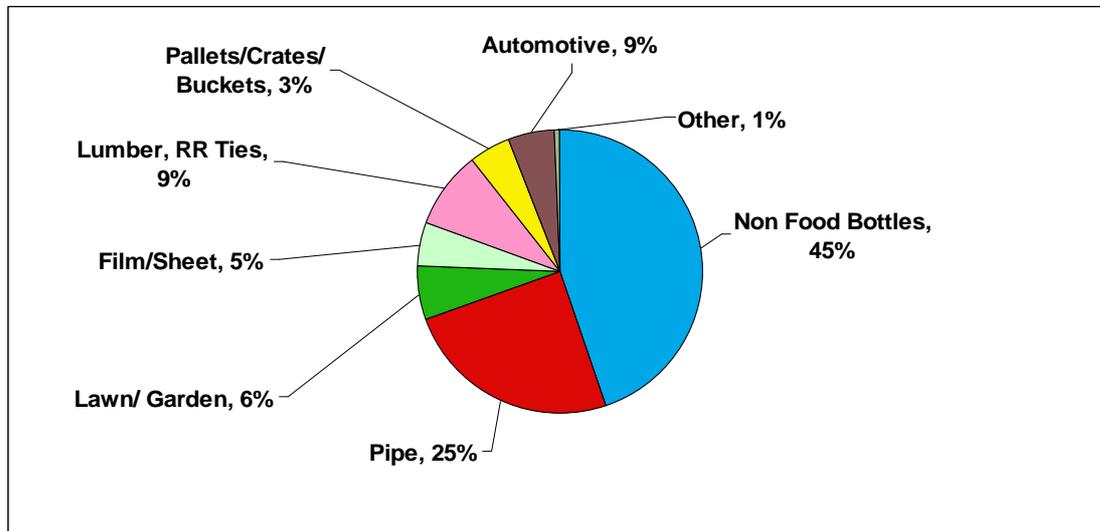
For US-collected HDPE bottle material, 234 million pounds were exported, representing 23.8% of the total bottle material collected domestically, an increase of 20 million pounds over 2008. Unlike in 2008 with 35% of those exports going to Canada, in 2009 14% went to Canada. The trade in bales is not one-sided. US reclaimers imported 40 million pounds in 2009, down from 141 million pounds of postconsumer HDPE bales imported in 2008. The imported pounds are not included in the totals of pounds collected in the United States and are not part of the totals on Table 1.

2009 PET exports totaled 55.6% of the total PET bottles collected with most going to China. This percentage is slightly less than the experience in 2008. The exports for polypropylene bottles dropped in 2009 vs. 2008, 9.3 vs. 12.1 million pounds, most as part of mixed resin or commingled bales or mixed flake. Because so much polypropylene was domestically processed, the exports fell from 57% in 2008 to 34% in 2009 for the bottles. 97% of PVC bottles were exported, a total of 1.9 million pounds. 99% of LDPE bottles were exported, a total of 1.4 million pounds.

End Use Markets for Recycled Plastics

- 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 films.
- Pigmented HDPE postconsumer recycled resin's markets continued to be pipe and lawn and garden 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-spec virgin resin.

Figure 7
Domestic Recycled HDPE Bottle End Use
2009



The market share for pipe applications rose slightly above value as in 2007, 24%, and greater than the usage in 2008. The pounds used for pipe reached its highest level yet. The market shares for lawn/garden and for film/sheet held steady. The market share for lumber and railroad ties fell back compared to 2008, but was above the 7% of HDPE PCR use seen in 2007. The market share for automotive uses fell down to 5%. The market share for non-food bottles rose to 45% compared to 43% in both 2007 and 2008, although the pounds used for bottles went down in 2009 vs. 2008.

The yield of post consumer bottles to clean product ranged, depending on raw material and end use, from 72% to 89%. The average yield of bales to clean pellets in 2009 was 77.9%, comparing to 80.4% in 2008 and 84.3% in 2007. The increased presence of contamination in bales of HDPE bottles presented an ongoing challenge to reclaimers.

Additional Information

ACC offers resources to communities that wish to increase postconsumer plastic collection. Details on the highly successful All Plastic Bottle collection programs can be found at www.allplasticbottles.org. A database for the recycling of clean plastic film and grocery/retail bags is provided at www.plasticbagrecycling.org. ACC maintains a database of buyers and sellers of recycled plastic and other valuable information, including school programs and a list of recycled plastic products, at the general website www.americanchemistry.com/s_plastics/index.asp or by accessing the pull down menu titled 'environment' near the top of the page.

APR offers resources at its website, www.plasticsrecycling.org, including lists of buyers and sellers of recycled plastic, market development workshop information, the Kids Zone for educating and involving children in plastics recycling, and technical resource documents to aid in designing recyclable packaging. APR announces at its website upcoming webinars and workshops to help local recycling coordinators achieve better plastic recycling results.

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

Legal Notice

The 2009 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. ***ACC and APR do 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 do ACC and APR assume any liability of any kind whatsoever resulting from the use of or reliance upon any information, conclusions, or options contained herein.

The Association of Postconsumer Plastic Recyclers and the Plastics Division of the American Chemistry Council produced this report.

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