



National Association for PET Container Resources
PO Box 1327
Sonoma, California 95476
707.996.4207
www.napcor.com



**The Association of Postconsumer
Plastic Recyclers**

www.plasticsrecycling.org



**2008 REPORT ON POSTCONSUMER
PET CONTAINER RECYCLING ACTIVITY**

FINAL REPORT

INTRODUCTION

2008 marks the fourteenth year that NAPCOR has issued this report in its current format.¹ 2008 also marks the fourth year that the National Association for PET Container Resources (NAPCOR) and The Association of Postconsumer Plastic Recyclers (APR) have worked together to produce this report. Without the APR's support and the cooperation of its members, this report would not be possible. As such, it is intended to provide the reader with a detailed overview of the recycling of injection stretch blow molded PET containers in the United States during 2008. Information contained in this report was obtained through surveys conducted by HDR Inc. and Moore Recycling Associates Inc, combined with data generated internally by the NAPCOR, the PET Resin Association (PETRA), and the International Bottled Water Association (IBWA). In order to present as accurate a picture of these activities as possible, additional data and information were obtained through discussions with individual collectors, intermediate processors, reclaimers, converters, brokers, exporters, resin producers, bottle manufacturers, public recycling officials, consultants and key industry members. Reports for previous years and additional information on PET bottle recycling can be found at www.napcor.com.

PET BOTTLES AVAILABLE FOR COLLECTION

The growth in PET bottles and jars sold in the U.S. hit the wall and reversed itself in 2008. A perfect storm of significant light-weighting by major brands, the bad economy, and continued consumer environmental and dietary concerns, combined to end what had been almost thirty years of non-stop growth. Negative growth was seen in all major categories, except tea and vitamin water, contributing to a net loss of pounds of PET used in bottles of 317 MMlbs from 2007. This reflects a negative growth rate of 5.6% year-on-year. Despite the bad news, there was strong continued interest on the part of brand owners in converting food and non-food containers to PET from other materials. This should contribute to industry growth once the economy recovers and consumer spending increases.

NAPCOR determined that the total number of pounds of PET bottles and jars available in the United States for recycling in 2008 was 5.366 billion. This number reflects the total amount of PET bottle resin used by U.S. bottle manufacturers from U.S., foreign, and recycled sources, less scrap generated and not reused, exported bottles and pre-forms, and bottles less than eight ounces in size. This number is used in this report as the denominator in determining both the recycling and utilization rates.

¹ It has become cumbersome to continue to provide all of the historical data so this report will generally show data for only the last 10 years. Those who are interested in previous reports can access them at www.napcor.com.

POSTCONSUMER PET BOTTLE PURCHASES

The amount of postconsumer PET bottles collected for recycling and sold in the U.S. was 1.4515 billion pounds in 2008. The breakdown of categories in millions of pounds (MMlbs) is as follows:

615.5	- Purchased by U.S. Reclaimers
793.6	- Purchased by Export Markets
42.4	- PET bottle component of mixed bales exported
1,451.5	- Total Amount of Postconsumer Bottles (MMlbs)

For the fifth straight year, the post-consumer PET bottle recycling rate has increased. As in 2007, the increase can be partially attributed to a number of factors, including:

- A decrease in the denominator;
- A 37 MMlb increase in California collections;
- Over 30 new collection programs, 8 major program expansions, and 14 program expansions / conversions to single stream affecting over 1.1 million households;
- Additional new commercial recovery efforts.

However, U.S. reclaimers were not able to take advantage of any of this additional volume with purchases by domestic buyers sinking to 42.4% of the total collected. Canadian buyers purchased a virtually unchanged 70 MMlbs, while the remaining material was purchased mostly by Chinese traders, either as PET bottle bales, 723.6 MMlbs, or as a component of mixed plastic bales, 42.4 MMlbs.

U.S. reclaimers continued to supplement their domestic purchases by importing 98 MMlbs of postconsumer bottles, predominantly from Canada, Mexico, South and Central America. U.S. reclaimers also reported buying 14.9 MMlbs of alternative feedstock, including pre-consumer bottles, postconsumer strapping, and other unprocessed industrial scrap. All total, U.S. reclaimers purchased a total of 728.4 MMlbs of scrap material, a drop of almost 45 MMlbs from 2007.

In 2008, PET bottles were again exported as part of mixed plastic bottle bale and mixed rigid plastic packaging bale shipments. PET bottles made up different, but increasing, fractions of mixed bottle or mixed rigid bales; totals are calculated accordingly and contributed to about 42.4 MMlbs of PET bottles sold in these forms. The small amount of dirty PET flake used directly in applications without being cleaned was included again this year in the U.S. reclaimer purchases total.

POSTCONSUMER BOTTLES <i>Gross Weight Purchases (MMlbs)</i>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>
A. Purchased by U.S. Reclaimers	656	588	599	600	522	520	631	681	619	641	615
B. Purchased by Exporters *	89	183	170	234	275	321	372	489	653	755	836
C. Total U.S. Material Recycled (A+B)	745	771	769	834	797	841	1,003	1,170	1,272	1,396	1,451
D. Postconsumer Bottle Imports	101	60	69	70	57	62	106	109	97	100	98
E. Total Postconsumer Bottles used by U.S. Reclaimers (A+D)	757	648	668	670	579	582	737	790	716	741	713

* As of 2005, this number includes the amount of PET sold in mixed bottle bale shipments.

2008 GROSS RECYCLING RATE

Total U.S. Bottles Collected and Sold for Recycling = 1,451 MMlbs. = **27%**

Total U.S. Bottles Available for Recycling = 5,366 MMlbs.

Year	Total U.S. Bottles Collected (MMlbs.)	Bottles on U.S. Shelves (MMlbs.)	Gross Recycling Rate
1996	697	2,198	31.7%
1997	691	2,551	27.1%
1998	745	3,006	24.8%
1999	771	3,250	23.7%
2000	769	3,445	22.3%
2001	834	3,768	22.1%
2002	797	4,007	19.9%
2003	841	4,292	19.6%
2004	1,003	4,637	21.6%
2005	1,170	5,075	23.1%
2006	1,272	5,424	23.5%
2007	1,396	5,683	24.6%
2008	1,451	5,366	27.0%

PET BOTTLE BALE MARKETS

The higher bale prices seen in late 2007 for East Coast curbside material held fairly steady through 2008 until the market cratered in the fourth quarter. Until that time, the two-tiered price structure seen in 2007, where export buyers paid \$.02 to .03 more per pound than domestic reclaimers, remained in play, a result of adequate supply for both market segments. However, when the Chinese traders pulled out of the East Coast market and curtailed buying from the West Coast, there was nothing to catch the floor and prices plummeted, both in the U.S. and Canada, with bales selling at prices not seen since December 2001. By year’s end, some of the more aggressive domestic buyers were taking advantage of the situation to build inexpensive inventory. The swoon on the West Coast was shorter-lived and except for a period of about two weeks, prices stayed in the double digits for the entire year, hitting a June high of \$.30 per pound, freight aboard ship (FAS).

As always, good quality, dirty granulate continued to be in high demand and short supply, and commanded as much as a \$.10 per pound premium over bales.

EAST COAST, NON-DEPOSIT PET BOTTLE BALE PRICES

(Picked Up, Truckload Quantities, Seller’s Dock)

2008	LOW	HIGH
JANUARY	\$.18/LB	\$.24/LB
FEBRUARY	.19	.24
MARCH	.18	.24
APRIL	.17	.24
MAY	.16	.24
JUNE	.16	.24
JULY	.16	.24
AUGUST	.16	.23
SEPTEMBER	.15	.20
OCTOBER	.12	.19
NOVEMBER	.02	.12
DECEMBER	.02	.08

RECLAMATION CAPACITY

At the end of 2007, there were 14 reclamation plants producing clean flake from postconsumer bottles or dirty flake in the United States, with a total capacity of 842 MMlbs gross weight in. By the end of 2008, there were 13 fully operational plants with a total capacity of 847 MMlbs, virtually no change from 2007. In addition, there were six semi-operational plants, processing material sporadically by the end of the year with a

total capacity of 182 MMlbs. These plants were either in start-up mode or operating intermittently as processing problems were being identified and remedied. Of the 847 MMlbs capacity, about two-thirds was vertically integrated, producing material for internal company consumption in the manufacture of carpet, strapping, bottles or sheet; the remainder was made available to the merchant market. Seven U.S. reclaimers now have the ability to manufacture Food and Drug Administration (FDA) Letter of Non Objection (LNO) recycled PET (RPET) suitable for direct contact in food and beverage bottles or thermoformed packaging and do not have to send their RPET flake or pellet elsewhere for further processing.

The reclamation plant utilization rate for U.S. reclaimers, based on the use of all feedstock, was around 80% for the year. This takes into account a portion of the semi-operational plant capacity.

Recycled PET (RPET) Production Summary (MMlbs.)	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
A. RPET Produced by U.S. Reclaimers from U.S. Bottles	457	476	476	401	412	505	558	523	496	477
B. RPET Produced by U.S. Reclaimers from Imported Bottles	47	51	44	46	49	83	85	69	82	87
C. Total RPET Production U.S. Reclaimers (A+B)	504	527	520	447	461	588	643	592	578	564
D. Clean Flake Equivalent from U.S. Bottles Exported	154	143	184	212	255	298	401	529	583	647
E. Total Clean Flake from U.S. Bottles (A+D)	611	619	660	613	667	803	959	1,052	1,079	1,124

PET UTILIZATION RATE



The utilization rate measures the sum of clean flake produced by U.S. reclaimers, plus the equivalent amount of clean flake expected to be produced from exported bottles, taken as portion of total U.S. bottles available for recycling. Reclaimers reported yield losses ranging from 16.2% for deposit to 22.4% for curbside. This seems to contradict the reports of higher contamination levels that reclaimers have been experiencing, mostly in curbside bales. Upon closer examination, the static yield loss figures reflect higher sales, or possibly more complete reporting, of reclamation byproducts such as fines and contaminated “kickout” from flake sorters. In addition, also as a result of more complete reporting this year, it was possible to calculate yield losses for each collection category and apply them accordingly, while in previous years the curbside yield loss was applied to all exports. As a result, the clean flake equivalent for the 836 MMlbs of bottles exported was determined to be 647 MMlbs resulting in a utilization rate of 20.9%.

Year	Clean Flake Equivalent <i>(MMlbs)</i>	Bottles on U.S. Shelves <i>(MMlbs)</i>	Utilization Rates
1996	572	2,198	26.0%
1997	578	2,551	22.7%
1998	588	3,006	19.6%
1999	611	3,250	18.8%
2000	619	3,445	18.0%
2001	660	3,768	17.5%
2002	613	4,007	15.3%
2003	667	4,292	15.5%
2004	803	4,637	17.3%
2005	959	5,075	18.9%
2006	1,052	5,424	19.4%
2007	1,079	5,683	19.0%
2008	1,124	5,366	20.9%

2008 RPET MARKET

The use of RPET in the primary conversion categories totaled 884 MMlbs for 2008. In addition, U.S. reclaimers sold 31 MMlbs to secondary markets, including exporters, for a total of 915 MMlbs of RPET end use consumption—making 2008 RPET end use the highest ever. U.S. and Canadian reclaimers supplied about 705 MMlbs from all sources of feedstock. The remaining 210 MMlbs was imported from reclaimers all over the world, including France, Italy, India, China, Mexico, Brazil, Peru and other Central and South American countries.

Despite the lower RPET usage in the carpet (Fiber), strapping and automotive (Compounds) industries, which was reflective of the downturn experienced in the third and fourth quarters, demand from all other applications remained strong. PET sheet buyers were particularly aggressive, posting a 20% increase in purchases over 2007. While there was a slight increase in RPET use for food and beverage applications, there was a corresponding decrease in use for non-food bottles, leaving the total use in bottles static at 196 MMlbs.

The common driver in all categories was increased brand owner demand for postconsumer content with buyers often requesting a pedigree: proof of postconsumer origination, and in some cases paying more than virgin resin prices to access this material.

U.S. and Canadian reclaimers continued to take advantage of aggressive Chinese buyers and sold about 25 MMlbs of off-spec material and byproducts, with an additional 6 MMlbs sold into unconventional market applications.

RPET Product Categories
RPET used (MMlbs)

Product Category	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Fiber	417	452	435	344	296	479	463	422	383	391
Sheet & Film	68	65	37	18	32	58	71	74	128	153
Strapping	80	101	82	83	77	116	131	132	144	137
Engineered Resin	26	27	24	10	10	12	8	9	11	7
Food & Beverage Bottles	68	54	77	86	106	126	115	139	136	141
Non-Food Bottles	50	40	44	43	24	63	63	49	60	55
Other	9	5	2	4	7	24	13	30	38	31
TOTAL U.S. CONVERTER CONSUMPTION	718	744	701	588	552	878	864	855	900	915

2008 YEAR END SUMMARY

2008 was a year like no other in many ways for the PET packaging and recycling industry. The growth in the PET bottle markets that the industry had taken for granted for almost thirty years flattened and then reversed itself, while PET thermoformed packaging saw continued strong growth in excess of 10%. Despite weak demand, a run-up in crude oil prices kept VPET and RPET prices high until the bottom fell out of the market late in the third quarter. During this period, it was not uncommon for pricing of food grade RPET (LNO) pellets to exceed VPET. Even when the market faltered in the fourth quarter, the demand for clear packaging grades of RPET from bottle and sheet converters was strong, remaining virtually sold-out throughout the year.

The overall reduction in RPET production seen in 2008 occurred on the vertically integrated side of the business, where strapping and carpet were severely affected by the poor economic conditions. So, while the volume of postconsumer bottles collected went up despite a decrease in volumes out in the marketplace – bringing the recycling rate up to a level not seen since 1997 – fewer postconsumer bottles were purchased and used by U.S. Reclaimers. Export markets, including Canada, accounted for 57.6% of postconsumer bottles purchased in the US.

The bigger news is what didn't happen in 2008: no significant new investments in reclamation capacity. Several smaller plants were in and out of production, and two new plants were under construction at year's end, but none of this prevented a collapse in the bale market during the last two months of the year when Chinese exporters pulled out of the East Coast market. Combined with the reduced demand from the carpet and strapping segments, there were simply too many bales and not enough U.S. reclamation capacity. In many ways this is perplexing since the last four years have arguably been very profitable for U.S. and Canadian reclaimers and market demand for postconsumer PET, primed by environmental and sustainability issues, has never been higher. Yet as the year closed, indications were that existing reclaimers were investing capital dollars in improvements that will allow the more efficient production of food grade RPET, not in additional reclamation capacity. While this will surely lead to more cost-effective production and pricing of food grade RPET, it will not address the growing overall demand imbalance.

If there is any reasonable expectation of meeting the increased demand from the packaging sector, not to mention that of fiber, strapping and compound applications, substantial investment in state-of-the-art reclamation capacity will be necessary. The two reasons generally heard for this lack of investment to date are:

1. Market messages are confusing, as is the business model;
2. U.S. Reclaimers can't compete with Chinese buyers for bottle bales.

When this reticence to invest under today's market conditions is combined with the current and projected demand for RPET, it's apparent that significantly more bottle collection is needed, not simply to meet demand, but to spur and justify the needed reclamation investments. Without a sizeable expansion in reclamation capacity and bottle supply, concerns about the industry's demise through the current export/domestic market dynamic may be self-fulfilling.