MOORE
RECYCLING ASSOCIATES INC.
Recycling Implementation Specialists

2010 National Postconsumer Plastic Bag & Film Recycling Report

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

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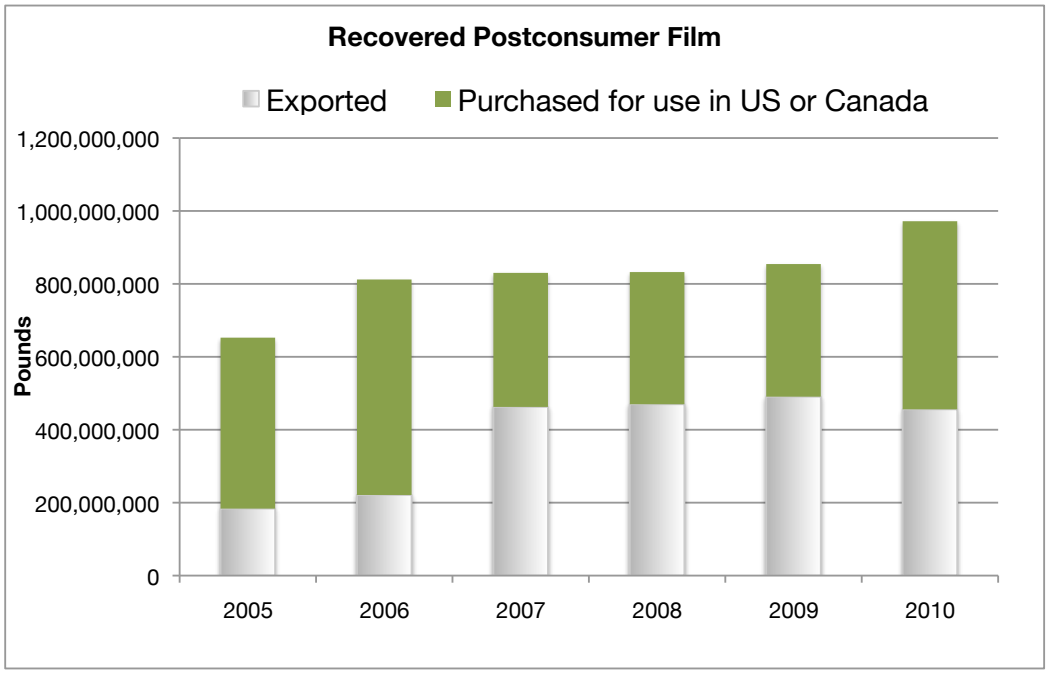
Introduction

The 2010 National Postconsumer[1] Plastic Bag and Film Recycling Report is the sixth annual report on pounds of plastic bags and film[2] recovered in the United States for recycling. Research for this report was conducted by Moore Recycling Associates Inc. for the Plastics Division of the American Chemistry Council (ACC).

Executive Summary

Plastic bag and film recovery has increased nearly 50% since 2005. Recovery of postconsumer film (which includes plastic bags and product wrap) grew to an estimated 971.8 million pounds in 2010.

In order to determine an accurate estimate of pounds of bags and film recovered in 2010, both the domestic and export postconsumer film markets were surveyed. The information for this



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

[2] Generally in this report plastic bags and film will be referred to as "film." Film is thin, flexible sheets of plastic. The majority of plastic films are made from polyethylene resin.

report is based on recovery data from twenty U.S. and three Canadian processors of postconsumer film and 41 companies that export postconsumer film.

Since 2006, more than half of film recovered in the United States has gone to overseas markets; however, in 2010 that trend reversed. In 2010, U.S. and Canadian processors consumed approximately 53 percent of U.S.-recovered postconsumer film and bag material. The export market consumed the remaining 47 percent. Composite lumber manufacturers continue to lead the domestic market, but there was continued growth in the amount of material going into domestic non-lumber end-use markets such as film and sheet. Scrap value for postconsumer film was higher on average in 2010 compared to 2009—primarily for the higher grades of film, such as clean, clear film and retail collected bags and film.

The total amount of postconsumer film collected for recycling in 2010 increased 14 percent over 2009. Historically Commercial Film has led the increase in film recovery, but in 2010 the amount of Commercial Film recovered decreased 8 percent compared to 2009. Recovery levels increased in all other large categories of film, including retail collected bags and film (Mixed Film), Curbside Film, and Agricultural Film. The amount of bags recovered in 2010 increased 27 percent over the previous year.

Methodology

Data on recovered postconsumer plastic bags and film is collected alongside data on plastic bottles and non-bottle rigid plastics during the Postconsumer Plastic Recycling Survey. Aside from combining film data collection with the plastic bottles and non-bottle rigid plastics data collection in 2007, the methodology has not changed since the first report. To ensure the most accurate information:

- Moore Recycling's markets database is continually updated to include current exporters and reclaimers of plastic scrap.
- A secure, online survey is distributed by email and followed up appropriately (email and/or phone) to collect the data.
- The data is vetted through follow up calls, speaking to other industry contacts and reviewing other sources of recycling industry information.

Markets Database

Moore Recycling continually updates an in-house database of plastic exporters, processors, reclaimers and key brokers. Through work with ACC, the Association of Postconsumer Plastics Recyclers (APR), the Plastic Recycling Corporation of California (PRCC) and the National Association of PET Container Resources (NAPCOR), and web sites PlasticsMarkets.org and PlasticBagRecycling.org, Moore Recycling Associates regularly receives requests from new contacts for material and markets. Contacts are also identified through published market

databases and conversations with suppliers, such as material recovery facilities (MRFs), and key reclaimers.

Data Collection & Analysis

Moore Recycling uses a web-based, custom-designed survey system to gather data. Every year Moore Recycling explores ways to improve the quality and timeliness of the survey. For the 2010 survey, Moore Recycling streamlined the questions viewed by responders. For example, when asked about material purchases—bottles, mixed and non-bottle material, film—if the responder only purchased bottles, they would only see questions about bottles. Efforts like this help elicit a better response rate by reducing the size of the survey for each responder to only include the areas pertinent to their particular operations. An email with a unique link and message is sent to each contact.

After an adequate amount of response time has passed, Moore Recycling staff send follow-up emails and make telephone calls to retrieve data. This follow up process can take weeks or months depending on responses. To encourage participation Moore Recycling offers free advertising on PlasticsMarkets.org.

All suitable data is entered in the online survey tool directly by the company being surveyed or by Moore Recycling staff when the survey is completed over the phone, by email or fax. As it is received, Moore Recycling staff review the data for accuracy and place follow up calls as needed. After completion of the data collection step, Moore Recycling compiles the data and categorizes it based on the detail reported. The final data totals are reviewed, analyzed, and then reported with as much detail as possible without compromising confidentiality. Describing as clearly as possible how the data is collected and what is and is not included in the survey are ways of providing readers with the transparency needed to cross reference our results with other industry data.

Film Categories

The survey questions specify pounds acquired within the following categories:

Commercial Film = Clear, clean PE film including stretch wrap and poly bags

Mixed Film = Mixed color, clean PE film including grocery bags

Curbside Film = Mixed PE film generated at MRFs

Dirty Ag Film = From the ground—up to 50% contamination

Clean Ag Film = Dry and from uses that do not touch the ground up to 10% contamination

Recovered film enters the market in various categories, and typically includes a combination of baled HDPE, LDPE, and LLDPE resins. Stretch film, collected as Commercial Film and as a part of Mixed Film, represents a significant majority of the postconsumer film recovered, while Curbside collected bags represents a small amount. Plastic bags often are commingled with stretch film wrap for efficient collection at retail locations. Processors estimate bags make up 40 to 55 percent of the commingled bales purchased from retail programs; this material is also called Mixed Film.

Findings

In 2010, a minimum of 971.8 million pounds of film plastic was collected for recycling in the U.S. The breakdown between the amount of U.S.-sourced film consumed domestically and exported is as follows:

Pounds of U.S. Postconsumer Film Recovered

Year	Exported	Purchased for use in United States or Canada	Total
2010	455,984,000	515,823,000	971,807,000
2009	490,718,000	363,659,000	854,377,000
2008	469,968,000	362,426,000	832,394,000
2007	462,611,000	367,569,000	830,180,000
2006	221,082,000	590,928,000	812,010,000
2005	183,701,000	468,776,000	652,477,000

Approximately 53 percent of U.S.-sourced postconsumer film was reclaimed in the U.S. or Canada, and the remainder was exported, primarily to China for reprocessing into new products. 2010 was the first year since 2006 in which the majority of recovered film was consumed by U.S. or Canadian processors. The survey total was calculated with nine fewer exporter responses than were available in 2009. Some exporters reported that they did not handle plastic in 2010 and some were unwilling to provide data for 2010[3].

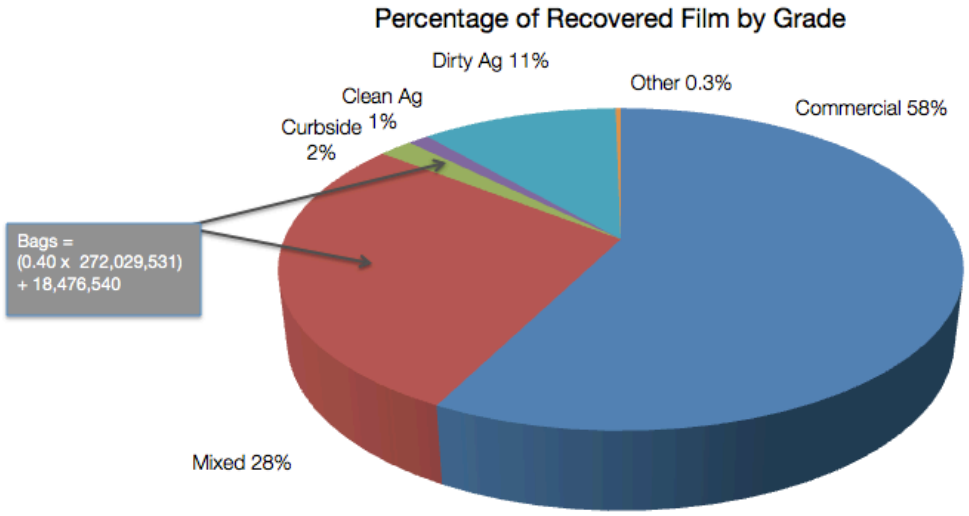
Grades of U.S. Film Recovered in 2010

The amount of bags recovered increased 27 percent over 2009 and made up approximately 13 percent of the total film and bag material recovered in 2010. Moore Recycling Associates determines the amount of bags recovered by adding the total Curbside Film recovered

[3] Moore Recycling Associates prioritizes data collection from exporters reported to move large volumes through U.S. ports as well as exporters identified by suppliers and other buyers as big players in the scrap marketplace.

to 40 percent of the Mixed Film. Processors provide the estimated percentage of bags in Mixed Film[4].

Both Mixed Film and Curbside Film totals increased in 2010. The volume of Curbside Film sold to the export market decreased, but the amount of film sold to domestic markets increased 32 percent.

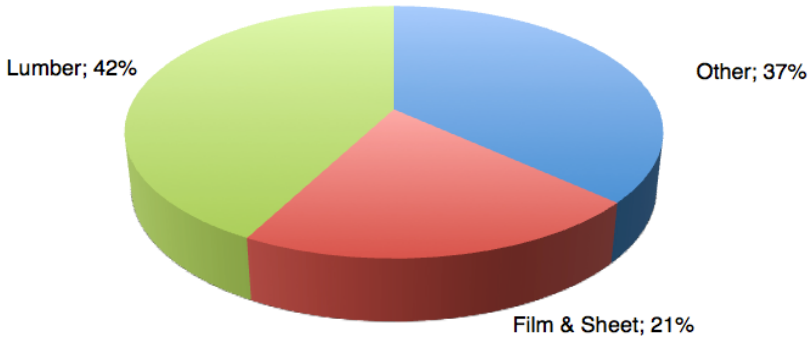


As the film recovery industry matures, film grades are becoming more clearly defined, but grades of material are still extremely inconsistent particularly with exporters. Because exporters reported fewer pounds of Commercial Film and more pounds of Mixed Film, a portion of the increase in bag recovery may be due to exporters providing more accurate recovery data. In previous years, exporters likely lumped retail collected film and bags into Commercial Film. The price spread between Commercial and Mixed Film grades increased on average by about five cents per pound in 2010 compared to 2009 for the export market. With a greater price spread, comes less tolerance for lower grades passing as Commercial Film. The price spread, and increased familiarity with the recycling survey, has likely led to better tracking and reporting.

Domestic purchasing increased for all categories of film (except “Other”). Agricultural Film increased the most—primarily due to the discovery of markets not previously included in the survey.

[4] If new bale sorts yield better data, Moore will adjust the percent used to calculate the amount of bags for the 2011 report. Some processors reported higher percentages of bags in Mixed Film bales in 2010.

U.S. Reclaimed End Uses 2010



The composite decking industry continues to be the lead U.S. market for recovered film. Film and sheet increased significantly, in 2010, primarily due to postconsumer recycled film resin used to manufacture agricultural film.

Nearly 37 percent of the recovered film reported went into Other miscellaneous applications, such as garden products, crates, buckets, pallets, and piping. Some of the material in the Other category may also have gone into film, sheet, or composite decking. Not all processors were able (or willing) to report their postconsumer resin end markets.[5]

Domestic Capacity & Utilization

U.S. processing capacity in 2010 was around 870 million pounds. More than 90% of this capacity is limited to fairly clean material, or material that does not have to be washed. Despite the jump in domestic processing over the last several years, domestic processing capability has not yet returned to the level seen in 2006, when the housing and construction markets were strong. One processing company went out of business in 2010, and several newly found companies were included in the 2010 survey for a total of 20 U.S. scrap film processors. The breakdown of U.S. processors by capacity is as follows:

Company Processing Size	Number of Companies
<10 million	10
10 - 30 million	5
>30 million	5

Utilization—even more challenging to estimate than capacity—is likely around 55 percent, which is up 10 percent from the previous year. The majority of responders said 2010 was a better year than 2009 in terms of productivity and sales.

[5] To protect the confidentiality of respondents, only end-uses in which there are more than 3 companies are listed.

2010 Film Marketplace

Scrap Value

Despite the struggling housing and construction markets, which largely impact demand for scrap film, prices were up in 2010 compared to 2009. Unfortunately, none of the scrap film commodities have reached the highs seen prior to the crash in 2008. Plastic scrap has the highest economic value per pound, of the five major scrap material categories (plastic, non-ferrous, steel, paper, and electronics) other than non-ferrous metals.

Plastic film is a valuable resource that should be captured. Price does not always drive recovery for postconsumer materials since consumer participation is through uncompensated, voluntary retail drop off and curbside collection programs. For postconsumer film, which is extremely dependent on commercial collection programs, strong scrap value plays a more significant role in driving recovery levels given the potential revenue for the commercial generators.

Collection

Most retailers that offer bag recycling to customers do so voluntarily. Many large chains have recovered film and bag material for over two decades—because they benefit from revenue from the scrap material, avoided disposal costs, and the goodwill they extend to their communities. The scrap value for Mixed Film has been strong enough that some retailers are willing to accept film and bag material from smaller, neighboring businesses in addition to their own customers. This Business-to-Business (B2B) model can be found in Chapel Hill, North Carolina where nearly 100 smaller businesses utilize the recovery efforts of larger retailers' such as Whole Foods and Harris Teeter to be able to cost effectively recycle their film. Large retailers have efficient reverse logistics. As their trucks return to distribution centers, they back haul scrap film, cardboard and other materials.Most small to medium generators do not have their own fleet of trucks and warehouses for storage. Recovery is less common in smaller generators.

Recovery methods include:

1. Co-collection with cardboard, most commonly by private haulers
2. Drop off at a recycling center
3. Utilizing existing reverse logistics
   - Business to Business: small neighboring businesses utilize larger retailer's recovery program
   - Back-haul after delivery of product by wholesale distributor (Some distributors provide recycling service in which after delivery of product to a small business, the distributor accepts scrap material as they return to their distribution centers)

Dry cleaners have increasing access to recycling because more wholesale distributors of dry cleaning products accept recovered film, which they backhaul and consolidate at their distribution centers.

More and more businesses are recovering their internally generated scrap film, and recyclers and haulers are more willing to handle film because they recognize the high value in the material—provided it is kept clean and dry. The challenge for film collection, like any light weight material, is consolidation of enough material to justify the shipping cost. Commingling film (residential or commercial) in a single stream program for processing at a MRF produces a heavily contaminated material stream (i.e., low value) and can create efficiency problems for other materials that rely on rotating screens to sort containers from fiber. Film often wraps around the screens, clogging equipment. Commingled film is costly to process—at the MRF and by reclaimers since it requires significantly more processing.

With space constraints and labor costs, efficient consolidation of clean material is the key. Smaller low-cost balers enable dense bales that are easy to handle, thus making recovery possible in a much greater number of business environments such as universities, malls, and car dealerships.

Quality

Quality standards are developing but have a long way to go. The number of grades in the marketplace is expanding and terminology is becoming more consistent. Efficient collection depends on the generator's ability to produce a decent commodity and the handler to consolidate and ship adequate loads.

Further up the chain, manufacturers play a role in designing products that are recyclable or do not create contamination problems within the recycling stream. Design for recycling guidelines are established for bottles, but not yet available for the film recycling industry. More brand companies are expressing interest and reaching out to recyclers to ensure their package is acceptable within the film and bag recycling stream. Through organizations such the Association of Postconsumer Plastic Recyclers and the American Chemistry Council, Design for Recyclability guidelines are likely to develop over the next year.

Conclusion

This 2010 Postconsumer Bag and Film Recycling Report shows a 14 percent increase in recovery over 2009. The increase for retail collected film and bags is likely due to years of education and support for recycling as more consumers take advantage of store collection programs and businesses discover the economic benefits of film recovery.

Historically states with retailers that have a strong commitment (through employee training and consumer education) to recycling have better recovery levels, according to large buyers of scrap film and bags who source material nationwide. Growth in recovery has been steady, particularly in retail environments with well-established programs.

It is also important to note large volumes of readily recyclable film are still being missed because the collection infrastructure is not yet comprehensive enough to handle the small to medium generators. With more haulers, wholesale distributors, and Business-to-Business programs accepting film, growth should continue.

Market development occurs as supplies increase—provided the quality is good. Better communication between brand companies and reclaimers will increase recyclability of product packaging. As brand companies realize the benefits of promoting their recyclable package, consumers will likely become more aware of the long list of recyclable film products beyond bags. Retailers will continue to play a critical role in recovery, but educational efforts will hopefully expand to brand owners with messages about recycling on their products and beyond, using a variety of message vehicles including social marketing.

Additional Information

This is the sixth year Moore Recycling Associates Inc. has conducted this survey and produced this report for the Plastics Division of the American Chemistry Council.

The Plastics Division of the American Chemistry Council provides resources to communities, businesses and consumers to assist them in increasing awareness and education of the recycling of plastic bags and film. Information can be found on the online web resource **www.PlasticBagRecycling.org**.

The 2010 National Postconsumer Plastic Bag and Film Report has been prepared to provide information to parties interested in the recycling of plastics, in particular film and bag materials. Facilities developing a recycling process and all entities involved in the chain of collection, processing, distribution, and sale of recycled products have an independent obligation to ascertain that their plans, actions, and practices meet all relevant laws and represent sound business practices for their particular operations. Facilities may vary their approach with respect to particular operations, products, or locations based on specific factual circumstances, the practicality and effectiveness of particular actions and economic and technological feasibilities.

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