



Illinois Carpet Recycling Working Group End Market Development and Best Practices Report February 2014

Introduction

The carpet recycling industry is a relatively new and dynamic industry with an abundance of exciting potential. Each year there is close to 4 billion pounds of spent carpet sent to landfills in the United States. Although this material is not toxic in any way, it is bulky and takes up a lot of space in landfills. Also, to a large degree, the materials in these carpets are petroleum based and quite valuable if recovered properly. As with other non-uniform materials, the key for successful recycling is the separation of each material from the others in a particular carpet. Better separation provides cleaner and more valuable materials, and this creates more opportunity for businesses to be successful.

New products made from recycled carpet

Since the mid 1990's, a variety of technologies have been used to process old carpet. Most of these technologies have been borrowed from other industries and adapted to carpet with mild success. Many involved with Carpet America Recovery Effort (CARE) and individual companies are working diligently to create that technological breakthrough that will lead the industry to the next level.

The 2012 CARE Annual Report released in spring 2013 provides detail on what products are being manufactured with raw materials from recycled carpet. The breakdown is as follows:

Engineered Resins	63%
Carpet Fiber	15%
Carpet Backing	12%
Cushion	9%
Other	1%

Clearly, the plastics and resins market is the leader in this area and has been since the industry was developed. Resin compounders have a bit more flexibility in handling the contamination by using additives in the resin extrusion process to reinstate the quality to a suitable level for part molding. As better technology is developed for processing, volume will likely increase in these existing markets, and new products and markets will emerge. CARE has been tracking specific products made from recycled products along with the companies who make them. That information can be reviewed at carpetrecovery.org/pdf/great_ideas/Product_Brochure.pdf

The full CARE 212 Annual Report can be downloaded at carpetrecovery.org/pdf/annual_report/2012_CARE-annual-rpt.pdf.

Illinois Carpet Recycling Barriers

The following barriers to end market development exist for carpet recycling in Illinois.

Lack of Outlets for Polyester Fibers

Far and away the biggest challenge for the carpet recycling industry is the dramatic rise in the waste stream of spent carpet made from polyester fibers, also known as PET. This, coupled with the lack of any significant market outlets for this material, has placed a huge financial burden on the collectors and processors in the industry. By most reports, the percentage of the waste carpet stream that is PET has grown from 5% to 35-40% in 5 short years. What was just a small problem in the past is now a critical financial barrier for most recyclers to achieve success. The increase in PET carpet manufacturing (and therefore spent PET carpet collection) really accelerated during the financial downturn in 2009. Consumers responded to a lower cost product and the residential carpet industry hurried to supply the new demand. Polyester, both virgin and recycled from water bottles, is much less costly than nylon. Since face fiber makes up the bulk of the cost of residential carpet, increasing PET capacity was the easiest way for the mills to fill the need for lower priced products and retain their marketshare.

CARE is now fully engaged with this issue, hiring a dedicated consultant in the summer of 2013 to work on new market development ideas. Currently, there is a small amount of PET recycled into fiber pad underlayment, but the volumes are relatively low. The key will be to find outlets that will be able to handle high volumes well into the future. Technically there are some possibilities already, but the key question will be - can these possible technologies produce a recycled PET that is competitive in the market with virgin PET resin and recycled bottle flake? If not, what type of subsidy will be needed to make it work financially? Recent trials with emerging technology indicate that subsidy will need to be in the range of 25-30 cents per pound.

Collection of pertinent information has begun. A good source comes from CARE at carpetrecovery.org/pdf/entrepreneur_meeting_2013/PETProject.pdf and carpetrecovery.org/pdf/news/RFP_PET_Project.pdf

Contamination Challenges and Solutions

One of the biggest problems facing carpet recycling in the Midwest region is rain. Wet carpet cannot be processed in most situations because most recycling systems are created to process dry materials. A large volume of wet material creates inefficiency in the process and results in a larger quantity of waste.

1. Construction and Demolition Facilities

Many C&D facilities have limited roof space to protect carpet and padding from the elements. In many cases, employees need to be trained to understand how important it is to keep the material dry. This varies widely by location.

Solution: Work with C&D operators to designate weather-proof storage areas and train employees on proper carpet recycling practices.

2. Residential Curbside Pickup

Carpet left on the curb is subject to the elements.

Solution: Require residential curbside programs to protect carpet and padding to secure dry materials.

Solution: Offer periodical collection locations for residents to bring spent carpet for recycling.

Solution: Work with retail stores to incorporate back of the house collection opportunities for residents looking to recycle their carpet.

Solution: The curbside initiative that CARE has begun in New Jersey should be monitored closely. Perhaps some of these ideas could be implemented in Illinois.

3. **Installers**

Installers are a direct source for carpet discards after removal. However due to the additional expense of landfilling, the bulk of the product and lack of convenient drop off locations, the installers don't always offer services to haul it away, or charge a disposal fee for the carpet. This can leave the disposal issue with the resident with a lack of information on benefits or options of carpet recycling.

Solution: Increasing conveniently located affordable drop-off options would motivate the installers to deliver clean, dry, bulk material. They could be educated on the types of material that is acceptable, in order to alleviate the cost of double hauling and ultimate disposal of undesirable material. (i.e. PET)

4. **Pre-sortation**

Presorting material by fiber type does not seem realistic for retailers and installers. The ID guns are costly (\$15-\$20,000) and therefore not attainable for most. This means that the undesirable PET carpet will likely be shipped more than once in the process.

Solution: Work with manufacturers to stamp the fiber type on carpet backing to lessen the burden on expensive identification guns, increase efficiencies and aid in the pre-sortation process.

Solution: Seek grant funds to supply the collection locations with guns. For example if the retailers had a gun they could sort the carpet into recycling and landfill roll-offs at point of receipt, again alleviating the cost of double hauling and directing undesirable material (i.e. PET) into landfill from the start.

Additional information regarding the Illinois Carpet Recycling Working Group (CRWG) can be found at swanainllinois.org/carpet.