

### Postconsumer PET Thermoformed Containers: Recyclable vs. Recycled

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Five years ago I was working Dordan's booth at the Walmart Sustainable Packaging Expo in Bentonville, Arkansas, when a packaging engineer from Burt's Bees walked by. "Thermoformed packaging!?" I exclaimed enthusiastically, only to be met with an ambivalent expression and the following remark, "We are getting out of thermoformed trays because thermoformed packaging isn't recyclable."

A lot has changed since then. The National Association for PET Container Resources (NAPCOR) is the trade association for the PET plastic packaging industry. NAPCOR reports that in 2013, PET thermoforms collected for recycling in the U.S. and Canada increased 25% over 2012, from 47.8 million pounds to 60 million.<sup>1</sup> In five years, PET thermoformed containers went from being largely landfilled to now being collected for recycling in the majority of American communities.<sup>2</sup> This tremendous development in post-consumer thermoform recycling served as the foundation for my 2013 "Recycling Report" published in *Plastics in Packaging* magazine.<sup>3</sup> In that article I described the industry-initiated timeline of events that facilitated the inclusion of thermoformed packaging in the recycling infrastructure. I stated the following in my conclusion:

*With the majority of American communities now accepting all non-bottle rigid containers for recycling and the technical barriers to PC PET thermoform recycling being resolved, the floodgates to PET thermoform are nearly ready to be opened.<sup>4</sup>*

So, have the floodgates opened? Are communities finding a market for post-consumer PET thermoformed packaging? It is one thing to accept material for recycling; it is quite another to actually recycle it. What follows is a discussion of how three different communities in America actually recycled post-consumer PET thermoform packaging into second-generation products and packaging. Through a discussion of the different education, collection, sortation, and reprocessing methods used, insight will be provided into which model proves best in class, allowing other communities to follow suit.

#### Background

In July 2011, The Society of the Plastics Industry (SPI) and NAPCOR released a request for proposals seeking submissions from recycling program operators that were interested in establishing a model program for collection and intermediate processing of PET thermoformed flake. SPI and NAPCOR expected grant recipients to address all necessary areas to implement a comprehensive and efficient program to recycle PET thermoforms including consumer education, outreach to non-residential sources of thermoforms, collection, intermediate

processing, segregation and bailing, and marketing of material.<sup>5</sup> The grant was available to any recycling program operators that could implement a program for private, county, municipal, or joint-venture facilities. Regional cooperative programs as well as state managed or directed programs were also included.<sup>6</sup> The primary grant in the amount of \$63,000 was awarded to Montgomery County (Maryland) Department of Environmental Protection's Division of Solid Waste Services. Secondary grants were awarded to the Pennsylvania Recycling Markets Center of Middletown, PA (\$25,000) and the Firstar Fiber, Inc. of Omaha, NE (\$10,000). Each recipient was selected for its unique demographics and market realities.

#### Grant Recipient Demographics

Montgomery County Division of Solid Waste Services provides waste management facilities, programs and services to a diverse customer base of 1.5 million people living and working in the county. This includes single-family homes, multi-family apartments and condominiums, commercial businesses and organizations, and governmental facilities. The County also facilitates away-from-home recycling opportunities such as local/regional events and festivals.<sup>7</sup> Montgomery County's goal upon receiving the grant was to develop an efficient urban/suburban model for PET thermoform recycling.

Based in Middletown (near Harrisburg), the Pennsylvania Recycling Markets Center (RMC) is a non-profit corporation providing waste management services for 165,000 residents of Elk and Lebanon Counties. Elk County has a population of 31,946 and offers public, private, and non-profit recycling collection operations including two curbside and six drop off programs sponsored by local government. The Lebanon County Recycling Program serves a population of 133,568 and, like Elk County, offers public, private, and non-profit recycling programs including seventeen curbside collection programs and eight drop off programs, all sponsored by local government.<sup>8</sup> RMC's goal upon receiving the grant was to develop a successful rural collection model for PET thermoform recycling.

Firstar Fiber, Inc. is a privately-owned recycler providing waste management services to Omaha and Lincoln metropolitan regions, central and northeastern communities of Nebraska and the Sioux City, Woodbury County, and western regions of Iowa. With its diverse customer base and collection methods, Firstar built a strong collaborative PET thermoform recycling program team that includes Omaha's recycling office, local college sport venues, and regional grocery representatives.<sup>9</sup> Firstar's goal upon receiving the grant was to implement a sustainable residential and away-from-home PET thermoform recycling model.

## Education and Consumer Outreach

Because of the different demographics among the grant recipients, different education and consumer outreach programs were initiated. Montgomery County employed the most extensive forms of education, investing in everything from advertisements in cable television, radio, movie theater previews, print publications, residential mailers and transit advertising. RMC invested in more moderate educational messaging, including residential mailers and radio advertisements. Firststar focused on targeted messaging, like video advertisements at sporting events (to facilitate away-from-home recycling) and “I’m Recyclable” stickers on grocery products.<sup>10</sup>

## Intermediate Processing

In my 2010 and 2013 Recycling Reports<sup>11</sup> I argued that issues of look-a-like contamination i.e., how you sort PET thermoformed containers from other rigid plastics destined for landfill, is one of the largest technical hurdles to the inclusion of PET thermoformed containers in the PET bottle recycling stream. After all, it is thought that the inclusion of PET thermoforms in PET bottles bales merits the highest post-consumer value for recyclers due to the excessive domestic and international demand for quality RPET. Each grant recipient, therefore, had to develop a method for sorting PET thermoforms from other look-a-likes such as PVC clamshells so as not to compromise the value of the PET bottle bales. While current market preferences indicate that the best way to sort PET thermoforms from other contaminating thermoforms is via automated sorting systems e.g., use of infrared technologies, each recipient developed the best process for sortation considering access to capital and existing sorting methods.

Montgomery County proved to be extremely effective via manual sorting: it processed clear PET thermoforms in *secondary sort* once all the fiber, metal, PET bottle and HDPE containers had been removed. The County trained sorters to visually identify PET thermoform packaging from other look-a-likes, relying on NAPCOR’s technical training and a video it developed internally. Grant funding was used to purchase two hoppers and to hire two individuals devoted to sorting PET thermoforms.<sup>12</sup>

RMC, with its focus on rural recycling programs, relied on source separation at drop off locations as the primary processing method for PET thermoform recycling. Those thermoforms not readily distinguishable as PET were put aside for further analysis via portable plastic resin analyzing equipment procured by RMC through grant funding. RMC also acquired durable storage containers that could be easily broken down when not used. Grant funds were also used for bulk mailing of education material and radio advertisements.<sup>13</sup>

Firststar processed curbside collected thermoforms via manual sorting into mixed plastic loads. The process to recover PET bottles and thermoforms was neither manual nor strictly mechanical insofar as requiring optical sorters. Instead, both items were left on a conveyor that fed the container sort line. The items would then fall off the end along with aluminum cans which were removed with eddy current. Firststar sorters removed only plastics #2-7, letting PET stay on the line. Sorters then

visually identified PET thermoforms on the line via NAPCOR technical training. Grant funding was used to situate participating colleges with recycling containers and the aforementioned targeted educational media.<sup>14</sup>

## The Results

In Montgomery County, the total PET thermoforms shipped during the grant period was 258.67 tons vs. the 40.14 tons shipped six months before the grant. For RMC, the PET thermoforms collected were mixed with bottles, with 10% of each bale by weight estimated to be PET thermoforms. Mixed PET bottle/thermoform bales totaled 27.4 Tons, 2.74 Tons being PET thermoforms. And at Firststar, a study performed on the PET sorted identified that PET thermoforms represented 9% of the total PET processed. The company estimates that thermoforms were approaching 1% of PET bales, though no definitive figures exist for total PET bottle and/or thermoform tons shipped/sold. Firststar suggested that allowable levels of thermoforms could be 5-10% by weight of PET bottle/thermoform bales and that only a manual sort could maintain low capital costs. Relying on sort crews further provides responsiveness to match the developing supply chain i.e., scale up or down thermoforms collected to match intermediate PET processors’ tolerance. It was determined that end market value related to combining thermoforms with bottles would inform material handling procedures at the MRF level. Similarly, the market would determine levels of tolerance.

## Conclusion

There is no one-size-fits all when it comes to recycling post-consumer PET thermoforms. These model programs demonstrate the unique character of each community’s waste management systems and how this variability informs the type of sorting methods required to find a home for post-consumer PET thermoform containers. NAPCOR urges recyclers/MRFs looking to collect PET thermoforms to talk to buyers about the available markets because each will have its own specifications for procurement. It is also recommended to sort PET using best practice guidelines to reduce look-alikes. Several PET reclaimers in the US and Canada now include specified percentages of PET thermoforms allowable in their PET bottle bales as part of their bale specifications, demonstrating the continuing development of this new market.<sup>20</sup>

## Looking Ahead

We have come a long way in the last five years. From landfilling PET thermoforms to collecting to actually recycling, post-consumer PET thermoforms are now a sustainable medium for protecting and selling product at retail. Due to the efforts of PET and recycling stakeholders up and down the supply chain, I can now exclaim with pride, “Recyclable and recycled thermoformed packaging!” at the next Walmart Sustainable Packaging Expo.

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## References

1 NAPCOR & the Association of Postconsumer Plastic