SPI and NAPCOR Study on Increasing PET Thermoform Recycling through Education, Access and Collection Programs

Background

PET thermoformed packages are the fastest growing segment of the rigid plastic packaging market. These packages are defined as PET (resin identification code #1), other than bottles and jars, made from PET sheet of .008 inch thickness or greater. They include, but are not exclusively limited to, clamshells, cups, trays, boxes and lids.

The rapid growth of this package is primarily the result of market dynamics:

- Retailer use of thermoformed packaging for an increasing number of products packaged in-store, such as nuts, dried fruit, candy, spices, grains, etc., and
- Strong consumer acceptance of the package.

NAPCOR estimates that by 2015, more than 2 billion pounds of PET thermoforms will be introduced into the marketplace in the U.S. and Canada, making PET thermoformed packaging a significant contributor to the plastic recycling stream,

NAPCOR worked actively since 2009 to remove the obstacles that prevent the recycling of these packages on a large scale. This work is still underway, underpinned by an ongoing commitment from NAPCOR to better understand and work through potential issues at all stages of the recycling process: collection, sorting, processing and end markets. NAPCOR and SPI believe there's a critical mass of material necessary to justify collection and support of domestic markets, and are confident of continued end market development for this collected material.

Part 1. Pilot Overview

Working in collaboration, SPI: The Plastics Industry Trade Association (SPI) and the National Association for PET Container Resources (NAPCOR) seek to increase PET thermoform recycling through public education, expanded access to rigid recycling and collection programs.

To gather information needed to establish potential models for the collection and intermediate processing of PET thermoforms, SPI and NAPCOR created a grant program to explore sustainable PET thermoform recycling models that could be replicable in other markets.

The purpose of this paper is to summarize the program's background, goals, objectives and results. The piece discusses the successes, failures and the resulting lessons that can be duplicated or averted in future projects.

In July 2011, SPI and NAPCOR released a request for proposals (RFP) seeking submissions from recycling program operators that were interested in establishing a model program for the collection and intermediate processing of PET thermoformed packaging. SPI committed to providing a grant of up to $100,000, while NAPCOR agreed to provide the necessary technical assistance required by the program(s) selected. Additional funding contributions were provided by Placon, Plastic Ingenuity and Solo Cup.

Requests for Proposals

SPI/NAPCOR expected the grantee(s) to address all areas necessary to implement a comprehensive and efficient program to recycle PET thermoforms including:

- Consumer education
- Outreach to non-residential sources of thermoforms, i.e. stadiums, special events, etc.
- Collection
- Intermediate processing
- Segregation and baling
- Marketing of material

Since this is a new commodity for most programs, NAPCOR was to provide technical assistance in all of the above areas, particularly with respect to specifications and end use markets. The grantee was also expected to provide data on the volumes of

recyclables collected before program commencement, by material and periodically for up to two years thereafter.

The grant was open to any recycling program operator(s) that provides or contracts for the scope of services documented above and could affect the implementation of a program across all areas. This included private, county, municipal or joint-venture facilities; regional cooperative programs; and state-managed or directed programs.

Matching program funds were not strictly necessary, but commitment of appropriate staff time was anticipated and taken into consideration as part of the full analysis of how to best utilize and leverage the available SPI grant funds.

Proposals were judged on the respondents overall ability to implement a well-run program that would collect, sort and market PET thermoformed packages, with an emphasis on the potential amount of recovery, matching funds and resources.

RFP Review Process

SPI and NAPCOR received 13 proposals in response to the RFP, and subsequently visited seven sites.

The program was originally designed to fund one program, however, sufficient funding enabled SPI and NAPCOR to fund three very different proposals in an effort to learn more about the differences in geography, population, collection and sortation systems.

Awards

The primary grant in the amount of $63,000 was awarded to Montgomery County, Md., Department of Environmental Protection. Secondary grants were awarded to the Pennsylvania Recycling Markets Center, of Middletown, Pa., in the amount of $25,000; and the Firstar Fiber Inc., of Omaha, Neb., in the amount of $10,000.

Part II. Program Implementation

Primary Grantee. Montgomery County, Md., Department of Environmental Protection. Montgomery County is located in central Maryland, adjacent to Washington D.C. The county owns, manages and operates comprehensive recycling programs and facilities, including its award-winning 57,000-square-foot publicly owned and operated Recycling Center, serving more than 1.5 million county residents, employees and visitors.

Montgomery County's programs encompass single-family and multi-family residential, commercial, government and other away-from-home opportunities, including private and public school education, local and regional events and festivals. With a strong focus on community education and a multi-phased approach to collecting and marketing PET thermoforms, Montgomery County's program was expected to provide a solid urban / suburban model program, offering both an immediate and a long-term impact on the recycling of PET thermoforms.
http://www.montgomerycountymd.gov/recycling

Goal

To establish a collection system for PET thermoforms in Montgomery County, Maryland.

Budget

Montgomery County was awarded $63,000 in June 2012 (through April 2014)

Consumer Education

On June 28, 2012, Montgomery County Executive Ike Leggett kicked off an extensive consumer education campaign by holding a media event at the county's Recycling Center to announce the inclusion of PET thermoform packaging in the recycling stream, and to ask residents to recycle as much material as possible.

Elements of the consumer education program included:

- An educational postcard mailer to explain that PET thermoform packaging is a recyclable material. This educational material was mailed June 28, 2012, to more

than 211,000 single-family households for which the county provides weekly curbside recycling collection services

- News and information about adding PET thermoform packaging to the county's recycling stream was posted on the website (montgomerycountymd.gov/recycling) in June 2012
- The county issued a press release announcing the addition of PET thermoform packaging into the recycling stream in June 2012
- Cultivated opportunities for media coverage to focus attention and highlight the inclusion of PET thermoform packaging in the recycling stream and to encourage and motivate residents, multi-family properties, businesses and organizations to recycle as much material as possible, including multiple public affairs programming on English and Spanish language radio networks and stations; news articles in local newspapers; on-camera television interviews promoting recycling; county cable television programming (in both English and Spanish); and, in a locally broadcast morning television program
- A broad-based multi-media educational campaign was developed to increase awareness and notify residents about recycling PET thermoform packaging. Placement was completed in autumn 2012, and included advertisements on cable television, radio, movie theater previews, print publications, and use of transit advertising – king-size and taillight ads on Metro buses, Metro subway station platform dioramas, and interior bus cards in Montgomery County Ride On buses
- Existing educational materials were revised to reflect the addition of PET thermoform packaging into the recycling stream
- Wrote and posted information on PET thermoform package recycling through articles in multiple electronic newsletters (and in limited printed quantities) geared to the residential, multi-family and business communities, as well as to the volunteers that support county recycling efforts
- Used social media to post information on PET thermoform recycling in the county
- Continued a multi-media educational campaign to increase awareness about recycling PET thermoform packaging throughout 2013 and focused on PET

thermoform recycling in radio public affairs programming, as well as editorial content in local newspapers

- Provided information pertaining to recycling, highlighting the addition of PET thermoform packaging for recycling during numerous outreach events held during autumn 2013
- A new educational postcard was mailed to all single-family households in January 2014 as a reminder of everything that could be recycled at the curb, including (and depicting) PET thermoforms
- Distributed a new bilingual door-hanger in early 2014 specifically designed for use in lower recycling-performing residential areas and townhome communities which included and highlighted PET thermoform packaging, as well as everything else residents could recycle at the curb
- Provided information about recycling, including PET thermoform packaging, at all educational and outreach events conducted throughout the county, including the Montgomery County Agricultural Fair, business and multi-family recycling educational seminars, and community and civic group presentations. Depicted examples of PET thermoform material, along with all other materials that could be recycled in the county, in a new series of short educational videos on recycling.

Processing

PET thermoform packaging was added to Montgomery County's recycling collections process beginning in June 2012. The county began processing clear PET thermoform packaging in October 2011. The facility also collected a dedicated stream of black PET thermoform food packaging that came directly from regional school foodservice programs. This material was processed separately from consumer clear stream. Intermediate processing for curbside material included:

- Processed clear PET thermoform as part of a positive second sort, all fiber, metals, PET and HPDE containers having been removed from line
- Trained sorters to visually identify PET thermoform packaging for recycling

- Produced a video in English and Spanish for sorters and for visitors to the Recycling Center in 2013 showing how to differentiate PET thermoform packaging from other thermoform packaging
- Completed a four-season waste composition study in June 2013 that included PET thermoform as one of the classifications
- Completed the Recycling Center's Education Center (where about 7,000 visitors annually begin their tours) renovation for the processing system explanation display in spring 2013; revised product life cycle display column for plastics (as well as columns for other commodities); and, front wall display of materials recycled at facility were updated to include PET thermoform recycling and examples of PET thermoform packaging.

County officials continue to work in partnership with the Maryland Environmental Service to assure that PET thermoform material is bid competitively. In support of this, additional markets for PET thermoform packaging, both clear and non-clear/black material, continue to be sought.

Results

The grant was used to purchase two new three-cubic yard hoppers, and to support the hire of two individuals devoted to sorting PET thermoforms. The county considered purchasing auto-sorters, but determined that it would not be cost-effective as their equipment would need to be retrofitted. Thus, the county continues with a hand-sorting operation.

Tonnage, Revenue and Costs

- Total PET Thermoform Tonnage Shipped, Six Months Prior to the Grant and During the Grant Period: **298.90 Tons**
- Total PET Thermoform Tonnage Shipped, Six Months Prior to the Grant: **40.14 Tons**
- Total PET Thermoform Tonnage Shipped during the Grant: **258.76 Tons**

- Total Number of PET Thermoform Bales Shipped, Six Months Prior to the Grant and during the Grant Period: **374**
- Total Number of PET Thermoform Bales Shipped, Six Months Prior to the Grant: **52**
- Total Number of PET Thermoform Bales Shipped during the Grant: **322**
- Total Revenue from the Sale of PET Thermoform during the Grant Period: **$41,889.41**
- Total Labor and Equipment Costs for Processing PET Thermoform during the Grant Period: **~$136,215.31** ($3,356.00 for two additional hoppers to hold sorted PET thermoform and ~$132,859.31 for two additional sorters)

Secondary Grantee. Pennsylvania Recycling Markets Center, Inc. (RMC) The Pennsylvania Recycling Markets Center Inc. (RMC) is a non-profit 501c(3) corporation that works to develop and expand recycling markets in Pennsylvania. Their grant proposal specifically targeted drop-off programs for the 165,000 residents of Elk and Lebanon counties, supporting the RMC's focus on reverse supply chain dynamics, end market development, intermediate processing and modeling of rural PET thermoform collection. http://www.parmc.org/

RMC worked with the two programs below to perform the workscope tasks and did not collect and market the thermoforms.

- The Elk County (population - 31,946 in 2010 census) Recycling Office operates a staffed drop-off recycling and materials processing center. This program augments public, private and non-profit recycling collection operations in the county including two curbside and six drop-off programs sponsored by local governments. Types of collection methods include source separated and commingled materials.
- The Lebanon County Recycling Program, operated by the Greater Lebanon Refuse Authority (GLRA), serves a population of 133,568 (2010 census). This program augments public, non-profit and private recycling collection operations in the county including 17 curbside and eight drop-off programs sponsored by local governments. Types of collection methods include, but are not necessarily

limited to source separated, comingled and single stream. GLRA operates a source separated drop-off center located at its landfill facility at 1610 Russell Road just north of the city of Lebanon, the county's largest municipality. The grant program added PET thermoform collection to this staffed drop-off facility, and to some of its other drop-off locations. The following materials are accepted: aluminum and steel cans; clear, green and brown glass; newspaper; magazines; phone books, #1 PET and #2 HDPE plastic bottles; corrugated cardboard; and electronics. Tires and appliances are also accepted for a nominal fee.

Goal of Grant Program

To develop a model for successful post-consumer collection of PET thermoform in traditionally underserved, rural recycling populations.

Budget

The budget was $25,000. (Grant/reporting period – September 2012 through April 2014)

Consumer Education

RMC promoted the recycling program through a public education strategy that included the development of communications materials.

The organization developed a four-panel brochure containing hours of operation and information unique to the respective programs as well as information common to the project including PET thermoform facts and figures, Pennsylvania recycling markets and economic statistics, and brief profiles for NAPCOR, SPI and the RMC.

The RMC worked with NAPCOR staff on development of promotional materials and radio spot scripts, mainly to ensure accurate and consistent information pertaining to PET. Promotional pieces included informational sheets for Lebanon and Elk programs to announce the new PET thermoform project and to provide the public with information as to what materials were accepted and how to prepare them for recycling. The Lebanon County sheet was inserted in the annual GLRA Recycling Program newsletter, which was mailed to approximately 50,000 households and distributed by

staff at the GLRA drop-off site. Five hundred copies of the Elk County brochure were printed for handout to patrons at the Sept. 26, 2012, kick-off event and during subsequent recycling center days of operation**.** In March 2014, the RMC bulk mailed this brochure to 11,670 households in Elk County.

The RMC developed radio advertisements that ran in both Lebanon and Elk counties, informing consumers that they could recycle PET thermoforms at specified drop-off locations. They also produced media releases to include “backgrounder” information so newspaper copywriters and editors could produce informative articles about PET thermoform production and recycling and the project participants.

Separation and bailing: Source separated at drop-off

RMC officials visited Cougle’s Recycling Inc. (CRI) in May 2012 to view operations and determine interest in project participation with respect to providing processing capability or for the PET thermoforms collected by GLRA. The Pennsylvania team was able to evaluate and view recovery of different streams of PET thermoform plastic.

CRI is a privately owned firm with optical sortation capability for its recovered plastics stream(s) and multiple downstream vendors including plastic lumber manufacturers, intermediary resin manufacturers, fuel blenders and potential PET thermoformers.

Domestic market limitations were assessed with regard to colored PET thermoforms within the CRI logistical footprint. CRI verified that domestic markets could be guaranteed only for clear PET thermoforms. RMC was informed that domestic markets require label- and contamination-free materials.

Materials Collection

Thermoform materials collected by Elk County that were not readily visually distinguishable as PET— based on NAPCOR training and input—and did not have an identifying #1 resin code were put aside for further analysis. Elk County in particular was able to do this due to their small size and strong volunteer base. This was accomplished using portable plastic resin analyzing equipment procured by the RMC through the

Pennsylvania Department of Environmental Protection grant funding. RMC personnel sampled collected material to determine the percentage of clear PET and non-PET thermoforms.

RMC provided field training to Elk County and GLRA, based on a three-page “Tip Sheet” used to train personnel, incorporating some of the visual sort criteria developed by NAPCOR as previously mentioned. Several weeks prior to the training, program personnel collected unmarked thermoforms, and participants were asked to view each item to determine the resin type. RMC verified the resin type using a hand-held infrared plastics analyzer. Based on this verification, it was determined that using the field resin identifying methods, contamination could be kept at acceptable levels.

Storage Containers

The organizations sought to procure specialized storage containers for the PET thermoforms collected at the Elk County Recycling Center. Because the facility had limited storage space, the containers could be broken down and stored to save space prior to use. Elk County relied on donated, used Gaylord containers to store collected material prior to baling/shipping. The containers were sometimes in poor condition and did not have a long useful life. Elk County wanted a more durable storage container that could be easily broken down and stored when not in use. Trienda/Lexington Logistics manufactured a strong rigid plastic that met these requirements.

Results

The grant program provided post-consumer and pre-consumer collection of PET thermoforms from both drop-off and curbside collections.

No tonnage for PET thermoforms were collected, stored, processed or marketed prior to the agreement term.

On Sept. 26, 2012, Elk County Recycling commenced accepting PET thermoforms at its staffed recycling drop-off center located in St. Mary’s, Pa. The PET thermoforms collected were comingled with PET bottles and subsequently baled. Elk County estimated that 10 percent of each bale by weight was comprised of PET thermoforms. Loads of PET thermoform bales were shipped to the market vendor,

Evergreen of Clyde, Ohio, April 15, 2013, Sept. 16, 2013 and March 19, 2014. The reported combined weight of these loads was 26.7 tons. Based on these weight figures, between March 19, 2014 and April 3, 2014, an estimated additional .7 tons of PET material was collected. Therefore, an estimated 27.4 tons of PET material was collected during the agreement term, with 2.74 tons being comprised of PET thermoforms. Total revenues generated from the sale of the PET bales was $9,478.42

On Sept. 27, 2012, GLRA commenced accepting PET thermoforms at its staffed recycling drop-off center located adjacent to its landfill operation. In October 2013, GLRA delivered a full 30-yard roll-off container of PET thermoforms weighing .25 tons to market vendor Cougle's Recycling, of Hamburg, Pa. At the end of the agreement term, April 3, 2014, it was reported that the roll-off container was near full with an estimated weight of .25 tons and that a second load delivery to Cougle's Recycling was imminent. Therefore, it is estimated that .5 tons of PET thermoform was collected during the agreement term. No sales figures have been provided at this time.

RMC considered expanding the PET Thermoform Rural Recycling Project to other rural Pennsylvania, but did not due to grant contract term expiration date. Grant balances were used for the bulk mailing of educational brochures to 11,670 households in Elk County and additional radio advertisements for GLRA.

Secondary Grantees. Firstar Fiber Inc. Serving approximately 1 million residents in the Omaha and Lincoln metropolitan regions, central and northeastern communities of Nebraska; and the Sioux City, Woodbury County and western regions of Iowa, Firstar Fiber is a privately owned recycling operation with a diverse customer base and collection stream. Firstar has built a strong collaborative PET thermoform recycling program support team that includes the city of Omaha's recycling office, local collegiate sports venues and regional retail grocery representatives. Its PET thermoform collection efforts were focused on residential and away-from home programs, including sporting event education and collection at Creighton University and the University of Nebraska at Omaha. http://firststarrecycling.com/

Goal

Firstar's initial strategy was to target generators to source more thermoform plastics and to cement close relationships with end markets. They sought to determine how to best improve the current processing system to match the needs and demands of these two ends of the recycling spectrum.

Budget

Firstar Fiber was awarded $10,000 and commenced its grant in early 2012.

Consumer Education

The consumer education program was designed to enhance public awareness of the recyclability of PET thermoform packaging. Working with the city of Omaha's recycling office, Firstar used its existing social media network, video promotions, events and points of sale locations for outreach and education purposes.

Sporting Events

Firstar targeted collegian sporting events where fast food and beverages were served in clam shells and plastic containers. The University of Nebraska-Omaha and Creighton University worked with Firstar to produce promotional videos featuring their team mascots. In turn, Firstar Fiber helped the universities set up commingled recycling collection sites at their sporting events.

A 60-second video advertisement ran two to three times per game reminding fans to recycle their cups/containers at one of the recycling containers placed around the venue. (Unfortunately, the video is not available for viewing because the University of Nebraska switched promotional companies and cannot locate the video.) The video ran at 17 hockey games and 26 basketball games. The average attendance for hockey games was around 9,000 people compared to 2,000 for basketball games. The cost was $10,000.

College and high school booster clubs were asked to invite their mascots to pass out recycling information at area stores (e.g., grocery stores).

Points of Sale

Shoppers at points of sale such as a grocery produce and bakery departments where products in PET thermoform clam shells are sold/used were targeted with decals bearing the message, “I’m Recyclable.”

The effort consisted of placing bright yellow 2” x 2” point-of-sale decals next to products packaged in PET thermoform clam shells. At least 36 decals were placed throughout the store where PET packages were located.

The local Sierra Club and Green Omaha Coalition sent volunteers to help install the tags, and Omaha’s mayor spoke at a press conference at the store to generate interest in the recycling program. Decals remained at the shelves until they were either jostled off by customers or replaced with the store’s regular promotional stickers. At a return visit about three weeks later, Firstar noticed that a handful of decals remained in place. Hence, it is likely thousands of shoppers were exposed to the message while the tags were displayed.

Online Outreach

The city of Omaha, Firstar’s largest municipal customer, agreed to publicize its inclusion in the program through numerous efforts including a mention its newsletter, which reached almost 130,000 households and through its web page (www.wasteline.org).

Another 100,000 households serviced by private haulers in the metropolitan areas surrounding Omaha and Lincoln, and parts of western Iowa and central Nebraska, promoted Firstar’s website (www.firststarrecycling.com) in an effort to educate their customers about items that may be included in carts.

Firstar connected with its 13,000 customers who participated in RecycleBank in the Omaha and Lincoln markets through biweekly e-blasts and reminders. Firstar’s straight truck collection vehicle that serviced businesses in Omaha also depicted a clam shell thermoform being deposited into one of its recycling carts.

Residents Who Already Recycled

Residents who demonstrated an affinity to recycle by paying a premium for the service or who accepted recycling tips were also engaged in the program. Firstar sent

frequent e-mail announcements to its existing 16,000-plus curbside recycling service subscribers and Facebook followers discussing PET thermoform recycling.

Use of Large Collection Containers Such as Lidded Wheeled Carts

Firstar encouraged the city of Omaha, via its contracted hauler, to begin using larger containers such as lidded wheeled carts, believing that it would promote recycling of thermoform plastics. because:

- Many residents will throw away recyclables when the smaller 18-gallon bins overflow
- Small carts probably have a negative impact on the recovery of large bulky items such as thermoform PET (e.g., cake lids).

An indication of how the size of the container impacts capture rates was evident in a comparison of Omaha's sponsored use of bins versus Firstar Fibers' Lincoln and the suburban Omaha residents who received 65- or 96- gallon wheeled, lidded carts.

- Omaha's monthly average capture rate was 20 pounds compared to the subscription patron's 60 pounds to 70 pounds per month
- Work with the city of Omaha and its hauler to trial the use of a 35-gallon wheeled and lidded cart, and making a point to encourage everyone who switches to the cart to include thermoforms

All area programs (Recyclebank with about 10,000 households) around Omaha and Lincoln use carts. And while Firstar conducted separate tests or surveys, it appeared that more clam shells were retrieved from these homes. Firstar attributes this success to the ongoing e-mail campaign designed to educate customers about what's appropriate to dispose of these carts.

Intermediate Processing

Firstar established protocols to consistently achieve acceptable, marketable loads. The few thermoform plastics that were received were manually sorted into mixed plastics loads. Firstar proposed to continue manually sorting and using the quality control inspection process to maintain a relatively low cost sorting approach until the determination is made as to what would best meet current and future market demands.

The process to recover PET bottles and thermoforms was neither manual nor strictly mechanical in the sense of requiring new technology such as optical sorters. Rather, both were left on the conveyor feeding the container sort line so as to fall off the end along with aluminum cans, which were removed by eddy current. Firstar sorters were trained to remove only plastic resins #2 through #7 letting PET bottles and PET thermoforms stay on the line. Sorters used the visual guidance tools and training provided by NAPCOR to distinguish the PET thermoforms on the line.

The relatively low tech approach to sorting proved to be an effective way to capture PET thermoforms, but has a greater margin of error for “look alike,’ non-PET contamination which is not acceptable for all markets. A random study performed on the content of the recovered PET identified that PET thermoforms represented 9 percent of the total. No comparable study was done on Firstar’s #3 through #7 loads to determine how much, if any PET thermoforms escape recovery with the other PET stream. Since Firstar instructed workers to err on the side of caution to only recover PET thermoforms, chances are likely they were not all being recovered.

To facilitate the capture of thermoforms, either solely or in combination with bottles, Firstar would need to extend the length of the conveyor and add additional storage bunkers. Trial loads could be created with varying amounts of thermoform plastics commingled with the containers.

- It was suggested that the allowable levels of thermoforms may be 5 percent to 10 percent
- Only a manual sort system could simultaneously maintain maximum flexibility and low capital costs
- Relying on sort crews further provides quick responsiveness to match the evolutionary nature of a developing supply chain (i.e., scaling up or down the

inclusion of thermoforms to match intermediate PET processors' tolerance levels)

Firstar determined that the end market and the value – positive or negative – related to combining thermoforms with bottles, would drive whether handling procedures at material recovery facilities (MRFs) are changed. Similarly, the market would determine tolerance levels of all resin types when commingled with PET containers.

Firstar's approach neither adversely impacted pricing nor resulted in any quality complaints from end markets, which have included Placon and more recently, Phoenix Tech Industries.

- By visual observations alone, Firstar estimated that thermoforms were approaching 1 percent of PET bales. To determine whether there was market for manual vs. automated sorted materials, the value would have to be sufficiently great enough to justify at least a capital return of under two years and accompanying with efficient operating costs
- Firstar worked with Phoenix Technologies to recycle PET and so far they have had very little issue with the amount of PET thermoforms in bales - which was about 1 percent
- A recent study found a higher presence of thermoforms. Phoenix will continued to provide feedback to Firstar if thermoforms in bales, or more non-PET contamination related to the manual sorting of thermoforms in bales, is causing them any quality issues. As for expanding to add more thermoforms, Firstar continues to encourage suppliers whether commercial or home recyclers to include more thermoforms

Firstar doesn't expect processors including MRFs or intermediate processors to incorporate costs that will impact the value of recovered materials. If the markets determine that thermoforms significantly degrade the value of bottles to the point that there is no choice but to significantly deduct their price when included, and yet there are no outlets paying sufficient amounts to offset other separation approaches – manual or

mechanical – it will leave Firstar with few options other than to allow them to be pulled with the lowest value mixed plastics loads. An important caveat to this is that many MRFs currently employ autosort vs. manual sort for their PET, and thus can significantly reduce one of the key issues pertaining to PET thermoform recycling: non-PET "look alike" materials made from PVC, PS, PLA and other materials.

Results

Consumer Education

Based on recovery levels, it was difficult to quantify the effectiveness of the point of sale decal program. However, Firstar was pleased with the exposure and attention its decaled messages received. This unique approach and large chain venue (Hy-Vee) attracted television station coverage.

Large Collection Containers

Unfortunately, the large collection containers program met with resistance from the hauler and the cost of purchasing carts were insurmountable challenges, hence Omaha is still using small 18-gallon set out bins.

Recyclebank

All area programs (Recyclebank with about 10,000 households) around Omaha and Lincoln use carts. And while Firstar conducted separate tests or surveys, it appeared that more clam shells were retrieved from these homes. Firstar attributes this success to the ongoing e-mail campaign designed to educate customers about what's appropriate to dispose of these carts.

Collections

- **Tonnage, Revenue and Costs:** No definitive figures due to Firstar's approach to include thermoforms with bottles and because there was no baseline study at the onset of the effort.
- A lot of items and services were either donated or conducted at a low cost, thus there was no tracking. For example, Dart provided PET cups (at no charge) for the UNO fun run that Firstar participated in. About 1,500 people attended the event.
- Another example is the Zoo Halloween event in which Firstar handed out post cards with fabric made from PET. The material was donated by UNFI. About 2,000 people came through the line, however, most were under 10 years old and mostly interested in the candy rather than the fabric.
    - Other project expenses in proposal included
        - Recycling containers for the colleges' facilities $20k from NAPCOR/SPI, $5K Match from Firstar = $25k
        - Newspaper promotional ads $5 k from NAPCOR/SPI, $5k match = $10k
        - Website and constant contact announcements $2k Firstar
        - Stipends for college booster clubs to promote recycling $1k Firstar
        - Posters and self-talkers for area groceries and fast food restaurants $2k NAPCOR/SPI
        - Establishing sorting protocols (sort line staff and management support to create test loads of varying thermoform concentrations and establish close working relations with end markets & automated equipment manufacturers $25k NAPCOR/SPI $25k match Firstar = $50k
        - Extension of QC sort line and storage bunkers = $10k NAPCOR/SPI

Pilot Conclusion

Results of the pilot grant program confirm that dividing the funds among varied organizations proved valuable as it enabled SPI and NAPCOR to learn more about differences in geography, population, collection and sortation systems.

The primary grantee was Montgomery County, Md., Department of Environmental Protection, a publically owned facility. Secondary grantees: Pennsylvania Recycling Markets Center, Inc. (RMC), a non-profit 501c(3) corporation in Pennsylvania; and Firstar Fiber Inc., a privately owned recycling operation in serving the Omaha and Lincoln metropolitan regions, central and northeastern communities of Nebraska; and the Sioux City, Woodbury County and western regions of Iowa.

Each of the grantees implemented public relations and media campaigns to educate the public and customers about the acceptability of PET thermoforms for recycling.

Montgomery County, which continues to collect PET thermoforms, was widely successful shipping 298.90 tons of PET Thermoforms during the grant reporting period (June 2012 through April 2014) compared to 40.14 tons in the six months prior to the grant.

Montgomery County used the grant funding ($63,000) to purchase two new three-cubic yard hoppers, and to support the hire of two individuals devoted to sorting PET thermoforms. The county considered purchasing auto-sorters, but determined that it would not be cost-effective as their equipment would need to be retrofitted. Thus, the county continues with a hand-sorting operation.

Limited grant funding precluded the **Pennsylvania Recycling Markets Center, Inc. (RMC)** from expanding the PET Thermoform Rural Recycling Project to other rural Pennsylvania communities. While RMC has concluded its involvement in the PET thermoforms pilot project ($25,000 grant), Elk County and Greater Lebanon Refuse Authority (GRLA) deemed the pilot program successful and will continue to collect and market PET thermoforms provided markets are still in place. During the pilot (Sept. 26, 2012- April 3, 2014) Elk County collected an estimated 2.74 tons during the grant period. GLRA collected an estimated .5 tons. (No tonnage for PET thermoforms were collected, stored, processed or marketed prior to the agreement term.)

Firstar Fiber Inc. ($10,000) was unable to provide definitive figures on collection/shipments because a baseline study was not performed. Furthermore, many of items and services were either donated or conducted at a low cost, thus there was no tracking. Firstar doesn't expect processors including MRFs or intermediate processors to incorporate costs that will impact the value of recovered materials. If the markets determine that thermoforms significantly degrade the value of bottles to the point that there is no choice but to significantly deduct their price when included, and yet there are no outlets paying sufficient amounts to offset other separation approaches – manual or mechanical – it will leave Firstar with few options other than to allow them to be pulled with the lowest value mixed plastics loads. An important caveat to this is that many MRFs currently employ auto sort vs. manual sort for their PET, and thus can significantly reduce one of the key issues pertaining to PET thermoform recycling: non-PET "look alike" materials made from PVC, PS, PLA and other materials.

Firstar established a low tech approach to sorting materials, but found that it was effective in capturing PET thermoforms. However, since Firstar instructed workers to err on the side of caution to only recover PET thermoforms, chances are likely they were not all being recovered.

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