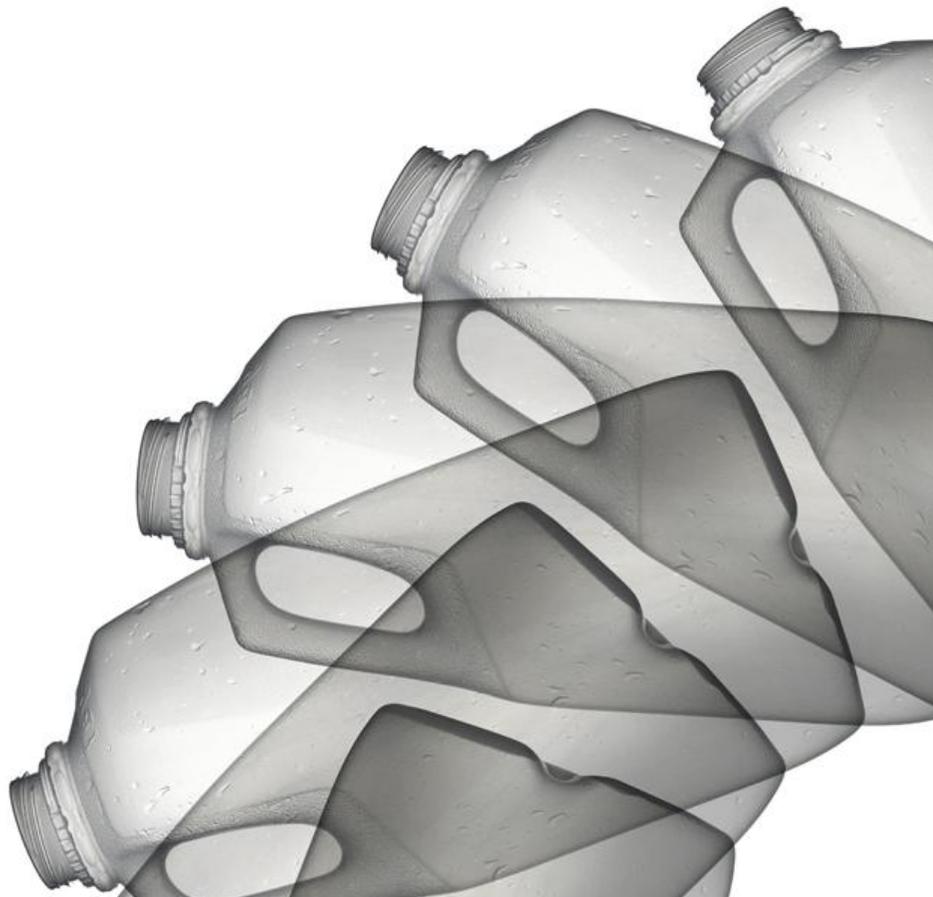




# King County 2012-13 Curbside Recycling Behavior Study

## Final Report

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# King County Curbside Recycling Behavior Study

## Project Summary

In 2012 Waste Management's public education team worked closely with King County Solid Waste staff to develop a residential education campaign and recycling behavior study that would test the impact of three common recycling outreach messages, and new "Oops!" and "Congratulations!" customer feedback tools, on customer recycling behavior.

The goal of the pilot project was twofold: to determine which type of educational message - *environmental*, *economic* or *incentive-driven*, would motivate households to increase recycling the most; and determine the effectiveness of new at-the-cart customer feedback tools in decreasing contamination.



The study was structured to measure changes in customer recycling behavior in two ways:

1. Changes in occurrences of non-program materials set out for curbside collection
2. Changes in the total weight of recyclables set out for collection

Fifty WUTC residential households were selected at random for the study from four neighborhoods in unincorporated Burien, Federal Way, Auburn and White Center, for a total of 200 households. The 200 households were then divided into four study groups - a control group, and three distinct message-testing groups.

Between January 8<sup>th</sup> and April 4<sup>th</sup> 2013, Waste Management's public education team visited each of the 200 households four times. Site visit dates were selected based on each study group's recycling collection schedule and cart weights were completed in the morning, before carts were emptied by collection vehicles. The first round of recorded cart weights established the baseline weight for each individual household and the average weight of the four study areas.



During the three cart checks in the message-testing study areas\*, the education team:

- weighed each cart
- collected cart-specific contamination data
- gave each household specific feedback on what was, and was not, part of King County's recycling program

When non-program items were discovered, each item was removed, placed next to -- or affixed to, the cart in a clear plastic bag, and tagged with an "*Oops*" message about why the items were pulled out of the cart, and where to find information about King County's recycling program. If no contamination was found, a "*Congratulations! You are a Recycling Rock Star!*" cart tag was affixed in a highly visible and prominent area on the cart.

\*The control group households did not receive any information about the study, nor did they receive household-specific feedback on what was observed in the recycling carts; only cart weights were recorded for this group throughout the pilot project.

A total of 2,000 data points were collected and analyzed as part of this study.

The following report details the customer recycling behaviors observed throughout the education campaign in each of the four study groups. This report concludes with recommendations on customer communication strategies that were found to positively influence residential recycling behavior and decrease occurrences of contamination.

## Project Background

All WUTC residential customers in Waste Management's King County service area are provided with a recycling collection cart as part of their garbage service. At the outset of starting service, customers are given a proportionate service level with the average volume of waste commonly generated by residential households in King County: 35 gallons for garbage and 96 gallons for recycling. Customers can select any size of garbage cart available, but the majority of customers select the 35-gallon garbage cart.

While many WUTC households actively recycle - there is a 99% set-out rate, recent waste characterization studies of materials sent to Cedar Hills Regional Landfill reveal that up to 65% of what customers are throwing away could have been diverted from the garbage into curbside recycling or compost collection carts. Even at the current WUTC residential diversion rate of 54%, King County's residential households have not fully utilized the resource recovery programs available at the curb.



In addition, there has been a steady increase over the past five years in the amount, and variety, of non-program materials being placed by customers in recycling carts. These materials end up as contamination and cross-contamination at the recycling center, and must be pulled off the conveyor belts by hand, and in some cases, cut away from sorting machinery where items have gotten tangled in the sorting screens (e.g. hoses, car chains, electrical cords, loose plastic bags, textiles).

The opportunity to prevent recyclable materials from going to the landfill, and decrease the amount of garbage and non-program materials ending up at the recycling center, helped inform the design of this recycling behavior study.

## Campaign Messages

In past WUTC recycling education campaigns, a wide variety of messages and tactics have been used to influence and increase residential recycling participation. For most of these campaigns, changes in recycling behavior has been documented at a macro-level by looking at changes in tons of materials processed at the recycling center.

To better understand which types of recycling messages resonate with WUTC residential customers, three of the most common value-propositions for participating in recycling programs – *environmental*, *economic* and *incentive-based*, were tested.

Three complete sets of campaign materials were created, each representing a different value proposition:

- **Environmental**  
*Recycle and make a difference.*
- **Economic**  
*Recycle and capitalize on the garbage rate structure; support the economy.*
- **Incentive-based**  
*Recycle and earn rewards.*

One good deed  
deserves another



One good deed  
deserves another



One good deed  
deserves another





In addition to three distinct value propositions, an overarching tagline was created for the campaign - *"One Good Deed Deserves Another."* This tagline was developed to inspire individuals to internalize ownership of their recycling behaviors, regardless of the primary influencer of the perceived value of recycling.

After the baseline cart weights were completed in early January -- 1/8, 1/9, 1/14, 1/16, each of the three message-testing groups were mailed a custom campaign announcement in an envelope designed with a matching visual prompt. The King County residential recycling guidelines were printed on the back of each customer letter.

**One good deed  
deserves another**  
Make a difference by recycling



**ARE YOU A RECYCLING ROCK STAR?**  
YOUR HOUSEHOLD HAS BEEN SELECTED TO PARTICIPATE IN A RECYCLING PILOT PROGRAM

Waste Management wants to help your community recycle more and reduce your garbage costs. We've selected four neighborhoods to participate in a recycling pilot program. You live in one of those neighborhoods! And, the program starts...now.

**How does it work?** During our three-month pilot you will receive recycling tips from Waste Management. If you increase your recycling, you will be featured as a WM Recycling Rock Star online and in local papers. Recycle more and be recognized. One good deed deserves another. It's that easy.

**Recycling saves natural resources.** For every bottle, can, box or piece of paper you recycle, we create new products from what you recycle. Recycling allows us to use less water, energy and other natural resources to create new products.

**The future is in your hands.** Thank you for recycling, it's good for the earth and our families future. To help you recycle more use the recycling guide on the back of this letter.

Ready, set, recycle! It's easy to do.  
wmnorthwest.com/kingcounty  
1-800-592-9995



**THINK GREEN!**



Waste Management  
720 4th Ave  
Everett, WA 98033

Make a difference  
by recycling



See Inside For Details

**One good deed  
deserves another**  
Are you throwing away money  
in your garbage cart?



**RECYCLING CHANGES LIVES AND SAVES MONEY.**  
YOUR HOUSEHOLD HAS BEEN SELECTED TO PARTICIPATE IN A RECYCLING PILOT PROGRAM

Waste Management wants to help your community recycle more and reduce your garbage costs. We've selected four neighborhoods to participate in a recycling pilot program. You live in one of those neighborhoods! And, the program starts...now.

**How does it work?** During our three-month pilot you will receive recycling tips from Waste Management. If you increase your recycling, you will be featured as a WM Recycling Rock Star online and in local papers. Recycle more and be recognized. It's that easy.

**Recycling creates local jobs.** On a ton for ton basis, recycling creates six times as many jobs as landfilling waste.

**Recycling saves money.** Throwing away recyclables is expensive. It wastes natural resources that could have been used again in new products and it fills up your garbage cart. The market value of recyclables, which were disposed in King County's Cedar Hills Regional Landfill, was over \$60,000,000 in 2011.

Decrease your garbage bill by recycling more and ordering a smaller garbage cart. To help you recycle more use the recycling guide on the back of this letter.

Ready, set, recycle! It's easy to do.  
wmnorthwest.com/kingcounty  
1-800-592-9995



**THINK GREEN!**



Waste Management  
720 4th Ave  
Everett, WA 98033

Recycle more and  
save money.



See Inside For Details



## One good deed deserves another

Increase your household recycling and receive a \$25 Fred Meyer Gift Card.  
It's that simple.



### RECYCLING MORE IS EASY

**YOUR HOUSEHOLD HAS BEEN SELECTED TO PARTICIPATE IN A RECYCLING PILOT PROGRAM**  
Waste Management wants to help your community recycle more and reduce your garbage costs. We've selected four neighborhoods to participate in a recycling pilot program. You live in one of those neighborhoods! And, the program starts...now.

**How does it work?** During our three-month pilot you will receive a \$25 Fred Meyer Gift Card for each month you increase your recycling. You'll also get recycling tips from Waste Management. It's that easy.

**Plus:** There is a bonus round. Every month that you receive a \$25 gift card your name is automatically entered into a drawing for a \$500 Fred Meyer Gift Card. That's right, \$500.

Because we want you to collect all three of your \$25 Fred Meyer Gift Cards - and help you recycle more, we've included a recycling guide on the back of this letter.

Ready...Set...Recycle!



THINK GREEN.™





## Campaign Doorhanger Delivery

After study group customers received their customized campaign letters, the first recycling cart study was conducted for each of the three message-testing groups.

On the same day of each of these cart studies - 1/28, 1/30, 2/5, 2/6, Waste Management's education team visited households door-to-door to deliver a campaign prompt in the form of a two-sided doorhanger.

On the front of the doorhanger was a version of the letter mailed to the customer's home. The back of all three campaign doorhangers were the same -- an easy-to-use residential recycling reference highlighting the common categories of recyclables and the WM Customer Service Center contact information.





## At-the-Cart Customer Feedback



Between July 14<sup>th</sup> and August 25<sup>th</sup> 2012, WM education staff conducted an in-person customer recycling survey with 806 customers at events in and around WUTC service areas. The survey results outlined a hierarchy of items that cause the most confusion for customers, and generated a list of customer suggestions on how to improve recycling programs.

The two primary barriers to recycling identified by customers in the recycling survey included 1) not knowing how to distinguish *recyclable* from *non-recyclable* plastics, and 2) wanting to have more information about what *was*, and *was not* recyclable in general.

Based on this information, two customer feedback tools were created - an “oops” tag that thanked customers for recycling, acknowledging how confusing recycling can be, and gave specific information about items which are not currently part of the King County recycling program; and a “Congratulations! You are a Recycling Rock Star!” tag, to acknowledge customers who had no visible contamination in their recycling cart.

**Congratulations.**  
You are a  
WM Recycling Rock Star!

Your recycling is clean and you've put a lot into your cart. We know recycling can be confusing but you're doing great. Keep up the good work!

**ARE YOU RECYCLING EVERYTHING YOU CAN?**  
Do you have questions about what can be recycled? We are here to help, visit [www.wmnorthwest.com/king-county](http://www.wmnorthwest.com/king-county), email [recycle@wm.com](mailto:recycle@wm.com) or call 206-296-4466.

Thanks to your efforts, our regions recycling programs are among the best in the nation!

Recycle More. It's easy to do.

THINK GREEN!

Sorry to share the bad news, but not everything is recyclable...Yet.

We know how confusing recycling can be and you are doing great.

**THESE ITEMS SHOULD BE PLACED IN THE GARBAGE.**

We appreciate your recycling efforts and are here to help. A recycling guide is on the back and if you have still have questions visit [www.wmnorthwest.com/king-county](http://www.wmnorthwest.com/king-county), email [recycle@wm.com](mailto:recycle@wm.com) or call 1-800-RECYCLE.

THINK GREEN!

Recycle!

**Did you know?** Half of what goes to the Cedar Hills Regional Landfill could be recycled and turned into new products. You can keep valuable, recyclable materials out of the landfill.

Place all the materials listed here in your recycling cart.

Not sure? 1-800-RECYCLE

**RECYCLE MORE**

- Clean Paper and Cardboard
- Clean Metal and Glass
- Clean Drink Cartons
- Clean Plastic Bottles, Cups, Jugs and Tubz

**Materials Not Accepted**

- Styrofoam
- Laminated paper
- Plastic take-out containers
- Plastic plates, cutlery, straws
- Plastic food wrap
- Crusty or sharp metal
- Food-soiled recyclables
- String
- Business Office Supplies
- Oil, grease and broken glass
- Light Bulbs
- Electronic Waste

[www.wmnorthwest.com](http://www.wmnorthwest.com)  
1-800-542-6965 Monday - Friday 7 a.m. - 5 p.m.



On the back of both of these at-the-cart customer feedback tags was a replica of the same easy-to-use residential recycling reference that highlighted the common categories of recyclables, the WM King County customer website, and the WM Customer Service Center contact information.

During the second, third and fourth cart studies in the message-testing study areas, every customer was given either an *“oops”* or *“congrats”* tag, based on what was found in their recycling cart.

When non-program items were found, the items were taken out of the cart and placed next to, or affixed to, the cart so the customer had specific feedback about their recycling behavior and were given information on how to improve.



## Recycling Behaviour Findings

During the three rounds of cart studies, the following data was collected for each household in the message-testing areas:

- **Participation:** Was the recycling cart was set out for collection?
- **Weight:** What was the weight of the recycling cart?
- **Preparation:** Were recyclables loose or bagged?
- **Contamination:** Were there any visible non-program materials in the cart?
- **Customer Feedback:** What type of tag was left for the customer - *“oops”* or *“congrats”*?

The participation results in the tables below indicate how many households set out their cart on collection day over the course of the study.



If the recycling cart was set out 100% of the time, the customer was counted in the *“3/3”* category. If the recycling cart was set out only twice during the three visits, the customer was counted in the *“2/3”* category. If the recycling cart was set out only once during the three visits, the customer was counted in the *“1/3”* category. Lastly, if the recycling cart was never set out after the initial visit, the customer was counted in the *“0/3”* category.



At the outset of the study, the education team expected to find some contamination in the recycling carts, as there has been a consistent amount of contamination coming into the Cascade Recycling Center from residential recycling routes.

The unexpected discovery was how many residential customers are placing their recyclables in bags, in the same way that garbage is typically prepared and placed in the garbage cart. On all education materials given to WUTC customers, recycling guidelines and flyers instruct customers to place recyclables in the recycling cart “loose” so that items can be easily sorted at the recycling center.

Recyclables were consistently found bagged in clear, white and black plastic bags.

### CONTROL GROUP

The recycling carts for the households in the control group were visited on four separate occasions, and each time only cart weight data was collected.

<b>Participation</b> <i>*100% of households participated in the 1<sup>st</sup> cart weight study</i>	<b>0/3*</b> 2	<b>1/3</b> 9	<b>2/3</b> 15	<b>3/3</b> 24
<b>Average Cart Weight/Household</b> <i>The tare weight for 96-gallon recycling carts is 34 lbs. The weight of the carts shown represent the material weight, as the tare weight has been subtracted from the number recorded at the curb.</i>	<b>1<sup>st</sup> Cart Study</b> 35.6 lbs	<b>2<sup>nd</sup> Cart Study</b> 32.8 lbs	<b>3<sup>rd</sup> Cart Study</b> 32.1 lbs	<b>4<sup>th</sup> Cart Study</b> 33.7 lbs



## ENVIRONMENTAL GROUP

<b>Participation</b> <i>*100% of households participated in the 1<sup>st</sup> cart weight study</i>	<b>0/3*</b> 2	<b>1/3</b> 5	<b>2/3</b> 13	<b>3/3</b> 30
<b>Average Cart Weight/Household</b> <i>The tare weight for 96-gallon recycling carts is 34 lbs. The weight of the carts shown represent the material weight, as the tare weight has been subtracted from the number recorded at the curb.</i>	<b>1<sup>st</sup> Cart Study</b> 33.9 lbs	<b>2<sup>nd</sup> Cart Study</b> 32.2 lbs	<b>3<sup>rd</sup> Cart Study</b> 30.3 lbs	<b>4<sup>th</sup> Cart Study</b> 30.2 lbs
		<b>2<sup>nd</sup> Cart Study</b> 17	<b>3<sup>rd</sup> Cart Study</b> 16	<b>4<sup>th</sup> Cart Study</b> 17
<b>Oops Tags</b>		17	16	17
<b>Congrats Tags</b>		24	24	23
<b>Bagged Recyclables</b>	17% (22 occurrences out of 130 set outs)			

## ECONOMIC GROUP

<b>Participation</b> <i>*100% of households participated in the 1<sup>st</sup> cart weight study</i>	<b>0/3*</b> 3	<b>1/3</b> 7	<b>2/3</b> 14	<b>3/3</b> 26
<b>Average Cart Weight/Household</b> <i>The tare weight for 96-gallon recycling carts is 34 lbs. The weight of the carts shown represent the material weight, as the tare weight has been subtracted from the number recorded at the curb.</i>	<b>1<sup>st</sup> Cart Study</b> 31.9 lbs	<b>2<sup>nd</sup> Cart Study</b> 21.8 lbs	<b>3<sup>rd</sup> Cart Study</b> 24.1 lbs	<b>4<sup>th</sup> Cart Study</b> 24.9 lbs
		<b>2<sup>nd</sup> Cart Study</b> 11	<b>3<sup>rd</sup> Cart Study</b> 13	<b>4<sup>th</sup> Cart Study</b> 13
<b>Oops Tags</b>		11	13	13
<b>Congrats Tags</b>		32	20	24
<b>Bagged Recyclables</b>	8% (9 occurrences out of 114 set outs)			



## INCENTIVE GROUP

<b>Participation</b> <i>*100% of households participated in the 1<sup>st</sup> cart weight study</i>	<b>0/3*</b> 1	<b>1/3</b> 7	<b>2/3</b> 17	<b>3/3</b> 25
<b>Average Cart Weight/Household</b> <i>The tare weight for 96-gallon recycling carts is 34 lbs. The weight of the carts shown represent the material weight, as the tare weight has been subtracted from the number recorded at the curb.</i>	<b>1<sup>st</sup> Cart Study</b> 41 lbs	<b>2<sup>nd</sup> Cart Study</b> 28.4 lbs	<b>3<sup>rd</sup> Cart Study</b> 29 lbs	<b>4<sup>th</sup> Cart Study</b> 36 lbs
<b>Oops Tags</b>		<b>2<sup>nd</sup> Cart Study</b> 29	<b>3<sup>rd</sup> Cart Study</b> 20	<b>4<sup>th</sup> Cart Study</b> 27
<b>Congrats Tags</b>		15	12	13
<b>Bagged Recyclables</b>	16% (19 occurrences out of 117 set outs)			

## Measuring Cart Weight Results

After the cart weights were recorded, the tare weight removed, and the site visit notes tabulated, an inconsistency in the data came to light: cart weight only tells part of the story, and does not always denote the fullness of the cart.

The following table provides five examples where the weight of the materials could not reliably relay information about the volume of materials in the cart.

Cart Volume	Cart Weight
Full	47 lbs
3/4 Full	4 lbs
1/2 Full	36 lbs
1/3 Full	43 lbs
1/4 Full	69 lbs

Using cart weight data to measure changes in customer recycling behavior over time is too inconsistent to be a reliable data source for this study.



Once this discovery was made, the focus of the behavior change analysis shifted to an in-depth review of individual responses to the “oops” and “congrats” customer feedback tags.

## Measuring the Impact of Customer Feedback Tags

Over the course of this study, four types of customer recycling behaviors were documented by observing the presence of non-program materials found in recycling carts after either the “oops” or “congrats” feedback tags were given to customers:

- **Improved (16%):** Improvement in the occurrences of non-program materials
- **Inconsistent (24%):** Improvement in the occurrences of non-program materials, but new, non-program item were found in the second or third cart studies
- **Consistently Good (28%):** No occurrences of non-program items found throughout the study
- **Consistently Contaminated (32%):** Occurrences of non-program items found every time carts were checked

HOUSEHOLD BEHAVIOR	Improved Over Time	Inconsistent: Improvements made, but new contaminants found	No Contamination Found	Consistently Contaminated
Environmental Group	7	13	14	16
Economic Group	7	10	22	8
Incentive Group	9	12	5	23



Out of the 146 households who set out their recycling carts during the recycling behavior study, 40 (27%) households placed repeat non-program items in their carts after receiving specific “oops” feedback.

Incidents of repeat contamination with the same non-program material:

- Environmental Group 13 households
- Economic Group 6 households
- Incentive Group 21 households

The remaining 106 households -- 73%, improved their recycling by decreasing the occurrences of non-program materials in response to the customer feedback tags.

There were only two households where the “oops” tag and affixed bag of non-program materials were never removed from the cart.

In most cases, when a “congrats” tag was given to a customer, it was left on the cart.

## Contamination Trends

Non-program items, i.e. recycling contamination observed in this study encompassed six categories:

1. Non-program plastic
2. Non-program paper
3. Non-program metal
4. Non-program glass
5. Garbage
6. Organics (food and food soiled paper)

Within these six categories, 41 specific non-program materials were recorded:

- loose plastic bags
- wrappers (candy/chip/snack)
- straws
- lids
- plastic hangers
- non-recyclable plastic packaging
- Tupperware
- bubble wrap
- Tyvek envelopes
- mailing envelope with bubble wrap/insulation
- zip-top bag
- zip ties
- plastic plant pots
- blister pack
- film (Syran)
- foam meat trays
- foam packaging
- pet food bags
- plastic utensils
- mesh produce bags
- 6-pack rings
- paper towels
- food-soiled paper plates
- paper cups w/liquid
- loose shredded paper
- bagged shredded paper



- plastic-covered cardboard
- bagged newspaper
- batteries
- window glass
- bagged garbage
- cotton swabs
- bathroom garbage
- dryer sheets
- dryer lint
- vacuum dust
- hair
- toys
- textiles
- cleaning wipes
- food

For each study group, the non-program items were recorded and ranked. The top 13 non-program items and the number of occurrences are detailed in the table below:

NON-PROGRAM MATERIALS	Environmental Group	Economic Group	Incentive Group	TOTAL OCCURENCES
loose plastic bags	28	13	30	71
bagged recyclables	22	9	19	50
non-recyclable plastic packaging	9	5	23	37
wrappers	5	3	13	21
paper towels	5	2	9	16
plastic film	5	2	8	15
Plastic-covered cardboard	7	3	3	13
bagged newspaper	6	4	0	10
straws	5	1	3	9
foam meat trays	1	4	4	9
plastic lids	2	1	5	8
blister pack	3	1	3	7
pet food bags	1	2	3	6

With the exception of paper towels, all contaminants found were some type of non-program plastic product or plastic packaging.

In the case of plastic-covered cardboard and bagged newspaper, these two items are classified as non-program because the primary recyclable material (cardboard and newspaper) cannot be sorted at the recycling center due to cross-contamination of mixed materials.

## Contamination Gallery





## Conclusions & Recommendations

There are four principal conclusions that can be made from this study of residential recycling behaviors:

- At-the-cart customer feedback tools and outreach is an effective way to increase customer understanding about which items are part of the current recycling program, and decrease occurrences of non-program materials.
- Volume, not weight, should be used as the primary metric to measure increases in recycling.
- Customers are very confused about which plastics are recyclable.  
*While there were many other non-program items found, none of the other materials were observed at the same frequency or quantity as non-recyclable plastic materials.*
- Customers are not connecting their role in ensuring that recyclable items are able to be efficiently and effectively sorted at the recycling center (i.e. not bagged or cross-contaminated), and the intended outcome: that recyclable items placed in the cart are able to be sent on to markets and manufacturers for recycling.

Unfortunately, due to the challenge of measuring increases in recycling by cart weight, there is not enough information to draw a conclusion about which of the three value proposition recycling messages was the most impactful in motivating households to increase recycling the most.

When reviewing the changes in household behavior after “oops” and “congrats” tags were distributed, the Economic Group accumulated the most “congrats” tags overall and had the fewest occurrences, by frequency, of non-program materials.

Based on these conclusions, Waste Management recommends that future residential recycling education campaigns provide specific examples of recyclable and non-recyclable plastic materials; and help customers better understand the active role they have in ensuring that the can, bottle, paper or cardboard they are recycling is prepared in such a way that it can be sorted at the recycling center and eventually made into a new product.

In addition, whenever possible, at-the-cart customer feedback tools should be utilized to validate good recycling behavior and provide information about what type of non-program items should not be placed in the recycling cart.