Increasing Indianapolis Residential Recycling Rates via Survey

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Abstract: *The City of Indianapolis worked with its waste removal company to run a free pilot program for curbside recycling. The city hoped that getting the bins out to residents' houses free of charge— getting them familiar with the program--would peak interest and eventually increase long-term paid program participation; this was not the case. According to the research, successful recycling programs are built on the specific needs of the community they serve. This paper proposes a survey to better understand Indianapolis residents and their feelings and apprehensions regarding curbside, residential recycling.*

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On November 3rd, 2012, the *Indianapolis Star* published an article reporting a dismal 10 percent participation rate in a city-wide residential curbside recycling program. As part of a pilot program to peak residents' interests in utilizing curbside recycling services, Republic Waste Services, the city's garbage collector, offered two separate ninety-day trials where participants could try curbside recycling without charge. Once the trial period was over, residents were charged a $6 monthly fee to continue receiving the service. Of the 14,200 customers who participated in the program, 52 percent continued after the free period. Retention rates of greater than half is promising on its face; however, it is important to look at these statistics in context. The increase in participation brought Indianapolis to its current rate of 10 percent of residents involved in the curbside recycling program. Participation rates in cities of comparable size and structure are above Indianapolis's; Milwaukee boasts an 85 percent rate, 65 percent of Des Moines residents participate, as do 35 percent of Louisville homes. While the $6 monthly cost may seem like a small amount, most believe this is the main stumbling block for involvement. Residents do not want to pay more to recycle, which makes it difficult for Indianapolis to achieve its goal of becoming the Midwest's most sustainable city (Jacobson, 2012).

According to the U.S. Environmental Protection Agency (EPA), a pay as you throw, or unit-based, program for waste removal is the best way to incentivize curbside recycling participation ("Recycling and other complementary programs", 2012). However, the cost of administering a pay as you throw system is often a deterrent for cities. A way to better estimate levels of involvement in the curbside program, should such incentives exist, may help to justify the heavy initial investment for a pay as you throw system.

This paper will present a scientific means by which to survey residents to better understand their recycling preferences and what type of incentives may be meaningful to them.

The data collected will help to better gauge residents' interest levels and inhibitions; Indianapolis can then better tailor a curbside-recycling program to its residents' needs.

Overview

In 2008, the newly elected mayor of Indianapolis, Greg Ballard, created the Office of Sustainability (SustainIndy) to serve as the catalyst and hub to push Indianapolis toward Mayor Ballard's goal of making Indianapolis "one of the most sustainable communities in the Midwest" ("Sustainability report to," 2012). In order to reach this goal, Indianapolis must do a better job diverting waste from the incinerator back into the production stream via recycling.

Indianapolis is an interesting case study because it has multiple factors that could potentially have an impact on the proposed recycling program. For starters, Covanta Energy has partnered with the city of Indianapolis to incinerate garbage to create the steam used to heat 40 percent of downtown Indianapolis ("Convanta energy facilities,"). Because of this symbiotic relationship, the city of Indianapolis is able to keep trash disposal costs down. This agreement is one major factor that has resulted in a resident's trash removal bill holding at $32 a year, with no increase in cost for the past 20 years (Jackson, 2012). These dramatically low rates help to lessen the impact of generating waste. It should also be noted that, according to research co-sponsored by Covanta, even if the whole of the U.S. could bring its recycling rates up to that of Europe, there would still be ample amounts of solid waste to be used for waste-to-energy incineration (Berenyi, 2009).

On top of the low cost of waste removal, the city-wide billing cycle poses additional issues. Currently, Indianapolis bills the cost of trash removal at a flat rate via a resident's annual property tax bill. This only helps to mask the actual cost of generating waste on a personal level.

Should a residence generate two or fifteen bags of trash a week the cost remains the same. Additionally, not having a physical bill each month, or even each quarter, reminding residents they are paying for the waste they generate only serves to further remove the sense of responsibility. This compounds the issue of sending a bill for the voluntary service of recycling because, even though the monthly cost may be relatively small, the reminder that it is a cost arrives monthly. Republic Waste Management conducted the free test pilot program with the goal of getting people familiar with the program and increasing enrollment in the standard residential curbside program. The hope was that if residents could experience the ease of use of the curbside program, residents might be willing to pay the small fee to continue using the program rather than using the drop-site option. Republic forwent revenue in the hopes of raising future revenue through increased participation; however, this plan did not work.

What are the actual barriers and perceptions of Indianapolis residents when it comes to recycling? If the Department of Public Works had a better understanding of what residents want in terms of a residential recycling program, enrollment could be higher. This paper proposes a plan that would address this information gap by developing a plan to collect measurable data regarding residents' feelings about curbside recycling.

The academic landscape

When it comes to measuring someone's likelihood to recycle, there are many factors to consider. There is already an ample amount of research to help explain the possible responses from survey respondents. The Theory of Planned Behavior (Ajzen, 1991) is a long standing, empirically tested, social theory. It provides a means to effectively measure a person's intent, should specific factors be accounted for, to take a specific action. For the purpose of this

research, the theory will be applied to Indianapolis residents' intent to participate in some version of an incentivized curbside recycling program. In order for Ajzen's theory to hold, the participants must believe they have control of their own actions. For this reason, this theory would only be applicable should a voluntary program be implemented.

Convenience of participation has also been determined to be a major factor in participation rates (Perrin & Barton, 2001). Considering the mechanisms are already in place for curbside pick-up, convenience should not be a big concern. The Perrin & Barton study also reveals that the lack of recyclable materials also affects a household's ability to participate in the program. Republic Waste Management's intake facilities allow for a wide range of acceptable materials, so this does not appear to be a major barrier in Indianapolis's program. With this said, there will likely be a perceived lack of materials rather than an actual lack of materials. Much research has been done to show that, with proper education of what is acceptable, and how to identify appropriate materials, this can be overcome (Oskamp et al., 1998; Shrum et al., 1994). A study conducted using data gathered primarily within the United Kingdom found that indoor space required, or overall inconvenience for sorting and storing materials, was also identified as a barrier to recycling (Jesson & Stone, 2009).

Martin et al. (2006) conducted research identifying many concerns that can be addressed when constructing a curbside program. For example, the researchers found that participation rates were higher when the recycling schedules coincided with the standard trash removal pick-up dates and times. Their review of published research also resulted in their conclusion that there is no ideal structure for a residential recycling program, but that the program needs to be tailored to the identified needs of the community. It is the hopes of the researcher that the proposed survey will help to provide this information for consideration.

Currently, the understanding within the waste management industry is that unit-based pricing for waste removal is a strong incentive to build recycling involvement (Kipperberg, 2007). Unit based pricing, or pay as you throw, is the practice of billing residents based on how much garbage is thrown away, rather than a flat rate disposal fee. Some communities bill by the trash bag, by the waste bin or, most infrequently by the total weight of garbage. In an effort to keep down waste removal costs, many homes will increase their recycling and composting rates to decrease the amount of garbage generated. Kinnaman & Fullerton (1997) conducted a comprehensive study of communities with and without unit-based pricing for trash removal. Their research found and increase in recycling program participation in the areas with unit-based pricing trash removal.

The Plan

Will Indianapolis residents willingly participate in curbside recycling programs? If so, what specific structures should be in place to result in the highest participation rates possible? It is not until a survey of residents is conducted that the answers can be known. Without survey results, the risks of creating another failing curbside recycling program is likely. To be good stewards of taxpayer dollars, it is imperative to insure funds are spent right the first time. By conducting this survey, it is more likely the city will design a more desirable recycling program that could lead to increased participation, which could aid Indianapolis in achieving its goal of becoming the greenest city in the Midwest.

The unit of observation is Indianapolis households, and the unit of analysis is individuals living within those households. For the purposes of this study, the term household refers to any single unit billed for recycling or trash removal. For example, a single individual may own a

home but share the home with two roommates; this is a household just as a single-family unit living in a home would be. It is important to acknowledge the impact of rental units on this study; any curbside recycling program that incentivizes recycling must identify the individual units, or households participating. Multiple households may reside within an apartment complex, and apartment complexes may also provide a single refuse point for multiple units, thereby limiting the ability to identify the individual households' units of waste. Because of this, the focus will be on all residential units not coded as rental properties for tax purposes.

For this study, all surveys will be addressed to the "heads of the household." A family unit's likelihood to recycle is often based on the head of the household's willingness to participate. The intent is to mail a self-administered survey with the monthly trash collection bill. This assumes that each residence paying a bill for trash refuse would be subject to the curbside recycling program; however, because Indianapolis includes the cost of trash removal in the annual property tax bill, this will not be a timely means by which to contact the identified population. In lieu of inclusion in monthly bills, a list of property tax bills including the names and addresses of residents will be used as the sample frame from which survey recipients will be pulled.

According to Stats Indiana (2011), there are 474,286 owner occupied housing units in Indianapolis as of 2010.

Housing	Number	Rank of 12	Pct Dist. In Region	Pct Dist. In State
Total Housing Units in 2010 (estimate)	793,518	1	100.0%	100.0%
Total Housing Units in 2010 (includes vacant units)	793,518	1	100.0%	100.0%
Owner Occupied (Pct. distribution based on all housing units)	474,286	1	59.8%	62.5%
Renter Occupied (Pct. distribution based on all housing units)	238,782	1	30.1%	27.0%

Source: U.S. Census Bureau, American Community Survey 2005-2009 5-year estimates.

Using this total population, a confidence level of 95 percent, and a confidence interval of two percent, a sample size of no less than 2,389 Indianapolis households should be selected to receive the self-administered survey.

Cost has been frequently identified as a reason for not participating in the curbside program (Blaine, Lichtkoppler, Jones & Zondag, 2005). Housing value is a good indicator of family income and will be used as the basis to structure the stratified multistage cluster sample of those to be surveyed:

1. The addresses will be clustered by home value. A list will then be made of residents within each cluster.
2. A random list of addresses will be generated.
3. A self-administered mailer will be sent to the random-address list.

Indianapolis home values are not categorized into equal-sized groups, as is shown in *Table 1*. For this reason, the Probability Proportionate to Size model should be used to insure the sample set is as representative of the population as possible. The selection of households within each cluster will be proportionate to the percent of the cluster to the whole of the group. The resulting sample will be representative of the housing value breakdown of the city. Additionally, the level of error can be estimated within the sample via probability theory by using this means of sampling.

Value of Home	**Percent of Whole**	**Sample Size Needed**
Less than $50k	7.14 percent	171
$50k to $99k	26.93 percent	643
$100k to $149k	33.44 percent	799
$150k to $199k	15.85 percent	379

$200k to $299k	9.47 percent	226
$300k to $499k	4.71 percent	113
$500k to $999k	1.91 percent	46
$1MIL plus	0.54 percent	13
TOTALS	**99.99 percent**	**2390**

The survey will be constructed using the semantic differential format. A very brief description, or narrative, will be given to describe the specific types of incentive-based recycling programs: pay as you throw bin program, pay as you throw bag program, and recycle rewards or recyclebank. After each brief narrative, a short semantic differential questionnaire will follow. The resulting ordinal responses will be used to construct a composite measure of interest of Indianapolis owner-occupied households in various curbside recycling programs. Chu & Chiu (2006) conducted a survey based on Azjen's Theory of Planned Behavior; the basic constructs of their questionnaire helps to identify and measure the three factors that lead to predictive behavior: personal attitude, social norms and perceived behavioral control (Azjen, 1991).

Conclusion

Residential recycling programs are not an easy endeavor for municipalities to take on. Via its website, the EPA posts applicable research and resources for reference to help communities across the U.S. develop and maintain cost-effective residential recycling programs; however, as Martin et al uncovered, the only consistent answer to how a program should be designed is based on the community's needs. A well-structured survey, disseminated as proposed above, will likely provide the data necessary to develop a successful residential recycling program for the city of Indianapolis.

Custom Profile

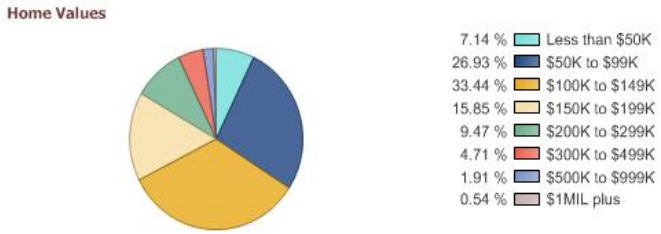
Households in 2010

	Number	Pct. Dist
Total Households	366,176	100.0%
Family Households	218,338	59.6%
Married with Children	56,067	15.3%
Married without Children	79,152	21.6%
Single Parents	48,251	13.2%
Other	34,868	9.5%
Non-family Households	147,838	40.4%
Living Alone	117,050	32.0%
Average Household Size	2.47	
Average Family Household Size	4.14	

Source: **US Census Bureau, American Community Survey 5 Year Estimates**

Home Values in 2010

	Number	Pct. Dist
Owner Occupied Units	210,098	100.0%
Less than $50,000	14,994	7.1%
$50,000 to $99,999	56,582	26.9%
$100,000 to $149,999	70,266	33.4%
$150,000 to $199,999	33,304	15.9%
$200,000 to $299,999	19,898	9.5%
$300,000 to $499,999	9,904	4.7%
$500,000 to $999,999	4,023	1.9%
$1,000,000 or more	1,127	0.5%
Median Value ($)	122,200	



Source: US Census Bureau, American Community Survey

Note: Home sales data for counties other than Boone, Brown, Decatur, Hamilton, Hancock, Hendricks, Johnson, Madison, Marion, Montgomery, Morgan, Putnam, Shelby may be incomplete.

(Metropolitan Indianapolis board of realtors, 2011)

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