



RECYCLING INCENTIVES: PART 1

Pay-as-you-throw goes toe-to-toe with points-based incentive programs in this exhaustive, two-part analysis of the performance and pros and cons of RecycleBank, recycling credits and PAYT.

BY LISA SKUMATZ, DAVID JURI FREEMAN, DANA D'SOUZA AND DAWN BEMENT

It's the question that faces all officials responsible for the recovery of recyclable materials at every level of government: What can communities do to move recycling and diversion forward? Meanwhile, private haulers everywhere are asking what options can they use to distinguish themselves in the market?

SERA, Inc. and the Econservation Institute have analyzed three strategies being used around the country and conducted an independent, numbers-based comparison of the performance, cost, strengths and weaknesses of the recycling incentive alternatives of RecycleBank, recycling credits and pay-as-you-throw (PAYT). The following analytical results are based on data obtained directly from communities, collectors and other organizations operating these programs.

The main incentive alternatives

• **PAYT:** Pay-as-you-throw (PAYT), also known as unit-based pricing, variable rates, etc., is a system in which the household pays more to dispose of more trash – the less trash thrown out, the less the consumer pays. This provides an incentive to recycle and reduce because households that recycle, reduce and compost save money in trash bills. These systems, which usually use bags, tags, cans or carts, are in place in more than 7,100 U.S. communities (Skumatz and Freeman, *Resource Recycling*, Oct. 2006). PAYT programs are nearly 100 years old; however, the real growth began in the early 1990s. As of 2006, PAYT programs were available to more than 75

million people in all but three states in the U.S., and programs have since spread to more states (see part two of this story in the March 2011 issue of *Resource Recycling*).

• **Recycling credits:** Recycling credit programs provide households with financial or other incentives for taking part in recycling, and have been in place since at least the mid-1980s. Many early programs used fixed credits based on recycling (commonly \$1.50 off the trash bill if the household participated in recycling). Some credit systems provided periodic household rebates computed as a share of the market value of the community's recycling tons. Recycling leads to dollars off trash bills. Most of the historic flat rebate programs have been discontinued, although new ones are evolving, e.g., Terracycle pays for hard-to-recycle materials.

• **RecycleBank and point-based recycling credits:** RecycleBank is one of a new generation of "recycling credit" programs that "pay" points for recycling. These include Waste Management's recently-introduced "Think Green Rewards," individualized city-delivered programs, and others. However, the best-known type of recycling bonus programs is RecycleBank, where a household's single-stream recyclables are weighed using a system of radio-frequency identification (RFID) tags on each 96-gallon recycling cart and a scale on a retrofitted fully-automated tipping arm. Households receive "points" based on the weight of the recyclables set out, and the accumulated points can be redeemed on the program's website for coupons for dollars-off purchases, or for gift cards from national and local

Table 1 | Why communities / haulers consider PAYT or RecycleBank

PAYT	RecycleBank
<p>Strong diversion results – recycling plus composting plus waste prevention</p> <p>Household savings / incentive for recycling</p> <p>Track record (7,100 communities), flexible system</p> <p>Low cost, self-funding, quick to implement</p> <p>No billing system needed for some program types</p> <p>Works with curbside or drop-off recycling</p> <p>Does not require new trucks or collection equipment.</p>	<p>Increases / jumpstarts stagnant recycling</p> <p>Provides incentive for households to recycle</p> <p>Hauler partnerships with RB bring the program</p> <p>Turnkey program – assistance with financing and outreach – appeals to haulers as well as communities</p> <p>No new billing system needed</p> <p>New, extensive publicity; RB marketing</p> <p>Politically acceptable in many areas / rebates appeal to households and politicians</p>

Source: SERA & EI, 2011

RecycleBank retailer partners, or donate them to non-profit organizations, schools or other options. This program began with pilot projects in 2005. Households are encouraged to recycle because more points link to savings on retail purchases or a few other types of rewards. Figures are hard to tally, but RecycleBank's (RB for short) website suggests there are 500 RB communities in 28 states covering about 2 million households. This report identified and assessed a subset of these programs covering about 1.2 million households in 25 states. The recycling rewards company is also expanding in communities overseas.

Tonnage diversion impacts

We analyzed the tonnage diversion impacts attributable to PAYT and RecycleBank programs based on data from communities that had implemented the programs. For the sake of brevity, and to provide parallel information, we have not repeated the information from RB's marketing materials, which have been widely distributed. Instead, we are focusing on the results from communities and haulers that have actually implemented the program.

To analyze tonnage impacts for any program, it is important to isolate the impact of the program *alone* – separate from the implementation or enhancement of recycling programs, yard debris programs or other changes that may have been implemented at the same time. That means measuring PAYT as an incentive, above and beyond any recycling collection frequency changes, containerization, single-stream conversions, etc. The same goes for the RB program. Here it means making sure to measure the impact of RB above and beyond the fact that the core RB incentive is an add-on to single-stream

recycling with large containers.

The key ways to measure this incremental impact are to: 1) examine pre/post impacts in communities that already had single-stream in large containers; or 2) to measure the impacts using many communities and statistically pull out the impact from RB separate from large containers and single-stream; or 3) look at pre/post for communities, but pull out the impacts that have been statistically associated with going to single-stream and large containers, to net out the RB impact.

We were able to do the first and third assessments, but were not yet able to use second method. Data were not available from enough RB communities to support that analysis, yet.

As a backdrop, it is critical to recognize that both single-stream programs and large containers have previously been shown to lead to large increases in recycling (simpler and more convenient for households; larger containers that don't limit recycling). Single-stream recycling also decreases collection cost. Published research by the authors (Skumatz and Bicknell, *Resource Recycling*, Aug. 2004) showed that single-stream – without RecycleBank or PAYT incentives – increased recycling over dual stream programs on the order of 3.5 percentage points, or about a 30 percent increase in recycling tonnages.

- **PAYT:** Extensive statistical analysis by the authors (published in *Resource Recycling* over the last decade) shows that PAYT reduces the total of residential trash disposed by about 17 percentage points. About one-third of this impact is an increase in recycling, about one-third is an increase in organics diversion and about one-third is source reduction/waste prevention. The recycling impact alone is an increase of 30-100 percent (an average of about 50

percent reported by Frable and Berkshire in 1995 and by numerous SERA studies). The total diversion impact is about three times the recycling impact. These represent the impacts of PAYT, separate from other changes. SERA studies show very similar increases occur from PAYT whether recycling is curbside collection or drop-off.

- **Recycling credits:** There has not been sufficient quantitative data from recycling credits communities to estimate tonnage impacts. We are conducting additional work on this.

- **RecycleBank:** We used several main sources of information on performance. These include results from a number of early eastern RB programs captured in an EPA article in 2009, as well as results from interviews we conducted with individual communities with RB programs that were able to provide data. Here we took pains to estimate the impacts due to the RB incentive only – separate from the single-stream conversion and containerization.

Individual community results we identified for communities with single-stream already in place ranged from an 11 percent increase in recycling to several with results in the 30-35 percent range (a couple that reported zero impact were not included in the analysis; inclusion would decrease the average impact estimate). Using data from a sample of communities with data available, we found RB increased recycling about 30 percent, and has between one-half and two-thirds of the impact on *recycling* that PAYT has, and, of course, none of PAYT's impacts on composting or source reduction, which it would not be expected to. Other results reported by communities include a comparison of several communities in the North Shore of Massachusetts. These re-

another example, the community may exit the contract after one year but must pay off the bins.

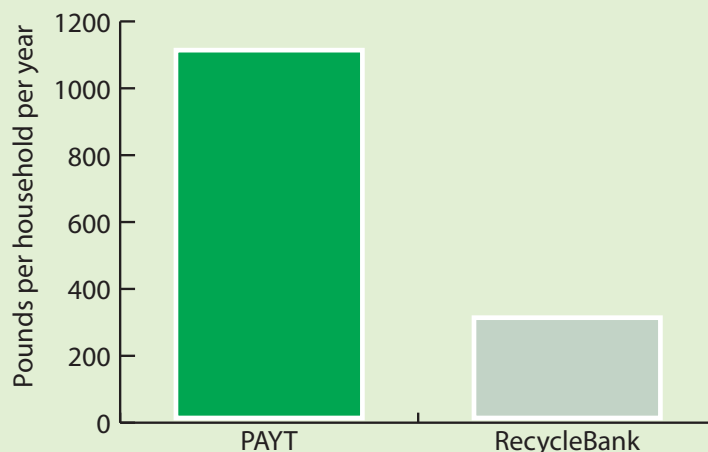
• **RecycleBank’s community-wide or route-wide program:** In some communities, RB is providing its community-wide program. They do not weigh individual households or provide credits that vary based on what a household puts out. Instead, it is a system very similar to the historical market-based “recycling credit” system we described in the introduction. The total tons of recyclables on the route or in the community are totaled. RB tracks the number of times containers are set out, and provide points based on community-wide behavior – the same points are given to each household on the route or in the community, or adjusted by participation record. The difference from recycling credit programs are that in RB’s version, the rewards are points redeemable for coupons from their partners, not direct dollar rebates as provided by the recycling credit programs. In at least some communities, RB’s per-household-charge for this program has been no different than the amount charged for the company’s individual-weigh program.

Relative cost results and comparisons

Using data from communities nationwide, SERA compared the costs per diverted ton for various programs. The ratio of tons diverted by a PAYT program to that from a RB program is estimated to be about 4.8:1 (17 percentage points versus about 3.5). The fees for RB programs vary based on arrangement, services and negotiating skill; however, we performed the computation based on various cost scenarios, as shown in Table 3. The comparison to recycling credit systems uses an assumption that the system gains less tonnage than the individual-style RecycleBank program (however, this is not verified; it may be that dollar rebates result in more tons than coupon systems; or fewer tons because traditional credit programs weren’t household-based). For conservative calculation purposes, we assumed credit programs – with associated outreach – would lead to about 75 percent of the tonnage diverted as RecycleBank.

The table shows that for communities getting RB deals at \$0.80 per household, the cost per ton diverted for RecycleBank is about six times as high as the high-cost PAYT scenario, and if the RB cost is \$2 per

Figure 3 | Comparison of annual pounds per household diverted in North Shore, Massachusetts communities



Source: U.S. EPA PAYT newsletter 2009

household per month, RB costs 15 times as much per ton as the higher-cost PAYT options. The home-grown recycling credit option costs about three times as much as the high-cost PAYT option. Comparisons to the low cost PAYT option are considerably more dramatic (far right column).

The Household Side: In PAYT, all households that set out less trash pay lower bills and automatically receive savings – those putting out more, pay more. As noted above, the costs for RB are passed through to the households. Importantly, the households have the potential to recover value through coupons offered on RB’s website, theoretically offsetting some

of this cost. Households register, then select coupons to save (with purchase), and wait for them to be mailed (this has been updated to home printing in at least some locations). Unfortunately, we find the real-world redemption rate is low. Well less than 50 percent have registered in the early years (lower than 20 percent in some), and reports show coupon redemption rates for those registered on the order of 10-20 percent. This means fewer than 2-to-10 percent of households redeem coupons and get savings (those redeeming any coupons likely redeem more than one). This will be discussed more in Part 2 of this article.

Table 2 | Relative cost per ton for PAYT, recycling credits, and RecycleBank

Relative Cost per Ton Diverted	Relative to high cost PAYT scenario	Relative to low cost PAYT scenario
PAYT (Low cost)	0.1	1
PAYT (High cost)	1	10
RB at \$0.80/hh/mo	6	60
RB at \$1.20/hh/mo	9	90
RB at \$2.00/hh/mo	15	150
RB at \$3.00/hh/mo	22	220
RB at \$4.00/hh/mo	30	300
Tailored Local Recycling Credit System (RFID or Bar Code & Website rewards)	3 (times as costly per diverted ton as high cost PAYT scenario)	30 (times as costly per diverted ton as low cost PAYT scenario)

Source: SERA & EI, 2011

Pros and cons of recycling incentive options

The options have three benefits in common – higher recycling diversion, GHG reduction, and job creation/economic develop-

ment because recycling and composting are more job-intensive than landfilling. All are well-suited to bringing incentives to single-family and small multi-family / condo


situations (and none is well-suited to large multi-family complexes). However, they also have many benefits and detriments that are unique to each as the below table details.

Table 3 | Pros and cons of recycling incentive options

	Pros	Cons
PAYT	<ul style="list-style-type: none"> • Encourages all kinds of diversion – recycling, organics and waste prevention; doesn't encourage consumption (coupons). • Works with curbside or drop-off recycling. • Works with existing single- or dual-stream programs as well as MRFs and composting programs. • Works with existing manual, semi-automated or automated collection and equipment. • Largest impact on diversion tons. • Flexible/tailorable and long-researched performance as demonstrated in more than 7,000 communities (SERA, 2006), covering 75 million in population. • Lowest cost per diverted ton diverted from landfill and per MTCE (GHG) of all the incentive programs analyzed (one-third to one- two-hundredth the cost per ton of other alternatives). • Provides direct financial rewards to households for recycling, composting and reducing trash. • Direct money link; do not have to go through indirect points, registration, and redemption steps. • Doesn't exclude other options. • Gives households the ability to control their trash bills, similar to other utilities. 	<ul style="list-style-type: none"> • Requires political will (often requires ordinance, RFP, or contractual language to implement). • Concerns may arise about illegal dumping. • Must reduce a whole 32 gallons per week (in most programs) to save money. • Getting households to support it initially is often a problem. • In some cases, people don't like the word "pay." • Misperception that the program is penalizing households that do not recycle/reduce trash. • Difficulties in getting some haulers to support it.
Recycling credits – community-wide with bar code or RFID tag	<ul style="list-style-type: none"> • Low cost to implement. • Reflects and rewards household recycling set-out behavior. • Second lowest cost per diverted ton or per MTCE (GHG) if use straightforward tracking system for participation (bar-coded route sheet or RFID). • Works with existing manual, semi-automated or automated collection; works with single- or dual-stream or other curbside recycling programs. • Provides direct financial rewards to households for recycling. • Some communities are expanding to points for other green or community behaviors than just recycling. • Encourages recycling more versus less often. • Direct bill / behavior link for rebate version 	<ul style="list-style-type: none"> • May be more difficult with hauler-based collection system (data transfers, etc.). • Encourages only recycling, not composting or waste reduction. • Does not provide rewards linked to individual behaviors, except participation in some designs. • Works only with curbside recycling. • With point-based system, must go through points to get dollar rewards.
RecycleBank – individual	<ul style="list-style-type: none"> • Strong outreach/advertising. • Link to individual behavior. • Encourages recycling. • Can be politically easier to implement in places where PAYT is difficult or where residents don't or can't pay for trash • Program is turnkey / can finance containers, single-stream conversion. • Partner with cities, haulers, home owner associations. • No separate billing system needed. • Rewards for every bit of recycling (up to the maximum threshold). • Doesn't exclude other options. • Market differentiation for a hauler. • Attractive to households and politicians. • Can encourage local business partner jobs. • Exciting "new" program that uses social media. • May be expanding to incentivize other green behaviors beyond recycling. • Program has won national and international awards. • This, or the community version, is reportedly in place in 2 million households. 	<ul style="list-style-type: none"> • Most costly per ton diverted from disposal or per MTCE (GHG) than other options (about 10-100 or more times more expensive per ton diverted than PAYT options). • Relatively expensive container financing option. • Does not encourage source reduction or composting. • Not available in communities without single-stream MRFs. • Works only with curbside recycling. • Generally only in place with fully-automated collection; may also be in place with semi-automated collection vehicles. • Perceived as consumption-incentive. • Must go through indirect points system to receive money off, and less than 10 percent of households are registering and redeeming points / coupons. • Cost depends on RB services chosen / needed, and city / hauler's negotiating abilities. • City or hauler provides most of services – RB primarily handles points, website and outreach.
RecycleBank –community-wide or route-based	<ul style="list-style-type: none"> • Same as individual RecycleBank program detailed above, but could be less expensive. • Encourages recycling, but shared behaviors, not individual, are rewarded. • May not require fully-automated trucks / retrofitted arms. 	<ul style="list-style-type: none"> • Same as individual RecycleBank program detailed above. • Does not provide rewards based on individual behaviors (except perhaps participation in some designs).

Source: SERA & EI, 2011

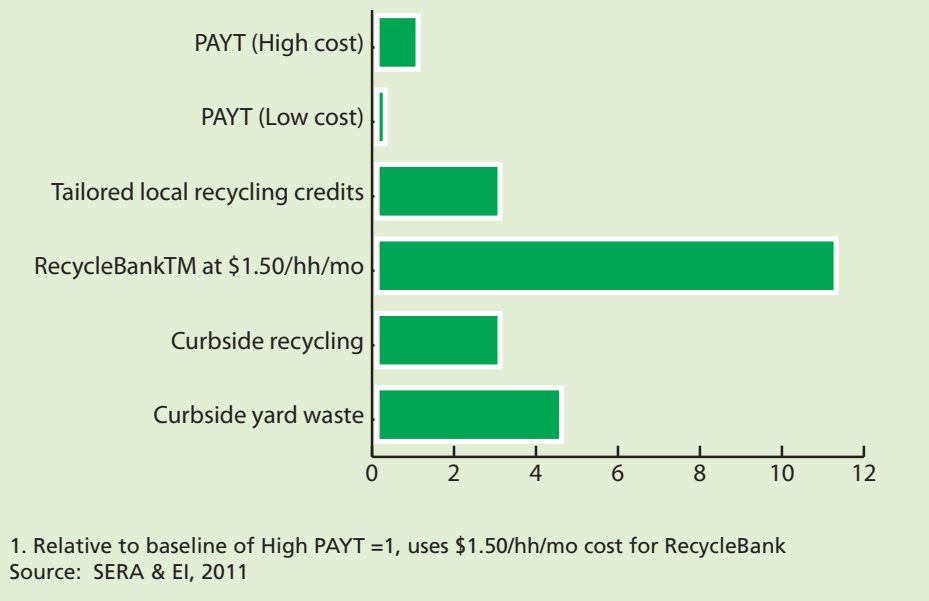
Summary, Part 1:

The cost and impact analysis indicates PAYT is by far the cheapest per ton. Under RecycleBank, the real-world communities show only a small share of households actually redeem coupons; however, it may be easier, politically, in communities where PAYT may have difficulty passing. It isn't all about the economics and results will vary from city to city – and each program has pros and cons, as we will expand on in part two of this article, coming next month. We will highlight interviews with the communities involved and further detail the methodology behind the analysis. 

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The Econservation Institute, estab-

Figure 4 | Relative cost per ton diverted for program options¹



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