



**Boulder Office:** 762 Eldorado Drive, Superior, CO 80027  
Voice: 303/494-1178 FAX: 303/494-1177  
email: [skumatz@serainc.com](mailto:skumatz@serainc.com)  
Website: [www.serainc.com](http://www.serainc.com); [payt.org](http://payt.org)

# ***PAY-AS-YOU-THROW / VARIABLE RATES FOR TRASH COLLECTION: 2014 UPDATE***

## ***REGION 9 GRANT REPORT***

### ***VOLUME 1 of 2 Executive Summary and Key Results***

*Submitted to:*  
*Timonie Hood, Region 9 EPA Grant Manager*

*Prepared by:*  
*Lisa A. Skumatz, Ph.D., Dana D'Souza, and Dawn BeMent*  
*Econservation Institute*  
*762 Eldorado Drive Superior CO*  
*Ph: 303/494-1178 FAX: 303/494-1177*  
*[www.paytnow.org](http://www.paytnow.org)*

*February 2015*

<This page intentionally left blank for two-sided printing.>

## Contents

1. Executive Summary .....	1
Findings and Conclusions in PAYT .....	3
2. Introduction to PAYT – Background and Frequently Asked Questions .....	6
3. PAYT Community Count .....	18
3.1 Summary / Background.....	18
3.2 Statistics on Program Counts .....	20
3.3 Programs in Region IX and the Implications of Strong vs. Weak PAYT.....	27
4. State Legislation in PAYT .....	32
4.1 Vermont’s 2012 Recycling and PAYT Law .....	33
4.2 Other Variations in State PAYT Legislation .....	35
4.3 Achieving PAYT by Ordinance or Legislation .....	35
5. Case Studies in Commercial PAYT .....	40
5.1 Description / Case Studies for Commercial PAYT – Embedded Recycling Fees .....	42
6. Findings Research On Special Topics in PAYT .....	45
6.1 Research on PAYT Rate Design Guidelines .....	45
6.2 Research on Pricing for Can and Bag PAYT Programs.....	48
6.3 Multifamily PAYT Options .....	51
6.4 Small Haulers and PAYT .....	52
6.5 Comparisons of PAYT Performance vs. Other Incentives (including RecycleBank™) .....	53
6.6 Sample Implementation Steps and Schedules for PAYT .....	60
6.7 Lists of PAYT Communities in Arizona, Nevada, and Hawaii .....	61

### **Project Documents Provided Under Separate Cover:**

- Volume 2 of 2: PAYT Webinar, Community Assistance Summaries

White Papers – each under separate cover:

- Multifamily Strategies for Recycling and PAYT
- Small Haulers and PAYT
- Comparison of Impact of PAYT vs. Other Residential Recycling Incentive Options
- PAYT Options for Guam: White Paper

### **Acknowledgements:**

*Thanks to Dawn BeMent, Dana D’Souza, and D. Juri Freeman for their assistance – as well as the many solid waste coordinators and others from across the country that assisted in this project.*

**The Econservation Institute**, established in 1998, is a non-profit dedicated to research and education on practical resource conservation strategies and policy options in solid waste management, energy efficiency, and other environmental issues. Contact [info@econservationinstitute.org](mailto:info@econservationinstitute.org) for more information, or [www.econservationinstitute.org](http://www.econservationinstitute.org) for publications and studies.

**About the Authors:** *Dr. Lisa Skumatz is a “hands-on” economist with The Econservation Institute and the Boulder-based research and consulting firm Skumatz Economic Research Associates, Inc. (SERA) ([www.serainc.com](http://www.serainc.com)). For 20 years, Dr. Skumatz has helped communities across the US analyze practical economic and policy issues in solid waste. Her work concentrates on program evaluation, benchmarking, cost-effectiveness and rates for the variety of solid waste programs. She has published extensively, and is best known for her work in incentive-based rates (Pay as you Throw and “Garbage by the Pound”) and for her work on detailed analysis of single stream recycling. Dr. Skumatz has a strong “numbers” orientation – focusing on “what real-world, operating programs tell us”. She maintains a database of recycling in more than 1,300 communities across North America, and has analyzed recycling features that increase diversion and cost-effectiveness in different situations. Dr. Skumatz was awarded national lifetime achievement awards in 2001 by the National Recycling Coalition and in 2007 by the International Solid Waste Association of North America (SWANA). She is a board member of NRC, former board member of and Colorado’s CAFR and Washington’s WSRA, Colorado’s SWANA Board, and a member of SWANA and numerous other state and regional recycling associations. Dr. Skumatz attended the University of Wisconsin for her undergraduate work and her Ph.D. in Economics is from The Johns Hopkins University in Baltimore.*

*Ms. D’Souza and Ms. BeMent are long-time Research Analysts with Econservation Institute and SERA. Their work focuses on community interviews, best practices, surveys / data collection and analysis related to PAYT and resource conservation assessment.*

### **Suggested Citation:**

Skumatz, Lisa A., Ph.D, Dana D’Souza, and Dawn BeMent, 2015, “Pay as you Throw / Variable Rates for Trash Collection: 2014 Update”, The Econservation Institute, Superior CO, Prepared for USEPA Region 9, February.

# I

## 1. Executive Summary

---

Pay As You Throw (PAYT) programs (also known as volume-based, or variable rate programs) charge residents for collection of their solid waste in relation to the volume of trash they set out for collection. This kind of “fee-for-service” option provides strong and effective incentives for reducing trash and increasing recycling and related “diversion” behaviors that are not present in the traditional “unlimited collection for a fixed fee” trash collection model. PAYT programs are in place in all but one state, and the variety of programs in place across the US show they are flexible and easily tailored to a community’s situation. The programs can be delivered by monitoring can volumes, bags, or tags, and PAYT exists in communities with multiple private competitive haulers (“open market”), franchise / district arrangements, contracts, or municipal collection arrangements.

Research and hundreds of case studies show that PAYT (or, as this project frequently called them, “Recycling & Save”, because of the apparent negative connotations of the “pay” part of the traditional moniker) programs have been found to be the single most effective, and most cost-effective method of increasing waste diversion. Under PAYT programs, participation in recycling programs increases dramatically, and tons to landfill decrease on the order of 15-20% from the residential sector,<sup>1</sup> extending the life of landfill and disposal facilities. PAYT does not limit options for collection, but it allows customers that put out less trash to save money and get control over their municipal solid waste (MSW) bill.

The activities funded under this grant (2009-2014) were intended to facilitate growth of PAYT programs in EPA’s Region 9 states; however, the project had considerable “spillover” to other states – and even countries – based on the attendance at project webinars, and other contact during the conduct of the project. The project’s tasks included:

- Prepared and delivered multiple webinars on PAYT, including guest lecturers for community and hauler case studies;
- Workshop for tribal attendees within Region IX;
- Research / white papers on special PAYT topics including commercial and multifamily PAYT, hauler issues, and PAYT performance relative to other incentives like RecycleBank™;
- Provided on-line peer match work for communities contacting the PAYTNow.org website;
- Maintenance of a PAYT-dedicated website (paytnow.org); and
- Direct assistance with communities considering implementing PAYT.

On this last task, the extended period of the grant allowed us to work hand-in-hand with communities through the multiple stages necessary to move PAYT along, including:

- Training: Conducted phone consultations and trainings with staff, council, committees in the communities.
- Special Topics / Challenges: Conducted original or co-funded research on specific issues of concern in communities, or identified suitable articles in the literature to guide community progress on PAYT.
- Data Collection: Conducted and analyzed citizen surveys on PAYT (attitudes, behaviors, acceptability and other topics), provided guidance on waste composition and set-out surveys to allow Econservation to tailor analysis of rates and behavior change associated with potential adoption of PAYT;

---

<sup>1</sup> Skumatz, Lisa A., Ph.D., “Beyond Case Studies...”, Skumatz, Lisa A., and David J. Freeman, “PAYT in the US: 2006 Update and Analyses”, co-sponsored by Skumatz Economic Research Associates (Superior CO) and USEPA Headquarters (Washington DC), December 2006, and other publications, 1996-2004.

1 | Econservation Institute      Skumatz et al, “PAYT/VR Rates for Trash Collection: 2014 Update”  
762 Eldorado Drive, Superior CO 80027      Region 9 Pay as You Throw Grant Report-Volume 1  
303-494-1178      [skumatz@econservationinstitute.org](mailto:skumatz@econservationinstitute.org); [www.paytnow.org](http://www.paytnow.org)

- Feasibility and Rates Work: Analyzed community situation (status quo) and future plans to identify the relative suitability of various PAYT options, analyzed tonnage and cost changes, and developed rates scenarios for communities;
- Assistance: Provided other detailed technical assistance to a set of Region 9 communities considering implementing PAYT (Specifically, Kauai County HI, Maui County HI, Reno-Sparks NV, Sedona AZ, Chandler AZ, and Guam).

Outcomes from the project included:

- Helping get PAYT adopted in two of the communities (Kauai and Chandler).
- The grant funded a portion of the time needed to update the count of US jurisdictions with access to PAYT, finding the number of jurisdictions nationwide has increased to more than 8,900, available to greater than 40% of the US population. In addition, the research finds more than 85% of the residents in Region 9 have access to PAYT.
- Analyzed PAYT relative to other incentive options (RecycleBank™ and Recycling Rebates) (White Paper in this Document).
- Assembled case studies on commercial PAYT options.
- Assembled literature on other special topics in PAYT, including multifamily sector (included white paper) and the issue of small haulers (white paper in this volume).
- Developed PAYT customer surveys, set out research, rate research, and implementation plans for communities considering PAYT, and provided several dozen peer matches for communities contemplating PAYT (these documents are included in Volume 2)
- Crafted webinars on PAYT, including the special cases of small communities (Volume 2), hauler concerns, and other issues.
- Prepared a white paper for consideration of PAYT specific to Guam.

At the beginning of the grant project, the most recent data on Region 9 state PAYT adoption coverage ranged from 0% in Hawaii to 50% in California (See Table E.1). This project focused on updating the information and providing targeted technical assistance to local government in the Region 9 states with low PAYT adoption rates (AZ, NV, and HI). Our direct assistance and research found considerable growth in PAYT adoption in the Region 9 – particularly in Arizona and Nevada, and recently, Hawaii.

**Figure 1.1: PAYT Adoption Growth in Region 9 States**

	2006 (before grant)	2010 (Updated Count)	2010 (Updated Count)	
Region 9 Jurisdiction	PAYT Coverage- Percent of Jurisdictions in State	PAYT Coverage: Percent of Jurisdictions	PAYT Coverage: Percent of Population with Access to PAYT	Notes
California	50%	81%	91%	Many strong programs, but strength of programs in some areas of state varies
Arizona	2%	12%	75%	Strong in a couple major communities; Strength of program varies
Nevada	6%	65%	91%	Most programs provide fairly weak PAYT incentives
Hawaii	0%	1%	5%	Existing program (2014) is relatively strong

Volume 1 includes the original research on PAYT in Region IX and the review of PAYT research from the literature.

## Findings and Conclusions in PAYT

Research on PAYT during the last few years has continued to show that PAYT has a strong impact, and provides data that helps communities design to optimize the impact. Lessons include:

- Diverted Tons:** PAYT has a substantial impact on diversion, and results in recycling, organics diversion, and source reduction. These impacts seem to last with the program, as old and new programs were included in these analyses. The extant statistical studies show 17% diversion from trash cans (1/3 to recycling, 1/3 to organics, and 1/3 to source reduction)<sup>2</sup>, with 50%-plus increases in recycling tons.
 

**Optimal Design:** The impacts are stronger with more aggressive PAYT incentives, as reflected in percentage or dollar variations, up to a limit. Differentials of about 80% for double the service (e.g. the cost difference between total fees associated with 64 and 32 gallons, with that dollar difference repeated for additional 32 gallon service levels) bring about the same incremental recycling as programs that double the cost for service (sometimes called “a can is a can”). Reducing the cost differentials below “double” helps reduce the risk of not recovering fixed costs; it reduces revenue risk. The statistical work shows incentives less than 50% have lower diversion impacts. Communities with PAYT that want to increase diverted tons may look to see whether their incentives are within this range; if not, diversion should increase if incentives are adjusted.
- Commercial and Multi-Family PAYT:** Certainly the commercial sector pays by volume of service, but the distinguishing factor of PAYT that is parallel to the usual effective design in the residential sector is having no additional fee for commercial recycling – that is, embedding the cost of recycling in the trash fee. This combination of incentive and access (similar to residential PAYT) results in strong participation and diversion, and there are communities around the nation with this system. There are strong and realistic options available for PAYT in the commercial sector – including options for small businesses and large / all businesses. Some require a minimum 96 gallons of “free” (really, embedded) recycling service; others establish ratios of recycling service equal to 50%, 100% or 150% of the trash volumes. Even if the incentive / access problem isn’t solved universally, some communities have addressed the problem for small businesses by requiring 96 gallon minimum service or by adding small commercial to the residential program at zero (or nearly zero) fee. This is critical to moving the commercial sector forward, and is the next sector to tackle after residential PAYT. Unfortunately, there are no magic variations of PAYT (or even strong recycling designs) that have yet arisen to address large multifamily buildings, although the buildings can be treated as commercial and subject the owners, at least, to the incentive and access advantages previously described.

---

<sup>2</sup> See publications including Skumatz, “Pay As You Throw in the US: Implementation, impacts, and experience”, Waste Management, September 2008; Skumatz, “Measuring Source Reduction: Pay As You Throw / Variable Rates as an Example”, Skumatz Economic Research Associates Technical Report (5/2000), on EPA website; and articles in *Resource Recycling* 6/2001, 8/2000, August-Oct 1999, 8/97, 9/96, and others continuing back to the late 1980s. Also see Skumatz and Freeman, “Pay As You Throw in the US: 2006 Update and Analyses”, for EPA and SERA, 12/2006 on EPA and serainc.com websites; and Skumatz, “Beyond Case Studies: Quantitative Effects of Program Choice on Recycling and Green Waste Programs”, SERA, July 1996; Skumatz and Rogoff, “Pay As You Throw – Now...”, APWA Reporter (March 2010), Skumatz, “Frequently Asked Questions about PAYT” on [www.paytnow.org](http://www.paytnow.org), among others.



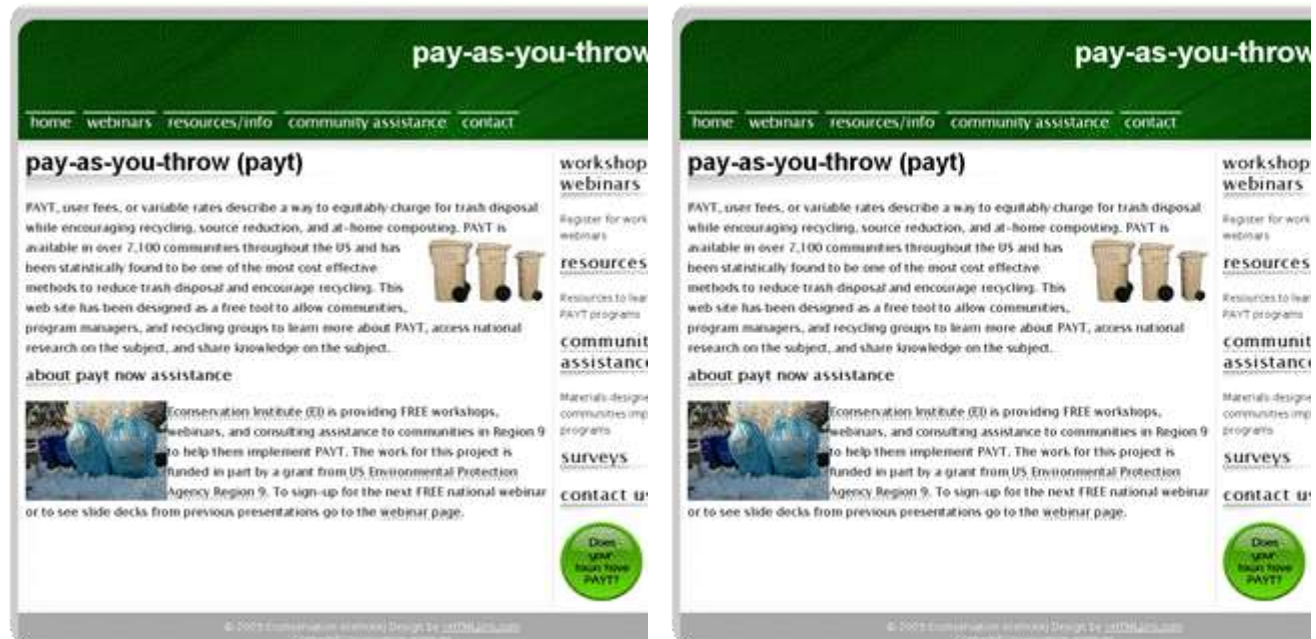
- **PAYT remains the Most Effective and Cost-Effective Option:** The introduction of a well-designed PAYT program diverts 17% of the tonnage disposed in trash cans. Because the programs can be implemented inexpensively (hybrid programs, bag, and tag options are especially economical), PAYT ends up being the most cost-effective “tool in the toolbox” for recycling coordinators and communities. Even Cadillac PAYT programs are inexpensive per ton – as long as there is some organized recycling collection or a convenient recycling drop-off system in town. Further, PAYT is user-funded or self-funding. It does not directly cost the community budgets anything, and can be implemented even in hauler-based systems using ordinances, or other means. Quantitative analysis indicates PAYT is more effective and cost-effective than RecycleBank™ or recycling credit programs, partly because PAYT encourages more than just recycling (also reduction and composting), and partly because the programs are not costly to implement – especially to town budgets.
- **PAYT doesn’t necessarily hurt small haulers:** Residential PAYT, implemented with the preferred design (including recycling at no separate cost, but embedded in the trash bill) is a benefit to the haulers operating in the area. If PAYT is required in a community or a bid, the hauler is not being asked to provide the recycling service gratis; they are to be paid, but through everyone’s trash bill, rather than through a voluntary fee. This allows the hauler to expand their service – and their revenues – and they may recover costs and profit to provide an additional service that is now mandated by the community. Some small hauler barriers are easily handled (simple billing systems, or avoiding billing entirely by using bag or tag programs). Costs of containerization for trash or recycling – if required – can be a real barrier for small haulers, but leasing of containers from manufacturers may be an option, paid back through an extra \$1 or so (per can) per month embedded in customer trash bills.
- **PAYT isn’t uncommon and continues to spread:** PAYT is now in nearly 9,000 communities nationwide. Effective program models are in place in the vast majority of states, and continue to spread to this day. Depending on definition, more than 25% (and up to 40%, depending on whether weaker programs are included) of the population has access to some form of PAYT program. Nearly 60% of the largest communities in the US have access to PAYT; some programs are weak design, but quite a few are traditionally-designed PAYT programs with multiple sized cans and rates with large enough differentials in price to strongly encourage diversion.
- **PAYT – Weak vs. Strong and Best Practices:** PAYT, if simply defined as paying more for more trash, is in place in many thousands of communities nationwide. However, many are PAYT “in name only” and provide fairly ineffective incentives for diversion and reduction (large containers, small price increments). Options provided by sized containers or multiples of containers can be successful (and work well with automated collection) but strong programs provided by pre-paid bags or tags are also common. Hybrid programs, allowing households to set out a certain volume of trash as part of their tax (or other fixed) bill, and tacking on a bag or tag program for extra trash has also been a low-cost PAYT option. The best, and most effective PAYT programs have:
  - **32 gallons or smaller as a weekly service size option.** This may be achieved by bag, tag, or can, and small service levels can sometimes be achieved through every-other week collection. Mini and micro-cans of 10-19 gallons are offered in some communities. Service is often



offered as multiples of 30-32 gallons (by containers or bags); 45 gallon containers are not uncommon.

- **Have convenient recycling available** – collected curbside or through convenient drop-offs. “Defining” the minimum compliant recycling program is important; indicate the minimum materials that must be accepted (consistent with local processing capabilities), and at least every-other-week collection of recyclables is a successful definition.
  - **Have parallel containerization**: If haulers provide trash containers, they should also be required to provide containers for recycling, or a barrier to recycling is created.
  - **Have effective rate incentives**: The research indicates (Skumatz 2007, 2013) that strong recycling is achieved with 80% extra charged for double the volume of trash service (e.g. \$10/mo for 32 gallons, \$18 for 64 gallons, and containing that dollar differential, \$26 for 96 gallons). Differentials below 50% do not change behavior (or tons) as substantially. Dollar differentials of \$7-12 should be considered a minimum; the incentive should be based on the higher of the dollar or percentage differentials noted in the research.
  - **Consider clarifying education responsibilities**: Successful programs identify education responsibilities for the community and the hauler(s), especially if PAYT is mandated by ordinance.
  - **Consider reporting**: Similarly, PAYT ordinances frequently require haulers to report the tons of trash and tons of recyclables collected in the community. This helps track progress, address stalls, and compare program effectiveness after changes.
- **Energizing Existing Programs**: Communities with stalled recycling and PAYT should consider checking whether the rate differentials should be revised to be consistent with the research; higher recycling can be achieved if 50-80% differentials are charged for double the service (assuming small container sizes like 32 gallons are available).

Figure 1.2: Screen Shots of PAYTNow.org Website



## 2. Introduction to PAYT – Background and Frequently Asked Questions

---

There is a considerable amount of background research on PAYT.<sup>3</sup> Communities have been implementing Pay As You Throw (PAYT) trash rate incentives in earnest since the late 1980s – as of today, they are in place in more than 9,000 communities. The programs can provide a cost-effective method of reducing landfill disposal, increasing recycling, and improving equity, among other effects. ... To learn more about how these popular programs really work, read on!

### **What is PAYT?**

Pay as you throw (PAYT; also called variable rates, volume-based rates, and other names) provide a different way to bill for garbage service. Instead of paying a fixed bill for unlimited collection, these systems require households to pay more if they put out more garbage – usually measured either by the can or bag of garbage. Paying by volume (like you pay for electricity, water, groceries, etc.) provides households with an incentive to recycle more and reduce disposal.

### **Are there different kinds of PAYT Systems? How do they work?**

PAYT systems are generally categorized into five major types:<sup>4</sup>

►► **Variable can or subscribed can:**

In this system, households sign up for a specific number of containers (or size of container) as their usual garbage service, and get a bill that is higher for bigger disposal volumes.



- **Bag programs:** Households purchase special logo-ed bags (city or hauler logo, depending on the collection arrangement). The price of the bag includes some or all of the cost of collection and disposal of the amount of waste in the bag. Some programs have a customer charge or base fee in addition to the bag fees to help make sure they cover fixed costs. For convenience, bags are usually sold at convenience and grocery stores in addition to City hall-type outlets.



- **Sticker or tag programs:** Households purchase special tags or stickers to put on their bags of garbage. The sticker price includes some or all of the cost of collection and disposal of the amount of waste in the bag. As with bag programs, some programs have a customer charge or base fee in addition to the sticker

---

<sup>3</sup> This section draws largely from the 2008 document published Skumatz, Lisa A., “Frequently Asked Questions (FAQs) about PAYT”, available on the [www.paytnow.org](http://www.paytnow.org) website.

<sup>4</sup> Skumatz, Lisa A., Ph.D., “Variable Rates in Solid Waste...”, Manual prepared for EPA Region X, 1990.

fees to help make sure they cover fixed costs. Bags are usually sold at convenience and grocery stores in addition to City hall-type outlets.



- ▶▶ **Hybrid programs:** In this system, households only pay for waste beyond a specified “base” set out volume. They pay a fixed bill or a tax bill that entitles them to a first can or bag of garbage (size limits are usually around 30 gallons). Then, additional waste is charged on a per-bag or per-sticker system as described above. This system is a “hybrid” between existing garbage programs and the new incentive-based approach, and minimizes billing and collection changes.
- ▶▶ **Weight-based:** Under this program<sup>5</sup> — customer garbage cans are weighed on the back of retrofitted collection trucks, and the household is charged for the pounds of waste it actually disposes. This system is fairer, and communities can use large cans but still provide a strong recycling incentive.
- ▶▶ **Drop-off and Other systems:** In addition, some communities have a drop-off program, where customers pay by the bag or weight at transfer stations using fees, bags, stickers, or pre-paid punch cards. In addition, some haulers offer PAYT as one option, or customers may choose unlimited collection for a fixed fee.

#### **How common are PAYT or Variable Rate Programs?**

PAYT is in place in thousands of communities (8,955, according to the latest research by Skumatz Economic Research Associates). This has grown substantially since the late 1980s, when only a few over 100 communities had these programs in place. Programs are in place in all but one state; more details on the numbers and states with programs are provided in the next chapter.

#### **Do most communities use the same system?**

The most common PAYT system is the variable can program – and the percentage is growing as communities adopt fully automated collection programs. The next most common systems are bag programs (about 25%), hybrid (15%), and drop-off, sticker / tag, and optional programs. There are regional patterns in the system types. The west and southeast is predominantly can-based programs (they are often automated); hybrid programs are more common in the Rockies, bag / tag / sticker in the Midwest and northeast, Mid-Atlantic, and south central.<sup>6</sup>

#### **Are all the programs in small communities?**

PAYT programs are in communities with populations ranging from 100 to over a million.<sup>7</sup> The average sizes of communities adopting PAYT can programs is 20,000, and range between 10-15,000 for sticker and tag programs.

---

<sup>5</sup> The first system was piloted in Seattle, and was called “Garbage by the Pound” (GBTP). For more information see Skumatz, “Garbage by the Pound...”, Resource Recycling, 1989. This technology, designed for GBTP, was later adapted as a recycling reward program, called RecycleBank™; see [www.recyclebank.com](http://www.recyclebank.com).

<sup>6</sup> Skumatz, Resource Recycling, 1999.

<sup>7</sup> Skumatz, Biocycle, 11/95.

### **Why are communities adopting these programs?**

These programs increase equity, dramatically reduce disposal, and allow recycling households to save money (as well as offering environmental and cost benefits). Our community surveys find common reasons for adopting PAYT include: rising landfill/disposal costs; adoption of diversion goals; reports of successful programs, and legislative mandates. Most commonly cited sources for information on PAYT from communities adopting the programs were: case studies, neighboring community (hence the regional patterns in adoption), and trade journal articles about successful programs.<sup>8</sup>

### **Aren't these programs mandated in some states? Are there effective local regulatory options?**

Some states have implemented legislation and policies around PAYT. For many years,<sup>9</sup> four states mandate PAYT with some caveats. One state includes PAYT as one of a menu of program choices from which communities must select. Thirteen states offer financial incentives or grants with PAYT preference, and 33 actively offer promotion or education about PAYT, and many others have voluntary recommendations. As of 2015, Vermont recently added strong PAYT legislation (detailed in the next chapter).

In states without legislation, some communities have been implementing local ordinances requiring any hauler operating in the area to use PAYT rate structures for trash.<sup>10</sup> It creates a level playing field, avoids rate “setting” (structure only), and provides a PAYT recycling and diversion incentive.

### **Why should communities consider implementing PAYT? Do they really reduce disposal?**

It is critical for communities to have realistic expectations about what will happen if they implement PAYT. Data from more than 1,000 communities around the country was used to identify the impacts of PAYT above and beyond any other recycling or yard waste program differences, demographics, and other factors. The research showed the following impacts on residential solid waste:<sup>11</sup>

- ▶▶ Disposal decreases by 16%-17%
- ▶▶ Increases in recycling of 5-6 percentage points or 5-6% of residential waste generation (usually about a 50% increase in current recycling)<sup>12</sup>
- ▶▶ Increases in yard waste diversion of about 4-5 percentage points
- ▶▶ Source reduction of about 6% of generation

---

<sup>8</sup> Skumatz, *Biocycle*, 11/95.

<sup>9</sup> Skumatz and Freeman, “2006 PAYT Update...”, 2006.

<sup>10</sup> usually with embedded recycling costs

<sup>11</sup> Skumatz, *Resource Recycling* 9/1996, 8/2000

<sup>12</sup> Analyzing Iowa communities, Frable, 1994, found an increase of 30% to 100% with an average of 50% increase in recycling tonnages.

- I
- ▶▶ Overall, a town with 100,000 tons of residential disposal could expect to see a reduction to about 84,000 tons. Recycling tonnage would increase by about 5,500 tons, and yard waste programs would see an additional 4,500 tons. About 6,000 tons would be avoided through waste prevention, based on the study's estimates.

The research indicates that adding a PAYT program is the single most effective change a community can make to increase recycling. According to the research, PAYT increases recycling more than adding a new material, changing collection frequency, or many other potential program design or collection changes.

### **What about impacts on costs, customer acceptance, and other changes?**

- ▶▶ **Cost impacts:** Based on detailed interviews, communities report that long term system costs are reduced; and the majority of communities in state surveys report short term system costs did not increase either. In two state surveys<sup>13</sup> (WI, IA), about two-thirds of the communities reported that short-term system costs were lower or stayed the same after PAYT was implemented. Only one-third reported increases. These results show you can make “sensible” choices in PAYT that minimize costs and “fit” well with the community.
- ▶▶ **Disposal Savings:** Don't forget that in addition to savings in disposal tipping fees (perhaps 16%, but net out the recycling and yard waste program cost impacts), the programs can also allow communities to delay building a new landfill, and this results in real financial savings. Reducing 16% of the disposal extends the lifetime of the facility by one-sixth – and similarly decreases the money that needs to be set aside for a new facility and for closure costs because the funds can be accumulated over a longer period.
- ▶▶ **Buying habits:** Reported results of customer survey research indicated 76% have purchasing decision-making affected by PAYT, and that PAYT has a demonstrable effect on waste-generation and buying habits.<sup>14</sup>
- ▶▶ **Cans set out:** Households put out fewer garbage cans for collection after PAYT is implemented – partly because of declines in tonnage, and partly because cans are “stuffed”. (dubbed the “Seattle Stomp”). Seattle (WA) cans reduced from 3.5 30-gallon cans to 1.0 with PAYT and new programs; Hoffman Estates (IL), decreased from 3.1 units to 1.3 stickered bags. Many communities report 1-1.5 30-gallon equivalents after a variable rates program -- important for setting rate levels.<sup>15</sup>
- ▶▶ **Customer Satisfaction:** Multiple community surveys indicate more than 90% of customers are pleased with systems after they are implemented – and they don't want to return to the old system because PAYT



<sup>13</sup> Frable, 1994 for Iowa, and Wisconsin DNR studies (citation to be completed)

<sup>14</sup> Skumatz 1993, “Variable Rates for Municipal Solid Waste...”, for the Reason Foundation, Los Angeles.

<sup>15</sup> *Ibid.*



is fairer.<sup>16</sup> However, the challenge is getting the systems accepted prior to implementation. Change is always difficult.

### **Aren't there environmental benefits too?**

Considerable attention has been paid to this issue. One study<sup>17</sup> estimated the tons of emissions reduced through PAYT programs, and then computed the dollar value of these greenhouse gas (GHG) reductions using valuations from the environmental literature. The study estimated that these environmental benefits were worth an additional \$1 to \$6 per ton.

An especially important point to realize is that solid waste programs can be both cheaper, and quicker to implement than other methods of achieving GHG reduction goals – even though energy and transportation receive the most attention for GHG goals. One community found that fully 40% of the first couple years of progress they had made in reaching sustainability goals had been attributed to their solid waste programs.<sup>18</sup>

### **Don't the programs lead to increased illegal dumping?**

Illegal dumping is one of the first worries when communities consider going to PAYT. However, in reality, dumping does not appear to be a serious problem, based on research in PAYT communities. Illegal dumping exists in virtually every community now -- the question is whether illegal dumping will increase significantly in response to a new PAYT system. One complicating issue is that very few communities have quantitative information on how big a problem illegal dumping is before they put in new rates – making it tough to compare changes. However, because illegal dumping is almost always a fear, and because people will be looking for dumping, illegal dumping will be noticed, whether or not it actually increases over pre-PAYT levels.

Several studies have attempted to address the illegal dumping issue (based on interviews with more than 500 PAYT communities), and the conclusions are:



►► **Low Incidence:** Illegal dumping is a problem in a minority of communities (about 20-25%), and all the communities surveyed said the problem was short term and illegal dumping should not be considered a barrier to PAYT. The research showed the program was a much bigger fear up-front than real experience after implementation.<sup>19</sup>

►► **Strategies:** The illegal dumping problem can be addressed and can through a variety of enforcement strategies.<sup>20</sup>

---

<sup>16</sup> *Ibid.*

<sup>17</sup> Skumatz and Freeman 2006, "2006 PAYT Update...", SERA / EPA.

<sup>18</sup> Insert citation here

<sup>19</sup> Skumatz, 1993, "Variable Rates for Municipal Solid Waste Officials...", SERA, Superior CO)

<sup>20</sup> Skumatz, et.al.1994, revised 2001, "Illegal Dumping...", [www.serainc.com](http://www.serainc.com).

▶ **Not Caused by PAYT:** The majority of illegally dumped material is not residential in origin – indicating residential PAYT/VR programs are not a large source of the problem.<sup>21</sup>

▶ **Bulky Items:** Incorporating a bulky waste collection program (by appointment, limited number of “free bulky” tags, a charge per item, or other strategies), can go a long way toward reducing the potential illegal dumping problem, and helps make sure the PAYT program works for all residents, not just the “average” resident.<sup>22</sup>

### **Isn't PAYT Unfair for Low-income Customers and Large Families?**

Concerns are often raised that PAYT programs might be unfair to large families. It is important to separate concerns about large families from concerns about low-income households. Addressing just the large family issue, consider turning the argument around. Has it been fair all these years for small disposers to be subsidizing large disposers all these years under fixed bill (or nearly fixed bill) systems?

Opportunities to reduce waste are available to all households (recycling, etc.) and those who limit their waste can get control over a bill they previously could not reduce. Although there is some relationship between family size and amount disposed, all households have opportunities to reduce. In most communities, large households do not generally receive discounts on water service, groceries, or other services that might also vary by family size. Subsidies for large families for garbage are not as easily justified as subsidies for low-income families.

One place this concern may be more important is the combined impact on large, low-income families. A consulting firm (Skumatz Economic Research Associates) conducted a specialized study of low-income strategies. The study found that low income or elderly discounts are provided in less than 10% of communities with PAYT.<sup>23</sup> The report also details certification issues, and methods for administering the program.

### **What Do We Do About Multifamily (MF) Buildings?**

When PAYT systems are implemented, they commonly include various combinations of garden apartments, town houses, condominiums, and apartments of about 6 or fewer attached units. These buildings can usually be signed up and treated similarly to single family dwellings.

Although the PAYT systems have not historically been available for large apartment buildings with shared “chutes”, recall that these larger multifamily buildings are already receiving a volume-based signal (although at the building and not the tenant, or generator, level) through dumpster charges, which are charged based on cubic yards of service. A few communities have recycling fees in MF trash rates, there are a few examples of tenant-based bag systems, providing in-unit containers or bags, parallel placement of recycling and trash containers in the building, and a great deal of attention on education. Contamination, space, tenant turnover, and lack of incentives have frustrated even hauler “bounty” approaches and “building recycling champion” programs in some communities. One leading community that was frustrated with lack of progress in the

---

<sup>21</sup> *Ibid.*

<sup>22</sup> *Ibid.*

<sup>23</sup> Skumatz, “How Can Low Income Programs Work...”, SERA, Superior, CO, [www.serainc.com](http://www.serainc.com).



sector opted to bring materials to a mixed material MRF (“dirty MRF”) to increase diversion. Many programs and technologies have been piloted; however, there is no widespread program in place in large multifamily structures.

However, the most important take-away for the multifamily sector is that implementation of PAYT in the single family sector should not be delayed awaiting a multifamily answer; the direct incentives are easily implemented in the single family sector, in a variety of well-demonstrated, and cost-effective designs. Keep an eye on multifamily, as new approaches are often being tried, including some from other countries.

### **Won’t it increase Workload and Costs?**

Of course, this answer varies town to town, based on the specific solid waste system that the City starts with, and the changes required by the system the town implements. However, some evidence was provided by surveys conducted by two states – Iowa and Wisconsin. These states asked PAYT communities whether the workloads increased, decreased, or stayed the same after implementing PAYT. They found that roughly 55-65% said their workloads stayed the same or decreased;<sup>24</sup> and nearly two-thirds stated that costs stayed the same or decreased. And the program discourages overuse of solid waste services, so in the long run, communities should have lower costs than if solid waste behaviors had continued unabated.

### **I’m worried about revenue shortfalls – what’s the story?**

Traditionally, solid waste revenues are based on fixed bills or tax payments – fairly reliable revenue sources. PAYT programs, because they depend on customer behavior choices, will inherently lead to more volatile revenue streams than systems with fixed bills. This is very commonly a concern both for haulers and for municipalities. Revenues are no longer based on a stable number like households, but rather on the number of individual *bags* or *cans* of waste sold/disposed. The number of bags disposed can vary month-to-month and week-to-week, based on diversion program availability, seasonal factors, advertisements and promotions, and many other factors, and this can cause revenue headaches.

However, several strategies can help reduce the potential volatility:

- ▶▶ **Up-front research:** Use the numbers from the research on disposal and program impacts listed above.
- ▶▶ **Pick a less volatile PAYT/VR system:** There are differences in the relative revenue volatility associated with different PAYT/VR programs. If revenue uncertainty is a primary concern, systems with less revenue volatility include variable can or hybrid programs, or bag/tag programs that include a customer charge. In these programs, every customer is at least paying some amount every month – whether for a minimal container or customer charge – helping provide a reliable base set of funding to support the program.
- ▶▶ **Reduce the aggressiveness of the “rate incentives” for recycling:** If the reliable size of the difference in rates between service increments – that is, the cost of an extra can or an extra bag of garbage – is set

---

<sup>24</sup> Frable, 1994, Iowa DNR.

low, then revenue variations based on number of garbage set outs will have a smaller effect on revenues. Thus, revenue variations would be low. Under this system, the “first can” rate, or the “customer charge” would tend to be higher. However, adopting a rate system with very low incremental rates for more service will 1) not provide much incentive for reducing garbage, and 2) will resemble a flat fee, so it may not be worth the administrative hassle of implementing the change! A balance between revenue volatility and incentives must be found to make the PAYT system most successful. In a detailed study (Skumatz 2001, updated 2008, 2013), the research showed that recycling impact are strong even if the difference between can fees are only 80% more for twice the service – so an incentive can be provide, but revenue risk reduced over “can is a can” pricing.<sup>25</sup>

### **Is PAYT waste disposal pricing difficult to administer?**

Anecdotal evidence from interviews with hundreds of PAYT communities (conducted by Skumatz Economic Research Associates) indicates that in most cases, after initial efforts to educate customers about PAYT, the programs “run themselves”. However, as with most programs, there can be certain administrative challenges that need to be addressed depending on the community. However, statewide surveys in Iowa and Wisconsin found that nearly 2/3 of the PAYT communities reported no additional workload or cost from implementing the PAYT program. This indicates that: 1) PAYT programs don’t have to be expensive or troublesome to implement, and 2) the programs are flexible enough that communities can make intelligent choices that help minimize disruption from PAYT programs. Communities can reduce the administrative load by picking a program that:

- **Blends well with the current (or planned) collection system:** if customers are currently using cans, with manual collection, selecting variable can or hybrid programs may cause minimal disruptions. If bags are common, incorporate a bag, tag, or hybrid program. If you are moving toward automation, a variable can (or weight-based) program will be much more suitable than other choices.
- **Blends well with the current billing system:** If the community does not currently have a mechanism to bill different rate levels, opt for a hybrid, bag, or tag program. Then the community can bill a fixed amount (or no bill), and the extra bags or tags are pre-paid – no bills are needed. Alternatively, the community can have grocery or convenience stores sell the bags or tags, and then the community only needs to invoice these stores for the bags – no “billing” for customers is needed.

### **Won’t citizens resist – won’t they see PAYT as less service for more money?**

Certainly, any change always leads to confusion and resistance to change. Even though there is generally resistance to change prior to implementation, numerous surveys have indicated that these programs are perceived as fair and are very popular after they have been implemented – upwards of 90% of residents are happy and prefer the system to past payment methods. A review of surveys from communities across the nation (conducted by SERA) finds customers routinely view the programs as fair, and they end up being very popular with residents after the fact.

Getting customers to accept the change in the first place is the tricky part. Equity is a big part of the effort to “sell” the PAYT program. Public education is strongly emphasized by all communities to improve success of the

---

<sup>25</sup> Skumatz, *Resource Recycling*, 6/2001

PAYT program. All systems also establish weight limits for the cans and containers, to address both safety and equity concerns.

However, the perception that the new program results in higher rates and provides less service for more money is something that some residents (and potentially the press) may latch onto. Several points are worth mentioning. First, recall that “rates” are not the crucial element. Rather, “bills” are what customers pay, and customers now have some level of control over their bills – control they did not have under fixed bill or tax-based systems. Bills are based on rates AND customer choices about the level of service they choose to use. Those willing to recycle and reduce can now save money and lower their bills. Second, make sure they understand that the rates provide them with multiple services (if it is true!) – including garbage, recycling, and yard waste programs. The toughest part of the “sell” is getting customers to recognize that they aren’t paying more (on average) than they were before. This is especially difficult if the charges were previously embedded in the tax bill and they didn’t know what they were paying. Some communities recommend “line-iteming” the tax bill for a year before the change to point out the cost of solid waste management. PAYT/VR can help reduce current and future solid waste management costs; getting that message across to residents is an important part of the education program. To improve acceptance, education needs to emphasize:

- ▶▶ Why the community is making the change, and what you are trying to accomplish
- ▶▶ Options available to residents to reduce and recycle
- ▶▶ Previous bills and costs, and new bills and rates
- ▶▶ How customers can work with the system to reduce their costs
- ▶▶ Special collections, programs, etc.

### **Won’t haulers resist this change?**

Haulers (large and small) across the US offer these programs. In some cases, the haulers are under contracts with municipalities; in other cases the haulers offer the program community-wide, provide service through private contracts to citizens, or offer PAYT as an optional alternative to unlimited collection. In truth, haulers are very familiar with these programs. PAYT has been well publicized, and exists in thousands of communities nationwide. If concerns like revenue risk, workload, and education can be overcome, haulers basically will offer whatever citizens or communities want. Involving haulers in the program design, and providing a level playing field – requiring all haulers to offer the program – will help haulers make sure the program is well-suited to your residents and their waste behaviors. However, make certain that the concerns about revenue risk do not lead the haulers to offer rates that vary too little with increases in service – limiting the incentive for customers to recycle (see discussion of revenue risk above).

### **Can PAYT work in areas with Multiple Haulers?**

Many communities with multiple haulers have successfully implemented PAYT. Nationwide surveys conducted by Skumatz Economic Research Associates (SERA) finds that more than 10% of the surveyed communities with PAYT had multiple haulers operating in the area under the program. The studies find that if one hauler introduces PAYT, the other haulers end up also offering the program. Haulers in the area know and bill their own customers under the can-based system – no special considerations are needed. In areas that use bag or sticker programs, customers just purchase the color of sticker or bag associated with their particular hauler.

Haulers are usually concerned about revenues, and the revenue tips above can be helpful. Haulers are familiar with the system, and working with them can speed implementation. The fastest implementation of PAYT that the authors have identified was in a county with multiple haulers. The County sat around the table with the haulers, refined the design of the sticker system, and implemented the program in 3 months. The system has been running successfully for more than a dozen years.

### **Can PAYT work in areas without mandatory garbage service?**

A significant number of communities with PAYT/VR do not require mandatory refuse collection by residents. This has not generally been found to be a problem. Revenues and rate setting are slightly more complicated in this case, but not significantly so. However, if collection is not mandatory in surrounding areas (like the County surrounding a town) and there has been a history of County residents avoiding collection by bringing waste into town, the new charges may cause some initial problems regarding ownership of waste and complaints about paying for more service than the bill payer actually disposes. This has not been a significant problem in other communities. Non-mandatory collection has not been a barrier to PAYT elsewhere.

### **Can PAYT work with automated collection?**

Automated collection is efficient, and can lead to significant labor and routing savings. Automated can-based PAYT collection is easily accomplished, and enforcement of can subscription levels is straightforward. Some raise concerns that automated collection has two features that complicate PAYT:

- Containers: Can-based PAYT requires specialized carts that fit the gripper arms, and small containers can slip in the arms or tip in wind, and are as expensive as large containers. Some communities are addressing this issue by allowing an option for fortnightly trash service.
- “Extras” in bags outside the specialized carts cannot be accommodated efficiently with automated collection. Extra fees keep these percentages low.

### **We’re putting out an RFP for service – are there issues we should cover or sample language to help me change to PAYT/VR?**

The website associated with this project includes solid waste ordinances, tips for the procurement process, and samples of language for penalties for poor performance, language for separation (ending the contract), and other language and tips from communities around the country.

### **How long does it take to implement PAYT?**

The amount of time it takes to implement PAYT programs varies from as little as 3 months to communities that are still studying the system after several years. Frankly, although billing system delays or technical issues are sometimes a factor, technical issues are seldom the problem in implementing PAYT. PAYT programs have tremendous flexibility in their design and can usually be tailored to accommodate most concerns. Instead, political will is usually the largest stumbling block and source of delay for implementing PAYT programs. Recall, however, that once these programs are in place, more than 90% of residents prefer the new system.

Later sections of this document provide sample implementation steps and schedules from bag and can-based options for reference; however, each community differs.

### **Any Tips for Success?**

Based on interviews with hundreds of communities nationwide what have implemented PAYT, published work by the consulting firm SERA has assembled the following tips.<sup>26</sup>

- ▶▶ **Pilot test:** Consider implementing the program in one area of the city first, and then spread to other areas. Learning lessons about subscriptions, set outs, containers, and other problems in ¼ of your town are much less expensive than making a mistake citywide.
- ▶▶ **Billing:** billing jointly with water service, if possible, can provide strong advantages. If the ordinance is arranged so that partial payments are assigned to solid waste first, then non-payments can lead to shutoffs of water service, a strong payment incentive. Bad debt is quite low under these systems.
- ▶▶ **Involve others in design:** Assembling a citizen or stakeholder committee to help assess and design the program can help sell the program to elected officials, and can make sure that the program addresses concerns of major stakeholders. Although this process may appear to slow down the decision-making, it can often speed it in later steps and can bring support for the program when it most needs it. Don't forget to meet with related city departments, including financial, billing, enforcement, customer service, police, and others that may be affected by PAYT changes.
- ▶▶ **Don't pile on other costs:** If you are just implementing PAYT, try not to pick that year to do a major renovation to transfer stations or other upgrades that are not visible to residents. The increased costs, whether or not they are due to PAYT will be blamed on PAYT and will undermine the buy-in for the program.
- ▶▶ **Determine whether to make changes at once or more slowly and design education accordingly:** Some communities argue that implementing many changes at one time confuses citizens and makes the education process difficult. Others argue that customers don't want to have to make decisions about solid waste in a piecemeal manner, and want to "deal with it once".
- ▶▶ **Education and outreach:** None of the town interviewed wished they had done less education. This is a crucial component of a successful PAYT program.
- ▶▶ **Keep constant for one year:** If at all possible, keep the system and rates constant for at least one year to help build confidence in the program. Then the rates and program can be refined to account for unexpected outcomes.
- ▶▶ **Tracking / revising:** It is very important to track key indicators related to the program and its performance to assure that the PAYT program is achieving its objectives and that the program is sustainable. Items to track include container subscriptions or sales of bags / tags; enforcement issues;

<sup>26</sup> Skumatz, *Resource Recycling*, 8/97; multiple manuals

revenues; costs; time spent by various staff; tonnage changes by programs, etc. Use this information to gauge program progress, cost-effectiveness, and to provide a head's up for needed changes.

- **Keep key groups informed:** Use the monitoring information to provide feedback to program staff, elected officials, and others to keep them informed about program momentum and successes. Be sure to note problems and timely corrections as well, to make it clear you have a handle on the program and are making sure it is on track and as efficient and effective as possible.

### **Where can we get more information on these systems?**

There are many journal articles, research papers, and manuals on PAYT systems. A list of publications and reports is included on the project website ([www.paytinfo.org](http://www.paytinfo.org)),

### **Have there been PAYT failures?**

There have been relatively few instances of cancelling PAYT programs at the community level, once it is in place. Sometimes private haulers that offer PAYT change ownership or decide for other reasons to cease offering PAYT. One noteworthy community in Maine passed and then defeated the program after it had been in for a while. The program led to a reduction in trash tonnage from 7800 tons per year to 3400 tons; however, it was viewed as punitive (not a reward), and was a divisive issue. Education was considered a driver in the program's failure, and in some communities, the name is being changed to something more "friendly-sounding" than Pay As You Throw.

### **Is PAYT the right answer for all communities?**

Simply put, no. A number of factors affect the feasibility of these programs in a community, including: collection system type; availability and relative cost of recycling and diversion programs; recycling markets; disposal costs and lifetimes; acceptability / support; and "fit" with the community's short- and long-term goals. The programs might not be feasible because of timing issues, economics, local factors, or other considerations.

However, these programs are uniquely suited to increasing recycling, yard waste diversion AND waste prevention. They help reduce system costs, and improve equity, and most communities should at least examine these systems to see if they make sense. And the potential of the programs should be re-examined every few years as conditions, priorities, and options change. These programs can be an important part of an integrated, cost-effective solid waste system.

### 3. PAYT Community Count

---

#### 3.1 Summary / Background

One of the early efforts undertaken by the grant project was to update the count of communities in Region IX with access to PAYT. To put these figures in context, we also present the latest information the authors have collected on a nationwide count of PAYT communities – work that has been undertaken nationwide on a periodic basis since the 1980s.<sup>27</sup> This count update, conducted as an early task in the grant effort in 2009 and 2010, showed real progress. The later part of the grant focused on providing direct assistance to communities in Region IX working to implement PAYT. The findings for the update to the 2006 count, conducted in 2009 and 2010 found:

- **Updated National Figures:** Between 2006 and 2010, the count of communities increased to more than 9,000 (about a 25% increase from 7,100 in 2006), and the population with access to PAYT appears to have increased to about 40% of the US population.<sup>28</sup>
- **Pacific Southwest/Region 9 Status – A Leader:** Region 9's PAYT programs are dominated by California, a large state with 90% plus access to PAYT. This state's dominance, plus the presence of PAYT in several large communities in Nevada and Arizona, make Region 9 one of the leaders in PAYT nationally. The 2010 count indicates more than 85% of the Region's population has access to PAYT. However, the programs in both Nevada and Arizona are largely a weak PAYT design, with large minimum containers and limited extra fees for additional volume. This created a more muted incentive for reducing volume through recycling, composting, and source reduction than programs that have more aggressive rate structures. Hawaii has a new program, and other Hawaiian jurisdictions are considering PAYT. California's large population, and PAYT program prevalence, still makes Region IX among the leaders.
- **Most Growth:** Hawaii gained a program (and is considering others), leaving Louisiana as the only state in which we found no PAYT program access. States that appeared to have relatively program growth between 2006 and 2010 included: AK, AL\*, AR, AZ\*, DE\*, GA, ID\*, KS, KY\*, NC, NV, OK, SC, TN\*, TX, and WY. The states with asterisks are states in which most of the program designs have weak PAYT incentives.
- **Greatest Population Covered:** The states with the largest share of population with access to PAYT (two-thirds or greater) include: AK, AZ\*, CA, IA, KS, MN, NV, OR, UT\*, VT\* and WA. Again, the states with asterisks have PAYT designs with weak incentives.
- **Lowest Population Covered:** The states with the lowest share of population with access to PAYT (20% or less) include: AL\*, CO, CT, FL\*, HI, KY\*, LA, MD, MS\*, NJ, NY, OH, SC, VA\* and WV. In some cases, this is because the population in the state is very concentrated in a couple of cities, and those

---

<sup>27</sup> This periodic PAYT count has been conducted as a proprietary product, privately funded, and only the count of communities (not their names) are released. The Region IX communities were updated using grant funds, and these communities are provided within this report.

<sup>28</sup> The percent with access does not necessarily reflect the percent using the programs. In many areas, haulers offer the programs in a region, but we cannot determine how many residents select that hauler or program.



particular communities do not have PAYT. In some cases, a considerable number of other communities in the State have access to PAYT.

- **Most with “Limited” Programs:** PAYT can be a sophisticated, well-designed program with a strong incentive. In other cases, the programs are more “limited” in nature – with a relatively small incremental fee for additional cans of trash (there is quite a continuum of programs in the US!). Our definition of a program would include various cart or volume options with sufficient price variation to induce behavior change. A strong (or fully variable) program would include cart sizes from 32 gallon (or smaller) and a price differential of more than \$5 per additional increment. For programs we find that have 96 gallon carts with no smaller sizes available and \$5 or less for an additional cart, we label these as very weak or extremely limited in that they do not provide much incentive to reduce trash volume. Those states with a high proportion of programs that are, definitely PAYT, but have relatively weak incremental incentives, include AL\*, AZ\*, DE\*, ID\*, KY\*, MS\*, NE\*, NM\*, TN\*, UT\*, and VA\*.
- **High Proportion of Drop-off Programs:** Another definitional issue with PAYT arises when determining whether to count PAYT programs that are drop-off only; that is, the communities pay more for more bags of trash at transfer stations, etc. In many cases, interviews indicate these were clear designs to provide PAYT principles in a rural location; however, this is not always possible to determine. States that our lists show have a fairly high proportion of their reported programs that are drop-off in nature include: DE\*, GA, MT, and SC.
- **Status in the Largest Cities in the US:** We examined the presence of PAYT In the largest 50 communities in the US.
  - Top 50: These communities include 48 million residents, or 15% of the US population. We found 29 of the cities (58%) and 49% of the population in these largest cities had access to PAYT programs (7% of the US population). Twelve of these programs were strong, well designed programs (small containers, incentive-based differentials), and they represented 22% of the population in these communities (3% of the US population). The remainder of the programs were extremely “limited” (large minimum cans, and/or relatively low extra charge for additional cans, on the order of \$5 or less; five were “extremely limited” with very small can differentials).
  - Top 100: These communities include more than 61 million residents, or 20% of the US population. A total of 62 of the cities (62%) and 52% of the population in these largest cities had access to PAYT programs (10% of the US population). Eighteen of these programs were strong, well designed programs, and they represented 20% of the population in the largest 100 cities (4% of the US population). Fifteen provided extremely limited (but non-zero) rate differentials for additional trash volume.
- **New Regulations:** We noted that a new state has been added to the list of those requiring PAYT in some form. WA, OR, and MN have previously done so; VT has recently passed legislation requiring PAYT in 2015. Vermont’s Universal Recycling law (Act 148) requires all Vermont municipalities (including solid waste districts, alliances, groups of towns, and individual towns—collectively Solid Waste Management Entities) to “implement a variable rate pricing system [also known as unit-based pricing] that charges for the collection of municipal solid waste from a residential customer for disposal based on the volume or weight of the waste collected.” This requirement must be met by July 1, 2015.

<http://www.anr.state.vt.us/dec/wastediv/solid/documents/VariableRatePricingGuideOrdinance2014.pdf>

## 3.2 Statistics on Program Counts

The details by state are found in Figure 3.1. Graphical representations are provided in Figures 3.2 and 3.3.

**Figure 3.1: PAYT Program Count by State – 2010 Update**

(Source: Skumatz, Lisa A., Ph.D., Skumatz Economic Research Associates and Econservation Institute, funded by SERA; Region IX funded by EPA Region 9) \*Asterisk after state indicates a high prevalence of very limited programs (low rate differentials, large can minimum), not the fully variable design. Two asterisks implies very weak programs.

State	Jurisdictions with PAYT Access-2010	% Pop in State with access to PAYT	Notes on Individual States
AK	18	74%	This includes several large communities / boroughs with well-designed programs.
AL*	12	14%	Very few programs are available in this state and more than 20% of the programs they have are extremely limited.
AR	309	38%	Multiple counties have begun requiring variable pricing and have well-designed programs.
AZ*	29	75%	This number includes large communities, but most of the state has very limited type programs.
CA	393	91%	1989's AB939 and amended legislation <a href="http://www.calrecycle.ca.gov/Laws/Legislation/CalHist/default.htm">http://www.calrecycle.ca.gov/Laws/Legislation/CalHist/default.htm</a> challenges communities to design system to reward and encourage waste prevention, reuse, recycling, and composting. PAYT / economic incentives are recommended options, among others. Many communities have aggressive programs to meet rates and dates but there are also areas / jurisdictions in the state with weaker program designs. This number reflects the major counties in the state that have PAYT programs. Most programs are curbside.
CO	83	14%	These programs range from drop-off in very rural areas to curbside with fully variable pricing. There are programs across the state, but not the largest communities
CT	35	19%	Most of the programs that exist in the state are curbside.
DE*	31	29%	Most of the programs are in three counties and are for limited drop off programs.
FL	46	18%	PAYT programs have been increasing in Florida and some fully variable programs exist, however more than 20% of the programs are very limited. The largest cities do not have payt.
GA**	118	28%	Many of the communities do not have or use curbside service. Many of the PAYT programs here are for drop-off locations.
HI	24	5%	PAYT is new here, and is in place in a County, with a fully variable program.
IA	631	67%	This state has had programs for a while and is steadily increasing the numbers. Many of the programs here are curbside and fully variable.

State	Jurisdictions with PAYT Access-2010	% Pop in State with access to PAYT	Notes on Individual States
ID*	102	40%	This includes large communities; many counties with PAYT have limited / basic programs (charging for an additional can) through haulers for unincorporated areas, but are curbside.
IL	160	40%	PAYT programs have been here for a while and are well-designed curbside programs.
IN	206	33%	The state has a range of programs from drop off to fully variable, curbside programs though most are curbside. Most of the newer numbers come from communities in a few counties
KS	83	76%	Many of the large counties required volume based trash and recycling from haulers and have curbside programs.
KY**	3	17%	One major population area has a two can program. The other programs found are limited.
LA	0	0%	The State has been unable to develop PAYT programs, recycling coordinators surveyed seemed reluctant to be the first to try.
MA	156	40%	There are a variety of programs in the state, and there are a high percentage of bag / tag type programs.
MD	59	16%	There are multiple counties that have access to PAYT programs.
ME	243	45%	The programs here are mostly bag programs.
MI	175	52%	There are a variety of programs in this state and some communities with excellent programs. Most are curbside.
MN	1850	100%	2005 State Statute 115A.93 Updated 2014) <a href="https://www.revisor.leg.state.mn.us/statutes/?id=115A.93">https://www.revisor.leg.state.mn.us/statutes/?id=115A.93</a> shall require licensees to impose charges that increase with the volume or weight of MSW PAYT by volume.
MO	49	27%	Programs are in place in major cities and there are many bag / curbside programs in the state.
MS**	36	20%	The access to PAYT programs here is mostly concentrated in a limited number of Counties that have a limited cart program.
MT**	87	24%	Aside from a program in a larger community, the majority of the programs are drop off.
NC	588	33%	There are a fair number of programs across the state, including some curbside programs, but many people self-haul.
ND	11	29%	This state has programs in several larger communities.
NE*	24	26%	Some fairly large communities have programs but a very limited form.

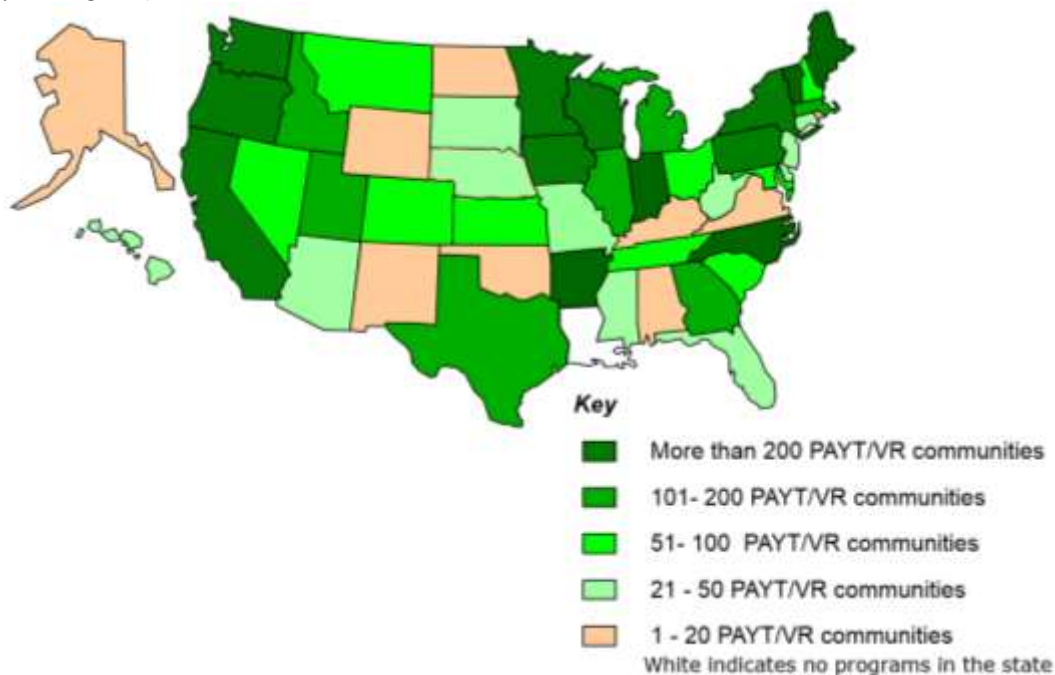
State	Jurisdictions with PAYT Access-2010	% Pop in State with access to PAYT	Notes on Individual States
NH	53	32%	The majority of the programs date from the late 1990's or early 2000 and is curbside bag/ tag type. The newer programs are cart plus bag.
NJ	49	12%	The majority of NJ programs date from the 1990's. The population numbers are lower since some of the largest communities are not included. Most of the programs are curbside.
NM*	14	49%	There are not many communities with programs, but it does include some very large ones in the State. There are both very strong, weak, and hybrid programs across the state, mostly curbside can programs.
NV**	68	91%	This includes some of the largest communities in the state by population and is centered in two counties. The programs are curbside can programs that charge additional for a second can.
NY	607	16%	The population of most of the communities in NY with PAYT is under 10,000 and have bag / tag curbside programs dating from the 1990's. Most of those added after 2006 have can programs that are fully variable.
OH	88	16%	There are some haulers that have PAYT bag programs as an option. Most of the programs are bag only curbside. The major cities of this state do not have PAYT.
OK**	10	37%	These numbers include a couple large communities, one with limited program and one with a well-designed program. There are few overall communities with programs.
OR	336	100%	Long-standing state legislation requires incentive-based rates that are based on amount (average weight) of waste in cans, larger cans cannot increase in cost per pound contained. A container less than 21 gallons must be available.
PA	267	27%	The state population access to PAYT does not include some of the largest communities. Programs are mostly curbside.
RI	17	28%	Overall, communities in this state tend to be curbside bag programs, fully variable.
SC*	99	10%	Several counties have PAYT for their unincorporated communities, but the major cities do not. They are mostly drop-off programs.
SD	27	47%	Two large communities make the majority of the populations' access to PAYT and both have well-designed curbside, can programs.
TN*	100	23%	There are limited programs in two large communities.
TX	129	43%	Three counties make up most of the programs here and a couple large cities. Programs mostly are curbside with cans.
UT	149	94%	One large community has a strong, fully variable program. Many of the counties in the state of PAYT through the hauler, but is of limited nature.

State	Jurisdictions with PAYT Access-2010	% Pop in State with access to PAYT	Notes on Individual States
VA*	7	13%	The largest cities do not have programs and there are few programs overall, that are either can or bag curbside programs.
VT	364	92%	There is one major hauler that offers PAYT pricing throughout the state that began offering a curbside can program in 2008. This count will increase because of the introduction of new legislation requiring PAYT, taking effect in the next few years.
WA	522	100%	State Statute 70.95.090 <a href="http://apps.leg.wa.gov/RCW/default.aspx?cite=70.95.090">http://apps.leg.wa.gov/RCW/default.aspx?cite=70.95.090</a> , RCW 70.95.010 <a href="http://apps.leg.wa.gov/RCW/default.aspx?cite=70.95.010">http://apps.leg.wa.gov/RCW/default.aspx?cite=70.95.010</a> requires comprehensive plans, programs to reduce waste, and incentives for source separation. PAYT in place in most all (major) communities.
WI	535	36%	This number is comprised of mostly very small communities and a couple large ones that have programs from the late 1980's and early 90's and are curbside bag programs. There is also one major hauler that offers the option of pay per bag.
WV*	28	2%	The programs we found in this state are mostly in small communities under 5000 residents. There are both pay per bag and variable can size programs.
WY*	7	35%	Very few programs throughout the state, but does include a couple are large cities. They have variable can sizes but are allowed very large amounts of trash (up to 3 96g carts)
TOTAL US	9,037	40%	Community counts are influenced by which census-type communities are included (e.g. census "places", incorporated or not, etc.); however, population count shows substantial growth.

*Table Notes: The count of communities is affected by the types of communities that are included. For example, a state with mandated PAYT (or a county adopting PAYT) will cover a number of communities; the total count would vary based on whether we count CDPs (census designated places), incorporated communities, etc. States vary in the types of communities they have. The population covered should provide a more consistent metric of progress in PAYT. Note also that the count covers communities or population with access to PAYT – for example, a hauler may offer PAYT as one of several service options. It is impossible to obtain information on the percent of households opting for that PAYT service, but we can note that citizens within the service communities for that hauler will have access to PAYT.*

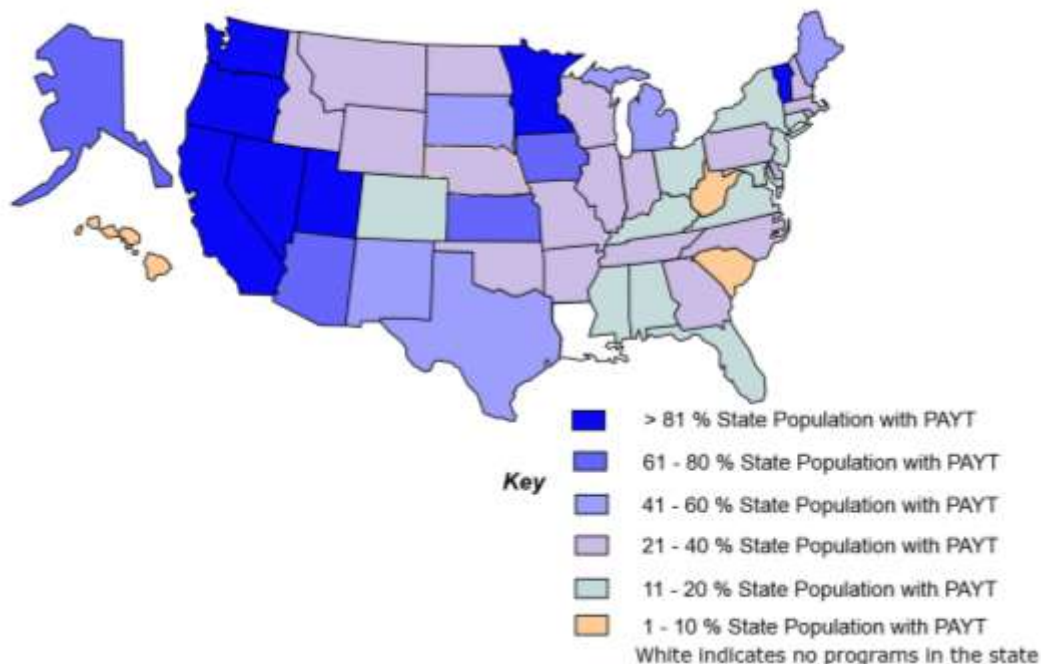
### Figure 3.2: PAYT Program Count by State – 2010 Update

(Source: Skumatz, Lisa A., Ph.D., Skumatz Economic Research Associates and Econservation Institute, funded by SERA; Region IX funded by EPA Region 9)



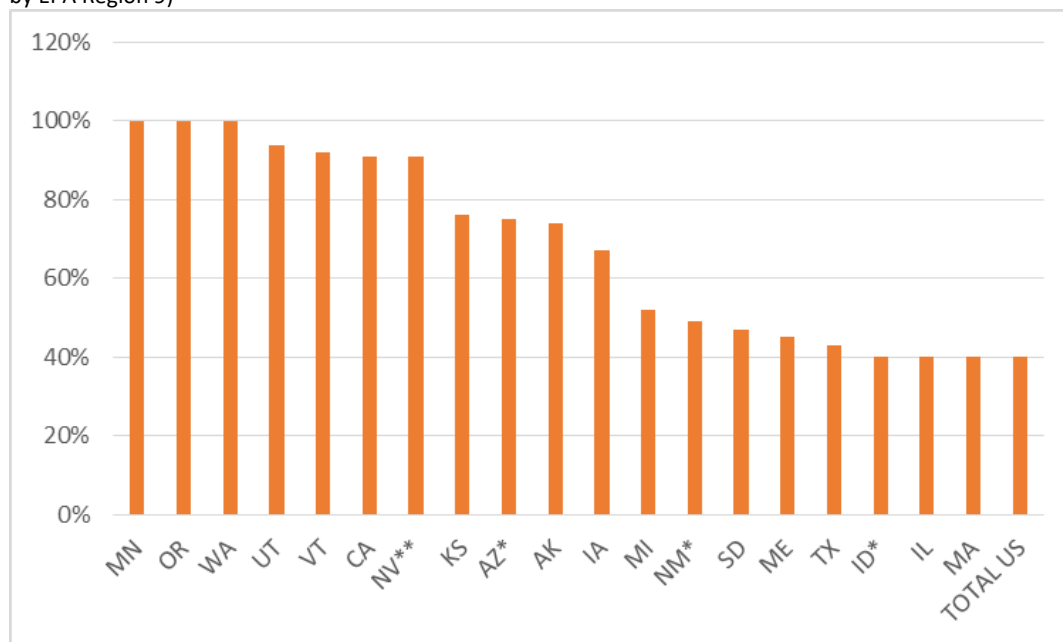
### Figure 3.3. PAYT States by Percent of Population with Access to PAYT Programs – 2010 Update

(Source: Skumatz, Lisa A., Ph.D., Skumatz Economic Research Associates and Econservation Institute, funded by SERA; Region IX funded by EPA Region 9)



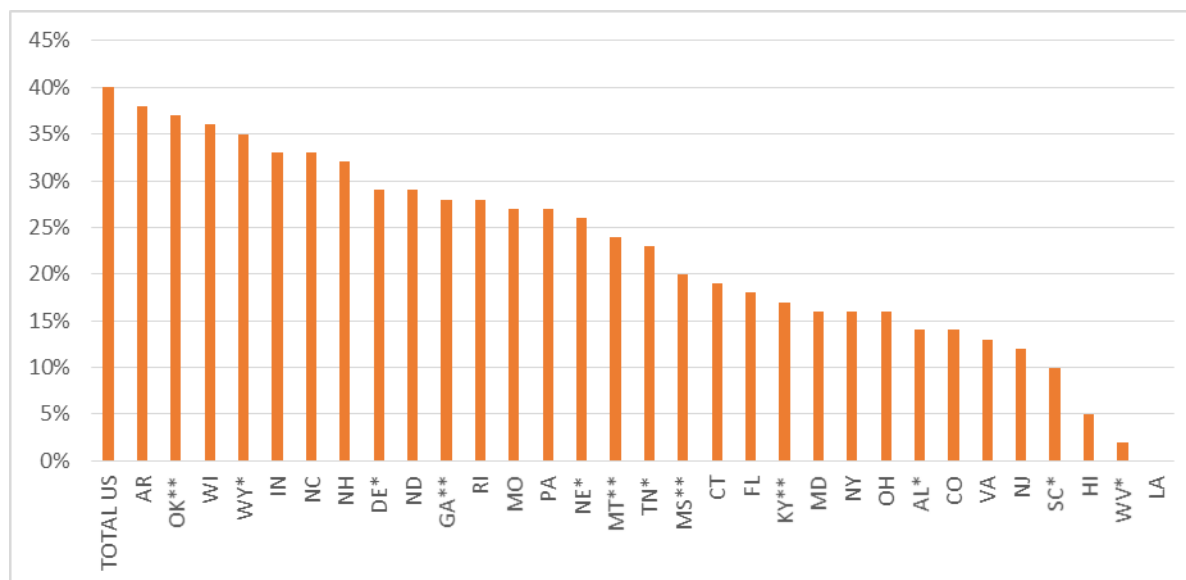
**Figure 3.4. Graph of States with Highest Share of Population with Access to PAYT (broad definition)**

\*Asterisk after state indicates a high prevalence of very limited programs, not the fully variable design; 2 asterisks indicate very weak.  
(Source: Skumatz, Lisa A., Ph.D., Skumatz Economic Research Associates and Econservation Institute, funded by SERA; Region IX funded by EPA Region 9)



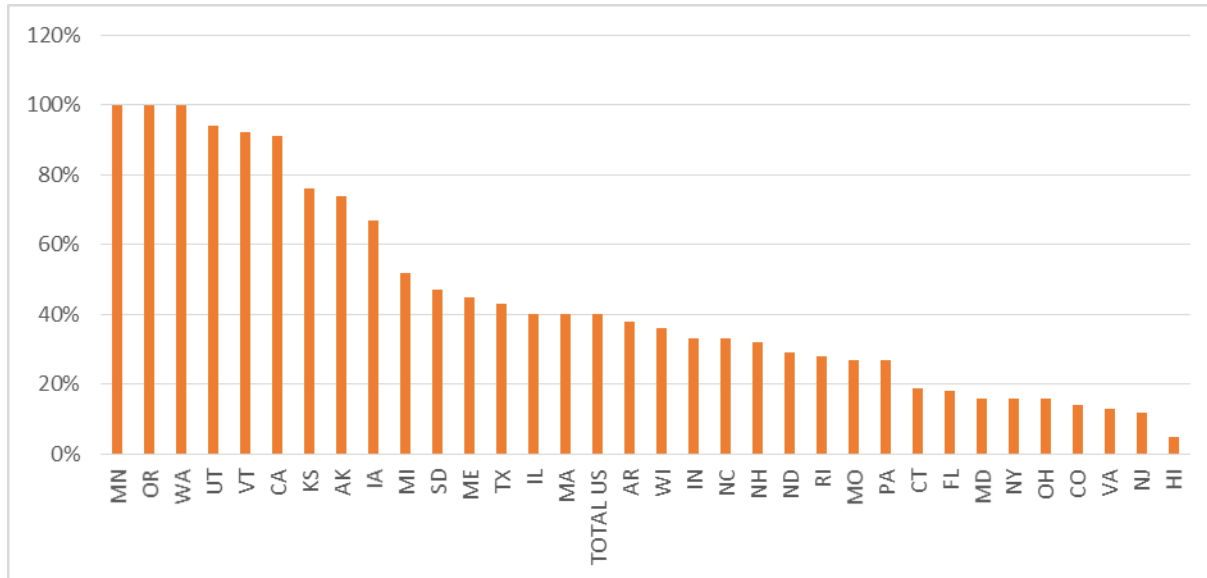
**Figure 3.5. Graph of States with Lowest Share of Population with Access to PAYT (broad definition)**

\*Asterisk after state indicates a high prevalence of very limited programs, not the fully variable design; 2 asterisks indicates very weak.  
(Source: Skumatz, Lisa A., Ph.D., Skumatz Economic Research Associates and Econservation Institute, funded by SERA; Region IX funded by EPA Region 9)



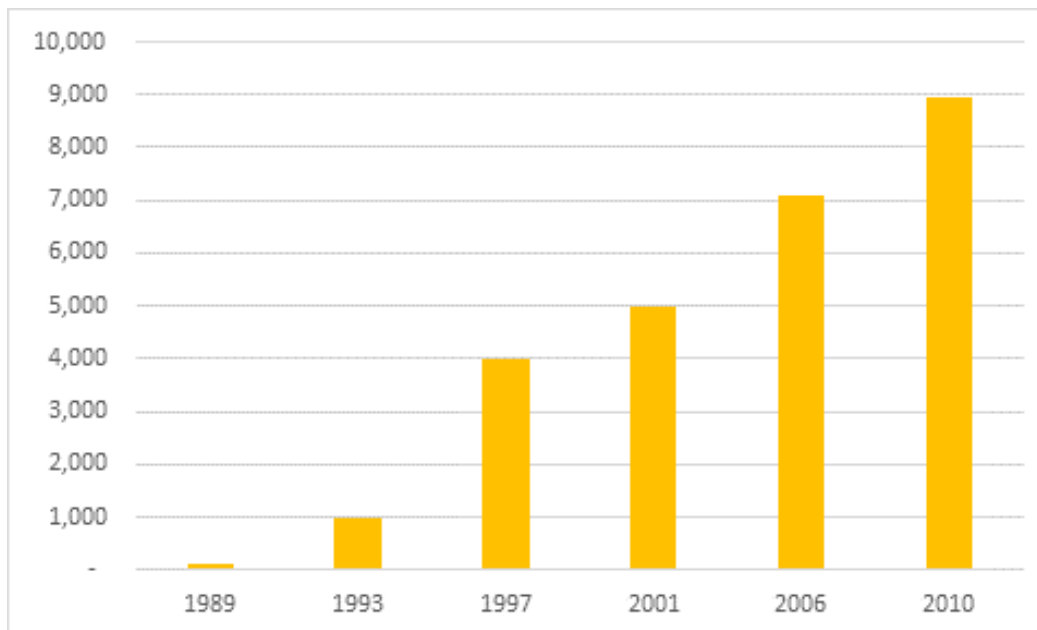


**Figure 3.6. Graph of States by Share of Population with Access to PAYT including only those states with strong programs \*** Asterisk after state indicates a high prevalence of very limited programs, not the fully variable design; 2 asterisks indicates very weak. (Source: Skumatz, Lisa A., Ph.D., Skumatz Economic Research Associates and Econservation Institute, funded by SERA; Region IX funded by EPA Region 9)



**Figure 3.7 Growth in US PAYT Communities over Time**

(Source: 1989-2001 counts from Skumatz Economic Research Associates. 2006 and 2010 counts, Skumatz, Lisa A., Ph.D., Skumatz Economic Research Associates and Econservation Institute, funded by SERA; Region IX funded by EPA Region 9)



### 3.3 Programs in Region IX and the Implications of Strong vs. Weak PAYT

This project provided the opportunity to drill down on some of the communities that have access to PAYT in Region IX. Within Region IX, the work concentrated on Arizona and Nevada because the PAYT programs have been widespread in California and few changes / updates were identified during the grant period. Note that many of these programs are hauler-driven; the citizens have access to PAYT, but we cannot know how well-advertised the option is, or how many citizens actually choose the option, if choices are available.

Focusing on two states provided the opportunity to conduct a more detailed review of the structure of the rates in the States. We found that the level of incentive provided by different programs that were “technically” PAYT (pay more for more trash) differed dramatically. We found many that provided only limited incentives, but a few are fully variable with strong financial incentives for reducing and diverting waste from trash cans.

The literature indicates that the level of price differential has an effect on the recycling / diversion behavior change induced by the PAYT incentives.<sup>29</sup> PAYT rate designs that charge at 80% more for double the service<sup>30</sup> (e.g. 60-65 gallons vs. 30-35 gallons) show recycling rates that are not statistically different than communities that charge twice as much for the higher service level. Furthermore, communities that charge less than 50% extra for double the service do not show appreciably much more recycling than those without price differentials. In related work, rate differentials less than \$5 for double the service did not lead to significant increases in recycling diversion.<sup>31</sup> These results indicate four things:

- There is no benefit from increasing rate differentials to levels beyond 80% for double the service. Very high differentials may seem logical, but statistically do not seem to increase diversion, and may anger customers.
- Significant additional recycling is not achieved from differentials above 80%, and higher differentials can increase the community’s or hauler’s financial risk. Higher differentials mean customers on high service levels are helping fund the discounted rates for low service levels. If the community or hauler under-estimates how many customers will select low service levels, there will be a shortfall in revenues to cover the cost of collection. Higher rate differentials exacerbate this risk.
- PAYT programs with low differentials (less than 50% differentials, or less than \$5 per monthly 30 gallons) do not lead to strong recycling levels. In simplistic terms, they may not be worth the administrative hassle of the PAYT program, at least in terms of the recycling incentive provided.
- Implementing PAYT with a differential of 50-80% differentials diverts significant tons.

Figure 3.8 shows that a number of communities that have implemented PAYT may not be achieving their full potential in terms of diverted tons.

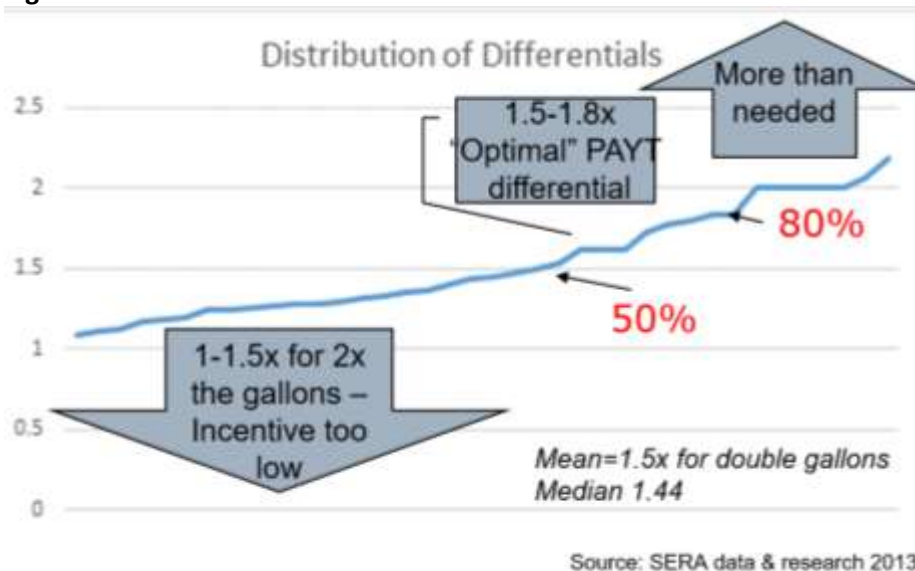
More detail about rate design is provided in a later chapter.

<sup>29</sup> Skumatz, “Maximizing Vr/Payt Impacts – Policies, Rate Designs And Progress”, Resource Recycling, June 2001, and Skumatz, “Recycling Best Practices Study: Practical and Effective Methods to Move Recycling Forward”, Skumatz Economic Research Associates, November 2013.

<sup>30</sup> And that dollar differential is continued for each additional 30-35 gallons.

<sup>31</sup> These computations were conducted using “all-in” rate – adding all fees into the program.

**Figure 3.8 PAYT Rate Differentials**



\* Rates charged in a sample of communities across the US (ratio of rate for 64 gal vs. 32 gal)

Suffice it to say, the “counting” of PAYT communities is complicated by these results. Further, the recycling performance a community may expect to get from its program depends on the rate design associated with the program, above and beyond the mere presence of the PAYT program.

For the following table, we present the following four categories of PAYT system:

#### *Good or Variable Programs*

**Fully variable:** 32, 64, and 96 gallon cans; more than one combination of bag, tag, & can option with more than \$5 price differential

**Variable:** 64 or 96 gallon can option; 96 gallon can & additional bag / tag options

#### *Weak or Limited Programs*

**Limited:** 96 gallon can and pay double for 2nd 96 gallon can per month; 64 and 96 gallon options with only \$1 difference in pricing per month; more than \$5 for 2nd can per month

**Very Limited:** 2nd 96 gallon can for an extra \$5 or less per month

Figure 3.9 shows the percent of PAYT communities within each state that are fully variable or variable, and the approximate share of population with PAYT available that has fully variable or variable PAYT. The data shows that there is room to grow. A substantial share of the population and programs in these states have done the hard work – getting a PAYT program in place – but are “leaving tons on the table”. Their existing PAYT rate programs could be tweaked with higher incentives and divert a great deal more tonnage from landfill.

**Figure 3.9 PAYT in Region 9: By State and Level of Incentive – Based on Number of Incorporated Cities with PAYT**

(Assembled by Econservation Institute for Region 9)

State	Fully Variable	Variable	Limited	Very Limited	Percent of communities fully variable or variable	Percent of PAYT Population with fully variable or variable PAYT
Arizona	0	1%	8%	17%	1%	26%
California	42%	16%	9%	6%	58%	39%
Hawaii	0	20%	0	0	20%	5%
Nevada	0	13%	2%	14%	13%	27%

\*incorporated cities only

PAYT encourages positive diversion behaviors by directly affecting pricing of trash volume. However, there are many variables and definitions of what embodies a PAYT program.

#### Amount of Incentive:

Our definition of a program would include various cart or volume options with sufficient price variations to induce behavior change. A strong program would include cart sizes from 32 gallons (or smaller) and a price differential of more than \$5 per additional increment. Many of the programs we found have 96 gallon carts with no smaller sizes available and \$5 or more for an additional 96 gallon cart. We label these programs as very weak or extremely limited in that they do not provide much incentive to reduce trash volumes.

#### Access:

Many communities are served by haulers in a free market situation. In many places our interviews uncovered haulers offering PAYT to their customers in an area that may have crossed jurisdictional lines. In those cases, residents have access to PAYT (through the hauler program), but we cannot determine what share of the residents actually select that hauler and subscribe to that PAYT program. We can, however, note that the residents in the area have access to a PAYT program.

#### Definition of Community:

Another issue in determining the number of PAYT programs in a state is the definitions of a community? Including only incorporated cities and towns excludes many populous areas that may have strong programs. The US Census Bureau recognizes these unincorporated areas as Census Designated Places or CDP's. "The Bureau of the Census defines a place as a concentration of population; a place may or may not have legally prescribed limits, powers, or functions. This concentration of population must have a name, be locally recognized, and not be part of any other place". Examples of PAYT programs can include unincorporated sections of a county that have many CDP's ranging in population from 150 to over 120,000 people. This particular issue comes into play when looking at States such as California and Hawaii.

#### Arizona:

In Arizona in the last few years there seems to be a general increase in the number of programs being established across the state. To date, Econservation Institute has found 56 programs in incorporated areas, or 127 programs when CDPs are included. Through these programs, 85% of the state's population now has access to a PAYT program. Many of the 4 programs in incorporated areas or 53 including CDPs established pre-2006 were very limited (a 96 gallon) can and fee for an additional can) and only reached about 19% of the population (using 2010 census number). Of the total programs found as of 2015, 18 are extremely limited,

which includes 14% of the state's population. Another 39 of them are limited, meaning they charge more for the second can than the extremely limited programs and affect 51% of Arizona's population, and includes the largest city, Phoenix. The remaining 20% (of the 85% with access to PAYT) include the second and third largest cities (Tucson and Mesa) and are good variable programs in that they have various can sizes with differential pricing, but the difference is not substantial (they vary by only a couple of dollars between can sizes). Overall, even though much of the state has access to PAYT, most of the access to PAYT is through very limited and not particularly strong programs.

The majority of the PAYT programs found as of 2015 have embedded recycling in the service cost (around 3% charge extra for recycling), and around 1% don't have any curbside recycling collection options. Less than one percent of the programs have access to "smart stream recycling technology" which allows residents to put all of their solid waste into the same cart, and the recyclables are separated out by hand at the Freedom Recycling Center in Prescott Valley. This facility is the only "dirty MRF" in the state and claim that they increased recovery of recyclables in 2013 by 400% compared to curbside service.

#### California:

According to the 2010 US Census, there are 482 cities and towns in California. If you include CDP's with cities and towns, the total number of populated places in California soars to over 1200 communities, which makes determining the exact number of communities with access to PAYT difficult if they are excluded. For example, San Bernardino County encompasses 20,056 square miles with only 24 incorporated cities and 30 unincorporated communities and 15 different haulers. Additionally, some areas have incorporated and unincorporated areas that belong to solid waste management boards or associations that affect entire county populations or combinations of counties.

California has been very aggressive in promoting and mandating communities improve their diversion rates, resulting in the wide range of established PAYT programs. In the EPA Region 9 area, this is where we see the strongest programs with true pricing practices to encourage behavior change; most notable are those in the northern areas of the state and central coast which have more established programs. However, in any area of the state you can now find examples of very strong programs. Counties seem to be at the headway of this which is reflected in our population account of residents with access to PAYT. Even in areas with limited programs, most communities now offer at least different size carts, even if the prices vary little.

#### Hawaii:

There have been several counties in Hawaii that have been looking into PAYT, but to date only Kauai County has established programs. According to the US Census Bureau, The State of Hawaii does have incorporated cities, but rather CDP's (Census Designated Places) and the number of 24 programs for Hawaii reflect the number of CDP's and other areas in Kauai County. Their program started in 2011 and is a hybrid program in that everyone pays base rate of \$6 per month and an additional \$6 per month for curbside pickup of a 96 gallon container. Additional refuse can be picked up for an additional \$12 per month. While the program is limited for PAYT it shows movement in the right direction for the State of Hawaii and provides access to basic PAYT pricing for 5% of the State's population where previously trash service has been included as part of residents tax base.

#### Nevada:

As of 2015, access to PAYT programs has increased to 91% of the State's population compared to only 36% pre-2006. The number of PAYT programs that we found have increased from 15 which were originally only in

CDPs, to 86 total programs that include 12 incorporated areas, 41 CDPs, and 31 unincorporated places as of 2015. These programs are present in the major population centers of the state. The majority of these programs that reach 77% of the Nevada population are either extremely limited programs with the 42 programs covering 74% of the population, or limited ones with 5 programs covering 3% of the population. This means that most of the population has access to only very weak programs that primarily consist of only the option of an additional 90 – 96 gallon trash container for less than an additional \$4 / month, or even weaker programs in which residents pay a base trash rate and then have the option to rent 95 gallon cans for a monthly charge, thus in essence paying more for more trash. Many residents of Clark County have access to the latter type of program. We found 39 good variable programs that provide access to PAYT to 14% of the state. All of them include some form of incremental cost for every 13 – 45 gallon increment in trash carts, and many include options for 3 or more different sized carts. Unincorporated Douglas County has many of these strong PAYT programs (note that there are not any incorporated areas in the county). Most of the programs in Clark County embed the cost of recycling, while some in Douglas County embed recycling costs and others don't even have an option for curbside recycling collection.

## 4. State Legislation in PAYT

---

As noted in previous studies (Skumatz, 2000, 2006<sup>32</sup>), there are three states that have clearly, or *de facto*, required PAYT:

- Oregon, requiring varying rates based on levels of service, and one can equal to or less than 21 gallons,
- Washington, requiring PAYT of haulers that have oversight by the State's Utilities and Transportation Commission (UTC), and
- Minnesota, requiring communities to have PAYT.

Their legislation is summarized below. Recently – in 2012 – Vermont joined the list, with implementation required by July 2015. Their new legislation is also summarized below.

- **Oregon:** The 1997 Oregon Legislature made changes to the existing legislation. Oregon Administrative Rules (OAR 340-090-0040) require garbage collection rates to be established as a waste reduction incentive, including a mini-can option. The rates at a minimum, shall include the following elements:
  - (A) At least one rate for a container that is 21 gallons or less in size and costs less than larger containers; and
  - (B) Rates shall be based on the average weight, as determined in paragraph (E) of this subsection, of solid waste disposed per container for various sizes of containers; and
  - (C) Rates, as calculated on a per pound disposed basis shall not decrease per pound with the increasing size of the container or the number of containers; and
  - (D) Rates per container service shall be established such that each additional container beyond the first container for each residential unit shall have a fee charged that is at least the same fee and no less than the first container; and
  - (E) Rates, calculated on a per pound disposed basis, shall be established by the city or Co through development of their own per pound average weights for various container sizes by sampling and calculating the average weights for a cross section of containers within their residential service area.
- **Washington:** State Statute 70.95.090: Each Co and city comprehensive solid waste management plan shall include ...A comprehensive waste reduction and recycling element that, in accordance with the priorities established in RCW 70.95.010, provides programs that (a) reduce the amount of waste generated, (b) provide incentives and mechanisms for source separation, and (c) establish recycling opportunities for the source separated waste. [2010 c 210 § 17; 1989 c 431 § 8.]. Most of the major counties have PAYT programs.
- **Minnesota:** The 2005 Minnesota State Statutes state the following: A licensing authority shall require licensees to impose charges for collection of mixed municipal solid waste that increase with the volume or

---

<sup>32</sup> Sources: Skumatz, Lisa A., "Model Variable Rates Legislation: Elements, Options, and Considerations for State Level Legislation in Solid Waste", Skumatz Economic Research Associates White Paper 9599-1, October 1995, updated 2001, Superior CO; Skumatz, Lisa A., and Juri Freeman, "Pay As You Throw (PAYT) in the US: 2006 Update and Analyses", Prepared for US EPA and SERA, Skumatz Economic Research Associates, January 2007, Superior, CO; Skumatz, Lisa A., and Juri Freeman, "Increasing Recycling Now! Implementing Recycling and PAYT Ordinances, Legislation, or Contracting: Practical Guide and Model Language", Skumatz Economic Research Associates working paper August 2008, Superior CO.



weight of the waste collected. A licensing authority that requires a pricing system based on volume instead of weight under subdivision 3 shall determine a base unit size for an average small quantity household generator and establish, or require the licensee to establish, a multiple unit pricing system that ensures that amounts of waste generated in excess of the base unit amount are priced higher than the base unit price.

- **Vermont:** In 2012 the Vermont Legislature unanimously passed Act 148, a universal recycling and composting law that "... requires all Vermont municipalities (including solid waste districts, alliances, groups of towns, and individual towns—collectively Solid Waste Management Entities) to "implement a variable rate pricing system [also known as unit-based pricing] that charges for the collection of municipal solid waste from a residential customer for disposal based on the volume or weight of the waste collected." This requirement must be met by July 1, 2015."

## **4.1 Vermont's 2012 Recycling and PAYT Law**

In 2012, the Vermont Legislature unanimously passed Act 148, a universal recycling and composting law. It includes the implementation of PAYT as part of an integrated set of requirements. Once implemented, the law is expected to double Vermont's recycling and composting rate (30 to 60), and greatly increase the amount of materials diverted from landfills (36 to 47). The following detailed descriptions of the law are taken from legislative summaries and press releases. The 'universal recycling and composting law' includes the following elements.

**Requirements for municipalities to implement variable rate pricing for landfill material generated by residential customers.** Also known as "Pay-As-You-Throw" (PAYT), variable rate pricing has proven to be a successful incentive for reducing the amount of recyclables that end up in the trash can. Variable pricing is based on volume or weight and more accurately pegs pricing to the actual amount of trash collected from a household. This results in those who produce more waste shouldering their true share of the cost of managing that waste. At the same time, those who generate less trash (through reducing consumption, reusing, recycling, or composting) pay proportionately less.

1. In accordance with Act 148, all Solid Waste Management Entities (SWMEs) shall have implemented a UBP system that is based on either volume or weight of waste collected, by July 1, 2015. Satisfaction of this requirement calls upon SWMEs to ensure that all haulers and drop-off facility operators in their jurisdiction are using some type of UBP system and to enforce these requirements.
2. The UBP system chosen can vary depending on the needs and dynamics specific to the SWME (see the common UBP systems provided).
3. In accordance with requirements of the new state Materials Management Plan, Solid Waste Management Entities must include in their SWIP that is submitted to ANR, a description of their UBP system or program, including how haulers and facilities have been brought into compliance and copies of any ordinance passed. ANR will review each SWME's SWIP and may take action to enforce the adoption and implementation of a SWIP.

Since many solid waste management entities, drop-off facility operators, and haulers have legitimate UBP systems already in place, these municipalities should easily be able to meet this statutory requirement. Others will need to make changes to their payment systems for the trash services they offer in order to fulfill this requirement.

Other elements of the legislation – and its background – are described below.

Many aspects of Act 148 focus on creating consistent and convenient statewide solid waste services that will lead to increased waste reduction and diversion. Unit-based pricing (UBP) systems have been shown to significantly incentivize waste reduction and diversion of recyclables and compostable materials. In fact, studies have found that UBP systems reduce residential waste disposal by as much as 17% (Skumatz and Freeman, 2006). Many Vermont towns, solid waste haulers, and drop-off centers already have and use UBP systems, easing the transition for Vermont to statewide UBP adoption.

The original Vermont Solid Waste Management Plan, written in 1989, had a directive for all Solid Waste Implementation Plans (SWIPs) to include action plans for UBP implementation by both public and private haulers of volume- or weight-based charges for residences and businesses. Many solid waste management entities elected to utilize UBP systems as a result, however statewide adoption was not achieved since the directive allowed for SWMEs to provide reasons for exemptions and to propose alternatives. With the adoption of Act 148, there is now a statutory requirement for all municipalities to establish UBP systems for residential municipal solid waste (MSW). This requirement extends to solid waste hauling companies and drop-off facilities / transfer stations that collect residential MSW. This means that regardless of whether a resident is dropping off MSW at a drop-off facility, or having it collected at the curbside, the resident is paying for the amount of materials disposed on a per unit basis — either through volume, such as a fee per bag or container, or through weight, such as a fee per pound.

#### ***Bans on the disposal of certain materials.***

Landfill bans will be phased in through the year 2020 (see timeline below). For example, in 2015, all mandatory recyclables (a “Mandatory Recyclables” list is provided) will be banned from the landfill throughout Vermont. This is already in effect in Chittenden Co. Also in 2014, businesses that generate over 104 tons of food scraps per year will be required to send those scraps to a donation program, a farmer for livestock feed, and / or a composting facility. In 2015 that ceiling drops to include those who generate more than 52 tons per year, and so on. By 2020, food scraps from all businesses and residents will be banned from the landfill.

#### ***Collection requirements for transfer stations, drop-off centers, and other facilities permitted to accept trash.***

All such facilities will be required to accept mandatory recyclables and divert them from the landfill by 2014, leaf and yard debris by 2015, and food scraps by 2017. Certain conditions will allow exemptions from this requirement.

***Curbside collection requirements for haulers licensed to accept trash.*** Haulers offering services for collecting trash must also offer services for collecting mandatory recyclables by 2015 (already mandatory in Chittenden Co); leaf and yard debris by 2016; and food scraps by 2017. Certain conditions will allow exemptions from this requirement.

***A hierarchy for managing food scraps and yard debris.*** Similar to the U.S. Environmental Protection Agency’s hierarchy, the universal recycling and composting law encourages businesses and residents to prioritize their diversion practices based on the following hierarchy:

- Reduction at the source. Encourage smarter food acquisition and use to reduce waste.
- Diversion of consumable food for people. Manage leftovers so they can be donated to food shelters.

- Diversion for agricultural uses, including for animals, composting, nutrient management, digestion, and energy recovery.

Phased in over time, starting with largest generators, the above diversion hierarchy will apply to all Vermonters in 2020. A timeline is provided for specific phases.

***Requirement for recycling containers to be provided in publicly owned spaces.*** Wherever trash cans are provided (except bathrooms), the universal recycling and composting law requires that recycling containers also be provided in state and municipally owned spaces.

## 4.2 Other Variations in State PAYT Legislation

**California** also has laws encouraging PAYT. The California Integrated Waste Management Act of 1989 (AB 939, Sher, Chapter 1095, Statutes of 1989 as amended [IWMA]) challenges local governments to rethink incentives in place for one-way disposal, and to redesign the system to reward and encourage waste prevention, reuse, recycling, and composting. These alternatives can include rate structure modifications, economic incentives, technical, instructional and promotional assistance, and local regulatory programs. With specific thresholds that communities must meet, many have established aggressive programs. This number reflects the major counties in the state that have PAYT programs. Most programs are curbside.

**Iowa** used to have legislation that seemed to require communities to implement PAYT (with negotiations with the State) if they did not reach the state's "rates and dates" without it. This law may no longer be in place.

Other: Wisconsin initially required communities not reaching goal to implement PAYT (or possibly other strategies). These requirements have been relaxed or apparently deleted from the legislation over time.

## 4.3 Achieving PAYT by Ordinance or Legislation

Legislation requiring PAYT is a strong driver for diversion. There may be some "chicken and egg" element; few states mandate the program without the program having a strong foothold in many communities in the State. The key elements of "best" legislation for PAYT (Skumatz 2001, 2007, 2008<sup>33</sup>) include the following.

---

<sup>33</sup> This chapter relies heavily on Skumatz 2007. Sources: Skumatz, Lisa A., "Model Variable Rates Legislation: Elements, Options, and Considerations for State Level Legislation in Solid Waste", Skumatz Economic Research Associates White Paper 9599-1, October 1995, updated 2001, Superior CO; Skumatz, Lisa A., and Juri Freeman, "Pay As You Throw (PAYT) in the US: 2006 Update and Analyses", Prepared for US EPA and SERA, Skumatz Economic Research Associates, January 2007, Superior, CO; Skumatz, Lisa A., and Juri Freeman, "Increasing Recycling Now! Implementing Recycling and PAYT Ordinances, Legislation, or Contracting: Practical Guide and Model Language", Skumatz Economic Research Associates working paper August 2008, Superior CO.

### Key Elements of the Legislation or Ordinance<sup>34</sup>

- **Safety Issues:** Requirements for truck and operator safety issues, avoiding leakage, etc. (usually addressed at the local ordinance or licensing level)
- **Recycling Opportunities:** All haulers<sup>35</sup> providing service within the state's / community's / county's boundaries must:
  1. offer curbside recycling to every single family (or up to X-plex) household with garbage service;
  2. provide recycling service at least every other week;
  3. must collect at least a base set of materials that the community lists (usually newspaper, waste paper, cardboard, chipboard / paperboard, aluminum and steel / bimetal cans, glass bottles, and #1 and #2 plastics, but the list will vary based on your local markets / MRF); and
  4. must provide recycling container(s) that are at least 64 gallons in total size (96 is preferred), and are covered (preferred);
- **Fees and PAYT:** The cost of the recycling program must be embedded in the trash rate, with no separate charge, fee, or line-item for recycling. The cost for trash service must be in a PAYT structure. The PAYT system must:
  1. Offer, as its smallest container, a container no larger than 32 gallons, and must offer service in 32 gallon increments above this service (one state requires a 21 gallon container to be available);
  2. The cost of the trash container service must be set so that, throughout the service levels available, double the service volume cannot cost less than 80%<sup>36</sup> more in total to the household.<sup>37</sup>
  3. The community should establish auditing rights.
- **Reporting and Audit Authority:** The community (or possibly the state) should require haulers to report the trash and recycling tons collected within the community's boundaries, with reporting at least quarterly. This will allow the jurisdiction(s) to monitor progress in recycling. Establishing the authority to audit compliance with the ordinance is also important.

<sup>34</sup> See sample PAYT ordinances from other towns and counties on [www.payt.org](http://www.payt.org) or [www.paytwest.org](http://www.paytwest.org); or use the template ordinance your town may want to adapt and adopt! These are the same elements that are important for state-level PAYT legislation.

<sup>35</sup> Recommend including all communities, or contracts

<sup>36</sup> The community may, of course, set a different percentage increment. This value – 80% -- is based on statistical studies that balance two objectives: 1) providing a strong recycling incentive, and this value was found to provide almost the same recycling incentive to households as rates that double for double the service; and 2) backing off from very aggressive rates to recognize the fact that the largest cost in providing trash or recycling service is getting the truck to the door – arguing for flatter rates. This differential tries to provide incentives, but also help decrease the risk of not covering fixed costs of the operations. If a community selects a lower percentage, be careful to provide enough incentive to modify behavior – perhaps not less than 50% extra.

<sup>37</sup> For example, if a 32-gallon container costs \$10/month, then a 64-gallon container would cost \$18, and a 96 gallon container would cost \$26, etc. Note that the ordinance sets rate structure, but not rate levels, and thus, is not rate-setting. Haulers may increase the level of the rates they need in order to cover the cost of recycling and the PAYT rate structure.

- **Educational responsibilities:** The legislation should designate minimum requirements for frequency of recycling education, and how much outreach the community or the hauler (or both) should be required to provide (e.g. requiring haulers to provide annual outreach or mailers to customers).<sup>38</sup>

## **PAYT Via Ordinance**

However, if a state does not undertake legislation, ordinances can be undertaken at the community or county level, requiring PAYT structures for all (residential) haulers operating in the community. This strategy has been used in many jurisdictions across the nation. The same conditions associated with strong state legislation are also elements of strong local ordinances.

### **Advantages of a Local PAYT Ordinance:**

- Covers all haulers, establishing a level playing field for haulers (which they are generally satisfied with) and the new programs bring them business opportunities;
- Better levels of service for residents;
- Better participation and diversion from recycling and other programs;
- More equitable rates;
- Safety, health, and other benefits to the community.

## **Contracting to Achieve PAYT**

A somewhat more complex – but also beneficial – option to achieve PAYT is to undertake an initiative to district or franchise trash collection, or alternatively to contract with a hauler (usually one hauler, or if your town is large, two or more haulers may be selected)<sup>39</sup> for trash service.

This is more complex than an ordinance-based process because the political issues are more prickly. The new system may lead to some local haulers being “winners” and others, “losers”, and the losers will not usually stay quiet, because their livelihood is affected. However, if your community has multiple haulers providing service, an ordinance establishing districts, franchises, or undertaking a contracting process for collection service can lead to:

- PAYT rates and better recycling (the goal achieved by both strategies – ordinance and contracting);
- lower rates because of economies of scale and collection from all households in an area;
- lower wear and tear on streets from fewer trash trucks plying the same neighborhoods and lower greenhouse gas emissions, and
- “neater” streets, with trash containers out on one day instead of multiple collection days, among other benefits.

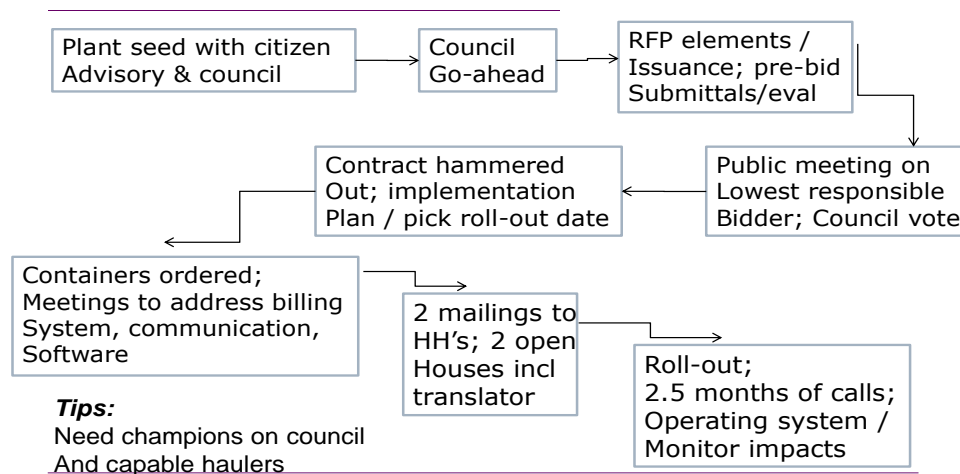
---

<sup>38</sup> Often the best programs have both the hauler and the community providing education to households. This establishes the portion for which the hauler is responsible. This can augment community outreach efforts and provide a coordinated message.

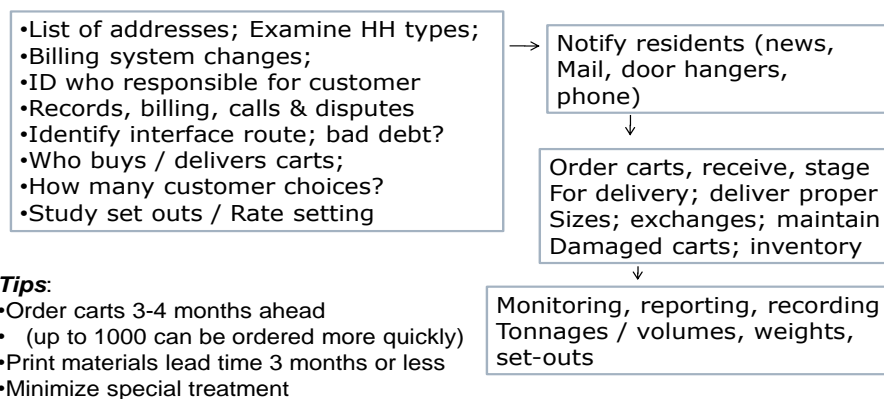
<sup>39</sup> As a note, if your community is large enough to accommodate two haulers, consider splitting the city in two – but NOT in half – and have haulers propose. Pencils are sharpened and the bidders can no longer count on getting half the city if you award the larger share of the city to the lower bidder. This has proved very successful in communities across the country.

A new contract can lead to benefits for your community; however, it requires strong political will to pass the program. Many communities that have taken this approach have heard complaints from residents that they do not like having their choice among haulers taken away – that they like their haulers. In addition, haulers will tend to prefer the “status quo” and fear possibly losing some of their customers – or all their customers if they are an unsuccessful bidder. They will likely oppose the new contracting option. To implement a contract requires a number of steps, detailed in the figures below (city and hauler perspective). One of the early elements bringing special complications is the discussion with Council on which elements will be part of the RFP for service (PAYT, embedded recycling, organics, cart ownership, etc.). The website associated with this project provides examples of community RFPs for collection service under PAYT.

**Figure 4.1: Steps to Issuing RFP for Contracting – City Perspective**



**Figure 4.2: Steps to Implement City-contracted PAYT from the Hauler's Perspective**



A few key “tips” in the contracting process include:

- The RFP should be constructed so that the City owns the carts at the end of the first contract period. That is the only way to make sure the second contract doesn’t provide an insurmountable advantage for the incumbent hauler.

- If the city is to be divided into two districts, awarded to the two best proposers, award a larger district to the “best” proposer, and a smaller district to the second highest scorer, so an incentive is provided to “sharpen pencils”.
- If the City can do the billing, this may provide advantages in lower bad debt, and may provide a more attractive bid from haulers. However, this will involve data transfers between the hauler and city.
- Other tips are provided on the website.



## 5. Case Studies in Commercial PAYT

---

PAYT in the commercial sector can be a powerful tool for diversion, much as the residential version drives substantial diversion in the residential sector. PAYT in the commercial sector seems an obvious thing – clearly, businesses commonly pay varying amounts for trash based directly on volume, represented by number of bins, bin-size, and frequency of container collection. **However, the key element that makes it commercial PAYT in a sense that modifies behavior is whether or not recycling (and potentially composting) service is embedded in the trash bill or whether the diversion program is only available for an extra fee.** Without recycling costs embedded in the trash bill, recycling becomes (or remains) a service at an extra fee.

On the residential side, it is believed that optional programs for a fee gain only about 5-15% participation, and it may be that this kind of barrier seriously impeded recycling in the commercial sector as well.

PAYT can be difficult to implement effectively with small business, who may reap no savings from recycling because they are already on the smallest (or small) trash service. As a result, savings from reducing trash service are either completely unavailable (if they are already on the smallest trash service), or are small enough (achieved by reducing their already small volumes) that they cannot compensate for the cost the hauler will charge for the collection of a new stream – recycling – which requires the dispatch of an additional truck and the associated (relatively fixed and high) stopping charge.

The main ways to effectively implement small business PAYT are three-fold:

- Special treatment for small businesses, adding them to the residential program, providing 96 gallon service option for small businesses, or other.
- All businesses: require haulers to embed cost of recycling in the trash fee, with limitations on the multiple of service (e.g. recycling service same volume as recycling, 150%, 50%, etc).
- Contract for commercial service by city, or by forming an improvement district, or working with business association.

### Description / Case Studies for Commercial PAYT – Small Businesses

#### Options for Small Businesses to get on Residential Service Routes

To make it easier for small businesses to participate in recycling, cities / haulers agree to pick up the recycling from small businesses that are located along already existing residential trash / recycling routes. The businesses enroll and sign a contract that allows them to receive service that is similar in scope to the residential service provided. There are usually restrictions on the frequency of collection and the type and amount of recyclable materials that can be collected. This often allows the businesses to get a cheaper rate than they would from other commercial haulers, and sometimes there isn't any charge for service. Four such programs are discussed below.

#### Community Examples:

**Fayetteville, AR** (population 73,580): In Fayetteville, businesses can get involved in this type of program for \$5.88 per month. They can set out five (5) 18-gallon bins per week for collection and 160 businesses currently participate. Although diversion rates have actually decreased since the program was implemented, this is

believed to be due to a major decrease in the amount of newspaper in the waste stream. Tonnages were not available. Commercial recycling is not mandatory.

**Newport, RI** (population 24,672): The program in Newport, RI has only been operational for a month. They are hoping that it will raise their diversion rate from 23% to the mandated 35% by 2012. Commercial recycling is mandatory, but this is not enforced. Options for the businesses are as follows:

- 1) \$15/month for one (1) 22-gallon mixed bin + one (1) 18-gallon paper bin with once per week pick up,
- 2) \$25/month for two (2) 64-gallon carts with once per week pick up, or
- 3) \$50/month for four (4) 64-gallon carts with once per week pick up

A total of 18 businesses currently participate. No data were available at the time of the interview since the program was so new. Over three years, several types of programs were proposed such as PAYT and NoBinNoBarrel, but they weren't as favorable. The coordinator felt that more outreach would be very helpful (13,000 letters explaining the program were initially sent out), and that the program was inexpensive and easy to implement.

**Waltham, MA** (population 60,363): In Waltham, the city offers every other week collection for no cost, but the businesses have to supply the containers that can be up to 32 gallons. This service is available to the first 600 businesses who apply. The program has been active for 4 years and there are currently 80 businesses participating. There hasn't been any increase in the recycling rate as a result of the program. The coordinator doesn't have an explanation for why this is the case, but feels that there should have been. No tonnage data is available because it's all mixed in with residential. Commercial recycling is mandatory.

**Greater Sudbury, Ontario** (population 160,274): The 'Biz' Box Recycling Program is available to small businesses in Greater Sudbury. For an annual fee of \$59 which is adjusted yearly according to a cost index, weekly collection of three 40 liter (~11 gallon) yellow boxes is provided. The program has been operational for a few years and has a couple of hundred participants. Diversion rates and tonnages weren't known. Commercial recycling is not mandatory in the municipality.

**Why it works:** These type of programs work because they easily allow small businesses that don't produce a large volume of recycling to have an inexpensive and easy method to recycle. These programs are easy for the city / hauler to implement as well.

**Pitfalls:** There haven't yet been increases in the diversion rates that can be attributed to implementation of these programs. Many businesses fail to take advantage of the programs and outreach and education are necessary to promote them.

## 5.1 Description / Case Studies for Commercial PAYT – Embedded Recycling Fees

A number of communities have implemented PAYT requirements in the commercial sector in a way that is more parallel to the residential PAYT design – embedding the cost of at least recycling, if not recycling and food scraps, in the trash bill. The key to this incentive is embedding the recycling costs, which eliminates that problem that commercial trash plus recycling (two collections) is usually more expensive than collecting only trash. However, to make sure the system has some cost controls for the hauler, the system is usually designed to provide a limited amount of recycling – rather than the “unlimited” volume usually assumed on the residential side. That is, the payment of a trash bill also entitles the business to 50% or 100% or 150% of that volume in recyclables service. The cost of this recycling service is not “free”; it is embedded in the trash bill and is not optional. This program is especially well suited in areas with access to single stream (because of space considerations), and businesses with limited outdoor space or “screening” considerations can be serviced using one or more 96-gallon wheelies, which can usually fit in a screened enclosure. Finally, haulers and markets may benefit if haulers route to collect from paper- or cardboard- rich businesses separately, or establish routes that avoid collection of restaurants or food-rich businesses.

A more detailed description of this option follows, along with names of several communities with this program in place.

Under this incentive-based program, the trash bill for each business in the Community / County is required to include the cost of recycling and/or compost/food scraps collection, and all businesses are eligible to use the service(s). Commercial Municipal Solid Waste disposal fees are often volume-based, so including recycling or diversion service at no additional cost (embedded in the trash bill) provides an incentive for commercial generators to divert recycling or compost in order to reduce trash service levels and save money. This is especially useful for smaller generators who might find the regular price for service too cost prohibitive.

Whether or not they choose to use the service is entirely up to the generator; however, they will all be paying for the service and those that choose to use it will have a lower trash bill than those that do not. It also helps to alleviate issues of low route density and allows haulers to spread the costs of service among all generators. In many cases, the amount of maximum recycling or compost service available under the program is linked to the trash service volumes provided; for instance, the embedded service haulers are required to provide is 100%, 150%, or 200% of the trash volume. This helps the hauler know the maximum of alternative services they must include as part of their “revenue requirements” when calculating trash rates that will be sufficient to cover the cost of all services provided. This calculation would be more difficult if the maximum recycling volumes were unlimited.

Design Considerations: Determine if the hauler will “embed” the fee for commercial recycling or compost collection in their cost of trash service and how fees will be monitored. In some cases, the fee might be charged by the municipality to fund the program with the haulers reimbursed for the additional cost of collection. For those businesses that claim lack of space for recycling and compost collection, will they be exempted from the program or will they be given technical assistance. Spelling out the exact requirements for recycling and composting service is vital if this is a standalone program. Specific clarifications that should be made include:

- Will haulers be required to offer recycling for materials of their choice or will there be a specific list?
- Will compostable materials be collected as well?

- How often must recycling and composting be collected?
- Who will pay for the recycling and composting containers, the community, hauler, or business (the preferred option is to have these costs all embedded in the trash bill)?
- Will cooperative containers be allowed, that allow small businesses to share a recycling container, in cases where space is constrained, etc.?
- How close will cooperative containers have to be to qualify?
- If recycling service and/or composting costs are embedded in the trash bill, this kind of shared service should be manageable, and the size of that container must reflect the multiple businesses using it.

**Implementation:** Determine if there are adequate facilities for the additional recycling or compostable materials. Prepare outreach not only for the haulers, but also for the commercial community. Pass an ordinance or renegotiate contracts / licensing regulations requiring all haulers serving commercial accounts to provide a designated level of recycling service with the costs of the service embedded in the trash rates. Unlike ordinances that target generators, this ordinance targets the licensed haulers.

**Sectors & Materials:** All sectors and any materials that the jurisdiction chooses to require should be designated. If left unspecified, haulers could only collect the most profitable recyclables in the local region, and may not include the collection of compostable materials or low value materials generators at all.

**Enforcement:** Planning for enforcement is critical to the success of the program. The ordinance should provide the regulatory authority to audit hauler records to ascertain compliance and should require regular third-party audits.

**Barriers:** Lack of space for recycling and composting is often an issue in densely spaced communities, and some businesses may feel they are not able to participate in the program even though they are required to pay for it. In some space-constrained areas, the program could allow for shared, or cooperative, recycling containers nearby, because the cost is covered by the trash bills. Some monitoring would be required, or responsibility established to assure it is used for recycling (a clearer responsibility when containers are not shared). While businesses must pay for the recycling and / or composting service, this type of program does not require businesses to actually recycle or compost, but it provides strong financial incentives to do so.

**Program Impact:** High: Provided there is adequate public education and/or haulers are required to inform their accounts, the program should have significant impact on reducing the waste stream through source reduction and in the diversion of recyclable and compostable materials.

**Cost Impacts:** Low: User fees ultimately pay for additional costs of services as haulers will pass it along. There will be a larger cost impact to those businesses that don't recycle/ compost as they will not realize a reduction in their trash service volume or cost.

**Community Examples:** Salt Lake City, UT; Santa Barbara, CA; Seattle, WA.

**Sectors:**

**Consideration by Community Size (if any):**

- Very Small: For implementation, very small communities may have an easier time with enforcement and oversight due to fewer haulers; however, staff is usually smaller as well and may lack available

staff for audits. This is an important consideration when setting up the program. The impact on diversion may be less than with larger communities due to the smaller percentage of commercial accounts, a fact which will need to be weighed against the cost of implementation and enforcement.

- **Small:** For implementation, small communities may have an easier time with enforcement and oversight due to fewer haulers. However, smaller businesses may be at a disadvantage due to the lack of volume of recyclable materials may not reduce trash service enough to offset the cost of the additional service if the discount/rebate are not sufficient. Consideration of available capacity for additional materials is still important, though perhaps less of a concern than for very large communities due to the smaller number of businesses.
- **Medium:** This type of approach is ideal for medium size communities due to several factors. Typically, there is enough staff to follow through with enforcement. There are usually enough commercial entities to see a significant increase in diversion. Available capacity for new or additional materials is important.
- **Large:** Large communities can see a great impact in diversion to do the potential number of impacted businesses. However, they also have unique challenges with enforcement due to potentially the large number of haulers needing to be monitored. Lack of space for recycling can also be a problem in dense communities and businesses may not use the service even though they pay for it. The availability of facilities with additional capacity is extremely important for large communities due to the potential increase in volume of recycled materials.

## 6. Findings Research On Special Topics in PAYT

---

The project helped fund research on four other special topics in PAYT:

- PAYT rate design guidelines and findings on set outs;
- Multifamily PAYT options;
- Small haulers and PAYT; and
- Comparisons of PAYT performance vs. other incentives (including RecycleBank™).

White papers on the last three topics are included in the appendices to this research grant report. However, we provide high level write-ups on this research below.

### 6.1 Research on PAYT Rate Design Guidelines

It might be conjectured that the greater the financial incentive for decreasing trash can size (or the greater the penalty for higher service levels), the greater the recycling achieved. Even if this is true, there is considerable financial risk to a rate structure that becomes very “aggressive”. Rates are designed to raise revenues sufficient to cover the cost of providing collection service. The cost structure for providing trash service is a high fixed cost and low marginal cost (or a low cost for collecting an extra pound or can of trash at a household). If a system is to provide a substantial financial incentive to reduce trash volumes, then some of the cost of basic collection for low subscription levels ends up being subsidized – and the only place to get that subsidy is to assign higher costs to the large trash subscribers. The greater the price differential, the greater the transfer, and the greater the risk of not recovering all the revenues needed to fund basic collection.<sup>40</sup> We analyzed whether there is an optimum.

#### Balancing Incentive, Performance, and Risk<sup>41</sup>

##### **Rate incentives and specifically, PAYT rate differentials can be a driver for successfully increasing diversion.**

In previous quantitative research<sup>42</sup> (Skumatz 2001, 2013 and others), it was found that a community can achieve the same recycling or diversion levels from a PAYT rate differential of 80% more for double the service. Less than this achieves less recycling – and the research indicates that an incentive or differential of less than 50% for double the service volume -- is much less effective. That implies a goal for effective PAYT price differentials is between 50% and 80% for double the service, with a bias toward higher levels.

The study assesses a community’s incentives by comparing rates for 64 to 32-gallon service levels (including embedded recycling costs).

---

<sup>40</sup> There can be a concern about “subsidies” and paying fair shares. The residential sector as a whole is not necessarily subsidized under a PAYT system (unless a community *chooses* to subsidize it from general fund, commercial customers, or elsewhere). However, there are usually some subsidies of low users by high subscribers in order to create a more effective financial incentive under the PAYT system.

<sup>41</sup> This section relies heavily on a nationwide study by Skumatz, “Recycling Best Practices Study: Practical and Effective Methods to Move Recycling Forward”, Skumatz Economic Research Associates, November 2013.

<sup>42</sup> Skumatz, “Maximizing Vr/Payt Impacts – Policies, Rate Designs And Progress”, Resource Recycling, June 2001, and Skumatz, “Recycling Best Practices Study: Practical and Effective Methods to Move Recycling Forward”, Skumatz Economic Research Associates, November 2013.

The study used data from a large nationwide database collected by the authors<sup>43</sup> and statistically analyzed a wide range of PAYT factors that might affect recycling, including system type, variations in incentive levels (differentials), and container sizes. One key factor that was systematically important to reaching higher levels of diversion was whether the community offered a mini- or micro-can option in a PAYT program – a 10 or 20 gallon container at a lower price. Mini-cans apparently work.

### **PAYT Rate differentials – How much is enough?**

The study also investigated the break points at which PAYT incentive levels become effective. The question of how much rate incentive / percent increment is “enough” vs. potentially “too much” in a PAYT system is an important one. Having too little incentive leads to a lot of administrative and political effort for barely any recycling impacts compared to a flat rate, and a shortfall in the diversion potential and equity benefits associated with PAYT. But there are difficulties associated with too high an incentive as well. There were those early on (specifically in California) that expected to “more than double” the rates for double the (gallons of trash) service, arguing for the strongest possible diversion incentive. The two main areas of difficulty from this kind of “too high” rate incentive are:

- Potential to anger residents, leading them to increase litter / illegal dumping, and complain.
- Revenue certainty problems.

To explain the balancing act on the second issue, consider the following. Communities (and haulers) set rates to recover revenue requirements<sup>44</sup>, and the cost of service is, in the largest proportion, the cost of getting trucks to the door, not the tonnage collected.<sup>45</sup> If too much of the cost of (collection) service is loaded onto the larger cans (which it must be if incentive-based rates are charged),<sup>46</sup> and the incentive is too successful, the system may mis-predict the number of customers signing up for larger cans, and the system runs a risk of not covering the basic costs of door-to-door service. The funds for the subsidy for lower cans do not materialize. The farther that the rate design deviates from strict cost of service by size, the greater is the risk of under-recovery of costs.

It is best to find the rate optimum: high enough to provide a recycling incentive, but not so high that the system’s economics are in jeopardy.

As a consequence, we conducted statistical work to analyze the impacts of different levels of incentives. The data from the PAYT communities around the country were used in regressions to assess the two ends: the cost at which rate incentives seem to “kick in” (increase recycling), and the differential at which no additional diversion incentive seems to result. We tested both dollar value differentials (between the 30 and 60 gallon containers), and the percentage differences (same container sizes – the percent extra charged for this “double the service” option).

---

<sup>43</sup> Data collected by Skumatz Economic Research Associates (SERA), Superior Colorado, including programmatic, cost, demographics, and other data from more than 1,000 communities nationwide.

<sup>44</sup> Plus profit, for a hauler, or plus an allowed net income in some communities.

<sup>45</sup> The literature often suggests the collection cost is 80-90% of the rates charged for service. Obviously, this varies depending on labor rates and tipping fees. The inverse is that 10-20% of the cost of collection [is the tip fee / disposal part.

<sup>46</sup> PAYT are still rates that cover the cost of service for the class appropriately.



Dollar differences of greater than \$5-6 / month for moving from 30 to 60 gallon container sizes were significant and positive, adding substantial diversion (about 4-7 percentage points to recycling beyond those programs that charge less). The impacts did not increase a great deal with larger rate differentials, but the study did find that differentials in the \$8-10 range were solidly at the high end of the range. The analysis of percentage differentials showed that the greatest additional recycling is achieved when the price for the 60 gallon container is between 50% and 80% more than the price of the 30 gallon container. This added nearly 9 percentage points of diversion. The recycling results were smaller for rate differentials outside this range.

The study notes that the analysis is based on “all together” rates – defined as no separate fees broken out – the total that the household sees. The study also assumes that, once the rate differential for 30 and 60 gallons is “set” (defined by dollars, or by percentage, but then translated into dollars), the same dollar differential is used for moving from 60 to 90 gallons – for each 30 gallon increment, excluding the setting of rates for a mini or micro can (about 20 or 10 gallons, respectively).

Communities with stalled recycling and PAYT should consider checking whether the rate differentials should be revised to be consistent with the research; higher recycling can be achieved if 50-80% differentials are charged for double the service (assuming small container sizes like 32 gallons are available).

**Figure 6.1: PAYT Program Design Results (Source: Skumatz, Lisa A. Skumatz Economic Research Associates, statistical research, 2012-2013)**

PAYT Program / Policy Factors	Range of Impact on Recycling Percentage (percentage points ADDED to existing recycling rate in town) <sup>47</sup>
Mini- or Micro trash can offered (10-20 gal)	Substantial increase
Optimal rate differentials moving from 30-60 gallons (dollar differentials)	Minimum \$7; strong impacts \$7-\$12 <sup>48</sup>
Optimal rate differentials moving from 30-60 gallons (percentage incentives)	50%-80% of 30-gallon rate <sup>49</sup>
Socio-demographic factors	
Low tipping fees	Less recycling
Large community	Less recycling

<sup>47</sup> The only other indicative finding was that hybrid programs may lead to higher recycling than bag or tag systems or can systems. This result is inconsistent, however. This is different from earlier results that indicated bag systems delivered higher recycling levels than can-based programs (Skumatz, Lisa A., SERA 2000).

<sup>48</sup> Differentials smaller than this value were less effective than \$7 differentials, which tended to have negative signs, indicating the incentive was too small to be effective in increasing recycling rates. Similarly, the impact on recycling diversion decreased for dollar differentials higher than \$11 or \$12.

<sup>49</sup> This range had the highest recycling incentive, adding substantial percentage points of PAYT recycling performance; other differentials had lower impacts, controlling for additional impacts of mini/micro cans, low tipping fees, and large communities.

## 6.2 Research on Pricing for Can and Bag PAYT Programs

The question can be asked – which are “better” PAYT systems-- cans vs. bag programs? All other things equal, we see slightly higher, but *not statistically significantly higher*, diversion from bag than can programs. Presumably that is because households are paying only for the actual trash service used; if the can isn’t full, the can’s service level is still paid for, so customers may be less careful about recycling if there is space in their trash can. Bags are only paid when set out, so if they can delay set out, they save money.

The question of whether can vs. bag programs are “better” for PAYT depends on two key factors:

- What kind of collection system is in place currently, or is planned for the community, and
- Whether financing carts is an insurmountable barrier

If bags are currently used, then the community may wish to continue with bags – unless they are moving toward automated collection, where 1) verification of bag use by haulers becomes more difficult, and 2) where households would be paying both for bags and for the purchase of the cans the bags are placed in. If cans or automated collection are currently used or planned, questions have been raised about whether bags in cans present the better option. Some bag manufacturers argue that paid bags in cans are a strong option, especially if a community already has 90-gallon containers and purchase of multiple-sized cans would be a new cost. Certainly, bag-based PAYT works in a number of communities, and communities putting these systems in place show strong recycling increases; but strong recycling increases would also have occurred with the implementation of a well-designed can-based program. Basics of the pros and cons of the choices follow. However, implementing PAYT – whether can or bag – is a move toward more recycling. Each community should select the system that works best for their situation.

**Figure 6.2. Advantages of Bag and Can Based Programs**

Bag-based PAYT - Advantages	The same for PAYT Bag vs. Can	Can-based PAYT - Advantages
<ul style="list-style-type: none"> <li>• Customers pay for only the “space” they use</li> <li>• Hauler or city only needs to invoice stores or city hall, not individual households</li> <li>• No extra investment in cans – can use 90 gallon cans for all households IF haulers can conduct reasonable verifications that bags are being used</li> </ul>	<ul style="list-style-type: none"> <li>• Recycling increase with program is not significantly different</li> </ul>	<ul style="list-style-type: none"> <li>• No need to buy tags repeatedly; can always available</li> <li>• No extra verification beyond can size needed</li> <li>• Works with traditional automated collection</li> <li>• Cheaper for customers / program than bag program. Assume bags cost about 20 cents each<sup>50</sup>. If households set out 1 bag per week, they are paying the same extra for the bag as they would pay to purchase the new cart over a 5-year period (about \$1/hh/mo)<sup>51</sup>. After about 5 years, the households would continue to pay for bags, but they would have been done paying for the new cart. Carts last 10-15 years, so households pay 2-3 times as much under a bag system as for a can-based PAYT system.</li> </ul>

<sup>50</sup> See next section; in addition, there may be perhaps 5-6 cents needed for distribution by some manufacturers

<sup>51</sup> Haulers and cities usually add about \$1 per household per month into customer bills to pay off the containers. Using common interest rates, a \$55 can is paid off in about 60 months at roughly \$1 per month. After that, the can is “paid off”.

## Costs of Bags

The Commonwealth of Massachusetts conducted a bid for bags, so communities statewide could benefit from large-scale orders and avoid negotiations that might not lead to most favorable prices. A table of the results of those bids – which may provide indications for bag prices for communities considering bag-based PAYT – is replicated below.

**Figure 6.3: Cost of PAYT Bags Purchased from Multiple Manufacturers – Lower end (MA Statewide Bids Valid thru 6/2016; from MA PAYT website)**

	Boxes & Bags	Box/Bags Twist Tie	Mansfield Handle tie	Mansfield Twist tie	TBC - Wave	TBC Standard	WasteZero
8 gal							\$0.131
10 gal							\$0.141
15 gal	\$0.124	\$0.127	\$0.154	\$0.140	\$0.122	\$0.129	\$0.156
30 gal	\$0.220	\$0.238	\$0.263	\$0.234	\$0.209	\$0.214	\$0.253
Added for distrib & billing	\$0.03-\$0.05	\$0.03-\$0.05					\$0.05-\$0.06
Wtd Avg (33%/67% for 15/30g)	\$0.188	\$0.201	\$0.227	\$0.203	\$0.180	\$0.186	\$0.221
Wtd Avg (25%/75% for 15/30g)	\$0.196	\$0.210	\$0.236	\$0.210	\$0.187	\$0.193	\$0.229
Wtd avg using 10/30 gal at 25%/75%.							\$0.225

From these figures, it appears a competitive price for a “bag” (assuming a mix of smaller and larger bags) is between a low of \$0.186 (from Tags Bags Containers, Inc.) to \$0.236 from Mansfield Paper Company, Inc. (their “handle tie” design).

## Bag Price Differentials seen “In the field”

Recent research was also conducted on can subscriptions and pricing differentials (Skumatz, et.al. 2013).<sup>52</sup> This study used data from national community surveys on solid waste and recycling conducted by the authors. The study focused on PAYT communities, and provided summary statistics on:

- average prices charged for various subscribed can service levels (Figure 6.4); and
- average prices charged for bag-based programs (Figure 6.5).

**Figure 6.4: Average Prices Charged for Subscribed Can Service (From Skumatz, et.al, 2013)**

PAYT w/ cans	Minican <sup>53</sup> (15-23 gal)	30-35 gallon	60-65 gallon	90-96 gallon	Add'l Can	Per "Bag" or "Tag" in addition
Count	29	55	57	60	5	19
Average	\$18.15	\$19.36	\$29.49	\$37.16	\$9.61	\$3.13
Min	\$2.75	\$5.50	\$7.56	\$10.80	\$6.90	\$0.50

<sup>52</sup> Skumatz, D’Souza, and BeMent, (2013), “Can Subscriptions and Price Differentials in PAYT – White Paper”, Skumatz Economic Research Associates, Inc., Superior, CO, 80027.

<sup>53</sup> Note there were not enough observations to publish results for microcan service levels.

Max	\$28.23	\$33.45	\$65.00	\$98.44	\$15.00	\$6.19
Ratio of average price compared to 32 gallon	94%	100%	152%	192%	50% (small sample)	16% (one-time, not 4.3 times)

The differentials between average prices (bottom row) are less than the recommended values for highest performance, but still show substantial variation for increases in volumes.

Figure 6.5 shows the results for respondents that answered that their community uses only bags for PAYT-based residential trash.

**Figure 6.5: Average Prices Charged for Bag-Based PAYT Programs**

PAYT w/ bags only	Bag (15-23 gal)	30-35 gallon	Per "Bag" or "Tag" in addition
Average	\$1.17	\$1.96	\$2.33
Min	\$0.60	\$1.20	\$1.00
Max	\$2.50	\$2.50	\$3.30

## 6.3 Multifamily PAYT Options

There has been relatively little research on large Multifamily<sup>54</sup> building recycling and PAYT strategies that work. Pilot studies abound, but after more than 20 years of working with the sector, there are few golden lessons or shining examples. Personal attention, hauler incentives, “on-site champions”, and other strategies have been used; some are successful (see below), but others are discontinued over time because of issues of contamination, resident turnover, and underuse. One of the most interesting examples is a leading community that attempted strategy after strategy in the multifamily sector, and finally increased the sector’s recycling from about 20% to about 70% by delivering the stream to a “dirty MRF” for sorting and recovery. The sector is challenging. A review of the literature and in-house information on programs in place across the nation found a few options that communities are using to incorporate versions of PAYT for multi-family buildings – but many are findings even successful recycling challenging.

As mentioned in many articles<sup>55</sup>, there are a number of common barriers to recycling and PAYT, related to difficulty of billing individual residents, split incentives (generators are not bill-payers), space issues, transient residents, and concerns about illegal dumping / cheating. As far as PAYT options, past literature has recommended modified versions of PAYT, including:

- Two tier rates or recycling credits – charging less for TRASH for buildings that recycle for either all multifamily buildings; low use MF customers, or for buildings assigning on-site recycling champions. This is not strictly PAYT, but a version of a financial incentive to owners.
- Direct tenant bill incentives / rebates / chits, either administered through trash or through other utility bills tenants pay, or tenants responsible for using pre-paid bags in the communal dumpsters.
- In reality, the most common strategy used in the multi-family sector is:<sup>56</sup>
- Embedded fees: The most common system in place is to treat multi-family buildings like commercial buildings, and embed recycling in the trash bill – providing a commercial PAYT incentive to the building’s owner/ bill-payer, although not to the resident. The barrier of a higher cost for recycling is eliminated. A number of cities across the US have recycling services embedded in the trash rates with variable rates for trash collection in the MF sector. The rates are paid by the property manager and there is no incentive to the household. Property managers can save hundreds and thousands of dollars a year by encouraging recycling. Under these programs easy access to recycling, outreach, posters/stickers, and other tools are very common. One community in Washington requires that trash bills automatically embed recycling service in the amount of 150% of the trash service – if you subscribe to 1 cubic yard once per week of trash, your trash bill includes the cost of getting 1.5 cubic yards of recycling once a week, too. SERA found successful examples of these programs in CA, NJ, FL, PA, TX, NY, MD, GA, OR, WA, CO, VA, CT, and others.

<sup>54</sup> Most of the time, small multi-family buildings – condos, town houses, duplexes, and larger buildings with direct access are commonly treated the same as single family (and are billed, and provided service nearly identically to single-family. In this paper, we are more concerned with the more complicated situations

<sup>55</sup> See, for example, Skumatz & Green, 1999, *Resource Recycling* 10/99, “Reaching for Recycling in Multi-family housing”, and others.

<sup>56</sup> A few have explored with “hardware options” – special recycling chutes with codes, lazy-susans, and others, but we have not seen a great deal of success.

Other suggestions in the multi-family sector focus more on recycling incentives and programs (rather than PAYT), and include:

- Discounted recycling fees- Whether through contracts, franchises, or ordinances, other communities incentivize building participation through reduced fees for recycling. In some communities, an equal amount of single stream recycling as trash service is included in the rate; others have a situation where recycling service is required to be 40% cheaper than trash service, and others the required rate differential is around 20-25%. Under these programs there is still no incentive for HHs to participate but there is an incentive for a property manager to sign-up for service.<sup>57</sup>
- Mandatory recycling- A few cities have mandatory multi-family recycling coupled with variable rates for multi-family trash (paid by property managers). The level of enforcement varies. In some places, property managers and/or tenants can be fined; in others there is little-to-no enforcement.
- Extensive Education- Some communities (CA, WA, OR, MN) have tried pilots or full-scale programs including block or building leaders, free containers, apartment unit parties/celebrations, posters, door-to-door, etc.,.

## 6.4 Small Haulers and PAYT

One factor at play for a number of communities that are shying away from PAYT is a concern that small haulers will lose business because of PAYT, either because they are unable to manage the equipment or billing services necessary to implement PAYT. In other cases, PAYT becomes (unnecessarily) “bundled up” with contracting for service, and big haulers are perceived to be able to win the contracts by bidding low, and shutting out small haulers.

First, PAYT is very often implemented without contracts, districting, or franchising. Communities with PAYT and multiple haulers are common. Second, there are PAYT options that do not require significant equipment changes or billing systems (bag, tag, or hybrid programs).

Finally, there are strong reasons that small haulers (actually, any haulers) should actually *like* PAYT.

**PAYT helps the small hauler:** PAYT is usually designed so that it requires trash haulers to provide not only trash service, but also recycling service for each and every one of their residential<sup>58</sup> customers. It also requires that residents pay for both those services. For haulers that have only been providing trash service,<sup>59</sup> this is a

<sup>57</sup> Point systems – Besides haulers and others, some cities are working on the application of point systems to small multi-family buildings, encouraging recycling with coupons and the like.

<sup>58</sup> Single family, and usually also small condo / town house customers. Generally all residential customers on trash can, rather than dumpster service, are covered.

<sup>59</sup> And for those that have been providing recycling to only a minority of customers

HUGE business opportunity. The government has just required that you receive more revenues<sup>60</sup> (and presumably more profits), and the town is requiring it. Nothing about PAYT itself says a town has to limit the haulers providing service in the town. Nothing prefers large haulers. There are a number of ways to provide PAYT that doesn't require expensive wheelie containers (logo-ed bags in existing cans, etc).<sup>61</sup> And towns can phase it in overtime to help small businesses ramp up. Towns can introduce PAYT and lead to expansion of the business (and profits) for all existing haulers. This is a very valuable business opportunity.

There are a number of other reasons that PAYT can be attractive in towns with either concerns about small haulers, or arguments that can be considered in communities in which the town is leery about intervening in the marketplace. These include job creation, local jobs, PAYT as a fee for service, national security, and other arguments addressed in more detail in the attached White Paper.

## **6.5 Comparisons of PAYT Performance vs. Other Incentives (including RecycleBank™)**

Quantitative studies of PAYT have indicated that PAYT is one of the strongest strategies to achieve recycling and diversion. The program provides savings for those who put out less trash, providing a tangible and visible financial reward for recycling. However, a few years ago, PAYT started to be criticized as being a "stick, rather than a carrot", and RecycleBank™ was put forward as a carrot-based alternative.

A multi-client study<sup>62</sup> was initiated to study the performance and impacts of various designs of financial incentives for residential recycling, specifically:

- PAYT;
- Recycling rebates or credits (money off the bill if the household participates in recycling); and
- RecycleBank™ (RB).

The study examined the tonnage impact (effectiveness), recycling behaviors induced, costs and cost-effectiveness, and the pros and cons of the systems. The analytical steps for the study included:

- Gather data from communities with PAYT, RB, and credits, and conduct interviews with communities with the programs;
- Conduct statistical and quantitative analyses to identify the incremental impacts on diverted tons that could be associated with the program separate from the influences of other factors (community demographics, other programs in place, etc.);
- Analyze the costs of the programs, and develop metrics like cost per ton, etc;
- Assess the pros and cons of the program options.

<sup>60</sup> Potentially on the order of 75% or more revenues if they aren't currently providing curbside recycling.

<sup>61</sup> See case studies for the variety of ways PAYT is implemented on [www.paytnow.org](http://www.paytnow.org) and elsewhere...

<sup>62</sup> This EPA grant, Econservation Institute, and Skumatz Economic Research Associates; White Paper is provided in the Attachments, along with the published article in *Resource Recycling*.



## Results from the Analysis of Attributable Tonnage Diverted

- **PAYT:** Extensive statistical analysis by the authors<sup>63</sup> shows that PAYT reduces the total of residential trash disposed by about 17 percentage points.<sup>64</sup> The total diversion impact from PAYT is about three times the recycling impact. These represent the impacts of PAYT, separate from changes in any other programs.
  - About one-third of this impact is reflected in an increase in recycling, about one-third is an increase in organics diversion, and about one-third is source reduction / waste prevention (donating to charity, buying durables, less packaging, buying carefully, etc.)
  - These impacts represent the impacts of PAYT, separate from other changes. The recycling impact alone is an increase of 30-100% (an average of about 50% based on studies in Iowa,<sup>65</sup> and in SERA studies<sup>66</sup>).
- **Recycling Credits:** There has not been sufficient quantitative data from recycling credits communities to associated estimate tonnage impacts. A conservative assessment of the tonnage impacts of RB are derived in the paper, and result in about three-fourths of the tonnage diverted by the RecycleBank™ program.
- **RecycleBank™:** Identifying the impact of the RecycleBank™ program alone is made more complex because the data often include changes beyond a simple implementation of a RecycleBank™ rewards system in a community with an existing single stream program with large containers. More often, communities switch to single stream and larger containers at the same time they add RecycleBank™.<sup>67</sup>
  - Using data from about a dozen communities,<sup>68</sup> we find RecycleBank™ increase recycling about 30%, and has between half and two-thirds of the impact on *recycling* that PAYT has,<sup>69</sup> and of

<sup>63</sup> See publications including Skumatz, "Pay As You Throw in the US: Implementation, impacts, and experience", Waste Management, September 2008; Skumatz and Rogoff, "Pay As You Throw – Now...", APWA Reporter (March 2010), Skumatz, "Measuring Source Reduction: Pay As You Throw / Variable Rates as an Example", Skumatz Economic Research Associates Technical Report (5/2000), on EPA website; and articles in *Resource Recycling* 6/2001, 8/2000, August-Oct 1999, 8/97, 9/96, and others continuing back to the late 1980s. Also see Skumatz and Freeman, "Pay As You Throw in the US: 2006 Update and Analyses", for EPA and SERA, 12/2006 on EPA and serainc.com websites; and Skumatz, "Beyond Case Studies: Quantitative Effects of Program Choice on Recycling and Green Waste Programs", SERA, July 1996; Skumatz, "Frequently Asked Questions about PAYT" on [www.paytnow.org](http://www.paytnow.org), among others.

<sup>64</sup> SERA studies show very similar increases occur from PAYT whether recycling is curbside or drop-off.

<sup>65</sup> Frable, Garth W., and Berkshire, M., 1995, "Pay-as-you-Waste: State of Iowa Implementation guide for Unit Based Pricing", East Central Iowa Council of Governments and Iowa Department of Natural Resources, Cedar Rapids, Iowa.

<sup>66</sup> Skumatz, "Frequently Asked Questions about PAYT", available on [www.paytnow.org](http://www.paytnow.org),

<sup>67</sup> Communities with small dual-stream bins have been a smart target group and strategy, because the recycling gains – representing the combination of recycling increases due to single stream, larger bins, and RecycleBank™ - are especially large. However, it complicates disentangling that share of the effect actually due to RecycleBank's™ incentive alone, separate from the cart and single stream effects.

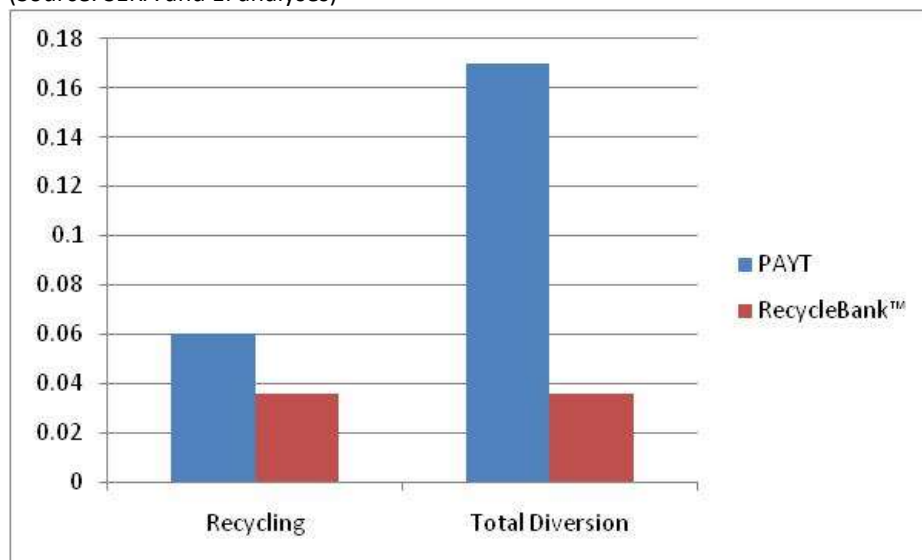
<sup>68</sup> Individual community results we identified for communities with single stream already in place ranged from an 11% increase in recycling to several with results in the 30-35% range (a couple communities report zero impact but were not included in the analysis. For some communities, the switch to RB included a change in recycling system to single stream and larger carts, and we extracted the portion of the impact attributable to single stream. For other communities, the data could be used directly as they maintained the same containers and recycling system and just added RB.

<sup>69</sup> We found much higher gross increases in towns starting from dual stream, 18 gallon bin programs, but in many cases, the larger share of the impact was attributable to the move to single stream with large containers. The smaller portion of

course, none of PAYT's composting or source reduction impacts (which is 2/3 of PAYT's total impact). RecycleBank™ would not be expected to have an attributable effect on composting or source reduction.

- Based on the results from a number of early eastern RecycleBank™ programs on the North Shore of Massachusetts (captured EPA's Spring 2009 newsletter)<sup>70</sup>, a community implementing PAYT had three times the diversion impact as similar communities that implemented RecycleBank™. Graphs showing the SERA and Massachusetts results follow.

**Figure 6.6: Average Percentage Points of Added Diversion Rate: Recycling and Total Diversion**  
(Source: SERA and EI analyses)

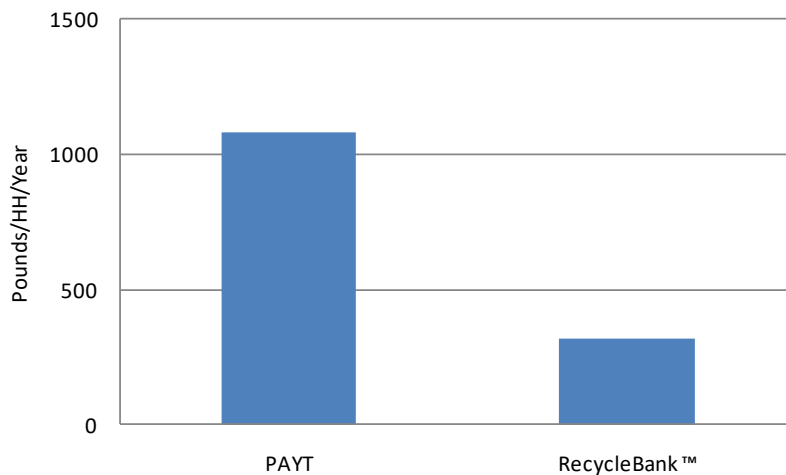


the net increase was attributable to the RecycleBank™ incentive program separately. On average (from a small sample), it was about half and half. Note that in a couple communities, the staff estimated that there was zero impact from RecycleBank™.

<sup>70</sup> <http://www.epa.gov/osw/conserve/tools/payt/tools/bulletin/spring09.pdf>.

**Figure 6.7: Comparison of Annual Pounds per Household Diverted in North Shore MA communities**

<sup>71</sup>(Source: EPA PAYT newsletter 2009)



The ratio of tons diverted by a PAYT program to that from a RecycleBank™ program is estimated to be about 4.8:1:0.75 (17 percentage points for PAYT vs. about 3.5 for RB and  $\frac{3}{4}$  that for recycling credits).

## Results of the Cost Analysis

Using data from communities nationwide, the costs per diverted ton were compared for various programs. The information, illustrated relative to the cost of curbside recycling programs, is presented in Figure 6.8. The information indicates that RecycleBank™ programs are multiple times the cost per diverted ton as PAYT; however, these figures vary based on the specifics in the community and the negotiated RB cost arrangements, etc.

- SERA had community data on the costs associated with PAYT programs, and included a low end (e.g. hybrid program) to a higher, more Cadillac installation of PAYT.
- The fees for the RecycleBank™ programs vary based on arrangement, services, and negotiating skill. This variation complicates the computations and comparisons. However, we can perform the computation based on various cases, as shown in Table 3.
- The designs for recycling credit programs varies, but from early-design simple recycling credits to communities and haulers that have developed their own tailored<sup>72</sup> systems, including web / rewards programs. Costs calculated out as minimal (pennies) per household per week.

The relative ratios of tons and costs for the programs are provided in Figure 6.8 and Figure 6.9. Table 6.8 shows that for communities getting RB deals at \$0.80 per household, the cost per ton for RecycleBank™ is about 6 times as high as the high cost PAYT scenario (60 times the low cost PAYT scenario), and if the RB cost is \$2 per household per month, RB costs 15 times as much per ton as the higher cost PAYT options (and 150

<sup>71</sup> RecycleBank™ advertises higher tons per household than the figures found in these communities.

<sup>72</sup> Waste Management's™ "Think Green Rewards", and Terracycle's™ programs are corporate examples; communities are also implementing programs. Some are hooking up with local retailers; other are broadening the ways to earn credits, considering granting credits for community service actions, and maybe expanding to composting or source reduction.

times the low cost PAYT scenario).<sup>73</sup> The home-grown recycling credit option costs about three times as much per diverted ton as the high-cost PAYT option. Comparisons to the low cost PAYT option are considerable more dramatic (far right column of below). Figure 6.8 illustrates the relative cost-per-ton differences for the \$1.50 Recyclebank™ option, compared to the others.

**Figure 6.8: Relative Cost per Ton for PAYT, Recycling Credits, and RecycleBank™**

(Source: SERA and EI computations) Uses Cost per ton for PAYT options as “1”, presenting the programs as multiples of the cost for PAYT.

Relative Cost per Ton Diverted <sup>74</sup>	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)

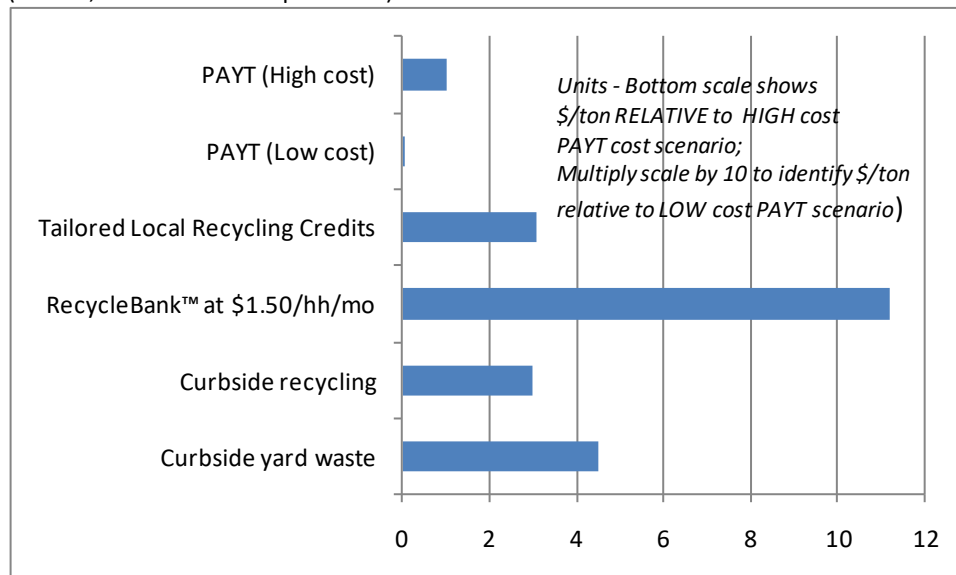
<sup>73</sup> And more than 100 times the cost for low cost PAYT programs. The average cost for RecycleBank™ for the communities we interviewed was \$1.50 per household per month in fee. As mentioned, these arrangements can be complicated; earlier communities included some sharing of landfill savings, and other contract terms. In some communities they were unable to estimate the costs because it was rolled into the service bid from a hauler.

<sup>74</sup> Note that this implies that RecycleBank™ can be more than 100 times more expensive per ton diverted than the low-cost PAYT options implemented in many communities.

**Figure 6.9: Relative Cost per Ton Diverted for Program Options**

(Relative to baseline of High PAYT =1, uses \$1.50/hh/mo cost for RecycleBank™)

(Source, SERA and EI computations)



### Analysis of Pros and Cons of the Program Options

Communities considering incentive options will need to assess the following points. Each option has pros and cons; however, there are other types of programs that, in some cases, will encourage diversion and do so in a manner even more suited in some communities.

- PAYT is the cheapest, most effective, most flexible option for increasing recycling, composting, and source reduction; however, in some communities political will to implement the option is missing.
- PAYT does not require curbside recycling or single stream recycling; it works with existing drop-off or dual stream programs. RecycleBank™ is linked to access to single stream curbside recycling.
- RecycleBank's™ programs can be a politically attractive option for increasing recycling; it may be more implementable in places where other options cannot move forward.
- If households don't pay for trash (and can't be billed), or if behaviors won't change, RecycleBank™ can represent a viable catalyst for change.
- The payments to RB can be half of or nearly equal to the costs for curbside recycling programs in some communities.<sup>75</sup>
- RecycleBank™ contract costs are negotiated and vary quite a lot<sup>76</sup>; contracts can last as long as 3, 5, or even 10 years. Cities need to negotiate good prices, or need to establish well-designed "baselines" (in landfilled or recycling tons) to make sure they get a good deal.
- RecycleBank™ and its sophisticated outreach raise awareness of recycling in a community.
- RecycleBank™ can be a useful and politically palatable method of helping finance a transition to single stream. Note, however, that communities can achieve about the same diversion level as RecycleBank's™

<sup>75</sup> Restated, in some communities, it can nearly double the cost of a recycling program, depending on the deal negotiated and the type of recycling program in place.

<sup>76</sup> Depending partly on what services are requested, and, it appears, partly based on the community's negotiating skills.

impact with cost savings (rather than a payment to RecycleBank™) by simply implementing a switch to single stream recycling (assuming a single stream MRF is nearby).

- To reduce direct cost outlays to RecycleBank™, and assume greater control / flexibility, some communities are opting for “home-grown” recycling credit programs, sometimes rewarding more than just recycling.
- Communities can increase diversion cost-effectively by looking at yard waste instead of more recycling. For communities with weekly recycling, consider switching to every-other-week recycling and change the other collection to yard waste.<sup>77</sup> This can be introduced for very little extra cost,<sup>78</sup> and diverts a whole new waste stream, adding 15% or more new diversion.
- It may be that adding a direct social marketing program may achieve benefits equal to or greater than some of these options; and the costs are cheaper than the RecycleBank™ program (see *Resource Recycling* 4/2010 and 10/2010).
- A RecycleBank™-type program on the trash side (dubbed “Garbage by the Pound”, RR 10/89) would achieve even greater diversion than PAYT. Early experiments with this option indicated it diverted 15% more tons succeeding even a mature PAYT program; it would garner even higher diversion in a non-PAYT community.<sup>79</sup>
- PAYT seems complicated, no one “owns” it (so it is not marketed), and is not “turnkey” in nature. Haulers or others wishing to distinguish themselves in the market or win additional market share from communities interested in PAYT may wish to develop a “turnkey” approach to PAYT. A “turnkey” approach may also increase adoption of PAYT by reducing barriers.
- Nothing prohibits both PAYT and RecycleBank™ or Recycling Credits programs. The only issue is that the marginal tons (the extra tons from the second program) become considerably more expensive, as all the costs, but only a few of the tons, can be attributed to the last program implemented.

Communities have many issues to consider in selecting their next steps.

## Conclusions:

The study concluded that each of these program options has similar goals – to provide incentives for residents to recycle and divert more material. Each has pros and cons, which can be weighed based on each community’s criteria. Although it is possible to implement two options in one community (e.g. PAYT plus RB), the “marginal” or extra tons that are contributed by the additional option will be relatively lower (the same tons are targeted by each program<sup>80</sup>), and thus, the cost per ton will be much higher.

The study’s quantitative analysis found that costs per ton are considerably higher for the RB program than for either PAYT or recycling credit programs. The degree to which RB is higher partly depends on the negotiated “deal” that the community or hauler works out with RB; however, RB was more expensive per ton diverted

---

<sup>77</sup> Costs can be reduced by conducting these collections seasonally, or skipping a few winter months, if that is all that is needed in your climate.

<sup>78</sup> The cost of adding every-other-week yard waste is not much higher because the total number of collection stops per week at a household doesn’t change, and the largest cost of the program is getting the truck to the house. The only difference in cost is the difference in the net cost of processing the material – recycling vs. yard waste – for the pounds collected from each household. The net costs are relatively small, especially considering the big increase in tons diverted from disposal. The longer-term best design may be weekly yard & food waste, alternating with every other week trash and every other week recycling.

<sup>79</sup> Certified equipment is available

<sup>80</sup> Although the PAYT targets go beyond just recycling.

than PAYT at any price that we saw negotiated for RB. In addition, although RB theoretically had a carrot, in the form of coupons for dollars off at partner retailers, the study found that only a small minority of RB customers ever redeemed a coupon (perhaps 5-15%). All customers on small containers under PAYT saved money.

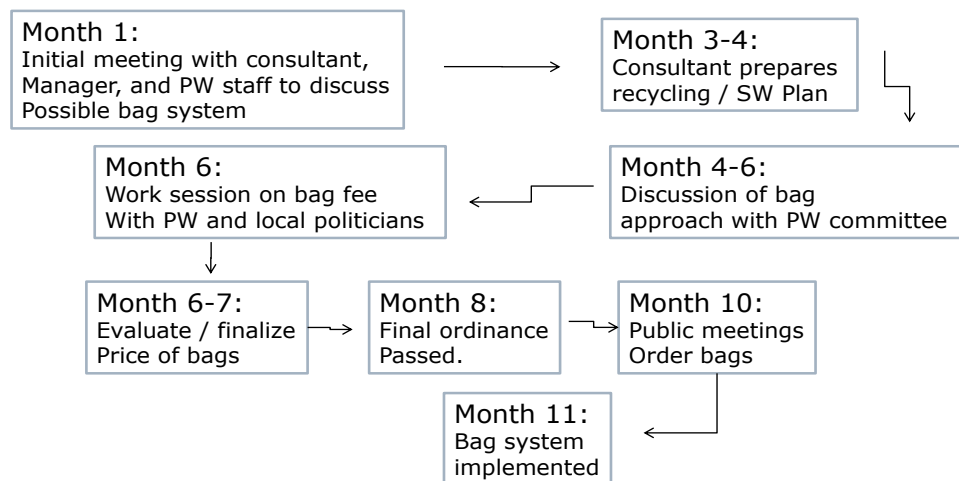
PAYT is the only one of the three options that encourages reductions beyond recycling (composting and source reduction), and avoids the concerns about encouraging consumption. The computations indicate that PAYT is the cheapest method of reducing residential MSW and increasing diversion. However, PAYT seems to take the highest degree of political will to implement, compared to the other programs. It might benefit from a renaming (perhaps to “Save as you Throw”!). RecycleBank™, in many cases, is more politically palatable because it often works through the haulers, and because it provides a way to help get single stream recycling containers financed – a burden to some communities and haulers.

The program that is “right” for a community depends on tradeoffs of politics, public opinion, operations, cost-effectiveness, and, perhaps timing or other considerations. However, the analysis showed that, of the three options, PAYT diverted far more tons, and at lower cost per ton than any of the other options. A detailed White Paper and a two-part article from *Resource Recycling* are included in the attachments to this document.

## 6.6 Sample Implementation Steps and Schedules for PAYT

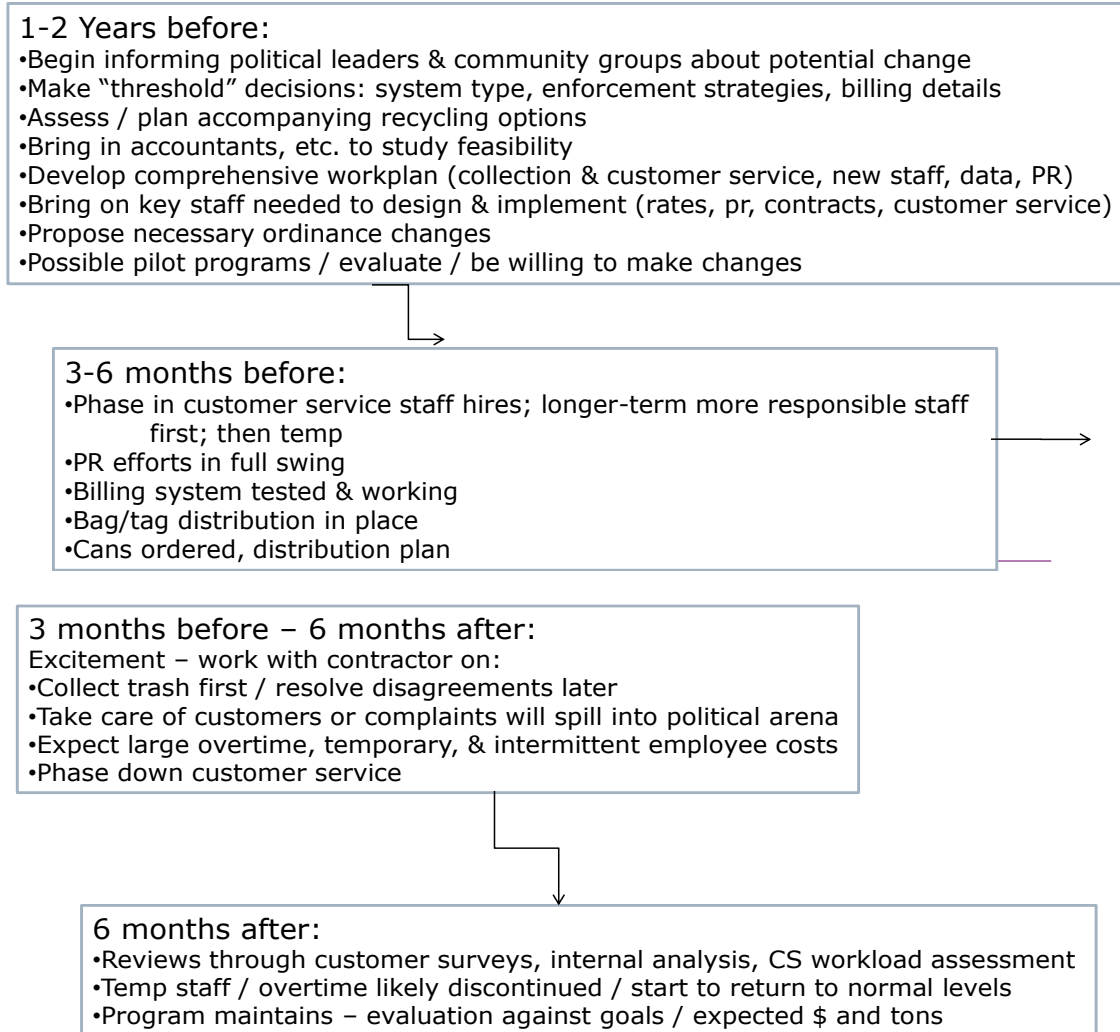
The following figures provide sample implementation schedules for PAYT implementation for can- and bag-based programs.

**Figure 6.10 Implementation Schedule- Bag Example**



This example is a year (with a solid waste plan). There have been bag/tag programs implemented in 3 months.



**Figure 6.11: Implementation Schedule- Can**

## 6.7 Lists of PAYT Communities in Arizona, Nevada, and Hawaii

Lists of communities with PAYT available to residents are provided in this section.

**Figure 6.12 PAYT in Region 9: Arizona – Strong Programs**

(Assembled by Skumatz, Econservation Institute for Region 9)

Arizona - Good or Variable Programs (multiple can sizes with different prices)	Population
Tucson, Pima Co*	548,555
Mesa, Maricopa Co*	462,486
Gilbert, Maricopa Co	217,285

<b>Arizona - Good or Variable Programs (multiple can sizes with different prices)</b>	<b>Population</b>
Sierra Vista, Cochise Co*	43,888
Surprise, Maricopa Co*	30,848
Clarkdale, Yavapai Co*	3,836
<b>Total (6)</b>	<b>1,306,898</b>

**Figure 6.13 PAYT in Region 9: Arizona –Limited Programs**

*(Assembled by Skumatz, Econservation Institute for Region 9)*

<b>Arizona - Weak or Limited Programs (90 gallon carts, at least \$5 for 2nd cart)</b>	<b>Population</b>
Phoenix, Maricopa Co*	1,601,587
Chandler, Maricopa Co*	255,230
Glendale, Maricopa Co* (recycling credit)	252,188
Scottsdale*	238,715
Pima County Unincorporated Mostly HOA's (non HOA, numbers included elsewhere); including 49 CDPs w pop of 290,132	233,950
Tempe, Maricopa Co*	175,523
Peoria, Maricopa Co*	142,042
Yuma, city, Yuma Co*	93,064
Avondale, Maricopa Co*	81,299
Flagstaff* Coconino County*	65,870
Casas Adobes, Pima Co	60,599
Catalina Foothills, Pima Co*	59,463
Buckeye, Maricopa Co	52,764
Casa Grande, Pinal Co*	48,571
Goodyear, Maricopa Co*	47,359
Maricopa city, Pinal Co*	43,482
Oro Valley, Pima Co*	43,223
Prescott, Yavapai Co*	42,697
Bullhead City, Mohave County*	39,540
Prescott Valley, Yavapai Co*	38,822
Apache Junction, Pinal Co*	35,840
Marana, Pima Co*	34,473
El Mirage, Maricopa Co*	31,797
Kingman, Mojave Co*	27,817
Queen Creek, Maricopa Co*	26,361
Florence, Pinal Co*	25,536
San Luis, Yuma Co*	25,505
Fountain Hills, Maricopa Co	24,669
Coconino County Unincorp 17cdps	21,627

<b>Arizona - Weak or Limited Programs (90 gallon carts, at least \$5 for 2nd cart)</b>	<b>Population</b>
Eloy, Pinal Co*	16,631
Sahuarita, Pima Co*	16,153
Payson, Gila Co*	15,301
Paradise Valley, Maricopa Co	14,558
Somerton, Yuma Co*	14,287
Coolidge, Pinal Co*	11,825
Cottonwood, Yavapai Co*	11,265
Camp Verde, Yavapai Co*	10,873
Chino Valley, Yavapai Co*	10,817
Show Low, Navaho Co*	10,660
Sedona* Coconino/ Mostly Yavapai Co	10,031
Winslow, Navaho Co*	9,655
Safford, Graham Co*	8,932
Tuba City CDP Coconino Co	8,611
Globe, Gila Co*	7,532
Page* Coconino Co	7,247
Tolleson, Maricopa Co*	6,545
Wickenburg, Maricopa Co*	6,363
Youngtown, Maricopa Co*	6,156
Oak Creek Village, Yavapai Co, cdp	6,147
Holbrook, Navajo Co*	5,081
Dewey-Humboldt, Yavapai Co*	3,894
Carefree, Maricopa Co	3,799
St Johns, Apache Co*	3,607
Black Canyon, Yavapai Co	2,697
Clifton, Greenlee Co*	2,265
LeChee CDP Coconino Co	1,443
Fredonia, Coconino Co*	1,314
<b>Total (57)</b>	<b>4,103,302</b>

**Figure 6.14 PAYT in Region 9: Hawaii – Limited Programs**

*(Assembled by Skumatz, Econservation Institute for Region 9)*

<b>Hawaii -Good or Variable Programs (multiple cans sizes with different prices)</b>	<b>Population</b>
Kauai County (24 CDP's)	62,993
Kauai County (non CDP population)	4,098
<b>Total (25)</b>	<b>67,091</b>

**Figure 6.15 PAYT in Region 9: Nevada – Strong Programs***(Assembled by Skumatz, Econservation Institute for Region 9)*

<b>Nevada - Good or Variable Programs (multiple cans sizes with different prices)</b>	<b>Population</b>
Reno, Washoe Co*	225,988
Sparks, Washoe County*	90,264
Douglas Co unincorp (no incorp in Co)	46,997
Fernley, Lyon Co*	19,368
Incline Village, Washoe Co cdp	8,777
Carter Springs, Douglas Co cdp	
Double Springs, Douglas Co cdp	
East Valley, Douglas Co cdp	
Fish Springs, Douglas Co cdp	
Gardnerville Ranchos, Douglas County cdp	
Genoa, Douglas County cdp	
Glenbrook, Douglas County cdp	
Indian Hills, Douglas County cdp	
Jack's Valley, Douglas Co unincorp	
Johnson Lane, Douglas County cdp	
Kingsbury, Douglas County cdp	
Lakeridge, Douglas County cdp	
Logan Creek, Douglas County cdp	
Round Hill, Douglas County cdp	
Ruthenstroth, Douglas Co cdp	
Sheridan, Douglas Co unincorp	
Skyland, Douglas County cdp	
Stateline, Douglas County cdp	
Tahoe Village, Douglas Co unincorp	
Topaz Lake, Douglas County cdp	
Topaz Ranch Estates, Douglas Co cdp	
Zephyr Cove, Douglas County cdp	
Buckeye, Douglas Co unincorp	
Centerville, Douglas Co unincorp	
Dressierville, Douglas Co unincorp	
Hobart, Douglas Co unincorp	
Holbrook Junction, Douglas Co unincorp	
Lake Village, Douglas Co unincorp	
Lincoln Park, Douglas Co unincorp	
Mottsville, Douglas Co unincorp	

<b>Nevada - Good or Variable Programs (multiple cans sizes with different prices)</b>	<b>Population</b>
Mountain House, Douglas Co unincorp	
Ranchos, Douglas Co unincorp	
Spooner Junction, Douglas Co unincorp	
Summit Village, Douglas Co unincorp	
<b>Total (39)</b>	<b>382,737</b>

**Figure 6.16 PAYT in Region 9: Nevada – Limited Programs**

*(Assembled by Skumatz, Econservation Institute for Region 9)*

<b>Nevada - Weak or Limited Programs (90 gallon carts, at least \$5 for 2nd cart)</b>	<b>Population</b>
Clark County Unincorp (incl cdp's)	862,779
Las Vegas, Clark Co*	584,044
Henderson, Clark Co*	257,437
North Las Vegas, Clark Co*	216,701
Carson City, Consolidate Munic of Carson City*	55,274
Pahrump, Nye Co cdp	36,441
Elko, Elko Co*	18,317
Mesquite, Clark Co*	15,278
Fallon, Churchill Co*	8,606
Winnemucca, Humboldt Co*	7,489
Gardnerville, Douglas County cdp	5,656
Minden, Douglas County cdp	3,001
Arden, Clark Co unincorp	
Blue Diamond, Clark County cdp	
Boulder City, Clark County*	
Bunkerville, Clark County cdp	
Cactus Springs, Clark Co unincorp	
Cal-Nev-Ari, Clark County cdp	
Cottonwood Cove, Clark Co unincorp	
Coyote Springs, Clark Co unincorp	
Crystal, Clark Co unincorp	
Enterprise, Clark County cdp	
Glendale, Clark Co unincorp	
Goodsprings, Clark County cdp	
Indian Springs, Clark County cdp	
Jean, Clark Co unincorp	
Laughlin, Clark County cdp	
Logandale, Clark Co unincorp	

<b>Nevada - Weak or Limited Programs (90 gallon carts, at least \$5 for 2nd cart)</b>	<b>Population</b>
Moapa Town, Clark County cdp	
Moapa Valley, Clark County cdp	
Mount Charleston, Clark County cdp	
Mountain Springs, Clark Co unincorp	
Nelson, Clark County unincorp	
Overton, Clark Co unincorp	
Paradise Clark Co cdp 186070	
Primm, Clark Co unincorp	
Sandy Valley, Clark County cdp	
Searchlight, Clark County cdp	
Sloan, Clark Co unincorp	
Spring Valley, Clark Co cdp	
Summerlin South, Clark Co cdp	
SummerlinTown, Clark Co unincorp	
Sunrise Manor, Clark Co cdp	
Sutor, Clark Co unincorp	
Vegas Creek, Clark Co unincorp (former cdp)	
Whitney (was East Las Vegas) Clark County cdp	
Winchester, Clark County cdp	
<b>Total (47)</b>	<b>2,071,023</b>