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Rate Structure Design

Setting Rates for a Pay-As-You-Throw Program

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Setting Rates for a Pay-As-You-Throw Program

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Introduction

Overview

The purpose of this booklet is to provide community planners and officials with an overview of two basic methods for setting rates within a Pay-As-You-Throw (PAYT) program. The booklet introduces and explains both conceptual and practical considerations for setting PAYT rates. It draws largely from the experience of many PAYT communities that are satisfied with their approach to rate structure design. This booklet *does not provide a formula or recipe* for rate setting but, instead, discusses the key steps and points to consider as you develop a rate structure that can best support your own community's goals.

What Is PAYT?

PAYT is an economic incentive that encourages citizens to reduce waste. Unlike traditional municipal solid waste (MSW) management systems, where residents pay for waste services through taxes or a flat fee, under PAYT systems, residents are charged for MSW services based on the amount of trash they discard. More than 4,000 communities across the country have implemented PAYT programs. These programs represent a concrete step that local officials can take to make their MSW management efforts more economically and environmentally sustainable.

What Are the '3-E' Benefits of PAYT?

PAYT offers three key benefits that can help communities move toward greater sustainability:

- **Environmental Sustainability.** PAYT helps protect the environment. Charging residents a fee for each bag or can of trash generated gives them an incentive to discard less waste. The typical result is a significant increase in waste prevention and recycling.
- **Economic Sustainability.** PAYT is economically viable for a broad range of communities. In fact, most communities considering PAYT focus first on the economics. Well-designed programs enable communities to generate the revenues they need to cover MSW program costs.
- **Equity.** PAYT is widely seen as a more equitable arrangement. Under PAYT, community residents who throw away less pay less.

What Is Rate Structure Design?

Rate structure design (RSD) is determining the price you charge per unit of solid waste set out for collection, processing, and/or disposal. All decisions about your program—from choosing a container type to maximizing resident participation—eventually feed into your rate structure. An effective rate structure should generate the revenues needed to cover the costs of service. By providing an economic incentive for residents to reduce their waste, an effective rate structure can also reduce those costs.

This booklet provides RSD information from a national perspective. It is important to remember that there are no 'cookie cutters' for PAYT; no two MSW programs share the same bottom line. Communities with successful PAYT programs base the fees they charge on their own unique goals and circumstances. This is one reason why PAYT rates vary widely among programs. The tools and information in this booklet will help you design a PAYT rate structure that works for your community.

This booklet also provides a collection of rate-setting success stories from five communities. These testimonials are presented in the words of the officials who developed the programs. They offer real-world examples of how different communities have approached the challenge of arriving at PAYT rates that are consistent with their own community's goals.

Maximizing the Power of Economic Incentives to Achieve MSW Goals

The power of PAYT to reduce waste is contained in the rate structure of a program. The process of designing a rate structure, therefore, is critical in maximizing this power. This section explains how PAYT's economic power works and provides an overview of the two basic methods for designing a rate structure. This section also helps you choose a pricing system for your PAYT program—a key step in the rate structure design (RSD) process.

Benefits of Using Economic Incentives and Price Responsiveness

Traditionally, communities have raised the revenues to cover MSW program costs in ways that are entirely disconnected from the amount of MSW services used by residents in their jurisdictions. Most U.S. communities, for example, charge for MSW services by either levying a property tax or billing all residents an equal amount. Residents in these communities usually lack information on the costs of the MSW services they use. As a result, citizens often act as if MSW services are free. No matter how much or how little these individuals use the services, they incur no financial consequence and reap no financial benefit. People typically respond to (apparently) free services by overusing them. In most communities, this results in unnecessarily large amounts of garbage with excessive costs for which the local citizens must then pay.

In contrast, PAYT introduces price incentives, based on market values, into individuals' decisions, which then collectively determine a community's pattern of generation, collection, processing, and disposal of MSW. It does this by pricing MSW program services in a way that reflects the resources (e.g., labor, equipment, fuel, and land) needed to dispose of household materials that are no longer useful—regardless of whether they were purchased (e.g., leftover food, discarded packaging, or broken products) or grown (e.g., grass clippings and tree trimmings).

This price signal gives residents *information* to decide on the actions they should take to set out less trash and more recyclables. Pricing MSW services also provides individuals with the *opportunity* to take actions that can make a financial difference. Both aspects of price—the information it provides and the opportunity it provides residents to reduce their MSW service expenses—cause individuals in PAYT communities to conserve on MSW services just as they conserve on any other service or product that has a price. PAYT provides a continuing motivation to residents to reduce their expenses for MSW services by managing their waste materials in a more environmentally sustainable fashion.

Many PAYT communities have demonstrated the power of economic incentives; they have sharply lowered the amounts of trash they dispose of and also significantly increased recycling rates. Price signals can steer residents to engage in a variety of waste reduction activities. Residents, for example,

might be motivated to reduce the amount of excess packaging of products they buy, reuse products or packaging materials, share magazine subscriptions, donate used clothing or furniture to charities, recycle more materials, and compost and grasscycle organics.

Under PAYT, all of these waste reduction activities can provide an economic advantage to the resident. In serving as a continuing reminder to reduce waste, PAYT serves as a powerful educational tool supplementing the efforts of MSW planners, recycling coordinators, and environmental organizations striving to enhance waste reduction activities within a community.

Growing numbers of communities are turning to PAYT and thereby shifting toward managing MSW services as they would any other utility. The aggregate result is a significant reduction in waste. Collectively, PAYT programs are succeeding in aligning millions of citizens' efforts to conserve their own financial resources with the overall goal of conserving the nation's natural resources.

Establishing Community MSW Goals

An effective RSD aligns the power of economic incentives with a community's specific MSW goals. It is essential, therefore, to clearly define those goals in advance of implementing PAYT. Clear goals can help you determine your approach to the RSD process; your pricing system, container types, and billing system; your public education techniques; and other key aspects of your PAYT program.

Examples of MSW goals in PAYT communities include:

- Reducing MSW amounts.
- Increasing recycling rates.
- Increasing composting rates.
- Reducing the total cost of the MSW program.
- Increasing equity among citizens.
- Generating revenues to cover MSW costs.

Basic Methods of Rate Structure Design

Once you establish your community's MSW goals, the next step in implementing PAYT is to choose a pricing system (see pages 7-8) and establish the rates. As PAYT programs have spread across the country, communities have acquired valuable experience about determining an appropriate price to charge per container. Planners use a wide variety of methods to arrive at a price. The method you choose will depend on your community's goals and resources and the size and the complexity of your MSW program.

This booklet describes two general approaches that encompass most of the methods used: using data from comparable communities, and building from your own community's data using a six-step process. These approaches to RSD are described in detail in Sections II and III, respectively.

In calculating an appropriate unit price for their program, some municipalities conduct an in-depth analysis of costs. Performing this detailed level of analysis requires a greater amount of staff expertise. Some communities use accountants skilled in utility rate setting for this work. For more information about initiating a comprehensive cost analysis for the RSD process, see Section IV.

Common Pricing Systems for Pay-As-You-Throw

Each of the two methods of RSD are compatible with the following commonly used pricing systems (or combinations of systems) that have been successfully implemented in communities across the country.

Communities commonly choose among three basic types of PAYT pricing systems: *proportional, variable*, or *multi-tiered*, or a combination of these. Each system has its own advantages and disadvantages. One pricing system, for example, offers greater revenue stability while another creates a stronger waste reduction incentive to residents.

To decide which pricing system is best for your community, consider your community's MSW program goals (e.g., increasing recycling or keeping administrative costs low). After familiarizing yourself with the tradeoffs associated with each price system, determine which is most likely to meet your goals.

Proportional

Proportional systems create the most direct relationship between trash amounts and price. Residents are charged the same amount of money for each unit of waste they set out for collection (e.g., $1.50 for each 30-gallon bag). The price is based upon the number of bags, tags, or stickers (usually sold at local retail stores or municipal offices) a resident uses.

Advantages

- **Provides a strong waste reduction incentive**. Since residents must pay for the collection of each bag they place at the curb, they have a strong incentive to reduce waste and increase recycling and composting. (It should be noted that each of these PAYT pricing systems will likely provide a waste reduction incentive, but proportional pricing tends to give the strongest relative price signal for citizens to reduce waste.)
- **Potentially lowers MSW program costs and is simple to manage.** Residents typically purchase bags directly from the municipality or from local retail outlets. Compared with options that require a billing mechanism, this system can result in lower administrative costs.

Disadvantages

- **Not a cost-based pricing system.** Most costs for MSW services (e.g., costs of labor, equipment, and fuel associated with collection) are directly built into a community's overall MSW system rather than the per container costs tied to changes in quantities of trash discarded. Proportional rates do not reflect the cost structure of most MSW programs.
- **Potential revenue uncertainty.** Since proportional pricing links all revenues to residents' trash set outs, a proportional system exposes all revenues to the uncertainty of residents' responses to the introduction of price signals. This can lead to significant over- or under-recovery of needed MSW revenues. In addition, for bag programs, residents might buy and store many bags at once to use them over time. This surplus buying may create revenue fluctuations for the MSW agency.

Variable Rate

Variable rate pricing means charging different amounts per unit of garbage. Residents subscribe to one of several different container size options (typically, these are 32- to 64-gallon sizes, although they can range from 10 to 96 gallons in capacity). The community bills residents based on their subscription level. For the garbage that residents discard above their subscription level, they must pay an additional fee.

Under a variable rate system, the price charged for subsequent containers may increase or decrease, depending on the community's PAYT program goals. A household that pays $1.50 per week for a 32-gallon can subscription level, for example, might be charged either $1.00 or $2.00 for each additional 32-gallon can it sets out in weekly collections.

In addition, container sizes used for set outs above the subscription level can be varied. Some communities offer only one container size for additional set outs. Others ask residents to use containers that are larger or smaller than their subscription-level container size. Residents pay the fee for extra garbage by purchasing specially marked or colored bags (or tags/stickers that can be affixed to the bags), or the trash collectors can count the additional set outs at the time of collection and bill residents accordingly.

Advantage

- **Increased control over the waste reduction incentive.** MSW authorities can charge a price for additional containers that is higher than the subscription-level price if their goal is to create a strong incentive to reduce and recycle. Some MSW departments, however, are concerned that residents might dispose of their waste in undesirable ways if they feel the pricing system is unfair. To avoid this, additional containers can be charged at a lower price than the subscription-level price.

Disadvantage

- **Potentially higher costs.** Communities must offer residents a choice of subscription levels, provide them with containers in varying sizes, and bill accordingly. Haulers may need to count set outs during collection. As a result, these systems might be more expensive to implement and administer (especially during the startup phase).

Two-Tiered or Multi-Tiered

Two-tiered or multi-tiered systems help communities achieve revenue stability. Similar to the billing systems used by telephone and water utilities, residents subscribe to a base level of service, for which they pay a flat fee. These 'first-tier' fees can be assessed through local taxes or through a monthly or quarterly charge, often included in a utility or other municipal bill. These fees can be used to cover the fixed portion of a community's solid waste program costs (e.g., accounting, personnel, purchasing, and executive oversight). Residents then pay a 'second-tier' fee based on the amount of waste they set out. Second-tier fees can be either variable rate or proportional. These fees are often used to cover variable costs (e.g., collection, transport, and disposal).

Advantage

- **Provides revenue stability.** Multi-tiered systems allow communities to ensure that the program's fixed costs will be covered, no matter how much residents reduce waste and increase recycling (and thereby decrease PAYT revenues).

Disadvantage

- **Potentially generates a lower waste reduction incentive.** The total cost of trash services might not be apparent to residents when part of the program cost (first-tier fee) is charged at a flat rate or hidden in taxes. This may lessen the incentive for residents to reduce and recycle.

First Method of Setting PAYT Rates
Drawing From Comparable Communities

Some communities start the rate structure design (RSD) process by examining programs in successful PAYT cities or towns with similar MSW programs, services, and/or demographic profiles. In this case, it may be particularly useful to look at communities with comparable disposal costs and tipping fees, complementary programs, and pickup frequencies. After learning what size containers these communities use and the price they charge for each, you can adjust your rates to fit your community's goals. You also might simply use other communities' rates as a starting point for your own, more extensive calculations (see Section III).

The map on pages 10-11 offers a sample of PAYT rate structures across the country in 1998. The communities shown have implemented many different program variations, from variable rate systems using a combination of bags and cans to proportional systems based on the sale of tags or stickers. All of these communities have set rates that allow them to meet their unique program goals. Use this map to learn more about rates and PAYT program variations in use today. (For a more comprehensive matrix of PAYT communities, check EPA's Web site at <*www.epa.gov/payt*>.)

Starting with rates used by comparable communities might initially be the simplest approach to RSD. Eventually, though, you might need to revise your community's rates to more reliably cover costs, more effectively encourage waste reduction, or more vigorously achieve other community goals.

RATE STRUCTURE DE

Auburn, WA

Population: **36,000**
Start Date: **1968**
Price per Container:
$8.87 per month for one 30-gallon can per week; **or $19.60** per month for one 60-gallon can per week

Pendleton, OR

Population: **15,000**
Start Date: **1935**
Price per Container:
$12.35 per month for one 32-gallon bag per week; **or $25** per month for one 90-gallon can per week

Pittsburg, CA

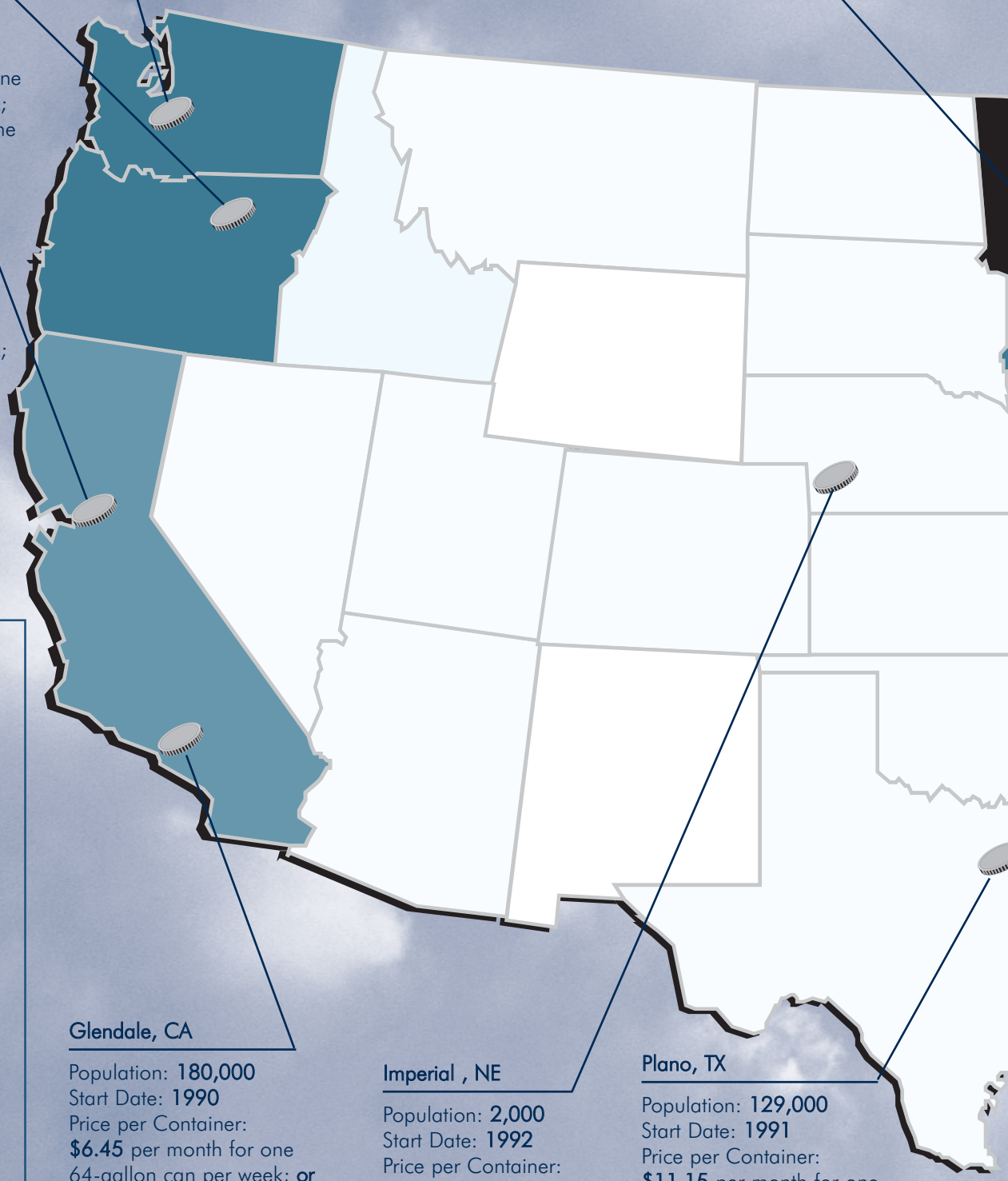
Population: **48,000**
Start Date: **pre-1990**
Price per Container:
$18 per month for one 32-gallon bag per week; **or $21** per month for one 96-gallon can per week

St. Cloud, MN

Population: **49,000**
Start Date: **1991**
Price per Container:
$2.00 per 32-gallon bag

Antigo, WI

Population: **8,000**
Start Date: **1990**
Price per Container:
$1.50 per sticker (30 gallons)



Number of communities with PAYT

- 0
- 1-10
- 11-25
- 26-50
- 51-10
- 101-500
- 500+

Glendale, CA

Population: **180,000**
Start Date: **1990**
Price per Container:
$6.45 per month for one 64-gallon can per week; **or $10.10** per month for one 100-gallon can per week

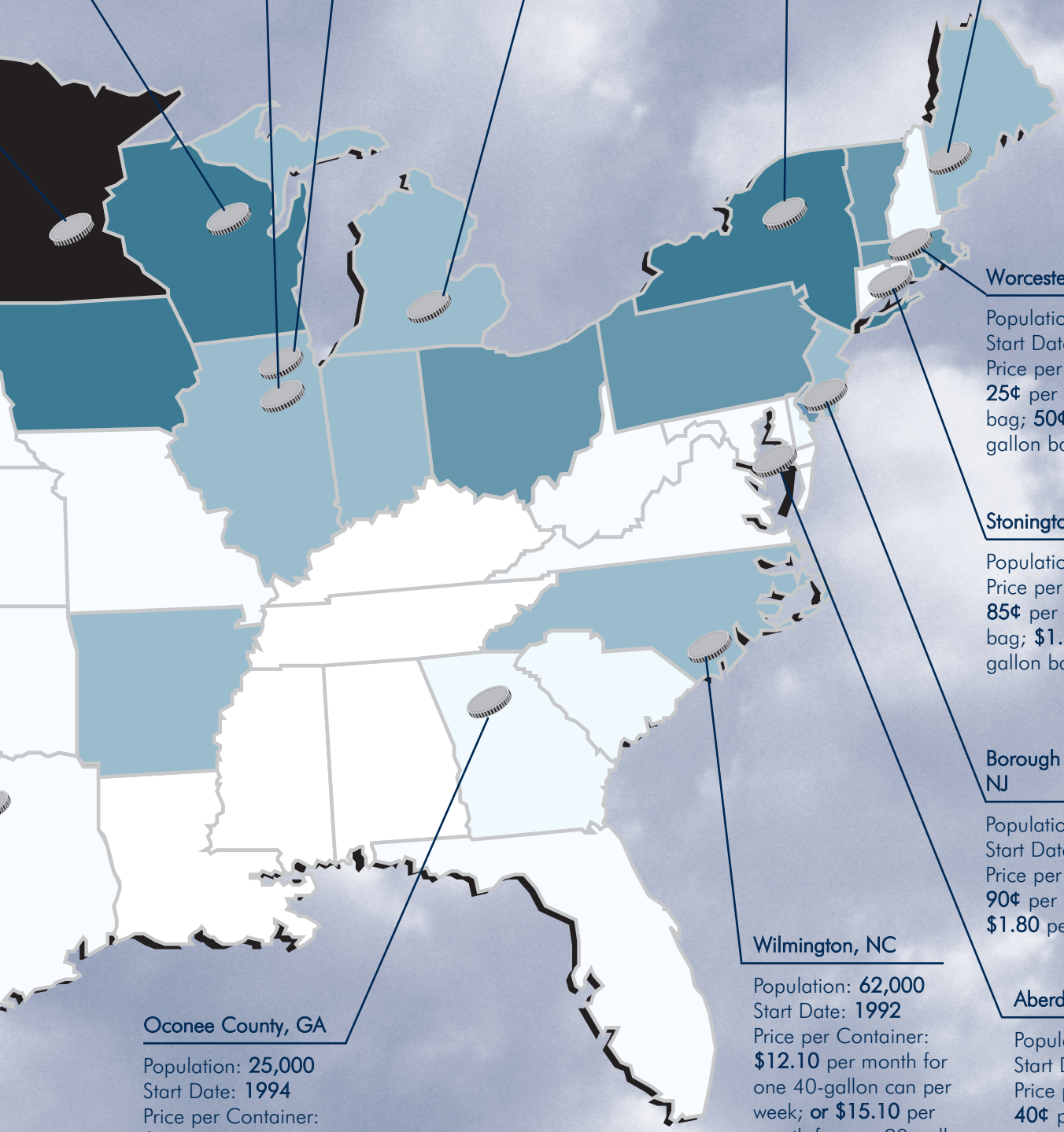
Imperial , NE

Population: **2,000**
Start Date: **1992**
Price per Container:
$2.00 per 30-gallon bag; **$6.00** per 90-gallon can

Plano, TX

Population: **129,000**
Start Date: **1991**
Price per Container:
$11.15 per month for one 95-gallon can;
$12.50 per month for each additional 95-gallon can

SIGN: SAMPLE RATES



Darien, IL

Population: **18,000**
Start Date: **1990**
Price per Container:
$1.50 per bag
(60 lb. maximum)

Aurora, IL

Population: **119,000**
Start Date: **1991**
Price per Container:
67¢ per 14-gallon bag; **$1.35** per sticker (32 gallons)

Lansing, MI

Population: **130,000**
Start Date: **1976**
Price per Container:
$1.50 per 30-gallon bag

Utica, NY

Population: **69,000**
Start Date: **1989**
Price per Container:
85¢ per 16-gallon bag; **$1.40** per 32-gallon bag

Fryeburg, ME

Population: **3,500**
Start Date: **1993**
Price per Container:
$1.00 per sticker
(30 lb. maximum)

Worcester, MA

Population: **170,000**
Start Date: **1992**
Price per Container:
25¢ per 15-gallon bag; **50¢** per 30-gallon bag

Stonington, CT

Population: **1,000**
Price per Container:
85¢ per 20-gallon bag; **$1.50** per 34-gallon bag

Borough of Woodstown, NJ

Population: **3,000**
Start Date: **1992**
Price per Container:
90¢ per 15-gallon bag; **$1.80** per 30-gallon bag

Wilmington, NC

Population: **62,000**
Start Date: **1992**
Price per Container:
$12.10 per month for one 40-gallon can per week; **or $15.10** per month for one 90-gallon can per week

Aberdeen, MD

Population: **13,000**
Start Date: **1993**
Price per Container:
40¢ per sticker (20 gallons); **80¢** per sticker (32 gallons)

Oconee County, GA

Population: **25,000**
Start Date: **1994**
Price per Container:
$1.50 per 32-gallon bag

Second Method of Setting PAYT Rates
Using the Six-Step RSD Process

A second method of rate structure design (RSD) is to review data on your community's waste generation, program costs, and other relevant factors to arrive at your own PAYT rates. These calculations can be simple or complex, depending on the kinds of data and the amount of expertise you have available. You will need to estimate the amounts of solid waste generated under PAYT, the types of MSW services that will be provided, and the net costs of MSW services. To help develop these estimates, communities often use simple worksheets or more complex tools such as computer software. While this method takes some time and effort, it may produce a rate structure in which you have greater confidence. The method has six basic steps as outlined below.

1. **Forecast residential MSW amounts.** Forecast the annual tonnage of MSW you expect to collect once PAYT has been implemented.

2. **Determine the types of MSW services to be provided.** Determine the types of MSW services that will be provided to residents (e.g., collection of trash, recyclables, and compostables) and the types of containers and billing options to be used under PAYT.

3. **Estimate net costs of MSW.** Estimate your net costs using the information developed above on forecasted amounts of MSW and the types of services that will be provided. Net MSW costs incorporate MSW costs less any revenues from complementary programs (e.g., sale of recyclables, composting, and trash or bulky waste pickup).

4. **Determine PAYT revenues and MSW program cost coverage.** Based on MSW costs and your coverage objectives, calculate the estimated revenues you need to generate. This may be more or less than net MSW costs, depending on your community's other goals and financial resources.

5 **Calculate PAYT rates.** Select a pricing system that is appropriate for your community after considering the pros and cons of the alternative systems (see pages 7-8). Based on the pricing system you select and the forecasted amounts and costs of MSW you expect under PAYT, calculate the price level necessary to pay for your program.

6 **Adjust MSW services and PAYT rate structure.** If the PAYT price level seems too high, consider less costly or more efficient MSW services and/or choose a PAYT pricing system that encourages greater reduction in your community's solid waste (and hence MSW costs). Then recompute the PAYT price level. Continue making adjustments until all of your community's objectives are met by the PAYT rate structure.

The six-step RSD process is detailed in this section using the example of a hypothetical community named 'Midtown.' Midtown is establishing a PAYT rate structure. It has a population of 35,000 (17,500 households). A task force comprised of diverse community stakeholders determined the town's MSW goals, which are:

- To encourage waste prevention
- To increase composting and recycling
- To maintain MSW revenue stability

Midtown currently has a curbside recycling program for collecting glass, aluminum, and newspaper. It will add collection of plastics, mixed paper, and steel cans. The city also decided to launch an aggressive education and outreach program on backyard composting and grasscycling in order to reduce the organics in its waste stream.

The example of Midtown is intended to help explain the basic RSD concepts. We encourage you to apply this six-step process to your own community's specific needs as you explore MSW program options and their implications for reduced solid waste tonnage, increased recycling, and PAYT revenues. This example is not intended to be a precise formula—there are **no cookie cutter** recipes for RSD! Rather, it is a methodology; a step-by-step analysis of the factors to consider when designing your own rates. Keep in mind your own community's goals, MSW services, costs, and revenue needs—which could differ greatly from this example—and be sure to use your own community's data when applying this approach.

To gather the necessary information, you might need to consult your community's MSW program records or the finance office in your town, city, or county government. You can base your estimates on community demographic and waste generation data. Other useful sources of information include local private haulers or the MSW offices of nearby PAYT communities.

Key terms and concepts used in this section of the booklet are listed on the following page. Refer to this list, as necessary, as you work through the six-step process outlined in this section; additional useful terms are referenced in the glossary on page 34.

Key Terms and Concepts

Base year: The year prior to implementation of PAYT, which can be used as a baseline against which potential PAYT impacts are measured.

Projection year: The year during which PAYT has been implemented and resident response has leveled out in response to the price incentives (e.g., through reduced waste generation and increased recycling).

Complementary programs: MSW services (e.g., curbside/drop-off recycling, composting, and bulky waste pickup) that supplement basic trash collection and disposal.

Waste reduction: The combined reduction in MSW that is discarded, resulting from greater waste prevention, increased reuse and recycling, and more backyard and municipal composting.

Direct costs: These costs are readily assignable to a particular MSW activity such as collection, processing, or disposal.

- **Collection and transportation costs:** Direct costs for trash and recyclables pickup, transportation, and temporary storage in transfer stations. These costs usually rise (or fall) as the level of MSW activity changes, although not always in exact proportion, and sometimes with a time lag. Major components include costs of labor, equipment, and/or contract payments.
- **Processing costs:** Processing costs of recyclables and other direct costs related to the postcollection management of recyclables.
- **Disposal costs:** Landfill tipping fees, incinerator costs, and disposal costs for residuals.

Indirect (overhead) costs: The management and support costs of operating the MSW program (including any indirect costs from centralized local government functions that are allocated to the MSW program's budget). These costs support the entire MSW system and are often relatively fixed costs, but they must be allocated among services and their associated rates on some basis (e.g., tonnage, full-time equivalents required, etc.).

1 Forecast Residential MSW Amounts

The first step involves estimating the amount of waste you will collect from the residents in your community during the base year and projection year. To obtain accurate calculations, you will need to isolate residential wastes from commercial wastes. Including commercial waste inflates both the total weight of MSW and the costs to be covered by the PAYT program. This will lead to inaccurate PAYT rate calculations. (If your community intends to collect commercial waste as part of your PAYT program, you will need to design a separate rate structure based upon dumpster size and collection frequency.)

A. MSW collected in the projection year, without PAYT.

Estimate the MSW tonnage you currently collect per household in a year. Adjust this amount for any likely changes in your community's population in the projection year.

B. MSW collected in the projection year, with PAYT.

Make a preliminary estimate of how much the residents in your community will increase their waste reduction efforts in response to PAYT. Successful PAYT communities recommend that it is better to overestimate reductions in trash set outs rather than to underestimate waste reduction efforts. This will ensure a sufficient revenue flow. (You can later revise this waste reduction estimate once you have developed more information such as the types of MSW services that will be provided, the pricing system that is best for your community, and the level of PAYT rates; see Section IV for more information.) Based on this estimate, calculate the MSW tonnage per household you expect to collect in the projection year under PAYT.

Table 1 on page 15 illustrates how Midtown calculated its residential MSW amounts in the projection year with and without PAYT.

Weighing the Difference With PAYT

A national study reports a **14- to 27-percent reduction** in trash (by weight) in PAYT communities that had **no recycling program or that simply retained their existing recycling program.** Communities that adopted PAYT in combination with new or expanded recycling programs achieved even higher percentage reductions in trash. Cities that did not change their recycling program with the introduction of PAYT typically experienced **increases of 32 to 59 percent in the weight of materials recycled.** (*Unit Pricing of Residential solid Waste: A Preliminary Analysis of 212 U.S. Communities* by Marie Lynn Miranda and Sharon LaPalme, June 4, 1997, Nicholas School of the Environment, Duke University.)

The percentage of waste reduction your community can anticipate will also be significantly influenced by such factors as the extent of your public outreach, the range of complementary programs offered, and the expected rate of resident participation.

Midtown

Table 1. Calculating MSW Tonnages

MSW in Projection Year, Without PAYT	**Trash**	**Recyclables**	**Total MSW**
Tons of MSW collected in base year	28,000	7,000	35,000
÷ Number of households (17,500) in base year			
= Tons per household per year	1.60	0.40	2.00
× Number of households (18,750) in projection year			
= Tons of MSW in projection year without PAYT	30,000	7,500	37,500
MSW in Projection Year, With PAYT			
Tons in projection year without PAYT	30,000	7,500	
× MSW multipliers from PAYT*:			
(1.00 - 0.30 drop in trash)	×0.70		
(1.00 + 0.40 rise in recyclables)		× 1.40	
= Tons of MSW in projection year with PAYT	21,000	10,500	31,500
Percent drop in MSW due to PAYT, projection year:	**- 30%**	**+ 40%**	**- 16%**

* Since Midtown will expand its recycling program and plans to offer an aggressive education and outreach program on backyard composting and grasscycling, it estimates a 30 percent reduction in trash tonnage and a 40 percent rise in recyclables with PAYT. Midtown expects total MSW tonnage to drop by about 16 percent with PAYT.

2 Determine the Types of MSW Services To Be Provided

Next, you will determine the collection options, the types of MSW services to be provided to residents, the customers to be included, and the container type to use.

A. Collection options
Examples include collection of trash, recyclables, compostables, and/or bulky items.

B. Type and frequency of service
Some examples are backyard pickup, curbside pickup, or rural drop-off. Collection frequencies include semiweekly, weekly, biweekly, and monthly.

C. Customers to be covered by PAYT program
Examples include single-family housing, small multifamily housing units, and large multifamily housing units.

D. Container type and capacity
Select the container type and size (volume) you plan to use in your PAYT program. Typical container types are:

- **Bags.** Trash bags, usually 20 to 30 gallons in capacity, are often used in PAYT programs. Residents purchase the specially marked bags from municipal offices or retail stores.
- **Cans.** Some communities use cans, ranging from 10 to 96 gallons in capacity. These systems often operate on a subscription basis under which residents choose the can size they wish to use.
- **Stickers or tags.** Some communities sell residents stickers or tags to affix to each container of trash they generate. Containers must not exceed prescribed volume or weight limits.
- **Compost bins.** Some communities provide bins to residents for backyard composting.

After you have chosen a container type, estimate its average weight. There are several ways to do this. The most accurate method for estimating the weight of the (filled) containers is to conduct a waste audit. Obtain samples of filled trash containers from representative households in your community. Sample from large households, one- or two-person house-holds, and elderly residents in the proportions they occur in your community. Weigh the samples to derive volume-to-weight conversions for your community.

You can also estimate the weight of containers using local or national data, although the average weight of a container of garbage can vary from one community to another (e.g., a filled 30-gallon bag may weigh 24 to 48 pounds). In addition, you might want to adjust expected weights upward to account for the tendency of residents to compact more trash under PAYT. Table 2 on page 17 shows Midtown's container selection and estimated weight under its PAYT program.

For tag or sticker systems, decide on the volume and weight of containers your program will permit. Keep in mind that some communities have reaped an unexpected windfall because residents set out less trash than is permitted by the sticker or bag. If residents set out only 25 pounds in a bag priced to allow 30 pounds, for example, the community retains the difference, which can quickly add up to a substantial surplus.

If you plan to use more than one container size, identify the volume and weight per container for each container size. Offering more than one container size (or smaller containers) offers customers several advantages, especially those residents already producing small amounts of trash, such as singles, childless couples, and retirees. These individuals can reduce waste only slightly and still see a drop in costs. If only 30-gallon containers are offered, for example, a resident that normally produces 60 gallons of trash per month would only see savings by cutting waste in half (to 30 gallons a month). If 20- and 30-gallon containers are offered, however, the resident could reduce waste to 40 or 50 gallons per month and still pay less.

Midtown

Table 2. Selection of Container and Volume-to-Weight Conversion

Container Type	Volume (gallons)	Weight With PAYT (pounds)
Cans		
Bags ✓	30	30*
Stickers		

* Midtown's residents currently set out 30-gallon bags that average 27 pounds. Midtown estimates that the weight of the bags is likely to increase by about 10 percent under PAYT, to 30 pounds per bag.

3 Estimate Net Costs of MSW

Next, you will identify the cost components of your solid waste program. Since no two communities record and report their cost information in the same way, this discussion is intended to provide only general guidance and should be customized to reflect information available in your community. Whenever possible, try to isolate MSW program costs from other public service or utility costs in your community's budget (see Section IV for further discussion). One of the most important steps in planning for PAYT is to identify where and why MSW activities (and their costs) will shift when you implement PAYT.

Under PAYT programs, there can be one-time **startup costs** (e.g., capital investment for garbage carts or compost bins, or costs for an education and outreach campaign). Some new costs can be **ongoing costs** (e.g., administration and staffing costs associated with billing residents for services). But most of the cost changes with PAYT involve **cost shifting** and, usually, a reduction in overall ongoing costs as total MSW amounts fall.

For each of the following categories, consider which costs, if any, **could increase** temporarily during the transition to the PAYT program or **shift permanently** to a higher or lower level under PAYT.

A. Direct costs

Itemize your MSW program's current direct costs for collecting trash, recyclables, and compostable materials; processing recyclables and compostables; and disposing of trash and residuals. These costs must then be allocated to the MSW pathways available (see Section IV for a discussion of pathways; for Midtown, trash or recyclables are the available MSW pathways). Then identify if any of these costs increase temporarily or shift permanently under PAYT. Direct labor, fuel, and equipment costs could be less under PAYT than under a traditional program, for example, particularly if the reduced amount of waste results in less frequent MSW collection. Do not include the costs associated with operating a municipally owned landfill or materials recovery facility under disposal and processing costs if they are already included in your indirect costs.

The cost of processing recyclable and compostable materials might rise as more citizens use these service options rather than the trash service. Disposal costs usually decrease under PAYT since there tends to be less waste for disposal.

B. Indirect (overhead) costs

Itemize the current indirect costs of your MSW program. Then identify which, if any, of these indirect costs might increase temporarily or shift permanently under PAYT. Introducing PAYT can

Midtown

Table 3. MSW Net Costs in Projection Year (in thousands of dollars)

Without PAYT	**Trash**	**Recyclables**	**Total MSW**
Direct Costs			
Collection	$900	$390	$1,290
Transport and storage	200	100	300
Disposal/processing	900	135	1,035
+ *Indirect Costs*	400	200	600
= MSW Gross Costs	2,400	825	3,225
- Recyclable Revenues	0	225	225
= MSW Net Costs Without PAYT	$2,400	$600	$3,000
With PAYT			
*Direct Costs**			
Collection	$760	515	1,275
Transport and storage	190	135	325
Disposal/Processing	630	190	820
+ *Indirect Costs*	320	245	565
= MSW Gross Costs	1,900	1,085	2,985
- Recyclable Revenues	0	315	315
= MSW Net Costs With PAYT	$1,900	$770	$2,670
Percent change in MSW net costs in projection year, due to PAYT			**-11%**

* Midtown has decided to fund PAYT startup costs from a separate fund, so as not to distort the initial PAYT rates it sets.

lead to temporary increases in the costs of some staffing positions, such as MSW public outreach specialists and customer service representatives. These individuals are responsible for educating residents and responding to questions, which are far more numerous at the beginning of the new PAYT program.

C. Net costs

Add together all of the estimated ongoing costs (direct and indirect) of your MSW program under PAYT. Subtract any net revenues from complementary programs to arrive at your MSW program net costs. Compare the projected year costs under your current program with those under PAYT. Separately consider one-time startup costs. Decide whether to fund these from other sources or from PAYT fees.

Midtown's net costs in the projection year are illustrated above in Table 3.

MSW Cost Resources

More detailed information on MSW costs is provided in Section IV of this booklet. You can also consult the U.S. Environmental Protection Agency's (EPA's) *Full Cost Accounting for Municipal Solid Waste Management: A Handbook,* EPA530-R-95-041, September 1997, or EPA's Full Cost Accounting Web site at *<www.epa.gov/fullcost>*.

4 Determine PAYT Revenues and MSW Program Cost Coverage

In the previous step, you calculated the MSW net costs in the projection year with PAYT. Now you must determine the level of revenues the PAYT program must generate to achieve your community's goals. Depending on your goals, you may want PAYT fees to cover all or part of your MSW program costs, or you may want the PAYT fees to generate revenues that exceed your MSW program net costs. Consider the following:

- You might decide to cover *less than 100 percent* of current MSW program costs if your PAYT program exempts residents living in multi-family housing units and your community draws from other revenue sources to cover the costs of those MSW services.
- You might decide to cover *100 percent* of current MSW program costs if you operate your MSW program as an enterprise fund.
- You might decide to cover *more than 100 percent* of current MSW program costs if you use PAYT fees to cover current MSW program costs and pay for other MSW costs (e.g., landfill closure or siting) and/or cover a budget shortfall for non-MSW expenses (e.g., public education).

5 Calculate PAYT Rates

PAYT rates can provide clear price signals to encourage residents to engage in specific waste reduction activities. Now that you have forecasted MSW tonnage with PAYT, determined the MSW service costs to be covered by PAYT, and chosen a container size and estimated its average weight, you are ready to choose a PAYT pricing system and calculate your rates. Refer to pages 7-8 in Section I to compare the pros and cons of commonly used PAYT pricing systems (i.e., proportional, variable, or two-tier). Choose the one that is most consistent with your community's goals. This section shows how to calculate your initial (provisional) rates under each of these three systems.

A. Proportional Rates

A proportional pricing system is the simplest type of system for which to calculate a rate. Under this pricing system, each container is the same size and the same price.

Number of containers

First, you will need to estimate the number of containers you expect will be set out each year. Convert your forecasted annual trash tonnage under a PAYT program into pounds of trash per year (i.e., multiply the number of tons by 2,000). Divide that number by the average weight (in pounds) of the trash container you have selected. The result is the estimated total number of containers of trash the residents in your community will generate each year under PAYT.

To develop a proportional rate, divide the MSW program costs to be covered by PAYT revenues by the number of containers of trash you expect with a PAYT program in place. The result is the initial (provisional) price per container each household will pay under a proportional PAYT system.

Midtown calculated a rate under a proportional pricing system (Table 4) and established a price of $1.90 per bag. If municipal officials in Midtown determine that $1.90 per bag is too high and residents resort to undesirable methods of waste disposal, other pricing options include two-tiered pricing (see page 21), covering less than 100 percent of solid waste costs with PAYT revenues (i.e., using tax revenues to help defray solid waste costs), or charging separately for recycling and waste disposal.

Midtown

Table 4. Calculating Proportional PAYT Rates

PAYT Proportional Rate Calculation	Example from Midtown
Tons of trash in projection year (with PAYT)	21,000
× 2,000 pounds per ton = Pounds of trash	42,000,000
÷ 30 pounds (Average weight per 30-gallon bag) = Number of 30-gallon bags per year with PAYT	1,400,000
MSW costs to be covered by PAYT revenues	$2,670,000
÷ 1,400,000 (number of 30-gallon bags per year with PAYT) = PAYT rate	$1.90*

* In this example, Midtown operates its MSW program as an enterprise fund and plans to fully cover ongoing MSW net costs with its PAYT revenues (and generate a small buffer fund to cover the uncertainties in the estimates). Assuming Midtown provides free recycling services, the price per bag is rounded to $1.90.

If Midtown decided to charge a separate fee for recyclables to cover its net cost, for example, it could apply this same proportional rate approach to both trash and recyclables. In this case, Midtown might charge $41 per household per year to cover net costs of recycling services (i.e., net recyclable costs of $770,000 divided by the number of households (18,750) = $41.07) and $1.40 per bag (i.e., costs of trash services ($1,900,000) divided by the number of bags with PAYT (1,400,000) = $1.36) to cover net costs of trash services.

B. Variable Rates

Variable rate pricing is the most flexible pricing system, but it can also be the most complex. With variable rates, the per-gallon price differs by the size of container set out by the resident. In some communities, containers are all the same size. In other communities, containers can be different sizes.

Number of containers

After selecting the container sizes, you must estimate the weight of each filled container. In addition, you must estimate the percentage of your community's trash you expect will be set out in each container size. (This estimate can be developed during the same trash container sampling exercise you carry out to estimate volume-to-weight conversions by container size.)

Multiply the total number of pounds of trash you expect with PAYT times the percentage of trash you expect will be set out in the first container size. Then divide the result by the expected average weight this container size will be when set out under a PAYT program. The result is the estimated number of containers of this size you can expect under PAYT. Next, repeat this calculation to develop estimated numbers for each of the other container sizes you permit under the PAYT program. Table 5 shows Midtown's container selections and estimated weight per container filled.

Midtown

Table 5. Selection of Container and Volume-to-Weight Conversion

Container Type		Volume (gallons)	Weight With PAYT* (pounds)	Percent of Trash by Container Size
Cans	✓	32	35	40%
Cans	✓	64	55	60%
Bags				
Tags/Stickers				

* Midtown's PAYT Task Force projects more trash compaction in the smaller, 32-gallon cans.

Allocating MSW net costs

To calculate a variable rate structure, you must also determine the proportion of MSW net costs that will be covered by the revenues from each container size. As discussed in Section I, you may decide to charge higher per-gallon rates for larger or additional containers (to encourage waste prevention) or lower per-gallon rates for larger or additional containers (to reflect the cost structure where there are significant fixed costs). Table 6 on page 22 shows how Midtown calculated a variable rate structure for 32- and 64-gallon cans covering 40 percent of its MSW costs with the small can and 60 percent of its costs with the large can.

Alternatively, if Midtown decided to charge a separate fee for recyclables to cover its net costs, it could apply this approach to both trash and recyclables. In this example, it might charge $41 per household per year (as in the preceding proportional rates example). Midtown might charge $1.60 per 32-gallon can (i.e., 40 percent of trash costs (0.40 x $1,900,000) divided by the number of 32-gallon cans (480,000) = $1.58) and $2.50 per 64-gallon can (i.e., 60 percent of trash costs (0.60 x $1,900,000) divided by the number of 64-gallon cans (458,182) = $2.49). This would generate sufficient revenues to cover total MSW net costs plus a small buffer fund to cover uncertainties in the estimates.

C. Two-Tier Rates

Under a two-tier pricing system, residents subscribe to a base level of service for which they pay a flat fee (first-tier fee) that may be assessed through local taxes or through direct billing. Second-tier fees, on the other hand, are based on the amount of waste that residents throw away. Many communities use the simplest version, a two-tier pricing system with a proportional second-tier rate. Some communities, however, use more complicated rate structures. The most complex are multi-tier pricing systems with variable rate pricing for the second and higher tiers.

Number of containers

Estimate the number of containers set out per year with PAYT. If you plan to use only one container size, follow the approach in the proportional rates section (page 19); if you plan to use several container sizes, follow the approach in the variable rates section (page 20-21).

Cost basis per tier

Some communities use revenues from the first-tier fees to cover fixed costs and revenues from the second tier to cover direct collection and disposal costs. Other communities use revenues from the first tier to cover direct and indirect collection costs, and revenues from the second tier to cover

Midtown

Table 6. Calculating a Variable Rate Structure

PAYT Variable Rate Calculation	Example from Midtown
Tons of trash in projection year (with PAYT)	21,000
× 2,000 pounds per ton = Pounds of trash with PAYT	42,000,000
	32-gallon cans
Pounds of trash × 0.40 (Portion of trash in 32-gallon cans) = Pounds of trash in 32-gallon cans with PAYT	16,800,000
÷ 35 (Average pounds per 32-gallon can) = Number of 32-gallon cans per year with PAYT	480,000
MSW program costs to be covered by PAYT	$2,670,000
× 0.40 (Portion of costs to be covered by revenues from 32-gallon cans)	$1,068,000
÷ 480,000 (Number of 32-gallon cans set out with PAYT) = Price per 32-gallon can with PAYT	$2.23*
	64-gallon cans
Pounds of trash × 0.60 (Portion of trash in 64-gallon cans) = Pounds of trash per year in 64-gallon cans with PAYT	25,200,000
÷ 55 (Average pounds per 64-gallon can) = Number of 64-gallon cans per year with PAYT	458,182
MSW program costs to be covered by PAYT	$2,670,000
× 0.60 (Portion of costs covered by revenues from 64-gallon cans)	$1,602,000
÷ 458,182 (Number of 64-gallon cans set out with PAYT) = Price per 64-gallon can with PAYT	$3.50*

* In this example, Midtown operates its MSW program as an enterprise fund and plans to fully cover ongoing MSW costs with its PAYT revenues. It has decided to cover 40 percent of MSW costs with the revenues from 32-gallon cans and 60 percent of MSW costs with the revenues from 64-gallon cans. Midtown has chosen a variable rate structure it believes will achieve its goal of encouraging waste reduction while taking into account the cost concerns of large families. Based on this calculation, it plans to charge $2.25 per 32-gallon can and $3.50 per 64-gallon can.

direct disposal costs only. As discussed in Section I, the greater the costs to be covered by first-tier fees, the more stable the PAYT revenue stream; the greater the costs to be covered by second-tier fees, the greater are the community's waste reduction and recycling incentives.

Two-tier price

Once you decide which costs will be covered by the revenues from each pricing tier, calculate the amount each household is billed each year by the first-tier fee by dividing first-tier costs by the number of households. (Divide the result by four to develop quarterly billings per household.) Calculate the second-tier charge per container by dividing the second-tier costs by the number of containers set out per year, if you are using proportional second-tier pricing. (If you are using variable second-tier pricing, follow the approach shown in the variable rates section.) Table 7 shows how Midtown calculated a two-tier rate.

Midtown

Table 7. Calculating a Two-Tier Rate Structure

PAYT Two-Tier Rate Calculation	Example From Midtown
Portion of MSW net costs to be covered by first-tier fees	$1,090,000
+ Portion of MSW net costs covered by second-tier fees	$1,580,000
= Total MSW net costs to be covered by PAYT revenues	$2,670,000
First-Tier Rate	
Portion of MSW net costs to be covered by first-tier fees	$1,090,000
÷ 18,750 (Number of households)*	
= Annual MSW net costs per household	$58.13
÷ 4 quarters = Quarterly PAYT bill per household	$14.53
Second-Tier Rate	
Portion of MSW net costs covered by second-tier fees	$1,580,000
÷ 1,400,000 (Number of 32-gallon bags per year)	
= Price per 32-gallon bag	$1.13*

* In this example, Midtown operates its MSW program as an enterprise fund and decides to fully cover ongoing MSW net costs with its PAYT revenues. It has chosen a two-tier rate structure it believes will strongly encourage waste reduction. It has decided to cover fixed costs for trash, plus net costs of recyclables ($320,000 + $770,000 = $1,090,000), with revenues from the first-tier billing. The remaining direct costs for trash are covered by second-tier fees per bag. Based on this calculation, Midtown rounds off the calculated figures and provisionally plans to charge households $14.50 per quarter and $1.15 per bag.

6 Adjust MSW Services and PAYT Rate Structure

By now, you have developed a PAYT rate structure that reduces trash, increases recycling, and generates revenues sufficient to cover your designated costs of MSW services. At this point, these are still provisional rates. It is important to know where your estimated costs and revenues are most sensitive to the underlying assumptions. It is also important to be sure your assumptions on some steps (such as percentage reduction in trash or increase in recyclables) are consistent with your assumptions on other steps (such as types of MSW services provided, effort devoted to public education and outreach, or PAYT rate and pricing system). This review may cause you to raise or lower your provisional rates to some degree.

To gain some confidence in your rate structure design—or to be aware of where you need to improve the quality of your underlying data—go back to the key decision points to see how higher or lower estimates would affect the final outcome.

If you must avoid a shortfall in revenues, consider using more conservative estimates. Assume that residents will aggressively reduce waste, for example, or that community population might not grow as rapidly as expected. These conservative assumptions result in lower levels of estimated waste and, therefore, higher expected PAYT revenues. Alternatively, you could simply acknowledge the need for a safe margin of revenues and then raise rates accordingly, without making assumptions about population or waste reduction changes.

Key Decision Points

Below are several key points to keep in mind as you consider your provisional rates and make adjustments.

- **Forecasting residential MSW amounts.** In Step 1, you estimated the number of households in the projection year. Consider the impact on your rate structure of greater or lesser population levels in the projection year.
- **Expected waste reduction impact of PAYT.** In Step 1, you estimated the levels of reduced trash, increased trash compaction, and increased recycling resulting from residents' responses to PAYT price incentives. Reconsider the strength of residents' responses in light of the type of pricing system you have chosen and the level of your provisional PAYT rates. Calculate alternative rate structures after assuming greater or lesser responsiveness from residents. Consider expanding education and outreach activities to ensure high rates of participation.
- **Estimated weight of trash containers.** Consider the impact on your unit price if the actual average weight of filled trash containers is higher or lower than your estimate.
- **MSW costs.** Vary these to see how reasonable variations above or below your best estimate could affect the unit price needed. Consider raising the rate structure to ensure your MSW net program costs are covered and then lower them later if you generate excess revenues.

This kind of analysis can be done on worksheets (e.g., paper and pencil or electronic) or through specialized computer programs designed to apply sensitivity analysis and iteratively develop a PAYT rate structure that is based on internally consistent assumptions and that best meets your community's needs.

IV

Refinements in Setting PAYT Rates

Your community may decide to include in the PAYT rate all the direct and fixed costs of the activities needed to support each of the MSW services available to residents. This section provides a more detailed discussion of MSW costs, their allocation among MSW pathways and activities, and related issues a community might wish to consider when calculating PAYT rates.

Direct and Indirect Costs

Residents often have many choices for recovering or discarding materials. They may be able to set out trash, recyclables, and compostable materials at the curb. They also may be able to take items to drop-off centers, or a transfer station or landfill. Local governments that provide MSW services send a message to residents through the fees they charge for each of these services. A major factor in deciding what to charge for MSW services should be the cost of each service. The following discussion can help you determine these service costs.

A. MSW pathways and activities

Pathways for MSW choices track the activities through which each type of material proceeds. MSW pathways (see page 26) include recycling, composting, waste-to-energy, and landfilling. MSW *activities* include waste collection, operation of transfer stations, transportation of waste, waste processing and disposal, and sale of byproducts. After being picked up at a residence, for example, trash may be taken to a transfer station and then hauled to a landfill and buried. Some activities may serve more than one pathway. The landfill in this system, for example, is part of the pathway for trash collection, recyclables collection, yard trimmings collection, and drop-offs by residents.

B. Direct costs

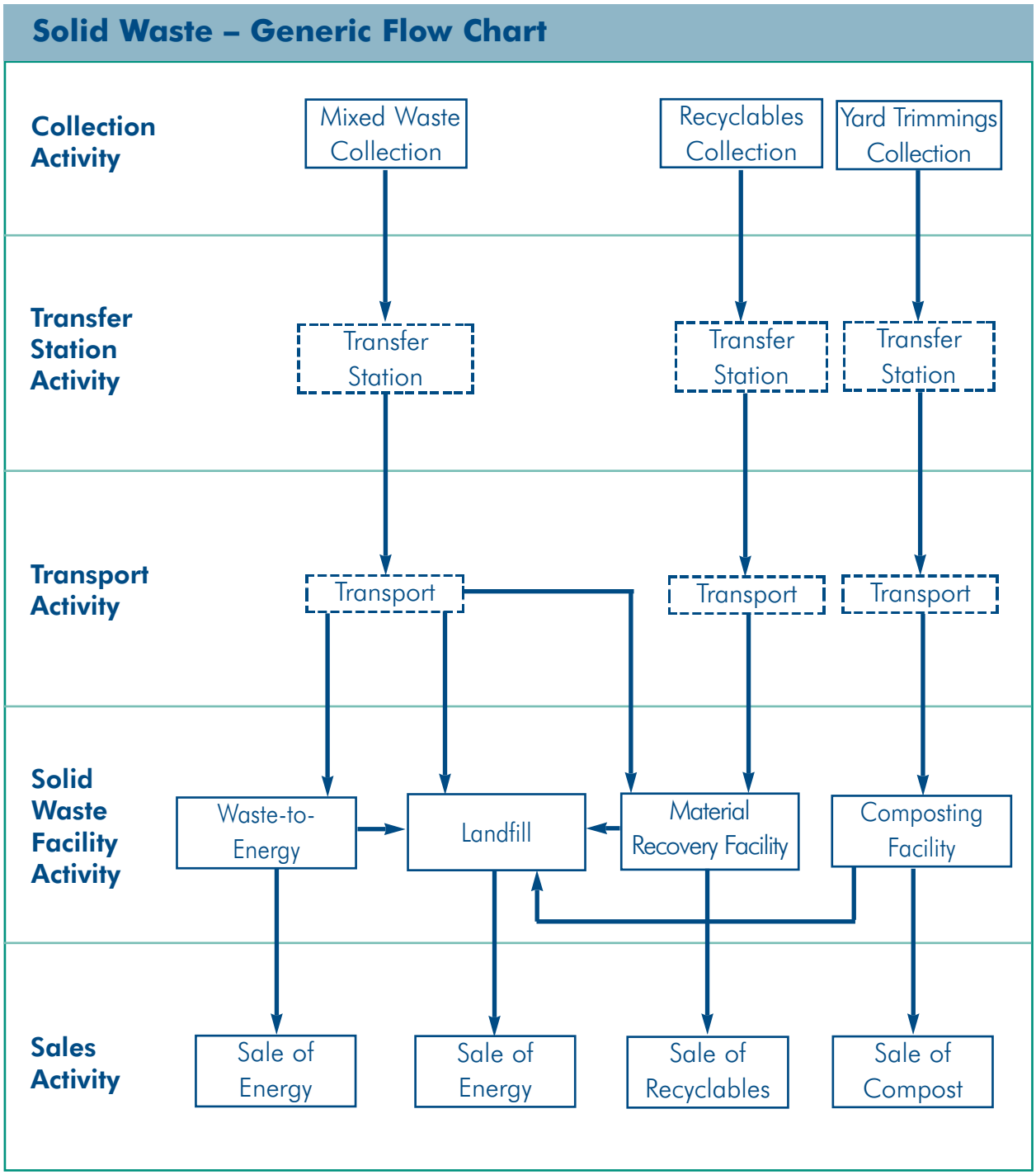
Costs directly attributable to an activity are sometimes relatively easy to allocate. If different trucks provide collection and transport for different types of MSW services, for example, you can allocate the cost of each truck to the appropriate service. If the same trucks are used for collecting trash as well as recyclables or yard trimmings, however, you should allocate those costs on some reasonable basis, such as the time a truck is used for each service. Similarly, landfill costs must be allocated to each pathway that uses the landfill. Since landfill tipping fees are usually based on weight, the weight of MSW dumped at the landfill might be an appropriate basis for allocating landfill costs among the MSW activities. In sum, it is important to develop a reasonable way to identify the costs associated with providing each MSW service to residents and then a way to allocate them among activities.

C. Indirect costs

Indirect MSW costs are usually spread over several MSW activities. A greater effort is required to identify the costs and to allocate them to the appropriate activity. The general manager of the MSW program, for example, is a necessary part of all MSW services. A person answering the telephone to take questions or complaints from residents is also essential for the smooth operation of the entire MSW program, as are the staff who bill for MSW services or handle MSW payables. All of these indirect costs must be identified and allocated on a fair basis.

One simple approach to allocating indirect costs is to estimate the tonnage of waste that each MSW service processes. Then the indirect cost can be allocated to each MSW service in proportion to the amount of waste it processes. Some communities may want (or need) to make even more precise allocations. Whatever allocation method is used, however, it is important that the allocation of indirect costs should be seen as fair by those who are charged for MSW services.

Figure 1: MSW Pathways and Activities



Other Factors to Consider in Setting PAYT Rates

Setting rates on the basis of the full costs of each MSW service can generate sufficient revenues to cover MSW costs. Yet there may be other public policy considerations that could suggest higher or lower PAYT rates as described below.

A. Front- and back-end costs

The costs discussed so far occur at the same time as service delivery. Other costs are incurred before or after service delivery, however, and must also be included to have a full picture of the resources being used to provide MSW services. Front-end costs for a landfill, for example, may include site preparation, liners, monitoring wells, and the costs of holding public meetings to obtain site approval. Back-end costs include landfill closure as well as postclosure monitoring and maintenance. Even though these costs occur before or after the actual provision of service, they are an essential part of the job and should be included in the basis for calculating PAYT rates.

B. Policy considerations

Your community may have MSW priorities based on other policy considerations. A local government, for example, may want to encourage materials recovery and composting but discourage landfilling. It may decide to charge less than full cost for options that it considers 'desirable' and more than full cost for options that are 'undesirable.'

C. Pricing complementary services

Many PAYT communities motivate waste reduction behavior by charging only for trash services and then collect and process recyclables and compostables for free. To some, this approach appears to most directly meet public policy objectives. Other communities charge for certain complementary services, however. These charges reflect the economic resources expended in recycling activities and, at the same time, may encourage residents to make greater efforts in waste prevention, reuse, and backyard composting activities.

D. Revenue stability

One of the most common goals of MSW agencies is to guarantee revenue stability. To achieve this goal, many communities use a two-tiered rate. This kind of pricing system recognizes that some costs are fixed and others are variable. PAYT rates can be set so that revenues cover designated costs in the first tier despite the reduction in MSW amounts. An MSW billing system, for example, may use the same resources regardless of how much MSW the community discards each month.

On the other hand, given that residents typically respond to PAYT rates by generating less waste, the second-tier rates can cover the costs for the reduced amounts of waste that are discarded. Also, costs for the landfill (such as expenses for equipment and operators) will eventually drop if the landfill receives less waste each month. The number of operators could be reduced through attrition or transfers to another activity. These lower costs can be covered by the second-tier fees. Direct costs and the revenues from second-tier fees tend to rise and fall by similar amounts as MSW amounts increase and decrease. (Discussed in Overview on page 3, and in the Midtown example.)

To further assist your own community's RSD efforts, you might attend workshops or choose a software program to calculate more advanced rate structures. Additionally, EPA offers several resources on PAYT, rate setting, and full cost accounting as described in the box below.

Resources

For updated information on rate setting and pricing and other available resources, visit EPA's PAYT Web site at <*www.epa.gov/payt*> and the Full Cost Accounting Web site at <*www.epa.gov/fullcost*>. Two useful resources on these Web sites are *Pay As You Throw: Lessons Learned About Unit Pricing*, EPA530-R-94-004, April 1994, and *Full Cost Accounting for Municipal Solid Waste Management: A Handbook,* EPA530-R-95-041, September 1997. These documents can also be ordered at no charge from EPA's RCRA hotline at 800 424-9346 (TDD 800 553-7672).

Case Studies

Every community approaches the process of designing a rate structure for its PAYT program differently. In this section you will learn how five communities met this challenge. These case studies represent a range of different pricing systems, container choices, and population sizes. The stories were written by the local officials who initiated or now run their community's PAYT program.

Program success is the thread that runs through each of the stories. As the following testimonials illustrate, there is no one correct price or approach to pricing that will make PAYT a success. There are many different paths local officials can take. Review the stories to learn more about rate structure design (RSD) and how you might set appropriate prices for your program.

Oconee County, Georgia

Oconee is a fast-growing, semirural county covering 186 square miles with a population of 25,000. The major portion of the population is located in the northern end of the county with more than 160 subdivisions. The southern portion is primarily rural.

The county started its PAYT program in May 1994 as a result of the necessary closing of our landfill (rather than meeting Subtitle D landfill requirements). We began by developing a comprehensive understanding of the areas we were presently serving and planned to serve with the new system. After privatization was discussed and rejected, we contracted with a neighboring county with an approved landfill.

Other counties were charging $1.50 and, based on the cost of operating the drop centers and disposing of the trash, that was about as high as we thought we could go.

Residents are offered the choice of contracting with a private collector or using the county's volume-based Blue Bag program. Residents that use the program buy the blue bags from retail outlets and haul their garbage to one of the county drop centers, where there are dumpsters for source-separated recyclables and blue bags. Residents are not charged for recycling.

The bag is 32 gallons in size and costs citizens $1.50 at retail outlets. The price of the bag was determined through bid prices from vendors and included a 10-cent profit for retailers. Tipping fees and hauling costs were also considered in determining this price.

A $1.50 per-bag price was determined to be the maximum amount that would ensure public cooperation in this new program, though it does not reflect the cost of the program to the penny. Other counties were charging $1.50 and, based on the cost of operating the drop centers and disposing of the trash, that was about as high as we thought we could go (although the actual cost is slightly less than that).

All county officials and a Citizen's Solid Waste Task Force were involved in detailed preplanning of the new system. It was decided the changeover would be made as rapidly as possible rather than doing it in stages. Once in place, total recycling tonnage increased 36 tons over the previous fiscal year, and this equates to approximately $26,000 in cost avoidance of tipping fees. We have a workable program, acceptable to the public, and one that is not incurring additional excessive expenses in view of the rapid population growth of the county.

Population: 25,000
Start date: 1994
Rate structure: Proportional
Price: $1.50 per 32-gallon bag

Trinity County, California

Trinity County began a PAYT incentive program in September 1996. The county is spread out over about 3,100 square miles with only 13,000 residents. We offer a combined drop-off and curbside collection program.

The $5.00 per cubic yard fee is based on the county's cost for landfilling the MSW. Other costs are covered under a 'benefit assessment,' the first tier of our multi-tiered system. Each household unit is charged $100 per year, which covers administration, some maintenance of the landfill, and other costs.

Before we considered the program, we decided it was necessary to do some kind of a revenue increase. The County Board decided that rather than raise the benefit assessment across the board, it would institute tipping fees charged per household. That way, those people who are recycling heavily or are a single person in a household and don't generate very much garbage are getting a break for not creating waste.

Under our program, residents are charged $5.00 per cubic yard for disposal at the county's drop-off transfer station and landfill. Residents who have refuse pickup are charged $1.00 for each 33-gallon can, which is based on the county's estimate that there are approximately six cans in a cubic yard. The $5.00 per cubic yard fee is based on the county's cost for landfilling MSW.

Other costs are covered under a 'benefit assessment,' the first tier of our multi-tiered system. Each household unit is charged $100 per year, which covers administration, some maintenance of the landfill, and other costs. The combination of the benefit assessment and tipping fees covers what it costs to maintain the landfill and transfer sites, all administrative fees, and everything else that is involved in solid waste. It also includes long-term care of the landfill and operation of recycling drop-off centers at two of the eight transfer stations.

We also encourage participation in recycling by adding an additional incentive through benefit assessment discounts. Residents who bring in recyclable materials are given a discount ($0.025 per pound of the weight of the recyclables they bring in) off their benefit assessment, with a ceiling of 40 percent of their annual assessment. Businesses are limited to a 25 percent discount. The program has been very successful for us, and hopefully more communities will institute these types of programs—helping us reach goals of 50 percent reduction in waste or more!

Population: 13,000

Start date: 1996

Rate structure: Multi-Tier

Price: $100 per year for first-tier fee; $5.00 per cubic yard or $1.00 per 33-gallon can for second-tier fee

Platteville, Wisconsin

The city of Platteville is a small university community in southwest Wisconsin, home of the University of Wisconsin-Platteville. The current Platteville recycling and solid waste program began on March 5, 1990. The intent of the program is to encourage recycling through a PAYT program. All single and duplex residential units in Platteville are allowed one 35-gallon clear bag or garbage can up to 50 pounds per week per residence. The city provides a bin for recycling, which is collected curbside on the same day as the garbage pickup. This is paid through the city taxes.

The $1.00 fee takes into account the cost of the bag, the incentive for stores to carry the bags (stores are charged 90 cents for the $1.00 bags), and administrative costs (including a portion of salaries and other line items).

Any solid waste beyond the 35-gallon bag or garbage can must go in a special plastic bag that citizens can purchase for $1.00. The city sells these bags at City Hall and has worked with local supermarkets and convenience stores to sell the bags. The $1.00 fee takes into account the cost of the bag, the incentive for stores to carry the bags (stores are charged 90 cents for the $1.00 bags), and administrative costs (including a portion of salaries and other line items).

The price also includes 40 to 50 cents per bag for collection, hauling, and tipping fees. Costs to collect yard trimmings and operate the compost pile are also included. In addition, we considered the potential for people to surreptitiously dump garbage: if the price is too high, people will find ways to illegally dump garbage. Based on these factors, we determined the best rate to be $1.00.

These efforts are encouraged by state law in Wisconsin. Beginning in 1997, all responsible units (a municipality or group of municipalities) must develop a volume-based fee system such as PAYT, unless the responsible unit diverts for recycling at least 25 percent (by volume or weight) of the solid waste collected. Through its PAYT program, the city of Platteville has surpassed this goal.

Population: 10,000

Start date: 1990

Rate structure: Multi-Tier

Price: Local taxes for first-tier fee (includes one 35-gallon can/week); $1.00 per 35-gallon bag for second-tier fee

Lansing, Michigan

We are the city of Lansing, Michigan. The Public Service Department's Waste Reduction Services provides recycling and refuse services to our residents. Fifty percent of our single-family housing units are rental units. We compete with all the private haulers in the city on a daily basis to fund our refuse collection program.

We arrive at our rates for refuse services by adding all costs for the program and dividing by the estimated number of bags to be collected (based on analysis of previous years).

Lansing started offering a refuse bag program in 1976. We currently charge $1.50 for each 30-gallon bag for refuse services. We arrive at our rates for refuse services by adding all costs for the program and dividing by the estimated number of bags to be collected (based on analysis of previous years). Administrative support from other city departments is paid for along with wages, equipment, utilities, supplies, landfill fees, insurance, bag cost, and miscellaneous operating expenses out of the revenue that is generated by the refuse bag sales.

The refuse bag program is a true enterprise fund operation. The $1.50 per-bag fee is for refuse collection costs only and is based on the actual costs. It does not pay for any other programs, nor is the refuse program subsidized in any way. Our recycling program is paid for out of an annual $55 per-unit fee. This can be broken down as $25 for recycling collection, $18 for yard trimmings, and $12 for education and promotion.

In conjunction with the refuse bag program, a bulk collection program was started to separate large waste item collections from the refuse collections and help keep the bag cost down. Recently, the bulk item fee was raised to $20 so there would be no subsidy necessary from the general fund. For all our services, the system has to be run like a business, which competes against the private waste haulers in the city.

Population:	130,000
Start date:	1976
Rate structure:	Proportional
Price: $1.50 per 30-gallon bag	

Wilmington, North Carolina

The city of Wilmington instituted PAYT in November 1992, after the tipping fee paid by the city jumped 150 percent, from $25 to $60 per ton. Following a successful pilot program, the city council adopted PAYT for the city at large.

The city's program operates out of an enterprise fund that is required to be solvent. Residents pay $12.10 per month for weekly collection of a 40-gallon cart or $15.10 per month for weekly collection of a 90-gallon cart. A second 90-gallon cart can be added to the weekly collection for an additional $6.40, or residents can request twice-a-week collection of the 90-gallon cart for $30 per month. Stickers can be purchased for 33-gallon bags for overflow garbage for $1.00 per sticker.

We basically used a form of full cost accounting to allow us to identify all of our costs. Then, we worked with some of our residents and collection crews to measure set-out rates and the number of pounds per pickup.

The two biggest factors influencing these prices are tipping fees and the cost of the city's refuse collection contract. A private contractor provides once-a-week refuse collection for about 45 percent of the households. The city provides the second pickup for residents that request it, in addition to providing refuse service to the remaining households. It also provides weekly recycling and yard trimmings pickup and bulky collection on demand to the entire area. Tipping fees for refuse as well as yard trimmings and administrative costs (including fees paid back to the general fund for services provided to the solid waste program such as human resources and finance) all must be covered in the fees collected. Since the city is required to give low-income and elderly people a reduced rate, however, some monies are received from the general fund to cover this cost.

We basically used a form of full cost accounting to allow us to identify all of our costs. Then, we worked with some of our residents and collection crews to measure set out rates and the number of pounds per pickup. We then divided these figures to arrive at our prices. The department spent a lot of time with spreadsheets to come up with our final figures.

With the change to once-a-week collection, the city was able to save $400,000 the first year. Twice-a-week collection is still available, but only 2 percent of the population now uses this option, and 35 percent has changed to the smaller 40-gallon cart.

Staff considers the program a success. Most people understand the relationship between garbage generation and their garbage bill. Less waste is going to the landfill and incinerator. People are recycling more, and most people's garbage bill has decreased with the more equitable billing system of the PAYT program.

Population: 62,000

Start date: 1992

Rate structure: Variable Rate

Price: $12.10 per month for 40-gallon cart
$15.10 per month for 90-gallon cart

Glossary

Administrative costs. The management and support costs of running the solid waste program. Includes both labor costs and other expenses.

Back-end costs. Expenditures to properly wrap up operations and take proper care of landfills and other MSW facilities at the end of their useful lives.

Base year. The year prior to implementation of PAYT, often used as a baseline against which potential PAYT impacts are measured.

Capital outlays. Expenditures to acquire a resource that will be used in MSW operations over more than 1 year.

Collection costs. Recurring costs for the collection of trash and recyclables, including labor, equipment costs, and contract payments.

Complementary programs. Municipal services designed to supplement basic trash collection and disposal, such as recycling, composting of yard trimmings, and bulky waste collections.

Direct costs. Costs that are clearly and exclusively associated with MSW management (e.g., collection, transport, processing, and disposal costs).

Disposal costs. Tipping fees, processing costs, and other costs related to the management of MSW and recyclable materials.

Enterprise funds. Mechanisms used by local governments for activities that can be financed and operated like a private business.

Full cost accounting. A systematic approach for identifying, summing, and reporting the actual costs of MSW management, taking into account past and future outlays, oversight and support service (overhead) costs, and operating costs.

Indirect costs. Cost that are not exclusively related to portions of MSW management but that relate to more than one local government activity. Such indirect costs (and other government activities) can include accounting and payroll, personnel, legal, purchasing, data processing, records management, and executive oversight (e.g., the mayor's salary and office expenses).

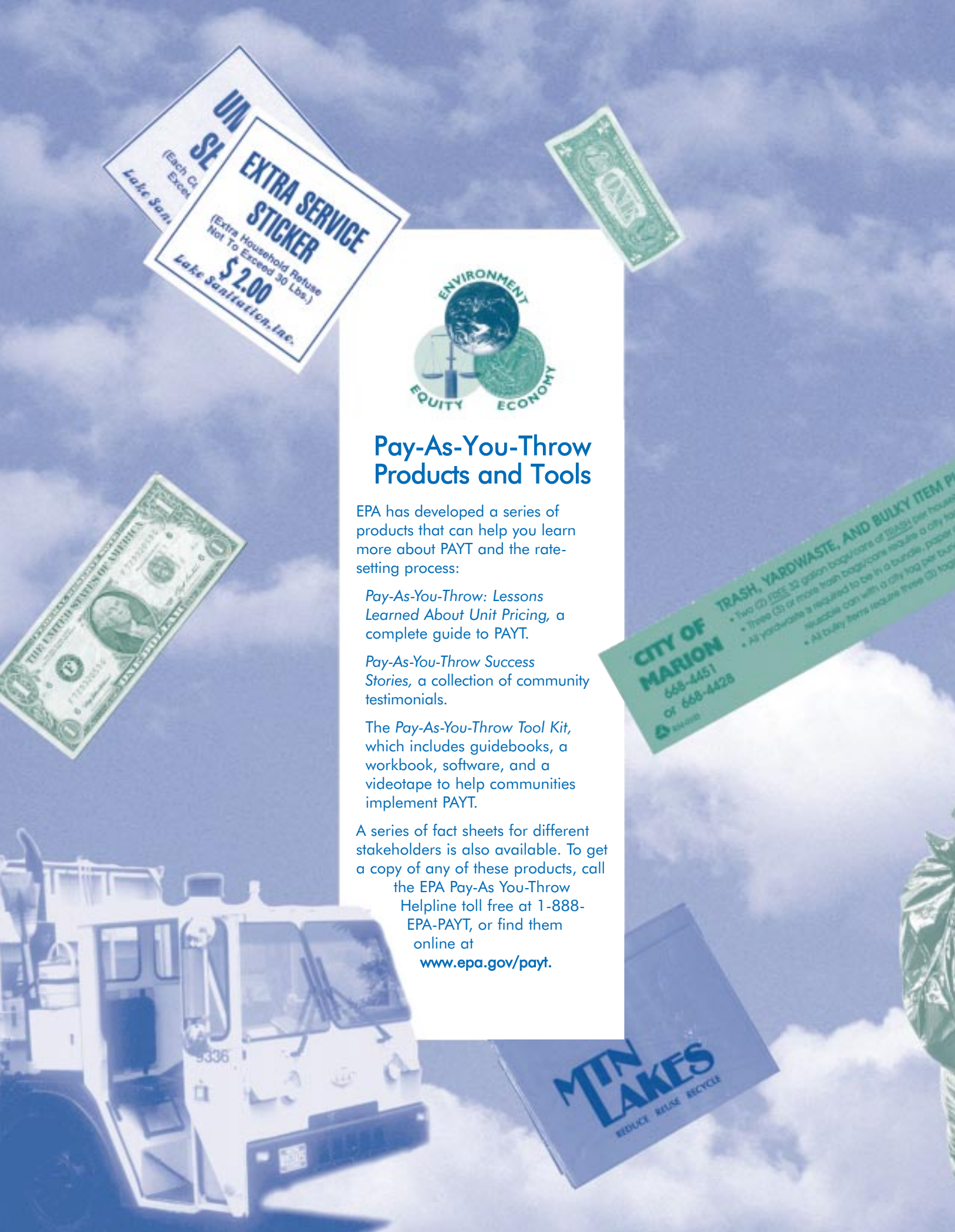
Net cost. The full cost of an MSW management activity or path minus its byproduct revenues. The net cost divided by the tons of waste managed yields the net cost per ton for that activity or pathway.

Operating costs. Regularly recurring costs of resources used over a short period of time (typically 1 year or less) to support ongoing MSW operations (e.g., wages, salary benefits, maintenance, and rents).

Projection year. The year of implementation of PAYT, when residents have responded to the price incentives and when their reductions in waste generation and increases in recycling have stabilized. (The actual implementation time will vary among different sized cities and complexities of programs.)

Rate structure design (RSD). The process of determining the price to charge residents for each container of garbage they set out for collection. It includes community choices about pricing systems, container types, and the goals they set out to achieve.

Up-front costs. The initial investments and expenses necessary to start an MSW activity or pathway.



Pay-As-You-Throw Products and Tools

EPA has developed a series of products that can help you learn more about PAYT and the rate-setting process:

Pay-As-You-Throw: Lessons Learned About Unit Pricing, a complete guide to PAYT.

Pay-As-You-Throw Success Stories, a collection of community testimonials.

The *Pay-As-You-Throw Tool Kit,* which includes guidebooks, a workbook, software, and a videotape to help communities implement PAYT.

A series of fact sheets for different stakeholders is also available. To get a copy of any of these products, call the EPA Pay-As You-Throw Helpline toll free at 1-888-EPA-PAYT, or find them online at **www.epa.gov/payt.**