United States
Environmental Protection
Agency

Office of Solid Waste and
Emergency Response
(5305)

EPA530-R-94-004
April 1994

EPA

Pay-As-You-Throw

Lessons Learned About Unit Pricing

Recycled/Recyclable
Printed with soy/canola ink on paper that contains at least 50% recycled fiber

Pay-As-You-Throw

Lessons Learned About Unit Pricing of Municipal Solid Waste

Prepared by

Janice L. Canterbury
U.S. EPA Office of Solid Waste

Acknowledgements

The following state, county, and local officials and private consultants contributed their expertise in unit pricing programs to EPA's Unit Pricing Roundtable and to the development of this guide:

Nancy Lee Newell, City of Durham, North Carolina
Peggy Douglas, City of Knoxville, Tennessee
Barbara Cathey, City of Pasadena, California
Bill Dunn, Minnesota Office of Waste Management
Nick Pealy, Seattle Solid Waste Utility
Jody Harris, Maine Waste Management Agency
Jamy Poth, City of Austin, Texas
Jeanne Becker, Becker Associates
Lisa Skumatz and Cabell Breckinridge, Synergic Resources Corporation
Lon Hultgren, Town of Mansfield, Connecticut
Greg Harder, Pennsylvania Department of Environmental Resources
Thomas Kusterer, Montgomery County Government, Maryland
Robert Arner, Northern Virginia Planning District Commission

Their assistance is greatly appreciated.

Contents

About This Guide vi

Key to Symbols viii

PART I: Is Unit Pricing Right for Your Community? 1

What Is Unit Pricing? 2

Potential Benefits to Unit Pricing 3

Potential Barriers to Unit Pricing 4

Types of Communities That Can Benefit From Unit Pricing 5

Making a Decision About Unit Pricing 6

PART II: Building Consensus and Planning for Unit Pricing 10

Setting Goals and Establishing a Unit Pricing Team 11

Addressing Barriers 12

Building a Public Consensus 13

Scheduling Your Planning Activities 15

PART III: Designing an Integrated Unit Pricing Program 19

The Building Blocks 20

Volume-Based Versus Weight-Based Programs 20

Container Options 22

Pricing Structures 24

Billing and Payment Systems 26

Accounting Options 26

Program Service Options 27

Multi-Family Housing 29

Residents With Special Needs 30

Putting the Blocks Together **34**

Step 1: Estimating Demand 35

Step 2: Choosing Components 36

Step 3: Estimating Costs 37

Step 4: Developing a Rate Structure 37

Step 5: Calculating Revenues 38

Step 6: Evaluating and Adjusting the Program 38

PART IV: Implementing and Monitoring Unit Pricing **45**

Implementation Activities 46

Public Education and Outreach 47

Reorganizing Your Solid Waste Agency's Administration 50

Developing a Schedule 52

Program Monitoring and Evaluation 52

APPENDIXES **63**

Appendix A: Unit Pricing Roundtable Discussion: Questions and Alternatives 63

Appendix B: Putting the Blocks Together: Additional Examples . . . 79

Appendix C: Definitions 83

Appendix D: Bibliography 85

About This Guide

In December 1992, as part of the U.S. Environmental Protection Agency's (EPA's) efforts to disseminate information about potential solutions to solid waste management issues, the Agency organized a gathering of experts and local officials involved in unit pricing programs. The Unit Pricing Roundtable resulted in a wide-ranging discussion of the benefits and barriers associated with unit pricing programs. This guide is based on the insights gained from that meeting.

Pay-As-You-Throw: Lessons Learned About Unit Pricing of Municipal Solid Waste is designed to help local solid waste administrators and planners, elected officials, community and civic groups, environmental and business organizations, and others find an answer to the question, "Is unit pricing a viable option for our community, and, if so, how do we implement it?"

Since communities differ in size, demographics, governing jurisdiction, and other factors, this guide presents lessons learned in a variety of communities that have implemented unit pricing. As such, decision-makers can use the guide to chart a course through the issues and potential obstacles involved in launching a unit pricing program and tailoring it to meet the specific needs and goals of the community.

In addition to information drawn from the Roundtable, the guide is derived from data on dozens of existing unit pricing programs in communities of varying sizes and demographics. Case studies showcase differences in the types of collection systems, fee structures, and complementary programs that can accompany unit pricing programs. The guide also reflects information extracted from available literature, as well as direct advice from experts in the field.

The process of considering, planning, and implementing a unit pricing program is a process of moving from general to specific notions of addressing waste management issues. After considering long-term solid waste goals and options and how unit pricing might help achieve them, decision-makers must move on to broad system planning and finally to specific details. This guide is designed to mirror that process of increasing specificity. It is divided into four parts:

Part I: Is Unit Pricing Right for Your Community?

Part I offers an introduction to the concept of unit pricing, helps readers decide whether unit pricing holds enough promise for their communities to merit continued investigation and study, and provides an overview of the organization of the guide.

Part II: Building Consensus and Planning for Unit Pricing

Part II focuses on creating a framework for a successful system. It describes how to establish goals, build a consensus for change within the community, make a decision to pursue a unit pricing strategy, and perform basic planning tasks for the new program.

Part III: Designing an Integrated Unit Pricing Program

Part III introduces solid waste officials to unit pricing program options, including container type and size, pricing structures, and billing systems. It also presents a six-step process for selecting options and designing a rate structure that will best address the community's unit pricing goals.

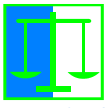
Part IV: Implementing and Monitoring Unit Pricing

Part IV guides communities through the process of launching their unit pricing program. While implementation often requires an ongoing series of tasks, this part focuses on the central issues: providing public education and reorganizing the solid waste agency's administrative office. Part IV also discusses ways to collect and analyze data regarding the performance of the program.

To meet the needs of many decision-makers, this guide has been designed to be modular in approach. Solid waste officials with little experience with unit pricing will want to read the entire guide carefully. Decision-makers who are somewhat familiar with unit pricing might want to skim Part I, while carefully studying the remainder of the guide. Those individuals with a good understanding of the pros and cons of unit pricing might proceed directly to the design and implementation guidelines offered in Parts III and IV.

Key to Symbols

To help readers focus on key issues, symbols are used throughout the guide to indicate the themes and concepts that are central to unit pricing. These are:



TRADEOFFS

There are no universally applicable guidelines that must be followed when developing a unit pricing program. All unit pricing options offer their own set of advantages and disadvantages. When designing a unit pricing program, decision-makers need to weigh these factors and choose the course of action that best suits the needs of their communities.

EDUCATION

Involving and educating the public is key to the success of any unit pricing program.

COSTS

One of the biggest issues associated with unit pricing programs concerns the costs to design and implement a program. Residents also will be concerned about waste collection fees.

HIERARCHY

EPA has established a hierarchy identifying the preferred methods for managing solid waste. At the top of the hierarchy is waste prevention. Recycling (including composting) is the next preferred technique, used for managing the waste that cannot be prevented. Finally, landfilling and combustion can be used to dispose of the remaining waste.

BARRIERS

Decision-makers will need to address some potential hurdles to implementing unit pricing. These include recovering expenses, increased administrative costs, perception of increased costs being passed on to citizens, and illegal dumping.

PART I

Is Unit Pricing Right for Your Community?

Over the past several years, many communities across the United States have found it increasingly difficult effectively and economically manage their municipal solid waste (MSW). Against a backdrop of steadily rising waste generation rates, many communities have seen their local landfills closing, tipping fees rising, and prospects for siting new disposal facilities diminishing. Other demands o waste management systems include growing public awareness of general environmental issues, as well as state and locally legislated waste prevention and recycling goals.

In response, many communities have begun adopting new approaches to waste management, such as collecting materia for recycling; composting yard trimmings and other organic materials; and conducting education programs intended to he residents understand the need for waste prevention and recycling. In addition, recognizing that market-based approaches are proving to be important tools in dealing with environmental issues, some communities have turned to economic incentives to encourage residents to prevent waste whenever possible and recycle or compost the remainder. One such incentive system is unit pricing.

What Is Unit Pricing?

Unit pricing is not a new concept. Berkeley, California, began its unit pricing program in 1924, and Richmond, California, launched a unit pricing program in 1916!

Traditionally, many communities in the United States have paid for waste management services through property taxes or through an annual fee charged to each household. The cost per residence remains constant regardless of differences in the amount of waste generated. This creates the mistaken impression that MSW management is free.

Unit pricing, also known as variable rate pricing or pay-as-you-throw, is a system under which residents pay for municipal waste management services per unit of waste collected rather than through a fixed fee. Unit pricing takes into account variations in waste generation rates by charging households or residents based on the amount of trash they place at the curb, thereby offering individuals an incentive to reduce the amount of waste they generate and dispose of.

Unit pricing programs can take two basic forms. Residents can be charged by:

- Volume of waste, using bags, tags or stickers, or prescribed sizes of waste cans.
- Weight of waste, with the municipality measuring at the curbside the amount of waste set out for collection.

While they operate differently from one another, these systems share one defining characteristic: residents who throw away more pay more.

By encouraging residents to prevent waste and recycle whenever possible, unit pricing is helping communities to better manage their solid waste.

If the basic concept of unit pricing is straightforward, however, the decision to adopt such a program is far from simple. To help communities considering unit pricing as a solution to their mounting solid waste management difficulties, EPA convened a Unit Pricing Roundtable, attended by representatives from communities that had implemented unit pricing or were actively considering it. EPA then organized the resulting wealth of ideas and advice to produce this guide. EPA designed the guide to help readers determine whether unit pricing is a viable option for their community and, if so, which factors to consider when planning and implementing such a program.

Potential Benefits to Unit Pricing

Communities that have adopted unit pricing programs have reported a number of benefits, ranging from reductions in waste generation to greater public awareness of environmental issues. These benefits include:

- **Waste reduction.** Unit pricing can help substantially reduce the amount of waste disposed of in a community. Some communities with unit pricing programs report that unit pricing helped their municipality achieve reductions of 25 to 45 percent in the amount of waste shipped to disposal facilities.
- **Reduced waste disposal costs.** When the amount of waste is reduced, communities often find their overall MSW management costs have declined as well. (A portion of the revenues previously spent on waste disposal, however, may need to be dedicated to recycling, composting, or other diversion activities.)

- **Increased waste prevention.** To take advantage of the potential savings that unit pricing offers, residents typically modify their traditional purchasing and consumption patterns to reduce the amount of waste they place at the curb. These behavioral changes have beneficial environmental effects beyond reduced waste generation, often including reduced energy usage and materials conservation.
- **Increased participation in composting and recycling programs.** Under unit pricing, new or existing recycling and yard waste composting programs become opportunities for residents to divert waste for which they otherwise would pay. Experience has shown that these programs are the perfect complement for unit pricing: analysis of existing unit pricing systems shows that composting and recycling programs divert 8 to 13 percent more waste by weight when used in conjunction with a unit pricing program.
- **Support of the waste management hierarchy.** By creating an incentive to reduce as much waste as possible using source reduction and to recycle and/or compost the waste that cannot be prevented, unit pricing supports the hierarchy of waste management techniques defined by EPA.

- **More equitable waste management fee structure.** Traditional waste management fees, in effect, require residents who generate a small amount of waste to subsidize the greater generation rates of their neighbors. Under unit pricing, waste removal charges are based on the level of service the municipality provides to collect and dispose of the waste, similar to the way residents are charged for gas or electricity. Because the customer is charged only for the level of

service required, residents have more control over the amount of money they pay for waste management.

EDUCATION

- **Increased understanding of environmental issues in general.** Through unit pricing, communities have the opportunity to explain the hidden costs of waste management. Traditional waste management systems often obscure the actual economic and environmental costs associated with waste generation and disposal. Once individuals understand their impact on the environment, they can choose to take steps to minimize it.

Potential Barriers to Unit Pricing

BARRIERS

While there are clearly benefits associated with unit pricing programs, there also are potential barriers. Communities considering unit pricing should be aware of the costs and possible community relations implications associated with the following issues:

- **Illegal dumping.** Some residents have strong reservations about unit pricing, believing it will encourage illegal dumping or burning of waste in their area. Communities can counter this fear with an effective public education program. Since most communities with unit pricing programs have reported that illegal dumping proved to be less of a concern than anticipated, providing residents with this information can help allay their concerns over illegal dumping.

COSTS

- **Recovering expenses.** Since unit pricing offers a variable rate to residents, the potential exists for uneven cash flow that could make it harder to operate a unit pricing program. To address this, communities must be sure to set prices at the appropriate level to ensure that, on average, sufficient funds are raised to pay for waste collection, complementary programs, and special services.
- **Administrative costs.** Effectively establishing rates, billing residents, and collecting payments under a unit pricing program will likely increase a waste management agency's administrative costs. Communities need to set waste collection prices at a level that can cover these costs.

In all unit pricing programs, residents who throw away more pay more.

- **Perception of increased costs to residents.** While a unit pricing program offers residents greater control over the cost of collecting their waste, it could initially be seen as a rate increase. An effective public outreach campaign that clearly demonstrates the current costs of waste management and the potential reductions offered by unit pricing will help to address this perception.
- **Multi-family housing.** Extending direct waste reduction incentives to residents of multi-family housing can present a challenge. Since waste generated by these residents typically is combined in a central

location to await collection, identifying the amounts of waste generated by individual residents in order to charge accordingly can be difficult. Communities must experiment with rate structures and collection systems to encourage residents of multi-family housing to reduce waste.

- **Building public consensus.** Perhaps the greatest barrier to realizing a unit pricing program is overcoming resistance to change, both among citizens and elected officials. Informing residents about the environmental and economic costs of current waste generation patterns can help overcome this resistance and build support for unit pricing.

Careful planning and design of a unit pricing program to meet specific community needs is the best solution to these potential difficulties. In particular, an effective public education program designed to communicate the need for unit pricing and address the potential concerns of residents will help meet these challenges. (Public education programs are discussed in detail in Part IV of this guide.)

Types of Communities That Can Benefit From Unit Pricing

Unit pricing programs work best when tailored to local needs. All types of communities can design unit pricing programs that will help achieve the goals of reducing waste generation and easing waste management difficulties; large, medium-sized, and small communities in every region of the country have realized these benefits. Local officials indicate that unit pricing programs also work well whether solid waste services are carried out by municipal or by private haulers.

As a result, unit pricing has grown significantly over the last few years. In the 1980s, only a handful of communities in the United States operated unit pricing programs. Now, over 1,000 communities have unit pricing programs in place. By January 1994, over 1,800 programs are scheduled to be in operation. In addition, laws in 10 states currently mandate or encourage unit pricing programs.

Unit pricing is a familiar concept for businesses. For years, many companies have been paying for waste removal services based on the size of their dumpsters and the frequency of collections.

Making a Decision About Unit Pricing

TRADEOFFS

After considering this overview of the benefits and barriers to unit pricing programs, decision-makers who believe unit pricing could work in their community can turn to Part II of this guide and begin the planning process. Decision-makers should carefully consider key factors such as the types of services to offer, the associated costs, the potential for complementary programs, the level of administrative change necessary, and the extent to which residents will support or oppose unit pricing.

questions & answers

Will this guide tell me what system to use and how to implement it?

No. This guide is intended to provide essential information about unit pricing and to help you think about how well such a program would work in your community. It will provide many suggestions borne of successful programs of all types and sizes around the country. However, final decisions about whether to adopt unit pricing, what type of system to use, and how to implement it should be made based on local needs and circumstances.

How expensive is it to implement unit pricing?

The cost of implementing a unit pricing program is directly related to how complex the selected system is, how it is financed, and how different it is from the current waste removal system. Many communities have implemented unit pricing with minimal upfront and ongoing costs. Over the long term, communities with unit pricing programs have generally reported them to be cost-effective methods of achieving their waste management goals.

Our community has had significant fiscal problems. Would unit pricing be appropriate?

A community introducing unit pricing may choose to use fees either to supplement or to replace current revenue sources. While a community with a tight waste management budget may choose to use unit pricing fees to supplement current revenue sources, the public may resist such fees as simply an additional tax. Other communities stress that local acceptance of a unit pricing program is greater if current taxes, such as general or property taxes, are reduced by the amount of the new solid waste fees.

Points to **remember**

Unit pricing requires residents to **pay for each unit of waste** that they dispose of. This billing arrangement is similar to fees assessed on other essential services (such as water and electricity), where the charge is based on usage.

Unit pricing has been effective in reducing the amount of solid waste disposed of in **all types of communities** across the country.

Communities using unit pricing **in tandem with recycling** and composting programs have found these programs increase each other's effectiveness.

This guide is designed to provide **basic information** about planning and operating a unit pricing program. Decisions regarding the actual program you adopt will be based on your community's unique circumstances.

Case Studies

All Types of Communities Are Adopting Unit Pricing

Rural areas. Unit pricing is found in a number of rural communities. For example, it has been implemented in High Bridge, New Jersey, which has a population of 4,000, and in Baldwin, Wisconsin, which has a population of under 2,000.

Larger communities. While unit pricing is not yet common in the largest cities, it has been working successfully in Anaheim, Glendale, Pasadena, and Oakland, California; Aurora, Illinois; Lansing, Michigan; Seattle, Washington; and a number of other communities with populations over 100,000. In addition, state laws in Minnesota, Wisconsin, and Washington either currently or soon will require implementation of unit pricing programs in communities statewide, regardless of size (with some exceptions).

County-wide. Unit pricing also can be implemented on a county-wide basis. Tompkins County, New York; Hennepin County, Minnesota; and King County, Washington all have implemented unit pricing programs.

Unit Pricing Cuts Down on Waste Volume

Unit pricing can result in dramatic declines in the amount of waste set out for collection. The Village of Hoffman Estates, Illinois, noted a 30-percent reduction in waste volume after implementing a unit pricing program. Seattle, Washington, reported a decline in waste generation from an average of 3.5 waste cans to 1.7 cans per household per week after unit pricing was launched. This amount was further reduced to just one can per household per week after complementary curbside recycling and composting programs were introduced (see the discussion of complementary programs in Part III).

Most communities, however, cannot delineate what percentage of waste reduction is directly attributable to unit pricing and what percentage is due to other factors, such as new recycling programs, consumer education, or even economic recession. Nevertheless, studies conducted over the last few years indicate consistent waste reductions in unit pricing communities. For example, a study at Duke University by Dr. Daniel Blume examined 14 cities with unit pricing. The waste reductions in this study ranged from 18 to 65 percent. The average waste reduction was 44 percent.

PART II

Building Consensus and Planning for Unit Pricing

Unit pricing involves many important decisions regarding how to perform and pay for solid waste services. To be sure that their communities are choosing the best options, many solid waste agencies have initiated a planning process that helps lay the groundwork for sound decisions and coordinated implementation. This process helps clarify the community's solid waste needs and goals, identify likely barriers and methods of overcoming them, and inform and educate residents about unit pricing and how it can improve solid waste management in the community.

Setting Goals and Establishing a Unit Pricing Team

Solid waste management can be a confusing business, with success measured against standards as varied as recycling diversion rates, total costs, or even quality of media coverage. For this reason, the first step when planning for unit pricing is to determine the goals of the program based on a review of your community's solid waste management needs and concerns. While goal-setting can at first seem like an abstract exercise, clearly defined and measurable objectives for your program are invaluable when deciding which unit pricing options would work best in your community. Goal-setting can help build community consensus and facilitate efficient monitoring and evaluation of the unit pricing program's progress.

Although you will want to solicit input from local residents and other interested parties before coming up with a final list of goals, it is useful to first examine and prioritize goals internally before introducing them to the community. Consider holding an internal brainstorming session to establish a preliminary list of goals. This session could last anywhere from one hour to half a day, depending on the size and makeup of your community, the issues that need to be addressed in the session, and the needs and structure of your agency. A shorter, followup session to revisit, refine, and prioritize goals also might be useful.

TRADEOFFS

Prioritizing goals also is important since the weight that you assign to goals now will help you design the rate structure for the program. (Setting rate structures is described in Part III of the guide.) In addition, achieving every objective on a community's list can be difficult. Consider the tradeoffs among program costs, citizen convenience, staffing changes, and other factors as you prioritize your goals. Circumstances often require compromise in one area in exchange for progress in another.

Specific goals and objectives can vary significantly among communities. Examples include:

HIERARCHY

- **Encouraging waste prevention and recycling.** A community should set unit prices at levels high enough to encourage households to reduce waste generation and to recycle and compost. This helps to achieve existing recycling goals and to conserve landfill space.

COSTS

- **Raising sufficient revenue to cover municipal solid waste management costs.** A unit pricing program should bring in enough revenue to cover both the program's variable costs and its more stable or fixed costs. Variable costs, such as landfill tipping fees, are the expenses that fluctuate with changes in the amount of solid waste collected. Fixed costs are costs that change only rarely, such as rent for agency offices, or that change only after large-scale waste collection changes, such as the number of collection trucks needed.

Establishing a clear set of goals for your unit pricing program is invaluable when deciding which program options will work best in your community.

- **Subsidizing other community programs.** A community might wish to generate revenues in excess of the actual costs for solid waste collection and then use those funds to enforce antilittering or illegal dumping laws, or to improve its recycling and solid waste infrastructure.

Once your agency has established a list of preliminary goals, consider setting up a unit pricing team or citizen advisory council to help you refine and prioritize these goals. A unit pricing team typically consists of solid waste staff, interested elected officials, civic leaders, and representatives from affected businesses in the community. Team members may be solicited through advertisements in local newspapers and on radio and television stations. Including these individuals in the planning process gives the community a sense of program ownership.

In addition, team members can help other residents in the community understand the specifics of the program as it evolves and can provide your agency with valuable input on residents' concerns about the program. Members of the team also can serve as a sounding board to help ensure strong community participation throughout the planning process.

Addressing Barriers

The team or council also can help your agency identify potential barriers to implementing unit pricing in your community and consider ways in which these barriers can be addressed. Illegal dumping and burning of waste is one of the mostly frequently cited barriers to unit pricing. Yet participants at EPA's Unit Pricing Roundtable and communities with unit pricing programs report that illegal dumping has occurred prior to implementing a program and tends to persist at some level, regardless of the way in which residents are charged for solid waste management.

A unit pricing team composed of residents, civic leaders, and town officials can help ensure the development of a successful unit pricing program.

The key is to design a unit pricing program that significantly deters illegal dumping and burning. Public education and enforcement policies are the most effective tools in addressing this barrier. Informing residents of the experiences of communities with unit pricing and setting up fair but aggressive enforcement policies to respond to incidents of illegal dumping also are essential.

Other potential barriers to unit pricing include recovering expenses, covering administrative costs, ensuring that unit pricing is not perceived as a rate increase by residents, implementing unit pricing in multi-family buildings, addressing physical or financial difficulties for senior citizens, and overcoming resistance to changing

the status quo. (Part III of this guide provides an in-depth discussion of barriers and specific strategies for overcoming them.)

Once both the municipal solid waste agency and the unit pricing team or council have evaluated specific goals and barriers, it is time to unveil the program to the city at large. The team or council might consider developing a preliminary proposal with several program options. This proposal can serve as a basis for public discussion and help illustrate what changes might occur.

Building a Public Consensus

Public education is critical to the planning, design, and implementation stages of a unit pricing program. In fact, education is the linchpin holding all of these phases together. While educating the public might at first seem unnecessary and expensive, the experiences of communities that have implemented unit pricing programs indicate that a good public relations program more than pays for itself.

Such a program is effective at developing a general consensus among residents on the need for unit pricing. Community support is vital to the long-term success of a unit pricing program. In fact, communities that have implemented unit pricing programs are nearly unanimous in listing education and community relations as the most important elements of a successful unit pricing program. Public education can combat fears and myths about unit pricing (such as the fear of increased illegal dumping) and help avoid or mitigate many potential implementation problems.

In Austin, Texas, solid waste officials included school visits in their public outreach program.

When first reaching out to residents during the planning stage, don't be surprised if many residents react with skepticism to the idea of unit pricing. Initial opposition is often related to a perception that unit pricing will result in an additional financial burden. Opposition also might be due simply to a natural resistance to change. Resistance to unit pricing is especially prevalent in communities where solid waste management fees are hidden in general or property taxes.

To counter this opposition, municipal officials can inform residents of the current difficulties associated with waste collection and management. In particular, officials can explain the costs to residents of the current system of waste management. Next, they could present the goals for improving the management of solid waste in the community. In this context, officials can introduce unit pricing, discuss its potential for meeting these objectives, and address any questions and concerns that residents have expressed about the new program.

Winning community support for unit pricing often hinges on explaining how the program can achieve certain critical objectives. Discussions at EPA's Unit Pricing Roundtable revealed that residents tended to support unit pricing if the program achieved the waste management principles about which they cared the most. Residents often develop a sense of civic pride in programs that meet these objectives. Roundtable panelists strongly recommended that solid waste officials devote a significant amount of attention to communicating these basic principles:

- **Equity.** The program should be structured so that people who generate more waste pay more, while residents who prevent waste, recycle, and compost are charged less.
- **Waste reduction.** The program must significantly reduce the community's generation of waste, increase the rate of recycling, and, therefore, reduce the amount of waste requiring disposal in landfills and combustors.
- **Reductions in waste management costs.** By helping to alter household waste generation patterns, the program should help reduce the cost of collecting and disposing of the community's solid waste.
- **Municipal improvements.** The program should contribute to improvements in the quality of life in the community, such as resource conservation and land preservation.

At EPA's Unit Pricing Roundtable, panelists ranked education and community relations as the most important elements of a successful unit pricing program.

In addition to deciding what information needs to be communicated, solid waste officials also should consider how best to reach residents in the community. An unspecified change in waste management services scheduled to occur at some future date is not likely to capture a community's attention. The following activities represent some of the ways in which officials can explain the benefits of unit pricing:

- **Hold public meetings.** Interactive public meetings offer solid waste officials the opportunity to present the case for unit pricing. Such meetings also give citizens the sense that their concerns are being heard and addressed in the eventual program.
- **Prepare briefing papers for elected officials.** As both shapers and followers of public opinion, elected officials tend to be at the center of public policy debates. Because well-informed leadership can raise issues in such a way as to attract residents' interest, solid waste officials might want to provide elected officials with brief summaries of the issues associated with solid waste management and the likely benefits of a unit pricing program.
- **Issue press releases.** Press coverage of a change in the way that a community pays for its solid waste collection services is inevitable. Keeping key radio, television, and newspaper outlets well informed of the reasoning behind the move to unit pricing can make the press a valuable participant in the decision-making process and prepare the community for an upcoming change.

- **Work with retailers.** Grocers and other retailers in your community can help educate citizens by displaying posters and other information about the new program in their stores. In addition, retailers can help customers generate less waste by displaying information about choosing waste-reduced products.

Part IV of this guide explains additional steps that communities can take to communicate their ideas to the public.

Scheduling Your Planning Activities

Even before the final decision is made to pursue unit pricing, some basic planning issues can be addressed. Chief among these are legal/jurisdictional issues and timing. Generally, states extend to local jurisdictions the authority to provide waste management services and to charge residents accordingly. During the planning process, however, many communities have the unit pricing team research the municipality's legal basis for implementing a new solid waste service pricing mechanism rather than risk discovering a problem unexpectedly during implementation.

Since unit pricing programs often involve a number of steps and some complex decision-making, consider developing a timeline for planning, designing, and implementing your program. Based on the experiences of communities that have successfully implemented unit pricing, planning for unit pricing should begin at least a year in advance of your targeted start date. You can establish goals for the unit pricing program and begin explaining the program to the community from 9 to 12 months before program implementation. Public education should continue throughout the months prior to the program and, to some extent, after the program is underway. You can identify the legal framework for the program at least six months before the start of a program. A detailed suggested timeline for a unit pricing program is provided in Part IV of this guide.

questions & answers

Everyone agrees we should prevent waste and recycle more. Why do we need to spend so much time thinking about specific goals and objectives?

It will probably be easy to get a broad consensus that some things are "good," such as saving money or reducing disposal rates. But solid waste management in general and unit pricing in particular often involve a series of tradeoffs. For example, a community may decide to sacrifice some convenience for households to cut costs or to create a stronger waste-reduction incentive. Establishing goals and priorities early in the planning process can make it easier to make difficult choices as they arise.

Why is public input so important? We have already consulted with many solid waste experts, who know a lot more about solid waste issues than residents.

Municipal officials and experts agree—no unit pricing program is going to work if local residents oppose it. Since improved solid waste management requires a good faith effort from residents to reduce the amount of waste they dispose of, it makes sense to include residents as equal partners.

Points to **remember**

Establish **realistic goals** for your unit pricing program that address your community's most pressing waste management needs.

Involve the community in the planning process. Representatives from community organizations can increase acceptance of unit pricing and facilitate implementation.

Plan for the possibility of illegal dumping or burning. In addition to explaining other communities' experiences with illegal dumping, let residents know about legal alternatives for managing and disposing of solid waste. Also explain that **concrete steps**, such as assessing penalties for violators, will be taken.

Public education cannot be stressed enough. Promoting the strengths of unit pricing and addressing residents' concerns is **critical** to the success of your program.

Provide elected officials with information on the benefits of unit pricing programs to help them address residents' concerns. Also, **keep local officials informed** of decisions made about the program as it evolves.

Be sure to **carefully research** your legal authority to establish and enforce a unit pricing program. Based on this research and on the advice of your municipality's legal counsel, ordinances may be necessary to establish the program.

Plan ahead by establishing a timeline for your program.

Case Studies

Three Cities Report on Illegal Dumping

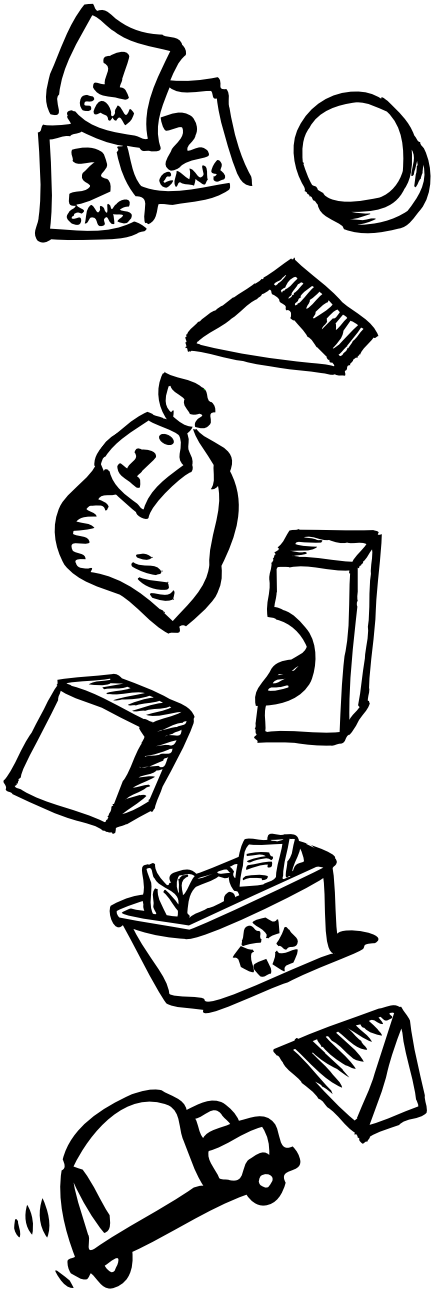
In **Mansfield, Connecticut,** officials report that illegal dumping did not increase significantly with the introduction of unit pricing. To prevent illegal dumping, Mansfield has relied primarily on public education. When necessary, however, the solid waste department also has worked with the police department to track license plates and identify violators.

In **Seattle, Washington,** unit pricing also has not been associated with an increase in illegal dumping. In fact, 60 to 80 percent of the illegal dumping incidents in the city are associated with remodeling waste, refrigerators, and construction debris—waste that the city suspects comes from small contractors who do hauling on the side and dump the refuse. Seattle officials are considering licensing these haulers or requiring remodelers to verify that their material has been properly disposed of.

The city of **Pasadena, California,** reports similar findings. A survey done at the city's landfill indicated that Pasadena was disposing of one-third more trash than was indicated in a waste generation study completed in the city. Pasadena suspects that this waste is made up of construction and demolition debris dropped off by small contractors. In the future, instead of contracting with small individual haulers, Pasadena may require those applying for a building permit to use licensed haulers to take construction and demolition materials to the landfill.

PART III

Designing an Integrated Unit Pricing Program



To this point, this guide has presented an overview of the major benefits and barriers to unit pricing, followed by suggestions on how to define the objectives of your program and begin building a consensus for unit pricing in your community. This portion of the guide introduces issues relating to the exact structure of your community's unit pricing program. The first half of Part III, "The Building Blocks," discusses the advantages and disadvantages of the specific program components and service options from which you can choose. This is followed by "Putting the Blocks Together," a six-step process to help you design a successful unit pricing program.

The Building Blocks

While unit pricing is based on the simple concept that households pay only for the waste they generate, designing a working program requires that you consider and decide on a range of specific issues. You may have already examined many of these issues, such as the potential for complementary recycling and composting programs, the types of solid waste services to offer, and the means by which you can provide these services to residents with special needs. During the development of a unit pricing program, however, viewing these issues in the context of how they might affect the success of your program is important.

The process of selecting program components and service options can begin as much as nine months before the start of a program. This part of the guide points out the kinds of decisions you need to make during this process, including:

- Choosing a volume-based or weight-based system
- Selecting containers
- Examining pricing structures
- Considering billing procedures
- Determining service options and complementary programs
- Including multi-family buildings
- Accommodating individuals with special needs

Communities also need to consider other factors, such as the remaining life of existing containers, the cost of container replacements, the preferences of customers, and the impact of assessing additional taxes or fees on households. Later in this section of the guide, a six-step process for designing an actual unit pricing rate structure is presented. This process should help you tailor a rate structure to local conditions.

Volume-Based Versus Weight-Based Programs

One of the first decisions to be made when designing a unit pricing program is to determine how solid waste will be measured. Based on your unit pricing goals, local budgetary constraints, and other factors, you need to decide whether your system will charge residents for collection services based on the weight or the volume of waste they generate. The two systems have very different design and equipment requirements.

Under **volume-based systems,** residents are charged for waste collection based on the number and size of waste containers that they use. Households are either 1) charged directly for waste collection based on the number of bags or cans set out at the curbside, or 2) required to purchase special trash bags (or tags or stickers for trash bags) that include the cost of waste collection in the purchase price.

Under **weight-based systems,** the municipality weighs at the curbside the waste residents set out for collection and bills for this service per pound. The program can either require residents to use standard, municipally supplied cans or allow them to continue using their own cans. Weight-based systems offer residents a greater waste reduction incentive than volume-based systems since every pound of waste that residents prevent, recycle, or compost results in direct savings. This is true no matter how much or how little waste reduction occurs. In addition, residents can easily understand this type of system and perceive it as fair. Weight-based systems also provide a more precise measurement of waste generation than volume-based systems.

For its weight-based unit pricing program, the city of Farmington, Minnnesota, has invested in collection trucks that weigh the waste as it is lifted . . .

TRADEOFFS

On the other hand, weight-based systems tend to be more expensive to implement and operate than volume-based systems because special equipment is required and more labor typically is necessary to handle the more complex billing system. In addition, some of the equipment used to weigh the waste, record the data, and bill the customer is still experimental. Startup costs for these systems can include truck-mounted scales for weighing waste and some type of system (such as bar-coding on waste cans) for entering this information into a computer for accurate billing.

While volume-based systems are less costly to set up and operate, a potential disadvantage associated with these systems is that residents might be tempted to compact their waste. Some residents will compact more than others, perhaps even using mechanical compactors. This reduces the ability of unit pricing to offer more equitable charges for waste collection services and complicates the task of identifying the impact of unit pricing on the community's rate of solid waste generation. Additionally, depending on the system chosen, there can be less of an incentive to reduce waste since such reductions might not translate into direct savings for the resident.

. . . and record the weight and resident information on an onboard computer for later billing.

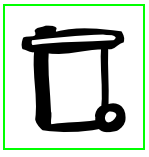
Although over 1,000 communities nationwide have unit pricing programs in place, very few have fully implemented weight-based programs. Accordingly, the remainder of this guide focuses predominantly on the process of designing and implementing a volume-based unit pricing program.

Austin, Texas, provides residents with either 30-, 60-, or 90-gallon cans as part of its unit pricing program.

Container Options

Communities that decide to design a volume-based unit pricing program must consider the type and size of waste collection containers on which to base their rate structure and billing system. Keep in mind that choices about containers, rate structures, and billing systems all go hand in hand. In some cases, container type will dictate the rate structure and billing system. In other cases, an established billing system (that cannot be drastically overhauled) can govern container type and rate structure.

A unit pricing program can be designed around the following container options:



Large cans. Under this system, households are provided with single, large waste cans, often with a capacity of 50 or 60 gallons. Each household is then charged according to the number of cans that they use.

Small or variable cans. This system uses a set of standard, graduated can sizes, often ranging from approximately 20 to 60 gallons in capacity. Typically, these systems operate on a subscription basis, under which residents choose in advance the number and size of cans they wish to use.

Prepaid bags. This system uses colored or otherwise distinctively marked standard-sized trash bags, typically 20 to 30 gallons in capacity. Residents purchase the bags from the solid waste agency through outlets such as municipal offices and retail stores. Only waste that is placed in the bags is collected.

Prepaid tags or stickers. Residents purchase tags or stickers from the solid waste agency and affix them to their own trash bags. The tag or sticker specifies the size of bag it covers.

Each system has its own specific advantages and disadvantages related to such issues as 1) offering a system that residents view as equitable; 2) creating as direct an economic incentive for waste reduction as possible; and 3) assuring revenue stability for the solid waste agency. Other issues to consider when weighing the pros and cons of different container types include simplicity of billing, compatibility with existing waste collection services, ease of collection for work crews, sanitation and aesthetics, budgetary constraints, and community solid waste goals.

The primary benefit of a **single, large container** size is revenue stability. When communities use large containers, the number of cans set out each week tends to remain fairly constant, and so do revenues. The primary disadvantage associated with this container choice is that households that don't generate much waste have no economic incentive

to reduce waste. Such households are billed the same amount whether they fill a 60-gallon can halfway or completely.

Conversely, the principal benefit of using **variable can** sizes is that even modest reductions in waste generation (for example, one less 10-gallon waste container) can clearly translate into savings. A disadvantage of variable cans is that they can be inconvenient for customers who generate large volumes of waste. In addition, to realize savings from reduced waste generation, households must request a change in the number of cans for which they are being billed. The solid waste agency might need to establish an inventory and distribution system that could be expensive to set up and maintain. Additionally, billing for this method can be more complex in some communities.

Like variable cans, **prepaid bags** encourage greater waste reduction than large cans if the bag size is configured so that residents that generate less waste pay less. Additionally, since residents pay for waste collection through the purchase of the bags, there is no billing, which means this type of system is relatively inexpensive to implement and maintain. The primary disadvantage associated with bags is that there is greater revenue uncertainty than with can systems. An individual might, for example, buy several months' worth of bags at one time and then none for many weeks. Also, semiautomatic collection vehicles that require residents to use a rigid container might not be able to adapt to bag collection. Bags also can tear or be torn open by animals, resulting in scattered trash.

Large, clearly marked tags and stickers will help eliminate confusion and speed curbside waste collection.

Prepaid tag or sticker systems offer many of the same advantages as bag systems. Chief among these is that such systems directly encourage waste reduction, since different stickers can be used to identify different amounts of waste "set-outs" (the waste residents set out for collection). This means, however, that the solid waste agency must establish and enforce size limits for each type of sticker. As with bags, waste collection is paid for upfront, so no billing needs to be done. Also like bags, stickers or tags offer less revenue stability. In addition, stickers can fall off in rainy or cold weather, and both tags and stickers can be counterfeited or stolen.

The advantages and disadvantages of each of these container options are described in more detail in Table 3-2 at the end of this chapter. You don't have to be locked into one type of system, however, if you plan for the possibility of change. Some communities conduct a pilot program in one part of the municipality before implementing unit pricing communitywide. In this way, difficulties can be worked out early in the process, when modifications are still relatively easy.

While the details of the pricing structures used in unit pricing programs can vary greatly according to local conditions and needs, four basic types are currently in use. These pricing structures are described below.

Pricing Structures

TRADEOFFS

The main consideration in choosing among the types of pricing structures is their impact on the stability of the community's revenues and on residents' waste reduction efforts. In addition, some pricing systems are more complex than others to administer.

1. The **proportional (linear) rate system** is the simplest rate structure. It entails charging households a flat price for each container of waste they place out for collection. This rate structure provides a strong incentive for customers to reduce waste. It also is easy to administer and bill. Careful consideration is often required, however, to select a price per container that avoids cash flow difficulties that can hinder a new program. While setting too high a price will increase resistance to unit pricing, setting too low a price may cause periodic revenue shortfalls (and can lessen the waste reduction incentive). In addition, when setting rates, decision-makers should assume that some level of waste compaction will occur. They also should plan for success, since as people begin to reduce the amount of waste they set out, the solid waste agency will see a corresponding drop in revenues paid for waste collection.

Weighing the Tradeoffs When Setting Pricing Structures

Decision-makers considering such issues as container choices, rate structures, and service options quickly realize that all of these choices are closely related. Decisions in one area will influence, or even determine, how your community responds to the remaining choices.

When considering container options, for example, a smaller community with fewer resources might favor a bag-based system because of its generally lower implementation and administrative expenses. Such systems, however, have the potential for revenue gaps that the community might not be able to bridge. As a result, a community might prefer a two-tiered or multi-tiered rate structure, whose base fee would help prevent such instability.

By contrast, a larger community interested in providing a stronger incentive to reduce waste might favor a proportional or variable container rate and higher per container fees. To avoid significant revenue fluctuations, such communities might choose a can-based subscription system that ensures a steady cash flow.

There is no one best approach to unit pricing. Throughout the design process, you will need to determine the specific combination of container choices, rate structures, and service options that will maximize efficiency and enable your community to meet its solid waste goals.

2. With a **variable container rate,** a different rate is charged for different size containers. For example, a solid waste agency might charge households $2 for every 60-gallon can of waste set out and $1.25 for every 30-gallon can. While this system creates a strong incentive for residents to reduce waste, it requires that communities carefully set their rates to ensure revenue stability. Because different rates are charged, this system can be complicated to administer and bill.

3. Both of these systems use a per-container fee to cover the fixed and variable costs associated with a community's MSW management. Other unit pricing rate structures address fixed and variable costs separately. **Two-tiered rate systems** assess households both a fixed fee and a per container fee. Under this system, a monthly flat fee is set for solid waste services to ensure that fixed costs are covered; a separate, per-container charge is then used to cover the variable costs. In Pennsburg, Pennsylvania, the solid waste agency charges residents a flat $65 per year plus $1 per 30-gallon bag of waste placed at the curb for pickup. This system provides more stable revenue flows for the community but offers less waste reduction incentives than proportional or variable container rates. Some communities use the two-tiered rate structure as a transition system. Once decision-makers are able to gauge customers' response to unit pricing, a proportional rate structure could be introduced to encourage greater waste reduction.

4. Multi-tiered rate systems charge households a fixed fee plus variable fees for different container sizes. For example, a community might charge a basic $10 monthly service fee plus $2 per 60-gallon can, or $1 per 30-gallon bag. This rate structure offers similar advantages to two-tiered rates and also encourage waste reduction. This type of rate structure is the most complex, however, and could be difficult to administer and bill.

Table 3.1. Pricing Options

System	Rate
Proportional (linear)	Flat rate per container
Variable container	Different rates for different size containers
Two-tiered	Flat fee (usually charged on a monthly basis) **and** flat rate per container
Multi-tiered	Flat fee (usually charged on a monthly basis) **and** different rates for different size containers

Billing and Payment Systems

Traditional solid waste programs typically assess households a fixed fee, raised through property taxes or periodic equal billing of all households. Unit pricing programs use various billing/payment systems, such as direct payment for containers, actual set-outs, and payment for advance subscriptions.

With a **direct payment system,** residents pay for solid waste services by purchasing bags or tags from the solid waste agency. Containers can be sold at the courthouse or city hall, at local retail stores, or at the hauler's office. Care should be taken to ensure that a sufficient number of easily accessible outlets are available for residents.

Under **subscription systems,** residents notify the solid waste agency of their "subscription level," or the number of containers they anticipate setting out each collection cycle. The customer is then billed on a regular basis for these containers. If customers are able to reduce the amount of waste they generate, they can select a lower subscription level and save money. In many programs, these subscription fees are set at a level that covers the purchase of a designated number of additional bags or cans for any waste that a customer disposes of above their subscription level. This system offers fewer fluctuations in revenues, although the waste reduction incentive is lower 0because residents who reduce their waste generation rate only receive a reduction in their waste collection bill after requesting the municipality to change the number of cans for which they pay.

An **actual set-out system** bills customers based on the actual number of containers set out for collection. This approach requires the hauler to count the number of bags, tags, or cans set out and to record the information so that households can be billed later.

To address citizens' concerns about "hidden" or "double" fees, some communities that implement unit pricing either reduce the household tax rate commensurate with the unit pricing fee or decide not to raise the tax base proportionately with the revenues received from unit pricing. Meet with the citizens advisory council to work out the details for a pricing system geared to your local needs and circumstances.

Accounting Options

Regardless of how they collect payment, most communities tend to manage the finances of their solid waste activities as one item in the municipal budget. A few communities, however, are using alternative accounting approaches to complement their unit pricing programs. One such approach is the use of "full cost accounting." Using full cost accounting enables a community to consider all costs and revenues associated with a task such as solid waste management, including depreciation of capital costs, amortization of future costs, and a full accounting of indirect costs. This method can help a community

establish a unit pricing rate structure that will generate the revenues needed to cover all solid waste management costs.

Another approach that can be used in conjunction with a unit pricing program is the development of an "enterprise fund." Also referred to as special districts, enterprise funds are entities that can be used to separately manage the finances of a municipality's solid waste activities. In this way, the costs and revenues of unit pricing are accounted for under a separate budget, enabling a community to better anticipate revenue shortfalls and, when appropriate, invest surplus revenues in beneficial waste management projects that can reduce the cost of MSW management in the future.

Program Service Options

The next step is to determine which solid waste services are most important to residents. Successful programs offer an array of solid waste services that citizens need and appreciate. The goal-setting process described in Part II of this guide identifies many of these services.

TRADEOFFS

Offering different services does add layers of complexity to a unit pricing program, especially to the billing component. Yet providing such service enhancements greatly increases overall citizen acceptance of the program. A carefully selected and priced service array allows a community to offer premium municipal solid waste services to households that want them, while generating sufficient revenues to support core solid waste collection services. The following sections highlight some of the most popular service options, many of which are complementary to basic trash removal.

Providing a recycling program in conjunction with unit pricing can further decrease the amount of waste your community must dispose of.

Complementary Programs

Complementary programs are those that enhance the unit pricing program and encourage residents to prevent and reduce waste. The most common complementary programs are 1) recycling and 2) collection of yard trimmings for composting. Providing recycling and composting collection services enables both types of programs to reach their maximum effectiveness. In fact, in many cases, recycling and composting are major contributors to the success of a unit pricing program.

Many communities already have some type of curbside collection or voluntary drop-off recycling program in place. Linking recycling and composting with unit pricing provides customers with an environmentally responsible way to manage their waste. In addition, since the cost of these programs can be built in to unit pricing fees, communities can recover these expenses without creating an economic disincentive to recycle. The extent of the recycling program is an important factor, as

Complementary programs also can benefit from a strong public education effort.

well. A community will more fully realize the benefits of offering recycling in tandem with unit pricing if the recycling program is geared to collect a wide range of materials (although the availability of local markets can constrain the types of materials a community can accept).

Providing for removal of yard trimmings such as leaves, branches, prunings, and grass clippings, and promoting backyard composting and "grasscycling" (leaving grass trimmings on the lawn), also will enhance the unit pricing program. For example, the community of Austin, Texas, mixes the yard trimmings it collects from residents with sewage sludge to produce compost called "Dillo Dirt," which is sold to nurseries as fertilizer, and Durham, North Carolina, makes landscaping mulch from brush. Distributing "how-to" materials can help increase the amount of organic waste residents compost, and some municipalities even provide their residents with free compost bins.

COSTS

In communities where weekly recycling or composting is too costly, curbside collection can be scheduled every other week or once a month. In addition, municipalities can encourage haulers to provide recycling services by including a risk-sharing clause in their contracts. Such clauses require the municipality to share with the hauler the risk of fluctuations in the price of recyclable materials. If a recycling company requires payment to process a certain collected material whose value had dropped substantially, for example, the hauler and municipality would bear these costs together. Some communities, however, might not feel their budget would allow them to incur additional, unexpected costs.

Backyard Collections

Backyard collection of waste and/or recyclables can be considered as a service enhancement that complements a unit pricing system. With this service, haulers remove residential waste and recyclables from backyards, garages, or wherever residents prefer, rather than requiring them to haul the material to the curb. Residents might pay extra for this service. When setting a price for backyard collection services, a community should consider costs to collect waste from the curb, transport it, and dispose of it. The higher charge for backyard waste removal should reflect the added municipal resources required for such a service.

Curbside Collection of Bulky Items

Curbside collection of large items, such as refrigerators and other major appliances, is another service that complements basic trash removal. In some communities with unit pricing, residents pay extra to

have bulky items picked up and disposed of by the municipality. The disposal of bulky items, which cannot fit into most unit-pricing programs' cans or bags, can be charged for within a unit pricing system by using printed stickers or tags that are attached to the item. To establish fair prices, the solid waste agency can use the same collection, transportation, and disposal cost considerations that apply to establishing prices for standard unit pricing waste collections. The price could be set in advance of collection, based on the owner's description of the item, or after collection, based on the collection agency's observations.

Multi-Family Housing

BARRIERS

One of the biggest challenges for communities implementing unit pricing is how to include multi-family (five units or more) residential structures into the program. Such buildings can house a large portion of the population, particularly in densely populated areas. Because waste often is collected from residents of such structures per building, rather than per unit, it might be difficult to offer these residents a direct economic incentive to reduce waste with unit pricing. To compound this problem, because many multi-family buildings receive less convenient recycling services than single-family housing units, residents of multi-family buildings might have fewer avenues for waste reduction.

There are several possible options to resolve multi-family barriers. One option is to have the building manager sell bags or tags to each resident. When households use these tags or bags, those that generate more waste end up paying more for waste collection. Problems arise

Tips for Accommodating Residents of Multi-Family Households

A number of ideas were presented at EPA's Unit Pricing Roundtable to help extend to residents of multi-family households the direct economic incentives inherent in unit pricing. One suggestion was to request that building managers pass on trash collection savings to residents in the form of cash rebates, rent reductions, or some free building services, although the impact of the incentive would be diluted since it is spread over all the tenants in the building.

New technologies, such as a bar code reader to identify the tenant and a scale at the bottom of the chute to record the weight, also were suggested as possible solutions. These technologies offer the potential for accurately recording the exact waste generation for each tenant.

In addition, building codes for new and renovated buildings could be amended to require the installation of separate chutes for recycling and for garbage disposal. Residents also could be required to use a trash token or some type of identifying code to gain access to a garbage chute.

when households do not comply with this system, however. In many cases, residents can easily place waste in the building dumpster without paying for a bag or sticker. Another approach is to modify the system of placing waste out for collection in multi-family buildings. For example, dumpsters or garbage chutes could be modified to operate only when a magnetic card or other proof of payment is used. Such modifications can be expensive, though. Communities with unit pricing systems in place are experimenting with other possible solutions to the multi-family barrier. If extending unit pricing service to multi-family buildings is a concern in your community, consider contacting other cities or towns that have addressed this issue for additional ideas. (A listing of these communities is provided in Table 3-2 at the back of this section.)

Residents With Special Needs

Many communities considering unit pricing are concerned about the special needs of physically limited or disabled citizens and those living on fixed or low incomes. For example, some senior citizens and disabled residents may be physically unable to move trash containers to the curb. Communities may wish to consider offering such residents backyard collection services at a reduced rate or at no extra charge. Such special considerations should be factored in to your unit pricing rate structure.

While the fees associated with unit pricing could represent a potential problem for some residents, unit pricing systems can be structured to allow everyone to benefit. To provide assistance to residents with special financial needs, communities can reduce the per-household waste collection charges by a set amount, offer a percentage discount, or provide a credit on the overall bill. In some cases, communities with unit pricing programs offer a certain number of free bags or stickers to low-income residents. Some communities charge everyone equally for bags or tags but reduce the base service charge for low-income households. Assistance also can be offered through existing low-income programs, particularly other utility assistance efforts.

In some communities, backyard collection can be arranged as a service for disabled or elderly residents.

These techniques allow low-income households to benefit from some assistance while retaining the incentive to reduce their bill for waste services by practicing source reduction, recycling, and composting. Communities will need to determine how to identify the amount of assistance they will offer based primarily on the program's anticipated revenues. As a basis for establishing eligibility for assistance, some communities with unit pricing programs use income criteria such as federal poverty guidelines.

Table 3-2.
Advantages and Disadvantages of Unit Pricing Container Systems

Can Systems

Advantages	Disadvantages	Communities Using This System
Revenues are fairly stable and easy to forecast.	Cans often have higher implementation costs, including the purchase and distribution of new cans.	Hennepin County, MN
Unlike bags, cans often work well with semiautomated or automated collection equipment (if cans are chosen that are compatible with this equipment).	Customers have a limited incentive to reduce waste. Since residents are usually charged on a subscription basis, there is no incentive not to fill cans already purchased. In addition, no savings are possible below the smallest size trash can.	Seattle, WA
If residents already own trash cans of roughly uniform volume, new cans might not be required.	Relatively complex billing systems are needed to track residents' selected subscription level and bill accordingly.	Anaheim, CA
Cans may be labeled with addresses to assist in enforcement.	Complex storage, inventory, and distribution systems are required to provide new cans to households that change their subscription level.	King County, WA (in unincorporated areas)
Cans prevent animals from scattering the waste.	A method of collecting and charging for waste beyond subscription levels and for bulk waste collections needs to be established.	Marion County, OR
	At the outset, residents may find it difficult or confusing to select a subscription level.	Pasadena, CA
	Nonautomated can collections tend to require greater time and effort than collecting waste in bags.	Glendale, CA
		Oakland, CA
		Bellevue, WA
		Santa Monica, CA
		Duluth, MN
		Richmond, CA
		Walnut Creek, CA
		Santa Clara, CA
		Auburn, WA
		Hastings, MN

Table 3-2 (continued).
Advantages and Disadvantages of Unit Pricing Container Systems

	Advantages	Disadvantages	Communities Using This System
Bag Systems	Residents find bag systems easy to understand. Bag systems might offer a stronger waste reduction incentive than can systems because fees typically are based on smaller increments of waste. Accounting costs are lower than with can systems, since no billing system is needed. Bag systems have lower distribution, storage, and inventory costs than can systems when bags are sold at local retail establishments and municipal offices. Bag collections tend to be faster and more efficient than nonautomated can collections. Bags can be used to indicate that the proper fees have been paid for bulky items or white goods, since fees for pickup of these items (above the subscription level) often are assessed by communities. Communities can ask residents to attach a certain number of bags to the items according to the cost of disposal (for example, two bags for a couch and three bags for a washing machine).	Greater revenue uncertainty than with can-based systems, since the number of bags residents purchase can fluctuate significantly. If bags are sold in municipal offices, extra staff time be will need to be committed. Residents might view a requirement to buy and store bags as an inconvenience. Bags are more expensive than tags or stickers. Bags often are incompatible with automated or semiautomated collection equipment. Animals can tear bags and scatter trash, or bags can tear during lifting. Unlike cans, bags are not reused, adding to the amount of solid waste entering the waste stream.	Grand Rapids, MI Reading, PA Lansing, MI St. Cloud, MN Darien, IL Carlisle, PA Quincy, IL Oregon, WI Fallbrook, CA

Table 3-2 (continued).
Advantages and Disadvantages of Unit Pricing Container Systems

	Advantages	Disadvantages	Communities Using This System
Tag or Sticker Systems	Tag and sticker systems are easier and less expensive to implement than can systems. Residents often find tag or sticker systems easier to understand. These systems offer a stronger waste reduction incentive than can systems because fees are based on smaller increments of waste. Accounting costs are lower than with can systems, since no billing system is needed. Selling tags or stickers at local retail establishments and municipal offices offers lower distribution, storage, and inventory costs than can systems. The cost of producing tags or stickers for sale to residents is lower than for bags. Stickers can be used to indicate payment for bulky items or white goods, since fees for pickup of these items (above the subscription level) often are assessed by communities.	There is greater revenue uncertainty than with can-based systems, since the number of tags or stickers residents purchase can fluctuate significantly. To avoid confusion among residents, the municipality must establish and clearly communicate the size limits allowable for each sticker. If tags or stickers are sold in municipal offices, extra staff time will need to be committed. Residents might view a requirement to buy and store stickers or tags as an inconvenience. Tags and stickers often do not adhere in rainy or cold weather. Extra time might be needed at curb for collectors to enforce size limits. In addition, there may be no incentive for strict enforcement if haulers are paid based on the amount of waste collected. Stickers left on trash at curbside could be removed by vandals or by other residents hoping to avoid paying for waste services. Tags and stickers are not as noticeable as bags or other prepaid indicators.	Tompkins County, NY Aurora, IL Grand Rapids, MI Lansing, MI

Putting the Blocks Together

Now that you have identified the components of unit pricing programs in general, you are ready to design a program that meets your community's specific needs and goals. "Putting the Blocks Together" presents a six-step process that can assist you in designing and evaluating your preliminary rate structure. This process should begin approximately six months before the start of your program.

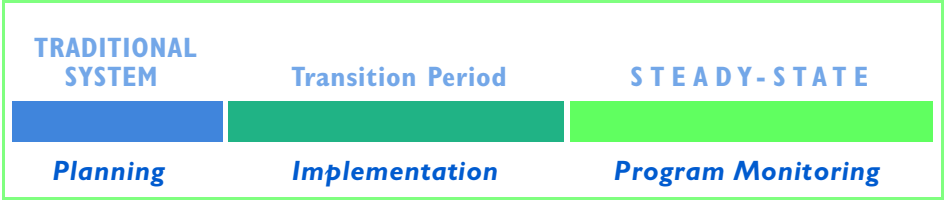
Performing the Six-Step Process...

As you are completing these steps, be sure to keep a few basic objectives in mind:

- Raise sufficient revenues to cover fixed costs and variable costs.
- Possibly raise revenues beyond the cost of the program to cover other waste management costs. These revenues might be used for antilittering campaigns or to discourage illegal dumping.
- Send clear price signals to citizens to encourage waste reduction.
- Charge appropriate fees to cover the costs of 1) recycling and other complementary programs, 2) providing services (such as backyard collection) for physically limited or disabled people, and 3) any discount pricing provided to low-income households.
- Compile accurate MSW baseline data to be used when evaluating your unit pricing program.
- Design a program simple enough to keep administrative costs low and to make it easy for people to participate in the program, thereby reducing both their waste generation and their waste collection bill.
- Also, don't forget to consider your unit pricing goals, community-specific conditions, and the most promising suggestions from municipalities with existing unit pricing programs to ensure a program tailored to the waste management needs and concerns of your community.

1 STEP Demand: Estimate Total Amount of Waste Generated in the "Steady-State"

Because the amount of waste your community generates affects the level of resources (including trucks, labor, and administrative support) required to manage it, you need to accurately estimate what the community's waste generation rate will be after your unit pricing program is fully established. This period is referred to as the "steady-state." In the steady-state, residents have accepted unit pricing and reduced their waste generation rates accordingly, and the municipality's waste management operations have adjusted to new, lower waste collection requirements.



Ensuring that the revenues received under the unit pricing program will cover the program's costs is a critical factor for most communities. As a result, accurately estimating the amount of waste collected in the steady-state is an important first step in determining how much money unit pricing will actually generate. To develop such an estimate, perform the following calculations:

- **Current demand.** Using your waste hauling records, estimate the amount of waste collected from residents last year.

- **Community growth.** Next, estimate the population growth trends and other demographic patterns in your community. Use this information to estimate the demand for waste management services over the next one or two years. This information can be developed in several ways; the box entitled "Forecasting Community Growth Trends" on page 31 discusses some different approaches. (Note: If you are planning special programs for low-income, elderly, or multi-family households, you should estimate the population trends of these residents or households as well.)

- **Impact of unit pricing.** Then, estimate the likely impact (i.e., household responsiveness) of unit pricing on this demand for waste services. Other communities with unit pricing programs in place might be a good source of information on the degree of waste generation reduction to be expected. Some communities have achieved 25 to 45 percent reductions in waste generation rates, depending on such factors as the use of complementary programs, the design of the unit pricing rate structure, and the effectiveness of the public education effort. Be sure not to underestimate the potential success of your unit pricing program, especially if strong public education and complementary programs are planned. Underestimating waste reduction will cause you to overestimate potential revenues.

Use this information on current demand, community growth, and the impact of unit pricing to estimate the total amount of solid waste you expect will be generated once the unit pricing program has been established.

Forecasting Community Growth Trends

Forecasting trends in the growth of a community's population is an important step in accurately estimating the amount of waste generated under an ongoing unit pricing program. Typically, the degree of sophistication a community brings to this process will vary with the information and resources available.

For example, if your community is small and you expect no change in population trends, per capita waste generation, and commercial or industrial growth, you could use a simple trend analysis to forecast growth. Your estimation of current waste generation amounts might be based on a waste characterization assessment, historical records from collection services and disposal facilities, or estimates based on similar communities' analyses. Extending these trends can provide an estimate of future demand for solid waste services. If you base your estimates on other communities' analyses, be sure to choose communities that are similar to yours in size, population, income distribution, urban/rural distribution, and economic base. In addition, using the most recent analyses available will increase the accuracy of your estimation.

In contrast, if your community is large and you expect a change in current trends, you probably will need to use a sophisticated forecasting equation that will account for all the variables you identify. Your solid waste agency may have collected data on a number of factors that previously have influenced the amount of waste generated by the community (such as housing construction, plant closings, household income, economic growth, and age distribution of the population). You could base projections of future demand for solid waste services by introducing these data into your

2 STEP Services: Determine the Components of Your Unit Pricing Program

After clarifying your community's goals and considering the pros and cons of the unit pricing program options described earlier in this section of the guide, you will be ready to determine the methods your solid waste agency will use to collect waste from residents and other details of your unit pricing program, including:

- **Containers.** After considering their practical implications, decide whether your unit pricing program would be most effective using cans, bags, tags or stickers, or some type of hybrid system. Determine the volume of the containers to be used.

- **Service Options.** While most unit pricing programs will include curbside collections, decide whether your program would benefit from such additional services as backyard collections and picking up bulky items such as white goods.

- **Complementary waste management programs.** If your community is not already operating programs like recycling or composting, consider whether you might implement them to enhance the effectiveness of your unit pricing program and to help meet other community goals.

- **Residents of multi-family buildings and low-income residents.** Determine how your community plans to extend the economic benefits of unit pricing to residents of multi-family buildings and deal with the needs of low-income residents and the elderly.

3 STEP Costs: Estimate the Costs of Your Unit Pricing Program

Having determined the structure of your program and the services to include, list all associated costs. Categories of costs can include:

- **Start-up costs.** Estimate the one-time costs your community will incur when implementing the unit pricing program, such as training personnel, purchasing new containers, and designing and implementing a new billing process.

- **Ongoing costs.** Estimate the costs your program will incur on an ongoing basis. These costs include variable costs (such as landfill tipping fees) and more stable or fixed costs (including rent and utilities for agency offices and office supplies) that remain relatively constant despite fluctuations in the amount of waste collected. Be sure to consider any extra costs from providing special services to certain groups. (Some communities might find it useful to employ full cost accounting procedures to better understand the exact costs of the different projects planned as part of the unit pricing program.)

4 STEP Rates: Develop a Tentative Unit Pricing Rate Structure

Having determined the components of your program, you can now set a tentative rate structure. At this point, the rates should be considered merely rough estimates to be revised and refined in light of the overall revenues they will generate and how acceptable the costs will be to residents. The rates you start with can be borrowed from the figures used by neighboring unit pricing communities offering similar services or adapted from price ranges found nationally. As you work through the remaining steps in the process of setting a rate structure, you can determine whether the rates are appropriate and make adjustments accordingly. Be sure to specify any lower rates that you plan to make available to some portions of your community (such as discounts for low-income households).

5 STEP Revenues: Calculate the Revenues From Unit Pricing

You now have the information needed to estimate the revenues that your unit pricing program will generate once it has been established and residents have adjusted their waste generation rates accordingly. Divide the total amount of waste generated per month in the steady-state (estimated in Step 1) by the volume of containers, such as bags or cans, you established in Step 2. This provides an estimate of the number of containers of solid waste you expect to collect per month. Then multiply the estimated number of containers by the unit charge you have tentatively established in Step 4. This yields an estimate of the total revenues per month generated under unit pricing.

Depending on the number of services offered and the unit pricing structure itself, these calculations can be simple or complex! For example, communities using cans of varying sizes and offering additional services (such as backyard waste collection) must estimate the revenues produced by each component of their solid waste program. In addition, if low-income households are subsidized under your program, be sure to calculate the size of the subsidies and subtract from the expected revenues.

6 STEP Balance: Evaluate and Adjust Your Preliminary Unit Pricing Program

For most communities, comparing the anticipated costs of their unit pricing program (Step 3) against expected revenues (Step 5) will provide the critical indication of whether the program is viable. (It is important in this step to be able to rely on accurate baseline data for gauging the viability of your program.) If this comparison indicates that the costs of your unit pricing program might not be fully covered by its revenues, you need to review both the design of the program (Step 2) and the rates you plan to charge (Step 4). Several revisions of program options and rate structures may be required to achieve a unit pricing program that most closely meets the goals established by the community in the planning phase (see Part II).

Once you feel that your program strikes a working balance between costs incurred for services provided and the prices residents will be charged, it might be appropriate to submit the program design to other municipal officials or community leaders for additional input. This process of review and comment can continue until a balanced program agreed upon by community representatives has been established.

The Six Steps in Action: Designing a Rate Structure for Community A

To illustrate the steps in action, we will follow Community A, a hypothetical town, as it designs a rate structure for its new unit pricing program based on its own particular goals and concerns.

Estimating waste generation rates. Community A's records show that it collected 480,000 cubic yards of solid waste from its residents last year. Municipal officials realize that the population of the town is likely to increase next year after a large multi-use building complex is completed. Based on population projections prepared by town planners, officials estimate that, at the current rate, residents will generate nearly 600,000 cubic yards of solid waste annually two years from now. Within this two-year period, however, officials hope their unit pricing program will have reached its steady-state and residents will be generating less waste. Using data from three nearby, demographically similar towns that have established unit pricing programs, municipal officials estimate that two years after implementation of the unit pricing program the community will generate about 410,000 cubic yards of waste annually.

Establishing rates. At this stage in the design process, municipal officials in Community A decide to use the median rate of the prices charged by other communities across the country ($1.75 per 30-gallon bag). In addition, this rate is very close to the price adopted by the three nearby unit pricing communities for their 30-gallon containers.

Calculating revenues. Dividing the annual amount of solid waste Community A expects to generate in the steady-state (410,000 cubic yards) by the size of their waste container (30 gallons or 0.15 cubic yards) shows that the municipality can expect to collect over 2,733,000 bags each year. By multiplying this figure by the price per bag ($1.75), officials calculated that Community A should receive about $4,780,000 in revenues from its unit pricing program each year.

Calculating costs. Community A estimates that the annual steady-state cost of its program will include approximately $1,000,000 in fixed costs, such as public education efforts, computers and other office materials, and enforcement efforts, and approximately $2,700,000 in tipping fees and other variable costs. Combining these figures produces an annual steady-state cost of approximately $3,700,000 for the program. Additional start-up expenses also would be incurred.

Comparing costs and revenues. While recognizing that their program must cover the town's waste management costs completely, officials in Community A agreed the town should cover any start-up costs that exceeded revenues during the initial transition period. Therefore, when a comparison of the expected revenues against the costs of the unit pricing program showed that the program would generate excess revenues, municipal officials decided to lower the price charged per bag to $1.35. This new price would yield a projected $3,690,000 annually, closer to the town's actual costs of maintaining the program.

Balancing Costs and Revenues

Costs

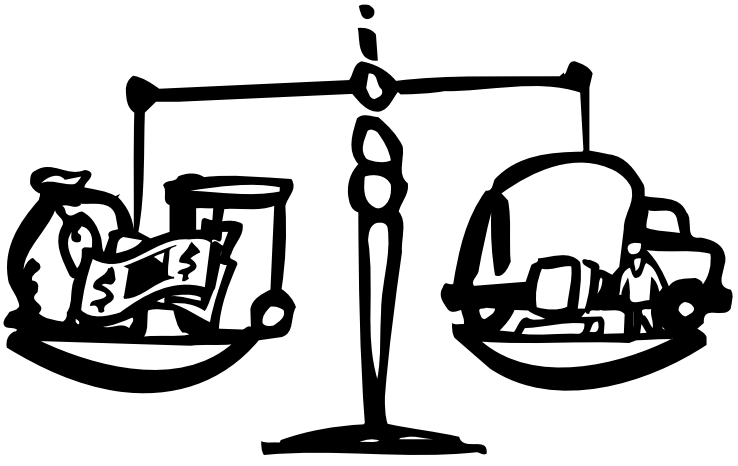
A community can select from an impressive array of service options when mapping out a unit pricing program. After estimating the demand for services in STEP 1, communities can plan for the services they will offer in STEP 2. Some communities will want to offer services such as backyard collections, comprehensive recycling programs, and assistance to residents with special needs. Bear in mind, however, that while these projects can help promote source reduction and increase citizen enthusiasm, they also can increase the cost of your program significantly. Use STEP 3 to help estimate the costs of the services you are planning to offer.

Revenues

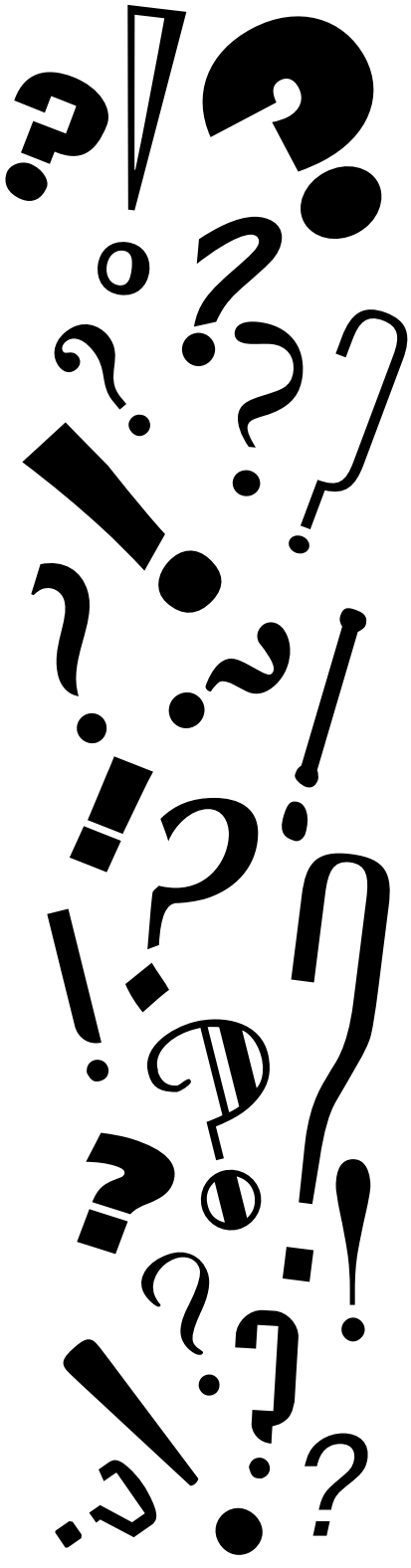
The flip side of costs is revenues. Unit pricing allows communities to generate the revenues needed to pay for solid waste management services under the new program. In fact, when developing a rate structure in STEP 4 and calculating the resulting revenues in STEP 5, communities might decide to set prices at a level above the cost of their unit pricing program. This would further encourage source reduction among residents and ensure that revenues could cover any shortfalls. Since residents will only support a program they feel charges a fair price for solid waste services, however, there are limits to this strategy.

Balance

To be successful over the long term, your unit pricing program will need to carefully balance the services you want to include against the revenues that residents provide. The exact formula will depend upon local conditions. Use STEP 6 to help you compare the costs of your planned program against anticipated revenues. Keep revising your rate structure until you feel that you have a program that offers the services you need at a price residents can support.



questions & answers



How small should our smallest can or bag be?

Unit pricing communities agree that planning for success is important during the design process. Some communities have found that cans as small as 10 to 20 gallons are needed! For example, Olympia, Washington, offers residents a 10-gallon can and Victoria, British Columbia, uses a 22-gallon can as the base service level. A number of communities using large containers (such as 60-gallon cans) are finding that these containers are too large to offer customers meaningful incentives, but purchasing and delivering new, smaller cans later in the program is very expensive. In the short run, a broader range of service can be provided by using several smaller cans. This also helps keep the system flexible for future changes.

What pricing rates are communities charging?

For bag systems in the Midwest and Pennsylvania, communities charge about $1 to $2 per 30-gallon bag. For variable can programs in the Northwest and California, towns charge $9 to $15 for the first level of service (20 to 40 gallons), with charges for additional cans of service ranging from 30¢ to $15.

We have an existing variable rate can program. How can we increase the incentive for waste reduction?

The key change to make is to base your billing on actual set-outs rather than using a subscription approach. Offer smaller cans to encourage waste reduction, and consider a bag-based system. Upgrading composting and recycling options (including plastics collection, for example, if you don't already) also will provide an incentive for customers to reduce waste. Communities also universally state that education is critical to helping customers understand and work with the system. Finally, consider a weight-based program. You might find that the cost of implementing this type of program is not prohibitive and that it can work in tandem with your existing cans.

How can we improve source separation of recyclable materials?

Some residents may tend to be sloppy about source separation regardless of the type of solid waste pricing system. As people learn to reduce their costs by recycling more, however, they may become more inclined to introduce nonrecyclables in their recycling bins. Many communities have found the best solution is a good education and enforcement program that creates a sense of ownership among residents, supported by peer pressure against such behavior. Some also impose a small charge for recyclable materials in their rate structure design.

Points to **remember**

Remember that container options, complementary programs, rate structures, and billing systems are all **interrelated.** As you consider the different options, keep in mind the need to cover costs, keep the system simple and convenient, encourage waste reduction, and minimize administrative burdens on your agency.

Tradeoffs must be considered as you make decisions about rate structures and program options. **Balance,** for example, the need to generate revenues against providing incentives for waste reduction.

Consider **complementary programs,** such as recycling and collection of yard trimmings, to increase the effectiveness of unit pricing.

Consider how to ensure that unit pricing's economic incentives to reduce waste can be extended to residents of multi-family housing in your community.

Design your program to be flexible enough to allow for groups with **special needs.** Discount pricing or assistance programs might be necessary to ensure that the program encourages waste reduction without imposing physical or financial burdens on handicapped or low-income members of your community.

Refer back to your **unit pricing goals** when making rate structure decisions. While information from other communities with unit pricing programs is helpful, your own community's solid waste concerns should be the overriding factor.

Case Studies

Establishing a Rate Structure
A View From Seattle

Unit pricing structure. Seattle has established a two-tiered, variable subscription can unit pricing program. To ensure support for the program from our City Council and residents in general, we needed to design a program that keeps rates low and revenues stable. To accomplish this, Seattle chose to adopt a two-tiered rate structure. The mandatory base charge (called a minimum charge) is $5.85 a month. We also charge $15 for each standard size (30-gallon) can per week. The Council pushed for this structure, believing it would keep overall rates down and send a strong environmental message to the community at the same time. There tends to be broad support for the single price per can.

We also have introduced smaller can sizes. About 30 percent of our customers use minicans (19-gallon capacity), which cost $11.50 per week, and we soon will be providing microcan service (a 10-gallon container) for $9.35 per week. After talking with customers and observing their waste disposal habits, we found a lot of customers could fit their waste into a micro can. We expect about 10 percent of all customers to use the micro cans.

Complementary services. After electing to collect yard trimmings as part of our program, we decided to set a flat fee of $3 per household per month for this service, believing that a more complicated system would only make the program's administration prohibitively costly. We offer bulky item pick-up for $25 per item. The price was set to cover hauling and administrative costs.

For waste that is generated above the subscription level, residents must attach a trash tag, marketed through local retail outlets, to garbage bags. The trash tag system has been one of our less successful programs, partly because customers just don't know about it. In addition, our haulers do not always enforce the tag system. Since they get paid per ton of waste they pick up, they have no incentive to leave the waste at the curb. We estimate we forfeit anywhere from $500,000 to $1 million dollars a year on fees not paid on this additional waste.

Tags and Stickers
A View From Illinois

One of the major advantages of tags and stickers is that, since residents pay for them at various outlets in the community, there is no billing at all. They also are applicable to different types of services, containers, and waste, and they are easy to purchase and hold on to until needed. Multiple tags or stickers can be used on bulky waste items, too.

Tags and stickers also are easy for collection personnel to use. Since every second they spend at a stop costs money, the more data collection or enforcement that a community

requires haulers to perform per stop, the less likely they are to do it. In addition, the tags and stickers are still useful even in cases where collection personnel can't read or write.

But tags and stickers are not perfect. The hauler might not be able to find them. People can steal them off other residents' garbage bags and put them on their own bags. A special problem for stickers is that they can fall off in rainy or cold weather. Furthermore, people may buy a large number of tags in January, and then none for the next several months. Not only does this create an uncertain revenue supply, it also makes predicting solid waste volume very difficult.

Experience With Weight-Based Systems

A View From Farmington, Minnesota, and Seattle, Washington

In **Farmington, Minnesota,** we worked for two years to develop and implement a weight-based unit pricing program for our town of 5,000 residents. Our new system uses fully automated trucks that require just one person per truck to hoist and weigh the garbage can. The truck's weighing system reads a bar code on the can that identifies the resident's name and address. The truck then empties the can and the information is fed automatically into the billing system through an onboard computer. This provides a reliable system for charging residents for waste collection by weight.

One issue we have to resolve is establishing an appropriate regulation for the weighing mechanism used in our system. After Minnesota's Weights and Measures Agency decided it did not have the authority to verify the scales on the trucks, the state legislature adopted standardized weight and measure legislation establishing regulations covering weighing equipment for garbage collection trucks. One issue that remains, however, is that the degree of calibration required is too precise (the same as that for grocery store scales). We are now in the process of petitioning for changes to make the regulation more consistent with practical needs.

In **Seattle, Washington,** we tested two different weight-based systems: a hand-dumped weight-based system and a semi-automated weight-based system. The hand dump system, designed around a "hook scale" and a bar code, was tested over the course of three months. The collector hung the can on the hook and used a scanner on the bar code. The weight and number were recorded in a portable calculator-sized computer and downloaded to a personal computer for calculating and mailing mock bills to customers. The second system we tested during a six-week trial used a retrofitted semiautomated tipping arm and a radio-frequency tag. The weight and customer identification number were automatically recorded during the dumping cycle. Both approaches worked extremely well. The first system took about 10 percent longer for collection; the second system operated exactly as the standard semiautomated variable can system and took no extra time. Surveys of customers participating in the hand-dump system trial showed that it was very popular. Participating residents reduced waste 15 percent by weight over the course of the testing.

In our research, we found that with the weight-based system, there are advantages to customers buying their own containers. The cost is lower and, if the garbage is hand-dumped, you do not need standardized containers. Under a semiautomated system, however, you might have to require customers to buy specific containers.

PART IV

Implementing and Monitoring Unit Pricing

Having carefully planned and designed a unit pricing program that best reflects the needs and concerns of your community, you can now get started. Implementing a unit pricing program is an ongoing process, requiring persistent attention to a wide range of details. This part of the guide focuses on the central issues concerning unit pricing implementation, including public education, accounting, and administrative changes. Suggestions also are included for collecting data and monitoring the program once it is in place.

There are two distinct schools of thought about the timing of unit pricing implementation. One maintains that unit pricing should be implemented within a specified time frame and that rate adjustments, complementary programs such as recycling, and any other changes be made all at once. The other believes that households respond better when they are asked to make changes in small, manageable increments over time.

The final decision about which path to follow is a local one based on the views of your agency, the local government, community organizations, and the households themselves. In most towns, residents will prefer to modify their habits as infrequently as possible. In this case, it might be easiest to implement a package of changes all at once, rather than ask for a series of adjustments six months apart.

Implementation Activities

Many tasks need to be performed during unit pricing implementation. While the exact activities vary from community to community based on program design and local conditions, certain tasks pertain to nearly all unit pricing programs. These include conducting public relations and reorganizing your solid waste agency's administrative office. (Both of these activities are discussed in detail below.) Other common tasks include:

- **Establishing legal authority.** Generally, to implement a unit pricing program, your solid waste agency needs the authority to set and approve waste collection rates and bill accordingly, establish an ordinance mandating the use of the waste collection service, establish penalties for illegal dumping, and spend solid waste agency funds for activities beyond those associated with traditional solid waste management services (for example, public education). If your community lacks the authority to implement and enforce any portion of the unit pricing program, the first step will be to draft the necessary ordinances in consultation with your legal counsel.
- **Procuring containers.** You also will need to purchase the necessary waste containers, bags, tags, or stickers for the program. Once the size and design specifications are established, you can seek vendors for the required materials. In some cases, a request for proposal (RFP) might be placed to solicit competing bids from several vendors. This can help you procure the necessary materials at the least cost to your agency. After a vendor is selected and an order placed, storage and distribution plans will be needed. In particular, communities planning to use local retailers to distribute bags, tags, or stickers should identify and negotiate with local merchants to arrive at a mutually beneficial arrangement. Communities developing a can-based system will need to inform residents of the can options, have residents select the number and size of cans they will use (if a variable can system is used), and distribute the cans to all residents.
- **Assisting groups with special needs.** If your community is planning to assist residents with special needs, such as multi-family, low-income, physically handicapped, or elderly residents, you will need to develop a list of qualification criteria. In addition, you might need to devise special applications and train staff to review cases. Procedures should be established for resolving any disputes or complaints that could occur during the review process. If you are planning to include multi-family residents in your program, consider planning and conducting a pilot program before you switch to unit pricing. In this way, different systems and technologies can be tested prior to launching the actual program.

- **Establishing complementary programs.** If you have decided to launch or expand recycling or composting efforts, bulky waste collections, or other complementary programs in conjunction with your unit pricing program, you will need to coordinate the many steps involved in establishing these programs. Depending on the resources available and on local conditions, these steps could include purchasing or modifying existing equipment, hiring and training collection staff, identifying local markets for recyclables, and contracting with buyers.

- **Ensuring enforcement.** Enforcement procedures could be established to address the possibility of illegal dumping or burning of waste, "borrowing" of tags or stickers from neighbors' bags, or nonpayment of fees. If necessary, enforcement staff can be hired and procedures developed for investigating incidents. In many cases, these inspectors will need to receive training, equipment, and facilities. Establishing special collections for certain wastes (such as bulky items or materials such as paints, pesticides, and other items considered household hazardous waste), combined with fines for violations, can help prevent illegal dumping or burning. Also, to help instill an environmental ethic in the community which can further reduce the potential for illegal dumping, consider establishing regular citizen cleanups, "adopt-a-highway" projects, and other programs that will gather residents together and focus their interest on maintaining and improving their community.

To ensure a successful recycling program, team members will need to coordinate carefully the collection and marketing of recovered materials.

Public Education and Outreach

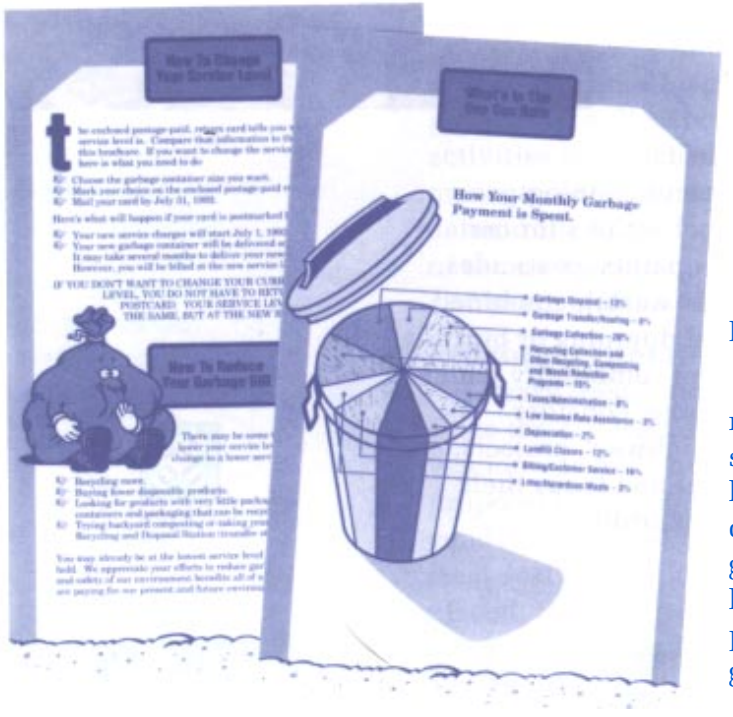
As discussed in Part II, public outreach during the planning and design stages enables decision-makers to learn more about residents' waste management needs, to inform them of the benefits of unit pricing, to solicit input on the goals of a unit pricing program, and to get feedback on a tentative rate structure. Such efforts are essential for building support among residents for unit pricing.

During the implementation phase, the public outreach program should have two goals: 1) to build on earlier efforts to increase public acceptance of unit pricing and 2) to provide residents with the detailed information they need to understand and participate in the new program. Participants at EPA's Unit Pricing Roundtable agreed that well-informed residents are easier to serve and more likely to be satisfied with the new program. Building public support and providing program specifics typically begins approximately three months before program implementation. These activities are often continued in varying degrees throughout the program.

The first step is to determine the scope and content of your community relations effort. All such efforts need to convey to residents the exact structure of the new unit pricing program. Be sure to relate all essential information, including:

- The types and costs of all services offered under the new program.
- The schedule for collections.
- The means by which fees will be collected.
- The methods or outlets for purchasing cans, bags, tags, or stickers.
- The penalties for noncompliance.

When imparting this information to the community, make sure that all instructions are clear and simple. Explain any unit pricing concepts that residents might not understand. If you are producing written materials, consider translating the text into more than one language, depending on the makeup of your community. Use illustrations whenever possible to convey key concepts. Sometimes local copying shops or printers will donate their services to help produce these materials.



As part of its public outreach program, Seattle's Solid Waste Utility is conveying important information about unit pricing using a series of engaging pamphlets.

Also, be sure to discuss the waste management goals for the community and show how the new unit pricing program will help meet those goals. If you had organized a citizens advisory council or an informal gathering of community or civic groups to help you with public outreach during the planning stage, you might reconvene this group to plan your implementation outreach efforts. Such a group can help you develop an effective message and ensure that you reach all segments of the community.

Offer citizens information on how to alter their purchasing and behavior patterns to prevent and reduce waste. Tips on waste prevention options, such as reusing containers, renting seldom-used equipment, and donating unwanted items, are useful. Encouraging residents to purchase recyclable items and goods with recycled content also is important. In addition, the message is likely to have a greater impact if information on additional benefits, such as saving energy and preserving natural resources, is provided. If residents make the program's goals their goals too, they are more likely to make long-term behavioral changes.

There are many ways to convey the specifics of the program to the community. While the solid waste agency will need to decide which methods to use and how often to repeat the message, some avenues to consider include:

- Introducing the program with a flyer or letter from a local official or recycling coordinator.
- Enclosing inserts in utility bills that discuss the program and answer common questions. Direct mailings to households also can be used.
- Developing posters or flyers for distribution in stores, libraries, schools, and other public places around the community. Retail stores will be especially valuable if your program uses bags, tags, or stickers that are distributed though retail outlets. You can leave flyers, posters, newsletters, and other materials with these stores, and ensure that the retailers themselves are familiar with the program.
- Producing newsletters that discuss the need for the program, answer questions, and provide updates about the program's progress.
- Establishing a telephone hotline to provide residents with immediate answers to their questions.

Drafting press releases and developing media spots for radio or cable television. Through the media, you can reach a broad range of residents.

Additional outreach techniques can be employed based on your community's particular conditions. For example, if you feel that a specific group of residents, such as senior citizens, are not receiving enough information to participate effectively, you might consider reaching out to senior centers, local churches, and other institutions to ensure that everyone is familiar with unit pricing.

Some solid waste agencies opt to conduct public education campaigns using existing inhouse staff. Others hire one or more qualified individuals to conduct these activities or pay outside consultants to perform public outreach. This decision is typically based on the size of your community, the scope of your program, and the available resources.

Keep in mind that public outreach is an ongoing process. A consistent flow of information, designed to answer questions, receive input, and communicate any changes made to the program after it has been implemented, will help maintain interest in the program. In addition, an ongoing campaign can continue to inform and educate citizens about new ways to prevent or reduce waste.

Reorganizing Your Solid Waste Agency's Administration

Depending on their current structure and the scope of the new unit pricing program, some solid waste agencies will not have to make significant changes in the way they administer solid waste collection services. Such communities can switch to unit pricing using only some overtime work from existing employees. Other programs, however, could require new administrative and accounting systems and staff to handle the changes in billing, tracking costs and revenues, managing operations, and maintaining customer relations. In some cases, larger communities planning more complicated unit pricing systems have found it worthwhile to hire analytical, financial, and customer service staff to handle both the transition and ongoing requirements of the program.

Getting Your New Administrative Office On Line

The keys to transforming your solid waste agency's administration into an efficient team capable of handling its new responsibilities are:

- Anticipating the level of expertise that will be necessary, both during program implementation and ongoing operation.
- Giving funding priority to areas that hold the greatest opportunity for savings or pose the greatest risk of financial problems.
- Meeting temporary needs during the transition with temporary help, rather than locking into a level of employment that proves excessive in the long run.

While the process of reorganizing an administrative system for a new unit pricing program can seem daunting, performing the switch as a series of steps with clear objectives in mind will help make the process manageable. Generally, communities with unit pricing programs have found that the process of reorganizing the administrative office should take place between three and six months before the start of the program.

The first step is to define the new responsibilities the administrative office must assume once the program has reached its steady state, as described in Part III. Consider all the functions, such as public relations, customer service, economic analysis, financial management and tracking, and enforcement, that the office will need to perform. With steady-state as the goal, try to create a new office that matches these needs rather than accommodate your goals to the skills that are available. After establishing

the functions and related skills required of your new administrative office, you should then begin to reorganize the office to meet these responsibilities.

During the process of defining new responsibilities, remember that the unit pricing program will change the administrative office's functions significantly. The office will be operating a revenue recovery system that pays for the work of the solid waste agency, rather than justifying funding levels to the municipality's budget office. The office will find it has an unprecedented level of influence on customers' behavior through the price signals it sends. This brings additional responsibility for the proper design and management of these price signals. Managing these new functions requires the office to have access to a range of skills, including:

COSTS

- **Economics.** Developing the unit pricing rate structure and related forecasts of revenues, costs, and total community use of waste collection, recycling, and composting programs.
- **Public relations.** Developing outreach and education activities and managing customer service representatives. This function includes interaction with the general public, as well as local interest groups, elected officials, and the news media.
- **Financial and logistical management.** Billing households or collecting revenues from the sale of bags, tags, or stickers; developing debt management strategies; managing cash reserves; and developing a distribution system for the program's cans, bags, tags, or stickers.
- **Enforcement.** Ensuring that households pay for the level of solid waste services they receive.

In addition, several important suggestions were offered during EPA's Unit Pricing Roundtable for organizing your administrative office's financial operations. Be sure to establish access to a cash reserve to help the office cover periods of unanticipated revenue reductions. Repeated instances of revenue shortfalls, however, could signal an imbalance between the services offered and your program's rate structure.

HIERARCHY

Preparing existing administrative staff for the changes that will result from the switch to unit pricing is another important step. While the change initially might not be viewed positively by all employees, conveying the positive aspects of the switch might help ease concerns. In addition to the reorientation of the office away from traditional collection and disposal services to a new emphasis on waste prevention, recycling, and composting, employees should be informed of the opportunities for staff training and development in new areas, such as public relations and customer service, that the new program will create.

TRADEOFFS

Furthermore, when organizing the new office, communities should be aware that expanding the administrative office requires a delicate balancing of resources: while allocating too much funding to the office could cut into the savings that unit pricing programs offer, underfunding the office can result in inefficiencies and poor revenue recovery. This is

particularly true during the implementation and transition periods, before the unit pricing steady-state has been reached. During this period, using temporary labor or employees on loan from other municipal agencies might help to cover short-term budgeting, analytical, and other tasks.

Developing a Schedule

Organizing the many steps involved in planning, designing, and implementing a unit pricing program into a clear schedule is an essential step for most communities. While the exact schedule of steps should be viewed as flexible, establishing an overview of the entire process will help eliminate the possibility of any serious omissions. Table 4-1 presents a detailed timeline for your reference. (The dates listed on the timeline represent the number of months before or after program implementation each step should be initiated. Program implementation is defined as the date on which actual service changes begin.)

While the dates have been established based on the experiences of a number of communities with unit pricing programs in place, local conditions and needs will inevitably affect the exact timing of your program's development. Many factors affect how you adapt this timeline to your community's needs, including equipment changes, contractual changes, financing requirements, and employment, as well as political factors (such as the nature and structure of the local political process and the potential existence of a perceived solid waste crisis). In most cases, the level of political support is the most important variable, routinely cited by communities as responsible for either significant delays or rapid progress in the implementation of their unit pricing programs. Most of the remaining steps can be conducted fairly routinely in 3 to 12 months, depending on system choices, size of the community, and types of solid waste collection and administration systems in place.

Program Monitoring and Evaluation

As solid waste management has grown more challenging in recent years, local officials are finding that they have greater freedom to develop and implement new systems for managing waste. At the same time, however, their efforts also are subject to a higher level of scrutiny. Within the context of tightening municipal budgets and increasing demands for city services of all types, local officials must be able to discuss budget needs and priorities in a compelling way, using reliable data to support their case. Specifically, a thorough process of collecting and analyzing data about the performance of the unit pricing program will:

- Provide the facts about the cost-effectiveness of the unit pricing program that local officials need to justify the current budget.
- Enable planners to justify future budget needs by demonstrating that the new spending on the program could in fact **save** money in the long run.
- Help reassure bond rating agencies of the cost-effectiveness of the unit pricing program, thereby reducing the cost of financing it through bond sales.
- Allow planners to accurately compare the performance of any complementary programs, enabling them to reallocate resources among the programs to increase the overall effectiveness of unit pricing.
- Generate concrete, understandable, and accurate information that can help other communities considering unit pricing.

Collecting and analyzing unit pricing data will help the solid waste agency adjust its program to changing circumstances.

Moreover, this data will enable solid waste agency planners to adjust the unit pricing program to unforeseen circumstances, ensuring that the effort and attention paid to planning, designing, and implementing the program will not be wasted. Typically, program monitoring and evaluation begins about six months before the date of unit pricing implementation, when information on the old waste management system is gathered. These data will act as a benchmark against which the progress of the unit pricing program can be measured. Monitoring and evaluation begins as soon as the new program is launched and continues throughout the program.

Data collection is the first step in program monitoring and evaluation. While the exact types of data a community collects will vary from one area to another, most municipalities track:

- Changes in the community's waste generation rate
- Costs incurred, both in starting up and in operating the new program
- Revenues received under the program

Communities often begin by collecting data on the amount of waste disposed of, recycled, and composted before and after the program's implementation. Estimates of the amount of material illegally dumped can be calculated as well. To allow for a more comprehensive analysis, the waste generation rates can be tracked by month and year, and, if possible, by origin and destination. In addition, the data can be further broken down by facility, customer group (such as residential, multi-family, commercial, or industrial), and program (for example, drop-off versus curbside services). To gain a more accurate picture of the impact of their program, some communities also estimate the amount of waste that would have been generated in the absence of the unit pricing program.

The specific costs that a community might want to research include disposal costs and tipping fees; new administrative costs, including public

COSTS

relations, billing and invoicing, inventory and distribution of bags, tags or cans, and additional customer service staff; and direct program and service costs such as wages, supplies, consultant services, and postage. Costs for monitoring and cleaning up illegal dumping can be included as well.

In addition, to increase the usefulness of cost data, communities might want to attribute different expenses to specific components of unit pricing (such as administrative labor or container costs) and track these separate cost categories by month and year. Be careful, however, to distinguish between short-term expenses and long-term investments for needed facilities and equipment. During this process, take care to separate transition and startup expenses from the ongoing operational costs of unit pricing. If possible, initial capital costs should be allocated over time and across programs. Collecting data on the revenues resulting from unit pricing tends to be simpler. Communities typically track revenues by type of program and customer category.

To closely track a new unit pricing program, communities also might want to develop data on the number of subscribers or participants, broken down into type of service and program; the service and subscription levels (if a variable can program is used); the inventories of bags or tags held by distributors or manufacturers; the weight of containers set out (if possible, through surveys); and the numbers of phone calls and letters and the issues raised.

Program evaluation can yield misleading results, however. To help avoid some common data collection and evaluation mistakes, panelists at EPA's Unit Pricing Roundtable recommended avoiding focusing on participation rates as a measure of success. While a study of participation levels can help guide program modifications, they are not useful for gauging overall progress since they do not address cost issues and tend not to distinguish between casual and committed participants. Likewise, panelists recommended that communities also consider factors beyond overall waste reduction when evaluating a program. For example, intangible issues, such as dissatisfaction with the program among residents of multi-family buildings, would not be reflected in an analysis that focused exclusively on waste reduction numbers.

Tips for Data Collection and Program Monitoring

- Get data from several different angles if possible (for example, waste quantity generation rates for both collection services and disposal facilities).
- Don't simply accept the numbers as they are generated. Consider the possibility that factors such as underlying shifts in categories, definitions, or reporting might affect the accuracy of the results.
- Be sure to carefully track costs. Without accurate and attributable data, the impact of your cost-effectiveness evaluation will be reduced.

Table 4-1.
Schedule of Implementation Activities

Implementation Activities	Months Prior to or Following Program Implementation						
	9	6	3	0	3	6	Ongoing
Customer Relations							
Public outreach							
Brief management and elected officials	X						
Conduct focus groups on rate program design and issues	X	X					
Develop information materials for council and press		X					
Hold council hearings and public hearings		X					
Public relations/education							
Issue RFP for public relations firm, if needed	X						
Design educational materials, bill stuffers		X					
Review/refine educational materials			X				X
Produce educational materials			X				X
Distribute educational materials			X				X
Customer service staff							
Request customer service representative (CSR) computers and workspace, if needed	X						
Advertise for CSRs			X				
Obtain and install CSR computer equipment			X				
Hire and train CSRs			X				
Release temporary CSRs					X		
Planning and Analysis							
Hire rates analyst (part- or full-time)	X						
Determine rate setting procedure and calculate rates		X					
Refine rate structure			X				X

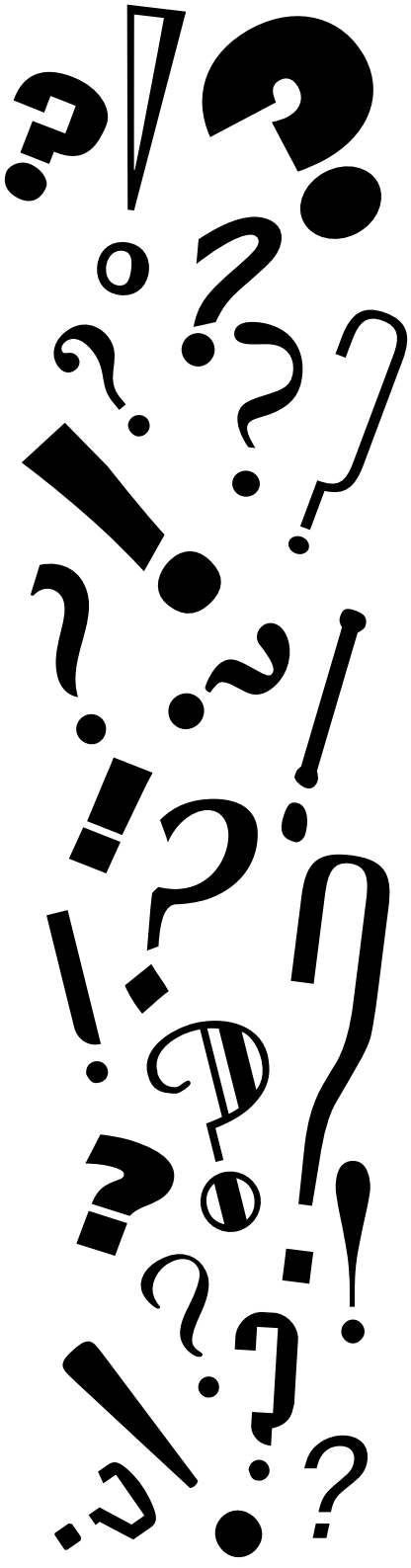
Table 4-1 (continued). Schedule of Implementation Activities

Implementation Activities	Months Prior to or Following Program Implementation						
	9	6	3	0	3	6	Ongoing
Containers and Enforcement							
Bags, tags, or stickers							
Set specifications for sticker or bag and design logo	X						
Issue RFP for sticker or bag manufacture	X						
Select manufacturer		X					
Negotiate with retail outlets for sticker or bag distribution	X						
Finalize sticker or bag distribution plans		X					
Begin selling stickers or bags in stores				X			
Design error tags	X						
Cans							
Issue RFP for can purchase and distribution	X						
Decide on can size and purchase containers		X					
Have residents select can size		X					
Distribute cans			X				
Replace lost, stolen, or wrong-sized cans				X			X
Enforcement							
Establish preliminary enforcement procedures	X						
Request equipment and facilities for inspectors	X						
Finalize enforcement procedures		X					
Train inspectors			X	X			
Release temporary inspectors						X	
Special Groups							
Negotiate with welfare agencies	X						
Develop exemption/discount criteria	X						
Determine responsible office	X						
Create procedures for qualification, disputes, etc.		X					
Finalize criteria and procedures		X					
Train inspectors or qualifiers		X					
Conduct qualifications			X				

Table 4-1 (continued). Schedule of Implementation Activities

Implementation Activities	Months Prior to or Following Program Implementation						
	9	6	3	0	3	6	Ongoing
Multi-Family Planning							
Evaluate level of multi-family need	X						
Evaluate multi-family pilot options	X						
Conduct pilot program, if appropriate		X	X				
Changes to Other Programs							
Determine which complementary services to offer		X					
Decide funding source for new and existing complementary programs		X					
Modify unit pricing program to cover these costs, if necessary			X				
Modify diversion program contracts and procedures as necessary							X
Ordinances							
Draft final ordinances for new program		X					
Draft ordinances, as necessary, for illegal dumping and burning, recycling, and special collections		X					
Enact ordinances			X				
Data Collection							
Analyze information needs and design reporting procedures	X						
Finalize procedures	X						
Conduct baseline data collection		X					X
Begin postimplementation data collection				X			X
Conduct data analysis and program modification					X		X

questions & answers



Is it really necessary to explain the new program repeatedly through so many different avenues?

Not all citizens find garbage fascinating, nor will they immediately understand the reasons for a new waste management program. Explaining a new program more than once is not rude or insulting—it's a courtesy to people who would like to participate but have other things on their minds. Also, because unit pricing requires that residents pay attention to details such as labeling waste containers with stickers or buying bags from the municipality, hearing the message several times increases the chance that all residents will get the information they need.

Does unit pricing require us to completely reinvent our solid waste agency?

It does require a significant review of your agency's goals and structure. But this examination of new needs and existing employees could lead to the discovery of some previously untapped skills in your agency.

Do I really need to follow this detailed timeline? Half the items in it are not likely to come up in our community.

Select what you need from the timeline. The timeline lists the many possible kinds of new activities that a unit pricing program could require. It is designed to help solid waste officials think about specific activities, thereby supplementing the broad concepts that are stressed elsewhere in this guide.

Our municipality is on a tight budget. Do we really need to spend money on data collection and monitoring?

While many of your unit pricing decisions face budgetary constraints, data collection is essential for planning and for ensuring cost-effectiveness. The right kind of information can show which types of unit pricing program and rate modifications can best meet the community's needs over time.

Points to **remember**

Be sure your public education campaign uses a **consistent, simple message** that clearly communicates the goals of the unit pricing program.

To ease the **administrative transition,** clearly define the responsibilities of the office, the level of expertise that will be necessary, and any new staff that need to be brought on.

Give **funding priority** to areas that hold the greatest risk of financial problems or hold the greatest opportunity for savings through effective management of limited administrative budgets.

Establish a **flexible schedule** for your unit pricing program that reflects the political, technical, and economic concerns and issues in your community.

Be sure to **evaluate** your program's progress periodically, including collecting and analyzing data on waste generation rates, costs and revenues, and the attitude of residents toward the program.

To improve your data collection, make **providing numbers** part of the contract (or franchise or license agreement) with your haulers. Ask for monthly reporting, and provide forms and definitions to ensure you receive the information you require.

Case Studies

Public Education

A View From Austin, Texas

While Austin, Texas, is a very environmentally aware community, our Environmental and Conservation Services staff realized that behavior does not always correspond to stated attitudes. To give our new unit pricing program a good chance of success, we realized a strong public outreach program was needed. Since unit pricing terms such as "variable rates" and "volume-based pricing" are not particularly user-friendly, our first challenge was to come up with a name that would convey the nature of the new program to city council members, customers, and our own solid waste service workers. The name we came up with was "Pay-as-You-Throw," which has economic as well as environmental appeal.

Then, we initiated a pilot program beginning with a three-phase marketing plan to reach out to the 3,000 participating single-family households. In the first phase, the Preimplementation Phase, we worked very hard to sell the program in the community. We lined up support from interest groups, asked city council members to talk about the program, and encouraged the media to write positive editorials.

During the second phase, the Implementation Phase, we had a more specific challenge. We have had curbside recycling in Austin since 1982 and good experiences with recycling behavior. With a well-established recycling program, however, when we brought the program to the pilot households, people were asking "Why do we need to do this when we're already recycling?" Our biggest challenge was to inform people about the need to further reduce waste and encourage them to use our unit pricing program in conjunction with recycling. After implementation, we learned from both attitudinal surveys and from direct observation of recycling bins that recycling had increased from 50 to 80 percent in some neighborhoods when unit pricing was introduced.

The third phase of our public outreach program was the Maintenance Phase. Once the program was in place, we realized it was important to continue trying to raise awareness. It was during this phase that we introduced what became our single best educational tool—a brief, colorful newsletter included with each garbage bill. Called "Waste Watch," the newsletter contains features on the garbage collectors, dates of the brush/bulk pickup in each neighborhood, discussions about our unit pricing goals, and other features. We knew that only 15 to 25 percent of our customers read the usual utility inserts. However, after we provided more sophisticated information in an appealing format, our survey results showed a rise in readership.

Administration Staffing

A View From Darien, Illinois

Darien, Illinois, with a population of 21,000, moved from a franchise flat-fee system to a franchise sticker system in May 1990. Their administrative staffing needs were unchanged: one person from the city oversees the activities of the franchise hauler. City council members and existing staff put in overtime to develop details of the new system and negotiate with the hauler during the implementation process. The hauler has reported some increased accounting complexity but no increased staffing needs. Research indicates that this level of small, temporary increases in administrative needs during implementation of a new or revised unit pricing program is typical of many smaller communities.

Administration Staffing

A View From Seattle, Washington

The Seattle Solid Waste Utility, an enterprise fund, operates a variable can subscription system with recycling fees and other charges embedded in the collection rates. Billing is performed in cooperation with the Seattle Water Department at a cost to the Seattle Solid Waste Utility of $1.9 million per year.

To manage this program, the utility employs two rate-setting staff, four finance staff, and three accountants. Another $15,000 to $20,000 per year is spent on consulting services, mostly to assist with setting rates. Additionally, Seattle's 22 full-time customer service representatives and 9 refuse inspectors help to meet the service and enforcement needs of the new program.

APPENDIX A

EPA's Unit Pricing Roundtable Discussion: Questions & Alternatives

This appendix presents a selection of proceedings from EPA's Unit Pricing Roundtable, held in December 1992. These proceedings include descriptions of different programs from around the country, experiences of solid waste officials who have spearheaded unit pricing programs, and ideas on managing program costs and challenges. The discussions provided in this appendix are organized around a number of specific questions and are divided into four general sections:

- *Getting started*
- *Exploring program options, issues, and experiences*
- *Integrating unit pricing and complementary programs*
- *Accommodating groups with special needs*

The first section explores issues involved in starting a unit pricing program, such as education, communication, and changing the status quo. The second section compares the essential components of a unit pricing program, including container choices, pricing models, and billing systems. It then moves on to financial issues, including cash flow and enterprise funds, and discusses enforcement issues. The third section focuses on integrating unit pricing and complementary programs, such as yard trimmings and household hazardous waste collection programs. The last section shares some of the Roundtable proceedings on accommodating groups with special needs, such as senior citizens, large families, and low-income households.

Getting Started

Changing the Status Quo

How do you convince citizens that unit pricing is a good idea in the first place? That has been a real obstacle.

Seattle, WA: *I think getting some good public support by working on it early is very important. Contact not only recycling groups but also community councils, people whom you might not expect to be big advocates of a unit pricing program.*

State of IL: *The public opposition question comes up for communities that currently pay for their garbage collection out of general taxes (e.g., property taxes). In a sense, that's a hidden cost, and people perceive garbage collection as a free service. But if they have a monthly bill (instead of paying through property taxes, for example), they know that garbage collection costs something and there's "no free lunch." Then, in moving to a unit pricing program, they can actually see that the cost of garbage collection comes down. Whereas if the costs are hidden as property tax or general*

Unit Pricing Roundtable Participants

The EPA-sponsored Unit Pricing Roundtable was moderated by Jan Canterbury of the EPA Office of Solid Waste and attended by over a dozen individuals who have been involved in successful unit pricing programs. The participants included:

Nancy Lee Newell of the City of Durham, North Carolina

Peggy Douglas of the City of Knoxville, Tennessee

Barbara Cathey of the City of Pasadena, California

Bill Dunn of the Minnesota Office of Waste Management

Nick Pealy of the Seattle Solid Waste Utility, Washington

Jody Harris of the Maine Waste Management Agency

Jamy Poth of the City of Austin, Texas

Jeanne Becker of Becker Associates, Illinois

Lisa Skumatz and **Cabell Breckinridge** of Synergic Resources Corporation (SRC)

Lon Hultgren of the Town of Mansfield, Connecticut

Greg Harder of the Pennsylvania Department of Environmental Resources

Thomas Kusterer of the Montgomery County Government, Maryland

Robert Arner of the Northern Virginia Planning District Commission

revenue, then no matter how far waste collection costs drop, they see unit pricing as an added cost.

State of MN: *What I have found in Minnesota, and it's true with a lot of waste issues, is that we have the true believers and then we have the skeptics. The two groups are pretty much cemented before the discussion even begins. So, how do you get them to move? I'm not sure. But mandates at either the state, county, or city level can work.*

SRC: *Maybe one of the ways to help get past public opposition is to work with members of citizen groups or "green groups" to start a groundswell of support for the program. Have some success stories from other communities. This can help make it so that the politicians supporting unit pricing are going with the tide rather than bucking the system.*

Citizen Education

Did you use ad hoc citizen advisory groups, focus groups, surveys, and things of that sort before you got started?

Austin, TX: *Yes, in fact, the way we introduced the program (this takes a lot of leg work but is extremely important) is that we contacted neighborhood and civic associations, as well as our recycling block leaders. Just coming up with the list of associations was a task. We produced an eight-minute video on unit pricing and played the video at the neighborhood meetings. We had real people talking about what was about to happen. We got a lot of feedback by showing that tape. We carried out two focus group surveys, including one on larger families, an issue that many people want to hear more about. We experimented with soliciting feedback that was recorded on a telephone voice mail system. This is effective because, believe it or not, people are not that hesitant to record their views. It is also cost-effective, since we use the telephone answering tree for our other programs as well. The voice mail is a call-automated system, so the caller presses "7" to find out when our brush pick up date is or "2" to find out how to exchange carts. Many of the questions asked are just that simple. As you review your communications and outreach system, it makes sense to look into voice mail.*

Costs of Public Education

How much money was budgeted for unit pricing education? Also, in developing your outreach efforts in-house, how many staff members did you devote to education and public relations?

Austin, TX: *Our educational costs ranged from $6 to $8 per household per year in the early years. Most of those costs were start-up costs. We saved a lot of money by doing all of our work in-house—designing a user-friendly name and a regular way of communicating in our pilot program. However, this in-house approach meant that we were constrained from using mass media such as TV and radio. We did not have the capacity to develop a TV commercial that said, "Here is how you participate in the new program." I really doubt that many communities phasing in their unit pricing program will find a mass media program useful because unit pricing can require a complex explanation. Instead, we use mass media only with our generic recycling and*

yard trimmings messages—simple messages such as "Either leave it on the lawn or compost it." We had three full-time staff members for education. One person was assigned to public relations, another was a graphic artist that participated in many things, and I was the planner. Also, we utilized volunteers (such as recycling block leaders or neighborhood association presidents) who provided the leg work in getting the word out. You would be surprised how interested the volunteers are in doing something. We produced our video out-of-house because we didn't have the necessary cameras.

Seattle, WA: *Seattle spends $3.25 per household per year on public education, but that is actually high because a portion of that money goes to educating commercial and transfer stations. So it's probably under $3. But if you can piggyback some of these things, you can reduce your costs even further. Postage is very expensive, so if you can tag postage for the unit pricing message along with something else, it's even cheaper.*

Pasadena, CA: *I'd like to emphasize that it is absolutely key to put yourself on the firing line with the customers. They pay the fees. When we went to the community we assured them, "We're not taking anything away from you. We are giving you the opportunity to have more control over your costs. You cut your trash down, you cut your trash bill down." You need to listen, take the abuse, but then once the people actually experience the program, they become converts, they don't want to go back. Either you take the time up front to educate, or you take it later with operational difficulties once the program is underway.*

Getting Ready for Unit Pricing

What about communities that don't have unit pricing now?

Knoxville, TN: *My fear is that a lot of what's being discussed here may be difficult to apply to most cities in the South. In Tennessee, for example, we did a needs assessment of all the counties, and we found, first of all, that the waste composition was very different from the rest of the country. Only about 25 percent to 35 percent of the total waste stream was residential. Also, there is no city-wide curbside recycling, very little yard trimmings recycling, no household hazardous waste collection, and only one regional materials recovery facility. In addition, our landfill tipping fees average only about $25/ton even though we have adopted Subtitle D landfill regulations. Our land values are just a whole lot less than other areas of the country, for now at least. I don't think Tennessee is a lot different than most states in the South.*

EPA: *I'm glad that you raised that because one of the goals of the guide is to provide information for communities that may not yet be at the jumping off point for implementing unit pricing. Any comments?*

Pasadena, CA: *What do you mean they are not ready? What's your objective?*

Knoxville, TN: *Well, to answer the first part of your question, in our needs assessment study, we found that a third of the counties in Tennessee didn't even have collection service, period. So it's hard to talk about unit pricing or recycling. And one of the main reasons why I wanted to go to unit pricing was to be able to finance some of the extra municipal solid waste programs. I can't do it right now, because every time I try*

to get city council to increase property taxes to pay for curbside recycling, I'm competing against stormwater drain programs or something else.

Mansfield, CT: *You can start implementation with a drop-off center. Our community used the closure of the town's landfill to start paying by the bag at the transfer station. Any major facility or system change could act as a catalyst for a unit pricing system.*

Durham, NC: *Well, some of the South is ready, and it's because we have a very progressive state legislation package to push us. We have a 25 percent goal for July 1993, which not many of us are going to reach. And a 40 percent goal by 2001. We have to provide some kind of recycling for our citizens. That's spurring a lot of interest in our state, and a lot of people are looking at all the complementary programs. We are trying to give people as many options as possible (e.g., curbside recycling and garbage collection once a week, yard trimmings collection, a yard trimmings composting facility, and a bulky item pick-up). Anything other than sending it to a landfill. Our landfill is going to close, and our county hasn't been able to site another, so we're going to be shipping our waste out of the county. So we have a real big incentive to make sure we dispose of as little as possible. When you do have a crisis situation, and you have legislation that's pushing you in that direction on a state level, it can push you into the cutting edge of things, so it could be that you need to knock on your state legislature's door.*

Program Options, Issues, and Experiences

Voluntary Versus Mandatory Programs

What are some of the advantages of voluntary programs?

Northern VA: *There are communities like Plantation, Florida, that have voluntary unit pricing. Voluntary programs are more compatible with ideals of personal freedom, and the enforcement costs may be lower. On the other hand, there may be less participation in voluntary programs. A certain amount of good will is associated with mandatory programs, since everyone has to participate. Mandatory programs also provide a greater ability to cover fixed costs and less of an incentive for illegal dumping. If you have to pay for at least some municipal solid waste service, then you may be less inclined to dump your waste.*

Time Factors

Does it take less time for your crews to go down the street and get their work done with the unit-based program?

Austin, TX: *Yes. We went from manual collection to semiautomated and estimate that the collection cost savings will be $5.11 per household per year. And we also went from three collectors to two collectors. That might not sound like much on an individual household basis, but certainly there is a cost savings. Then, we promote the*

educational message of "share your boundary with your neighbor," so we can make fewer stops in your neighborhood.

Seattle, WA: *I think there are economies when you're collecting minicans as opposed to toters. Toters take 20 to 45 seconds apiece, depending on what you've got. The minican takes less time than that, so there are definitely time savings. But, I think that bags are considerably faster than either toters or minicans.*

Bag Programs

What is the largest city with a bag program in Pennsylvania?

State of PA: *Probably the largest city in Pennsylvania that has a bag system is Allentown, but it has a limited per-bag system that is only used for grass clippings. Reading has a population of 78,000, but it has a voluntary system in which haulers are required to offer a variable rate option. Wilkes-Barre has a population of around 48,500, but its program applies only to residents of apartment buildings. The largest mandatory per-bag system is probably Carlisle, which has a population of around 20,000. Carlisle is followed by South White Hall Township, with a population of around 18,000. Most per-bag systems in Pennsylvania use standard size 30-gallon trash bags. And usually they put a weight limit of around 40 pounds on the bags so you can't fill them up with bricks.*

Stickers

How are stickers working out in your unit pricing program?

State of IL: *The advantage of stickers is that there is no billing at all. They're applicable to various types of service, types of containers, and types of waste. With a simple, uniform schedule, stickers could be ordered through the mail. Or somebody could buy 50 stickers at a time from a hauler or from the local grocery store. The stickers are easy to keep and they are not going to rot. Often times, the haulers can't read and write, and so stickers are very simple. Since every second they spend at a stop is money to them, the more data collection or enforcement that you require haulers per stop, the less likely they are to do it. It's a time limit. But stickers are not perfect. The adhesive can be a problem. The hauler might not be able to find them. Stickers can be stolen off of someone else's garbage bag. And maybe the biggest problem is that people could buy a year's worth of bags in January, and then not buy anymore for the next several months. It is really hard to have to predict people's behavior in order to forecast revenue. The largest community in Illinois that has a sticker program is the City of Aurora, which has 100,000 people.*

Durham, NC: *Stickers are interesting because you can take a big bag that you got at the store and put your garbage in it and put a sticker on it. Then you are reusing that bag and not generating another waste product.*

Pricing Models

What unit pricing models have you used? And how are the variable costs of providing services kept low?

State of IL: *In Illinois, communities tend to charge what their neighbors do. The rates vary from $1 to $2 a sticker. I really think they just try it and hope that the price is in the right ballpark.*

State of PA: *Most Pennsylvania communities use a bag-based unit pricing system because they see examples in nearby communities. Carlisle adopted one about three years ago, and people in the neighboring township actually began clamoring for the same. In fact, they actually sued the township to give them a bag-based system instead of a flat-rate system. People like unit pricing because they see it as being very fair and very equitable.*

SRC: *A 30-percent impact on customer costs may be a threshold level at which people begin responding to unit pricing. In contrast, I've seen some communities offer 90-gallon cans as the smallest size and then charge a quarter or a dollar for each additional 30 or 60 gallons. That may be unit pricing in one sense, but it certainly doesn't provide much of an incentive for people to source reduce. You can also use a fairly simple model and then consider some scenarios that give you an idea of what your rates should be. You don't have to have a massive rates model; there are communities working fine with microcomputer spreadsheets.*

Subscription Service Changes

How do you handle it when people want to change their service?

Austin, TX: *Do not underestimate how many people will select the smallest cart. Right off the bat, we went $2,100 in the hole because of all the people who were going to do the "right thing" and picked 30-gallon carts. In other words, be prepared for your program to become successful. Secondly, when it comes to cart exchanges, the start-up costs for this program are really high. You really need to talk to your politicians and everyone and get it all in a nice spreadsheet and realize that you're going to bite the bullet for the first three to six months of the program. We offer a free cart exchange the first time, and then $15 subsequently. But we were estimating that a total of 15 percent ended up changing in Austin. Instead of doing any surveying up front on the carts, we had to rely on the household size for estimates.*

Pasadena, CA: *The thing that my staff keeps coming back to me about is the administrative cost of making changes. Our rule is, you can't change service levels more often than every six months. Only every six months, however, even with 27,000 customers, means that there's somebody changing every single day. We don't charge for changing service right now, but I think that we must begin to charge for changes in order to create a disincentive. Soon, if you want to change, it's going to cost you $15 to $25 to make that change.*

Billing

What elements are needed in a successful billing system?

Seattle, WA: *When you start unit pricing, determine if there are certain reports that you want to be able to generate from the billing system and make sure you get that capability integrated in your billing system right away. Later on, this type of modification can be just horrible and extremely expensive.*

Mansfield, CT: *Mansfield originally had a private system, with the haulers doing the billing. When we implemented our unit pricing program, the town took over billing. We find that one of the side benefits is that we can lien property. The haulers have liked the system very much because they know they are going to get paid every month. And that might be a way to sell it in a community that is also planning to take over the billing.*

Seattle, WA: *That's a double-edged sword for us. We do our combined billing with the city's water department and drainage and waste water utility. We do have the lien authority and essentially can turn off the water if somebody doesn't pay their bill. The problem is that we have to deal with a lot of complaints from their customers, and it doesn't always lead to the best results for us in terms of a quality billing system.*

State of MN: *In some places in Minnesota, we are using a two-tiered (fixed plus variable fee) system that is separate from the garbage collection billing system. The government collects some of the fixed costs to offset it.*

Cash Flow

How did you project your cash flow over a certain period of time?

Mansfield, CT: *We collect quarterly and in advance. That solves a lot of the cash flow problems.*

Seattle, WA: *If you're tight for cash, you need to know what's coming in and what's going out. It's very important to build in lags in your billing system. There's going to be some lag time in how people respond to unit pricing, and that tends to work to your benefit. You need to be conservative about the rate at which people reduce their solid waste, particularly customers using the extra can, especially if you have high extra can rates. And, don't underestimate the portion of the construction and demolition debris in the waste stream. Look really hard at wood waste. Wood waste typically comes to your transfer stations in small loads. It can disappear real fast if you don't flow control it or know what's going on with it.*

Enterprise Funds

What are the key advantages of enterprise funds? Do they help you in tracking costs of services? Do they make it easier to raise rates than taxes?

Austin, TX: *It's never easy to raise rates, enterprise or not, but from a marketing point of view, if we have a program that may be a little more sophisticated than what a council member had thought about doing and if we can justify that we can pay for it, certainly it's easier to get quality proposals for rate changes approved. I think that is the key: it must be performance-based and used to justify budgets.*

Pasadena, CA: *It also can be used as a point of leverage, in the sense that we can say we are an enterprise. We are a business and we have to charge full costs for our operations.*

Seattle, WA: *I think it's easier to get analytical staff, because there is a perception that if you've got big capital programs and big resource acquisition programs, then it tends to be easier to support getting people like that. The same is true with computer systems. It tends to be easier to support those, which is real helpful.*

Mansfield, CT: *Our municipal solid waste enterprise fund has grown, matured, and is now supporting other activities, such as litter control. The downside to this is that policy makers may look to healthy off-line funds for support in the struggle to fund various other community programs.*

Municipal Versus Private Haulers

Does a municipal program have more of a revenue-cost cushion than a private hauler?

Mansfield, CT: *I wouldn't say more cushion, but definitely more control over costs. We took over a private system and added recycling collection and still kept the rates the same. Our unit pricing program provided more service for the same price as the "free market" system. Mansfield contracts with two private haulers to implement its system.*

Pasadena, CA: *You can't assume that there are a lot of cushions. In Pasadena, we operate like a business and must be competitive. Now, if your municipality owns a landfill, you can find a little subsidy. But, if you do full cost accounting, then you know your true cost of operation. Then if you decide you need a cushion, that is part of the decision-making process. Another thing is, don't underestimate the sophistication of the private haulers. If you work very carefully with them, then you can learn a lot together. For example, I'm working with my commercial haulers very closely, because we have commercial recycling requirements. We're planning to adopt unit pricing in the commercial sector for the same reason—to encourage waste reduction and recycling. So commercial haulers need some help from us, but they also should be part of the process of gathering and sharing information.*

State of IL: *One of the differences between municipal systems and private haulers is that with the municipal system, you have a captive audience, and you can reach economies of scale. This is especially important for some of the programs we've talked about, such as Austin, Pasadena, and Seattle: all are larger population bases where a hauler can*

reach economies of scale. This is not the situation, however, in the Midwest. In Minnesota, Wisconsin, and Illinois, outside of the metropolitan areas, the problem is that you have much smaller communities of several hundred or a few thousand people. Second, many of these communities use multiple private haulers. The goal of some communities is to keep every hauler in business, even if it's only one guy with one truck.

State of PA: *A few months ago, I talked with a group representing waste haulers from Pennsylvania. I wasn't sure what their attitudes would be toward unit pricing. It turns out they actually like the idea, but their great fear was the uncertainty and risk from having a straight price per bag (proportional) program. They were much more favorable toward the idea of having a two-tiered system (i.e., fixed rate plus a per bag fee) that would better allow them to recover their fixed costs.*

Ways To Use Local Ordinances

How can your local government, city council, or state legislature help?

Pasadena, CA: *In order to protect business for waste haulers and recyclers, communities can pass ordinances that require a franchise to do business. In this way, local governments can help create a level playing field. We designed an ordinance that makes haulers buy franchises from the city. We put as much flexibility into the ordinance as possible, but, at the same time, established some sort of guidelines. This assures that everyone's working under the same terms and conditions, whether it's one person, one truck hauler, or a bigger hauling firm.*

Seattle, WA: *Another way to help smaller haulers is by stabilizing transfer station rates and disposal rates for reasonably long periods of time. This approach uses authority from state and local governments to insulate haulers from a lot of risk.*

State of MN: *If your goal is to encourage source reduction, you might have to employ mandates. This is especially important when budgets are tight, since both composting and recycling cost real money. As an example, in Minneapolis and St. Paul, they enacted ordinances that require food establishments to have food packaging that is either returnable, reusable, or recyclable—that's really a cutting edge area. Also, don't forget to amend your solid waste ordinance to allow for backyard composting and set up some standards and advertise them to protect against rodents and odor.*

Methods of Enforcement

Are you finding that illegal dumping is a big issue?

Pasadena, CA: *I think the key here is not to associate illegal diversion with variable rates. There is always going to be some amount of illegal dumping, especially in hard economic times. So you have a multitude of factors that are contributing to what is generally called illegal dumping. The key here is education and providing alternatives such as legal diversions (for example, recycling and composting) and constructive source reduction actions.*

State of ME: *Enforcement efforts can be made more cost-effective through publicity. It only takes one enforcement instance along with a lot of big publicity to send a loud message to people who might be thinking about illegally dumping. In Maine we had a very large investigation on private haulers who were hauling to other municipal landfills with lower fees. The investigation was blown up in the press, with nightly TV coverage. It stopped a lot of the illegal dumping in other communities.*

Mansfield, CT: *We have a part-time garbage enforcement agent who works a couple days a week on enforcement and public education.*

State of MN: *In all fairness, I want to stress that it's not unit pricing per se that is driving illegal dumping. It is also driven by growing restrictions on what you can put in the garbage can. I believe restrictions may have more effect on illegal dumping than unit pricing.*

What People Really Do With Their Trash

People say, "My neighbor is the last one who goes to work, and he's going to put his garbage in my can." I have also had professional people say that they are planning to take their trash to work. So how do we address these concerns?

Mansfield, CT: *Again, I would like to underscore that in our experience, neighbors have not put their garbage in the cans of other neighbors. We have had some calls—not many—from people who swore that their neighbor had put additional recyclables in front of the caller's bins. We investigated and found out it was the hauler who had put all the bins on one side of the street so that he could make one stop.*

Austin, TX: *We did a study that measured what households would do with garbage that could not fit in their subscription cans. Extra trash had to be labeled with stickers that were purchased for $2 each. We received 554 responses to our survey and got the following results:*

- *32 percent used the stickers and paid for their excess trash disposal.*
- *29 percent never had excess garbage and never had to use stickers.*
- *14 percent saved their excess garbage until the next trash pickup.*
- *11 percent stomped the extra garbage into their carts.*
- *5 percent threw their extra garbage out at a neighbor's or friend's.*
- *3 percent threw the extra garbage away at work.*

We also found that most excess garbage came from households that subscribed to larger, 90-gallon carts. We knew that most 90-gallon carts were purchased by households with five members or less, so we decided that excess garbage was not a problem created by large households that might not be able to reduce waste. Instead, we think some families simply choose not to respond to unit pricing—some families decide that they would rather pay more for larger carts and extra disposal than recycle or reduce waste.

Integrating Unit Pricing With Complementary MSW Programs

Yard Trimmings Programs

What's the most effective complementary program that you've used with unit pricing and would recommend?

State of IL: *Yard trimmings systems (pay-by-the-bag) can easily be implemented as programs that are complementary to unit pricing. If the household properly manages its yard trimmings by composting or keeping grass clippings on its lawns (grasscycling), it can avoid disposal costs without much effort. Second, a yard trimmings system costs almost nothing for the community, except relatively low infrastructure costs. And a yard trimmings system can reduce the total amount of residential waste by up to 30 percent, depending on where you live and how great a quantity of yard trimmings you have initially. I would say that if you had only one program to go along with unit pricing, it should focus on yard trimmings. Illinois instituted a ban on yard trimmings. Everyone thought we'd need a lot of new compost sites and thousands of bags to pick up yard trimmings. In fact, about 60 percent of all homes started grasscycling. Overnight, households just stopped picking up grass clippings, and costs for picking it up plummeted.*

Knoxville, TN: *In our little city, we generate 20,000 tons of large brush and limbs every year, but we haven't budgeted for composting equipment. Any suggestions?*

State of IL: *Instead of buying chippers, you can stockpile the brush at the compost site. It doesn't smell so you can store it for a long period of time. Also, you can rent a big chipper or tub grinder several times a year and then use your mulch for landscaping.*

Pasadena, CA: *In Pasadena, 15 to 20 percent of the population has signed up for separate collection of yard trimmings. They put out an average of 50 pounds per household per year. If I could increase my participation in this program to 30 percent and everybody put out 50 pounds, then that's a big savings on landfill tipping fees. In addition, yard trimmings are dense compared with plastic, which is light relative to its volume. If your ultimate goal is to keep tonnage out of the landfill, then, dollar for dollar, you have a lot bigger bang for the buck with a yard trimmings program.*

State of PA: *In Pennsylvania, many municipalities use their bag system to collect yard trimmings, too. In Carlisle, residents put the leaves in plastic bags and the hauler dumps them out of the bags. Then the hauler actually puts the bags back on the curb so that people can reuse the bags. And, in Allentown, they use paper bags that break down in the composting process. Some communities use a vacuum system. It varies from place to place, but plastic bags are pretty widely accepted in Pennsylvania.*

Austin, TX: *Our yard trimmings do not get burned or go into a landfill. We mix them with our sewage sludge and create a product called "Dillo Dirt" (short for Armadillo). We bag*

it and sell it at nurseries or use it for our city parks. The Dillo Dirt program is very popular. People like to know that their grass will be used to deflect program costs. It's not a big money maker, but it does do a little better than break even.

Seattle, WA: *I'm surprised that people are talking about leaving their yard trimmings on their lawns, because in Seattle that's not a real common phenomenon. Households either compost or use curbside collection. We distribute free compost bins, which could be one reason; another could be differences in climate.*

Recycling Programs

What about adding a recycling program?

Pasadena, CA: *If you don't have curbside recycling in place, you might look at other alternatives. It is extremely expensive to put in curbside recycling.*

Mansfield, CT: *Well, we found a big increase in recycling participation when we went from drop-off recycling to curbside pickup, so I don't think our unit pricing program would work as well without curbside pickup of recyclables.*

Seattle, WA: *I think that on the issue of cost of services, you need to know, as best you can, what services customers are willing to pay for. Then, if you provide a broad enough range of services at different prices and levels of convenience, you can best serve the majority of people's needs. I think people are willing to pay for convenience, and don't underestimate that.*

Also, Seattle has risk-sharing clauses built in to its recycling contract where the haulers either receive an extra payment or pay us a credit, depending on whether the economy indices and market prices are good or bad. That actually increased our financial exposure beyond what we like, but we felt that it was the appropriate thing to do, given the state of markets right now.

State of IL: *For some very rural communities it is prohibitively expensive to do curbside collection once a week. In central Illinois, communities have curbside collection of recyclables once a month, and they found that it's actually working quite well. When they went to unit pricing, they just offered refuse bag collection once a week and recyclables collection once a month.*

Household Hazardous Waste Programs

Some communities already have household hazardous waste pickup or drop-off. How can these programs work with a unit pricing program?

Durham, NC: *You may be able to share expenses with other city agencies. In addition to our yard trimmings, curbside recycling, and bulky item pickup programs, we have a household hazardous waste program. The payment for this came from our wastewater treatment department, not from our landfill tipping fee. The waste staff are just as concerned about hazardous waste going into the wastewater system as we are about it going into the landfill. We may have to change that in the future and split it, rather*

than let them pay the whole bill. But it was a cushion for some time. We are also working on a permanent collection system on a regional basis. We hope to get a four-county region together and see if we can get a price break. We would set up permanent sites and negotiate with a contractor, saying, "We're going to give you a million people's worth of household hazardous waste. Can you give us a better price than dealing with one county, or one city"? Then we can reduce our costs and provide more frequent service to more people.

Keeping the Message Simple

How do you avoid confusing your customers when you add a program to your unit pricing system?

Austin, TX: *Through mass media we talk about complementary programs such as recycling and our Dillo Dirt program. But for unit pricing, and specifically how to participate in "Pay-As-You-Throw," we targeted our audiences more directly by using direct mail, a newsletter, and doorhangers. In these, we explained how to set out your wheeled cart, where it should face, and how to share with a neighbor (i.e., go ahead and pull two carts together on a neighbor boundary at the yard so that it's fewer stops for the collector). So, we steer topical information to specifically reach the affected audience. We choose to use easy terms to promote the program. It's important to keep messages simple and clear.*

Accommodating Groups With Special Needs

Older Households

How do you cater to the needs of senior citizens?

Pasadena, CA: *Our older population began to have some concerns about their ability to actually move their trash and pay for their trash. What we came up with seems to be working well. We sent a note that said, "If you are over 62 years of age or if you are disabled, call for special rates." Almost 10 percent of our population has called and about 5 percent are on the special rates right now. The special rate for senior citizens is a 10-percent discount. They can choose any service option they want, because we found that their needs varied.*

Durham, NC: *What about the people who don't have driver's licenses, or are temporarily disabled; they broke their leg and it will be six months before they are mobile again? And, also, do you go back and check to see if the older person has died or if a young person is now living there and getting this service?*

Pasadena, CA: *First, if they don't have a driver's license, we ask for some kind of ID card or birth certificate. People send all kinds of things; they're very good about wanting to show you that they qualify. Secondly, our eligibility criteria say that if there is a younger person in the home that can roll the trash for the disabled, then that household does*

not qualify. You have to be disabled, and you can't have a caregiver who is able to do this. A lot is based on trust, although we do expect that we will do some followup, depending upon how many people subscribe to the service. As far as people with temporary needs, our basic message is if your need is less than six months, the administrative costs of making that change are greater than the actual discount that we could provide. But we do make exceptions on a one-to-one basis. Our customer service reps do a tremendous amount of talking, asking a lot of questions and dissuading people. The idea behind their asking questions is as much to help as to provide disincentives to taking advantage of the system. So we try to do it in a very courteous, polite way. After a while, most people get tired of answering the questions, but if they can answer all the questions then we do try to help them.

How large is your customer service department?

Pasadena, CA: *For 27,000 residences, we have three people. One person answers the phones out front and dispatches on the radio for very basic questions. For more detailed questions, I have two more individuals who can respond. But, if the question is very difficult, it goes up to another level.*

Low-Income Households

How do folks handle the low-income issue?

Seattle, WA: *We don't have any family rates, but we do have a low-income rate. This summer we qualified low-income, elderly, and handicapped customers for rate assistance. We include all households who are under the federal poverty line.*

Pasadena, CA: *I would concur that if you're looking for standards, try to find something that is an established standard—not something that you create for your city. That's where we had problems because Pasadena is a more expensive place to live than other places in the nation. It's difficult to defend a low-income standard if it's not already established.*

Large Households

Could you address the perception that a unit pricing program bashes the family?

SRC: *That is a very common question at conferences. I guess to me, that's an education issue. People who have larger homes pay more for electricity. People who have more people in the house pay more for water and more at the grocery store. The question is not so much aren't we going to be hurting these families but rather should small families continue to subsidize these large families? I think that you need to turn the question around.*

Inner Cities

What about our inner cities?

Seattle, WA: *Monthly reports in Seattle show that illegal dumping is more concentrated in certain areas than others, and it tends to be in lower income areas of the city.*

Mansfield, CT: *Our toughest enforcement problems are in multi-family housing because of the transient population and difficulty in communicating with individual tenants, as opposed to single-family residents.*

Pasadena, CA: *Pay special attention to any area of more transitory populations. They are going to have special needs and special demands. We may need more frequent neighborhood cleanups there.*

Seattle, WA: *Also, it is effective to use community groups, and to provide grants to community councils. Often, they can do it for less money, and there is a lot of community pride in dealing with the problem. City government is not great at doing it, but community groups can do it.*

Multi-Family Units

What has been your experience with applying unit pricing to multi-family housing?

Seattle, WA: *We've had a broad range of problems providing unit pricing to residents of multi-family housing. These include contract relations, design, enforcement, and deciding whether the city or haulers will serve these units. Also, if you're going to do unit pricing in a big city with lots of multi-family housing, you have to have a reliable billing system that the customer service reps can use. We've got 9 inspectors and 22 customer service representatives, so we've got a big staff. But we have 300,000 collections a week, so even 1 percent of that turning up as phone calls can be a problem. We get about 650 calls a day from customers, and we can deal with that.*

Pasadena, CA: *I have a problem with landlords who call me when their units are empty. They say, "I'm not using the unit because I'm remodeling it right now, so I shouldn't have to pay for trash." But I still have to have the same operation; I still have to pass by the unit. So, when you set up a unit pricing program, be sure to educate your landlords about this.*

APPENDIX B

Putting the Blocks Together: Additional Examples

In Part III of this guide, a six-step process for assembling a unit pricing program entitled "Putting the Blocks Together" was introduced. The six steps demonstrated how to combine projections of cost, demand, and service levels in order to arrive at a tentative rate structure for a unit pricing program. The six steps provided a general introduction to the process of designing a rate structure but did not demonstrate how to accommodate the specific needs of your community when designing a unit pricing program.

This appendix consists of three examples to assist decision-makers in tailoring their programs to the specific waste management goals and needs of their communities. Each of the three examples outlines a community goal and the modifications to the design and assembly process considered necessary to meet that goal. The three examples are:

- *A community that wants to keep revenues higher than costs as it moves from a traditional waste collection program to a unit pricing program (the transition period.*
- *A community that wants to provide complementary solid waste services such as a recycling collection program.*
- *A community that decides to accommodate citizens with special needs within its unit pricing program.*

Designing a rate structure that meets the particular goals and concerns of your community is important. Use the three examples to get a sense of how to customize the six-step process to better meet the demands of your community.

- **Step 1: Demand**. Estimate total amount of waste generated in the "steady-state."
- **Step 2: Services**. Determine the components of your unit pricing program.
- **Step 3: Costs**. Estimate the costs of your unit pricing program.
- **Step 4: Rates**. Develop a tentative unit pricing rate structure.
- **Step 5: Revenues.** Calculate the revenues from unit pricing.
- **Step 6: Balance**. Evaluate and adjust your preliminary unit pricing program.

Focusing on the Transition Period

During the transition from a traditional waste management program to a unit pricing program, households gradually adjust their habits to the new opportunities and costs introduced by unit pricing. The demand for services from local municipal solid waste agencies might settle to new, lower levels during this time. The result can sometimes be a drop in revenues for the local agency. Many communities introducing unit pricing need to know that revenue shortfalls, however, will not be excessive during the transition period, nor in the subsequent steady-state.

If a community requires the revenue from its unit pricing rates to cover costs during both the transition period and the steady-state period, it needs to focus on Steps 1 and 3 of "Putting the Blocks Together." During Step 1, the community needs to produce a detailed and accurate estimate of the degree to which households will reduce solid waste generation to better anticipate changes in revenues that will result from the unit pricing program. To acquire reliable estimates for this step, the community can draw on the experience of other communities that have introduced similar complementary programs, public education efforts, container options, and special services.

A detailed estimate from Step 1 will also help the community accurately anticipate the rate at which costs will settle downward. In Step 3, the community needs to look at how a reduction in waste volume will lower costs, such as transportation and tipping fees. Unit pricing planners then need to test tentative rate structures to find the correct balance between decreasing revenues and decreasing costs and to keep the local solid waste agency's revenues in line with costs during each quarter of the transition period, as well as the subsequent steady-state.

Adding Complementary Services

Communities that have a clear mandate for waste management can sometimes pursue a program that combines source reduction and recycling. For example, the citizens of a community might demand a combined program of unit pricing and curbside pickup of recyclables. To develop a rate structure that would accommodate a complementary curbside recycling program, the community would need to accurately identify all of its waste management costs and carefully weigh all of its revenue-raising options to determine if such a program was feasible.

In Step 3 of "Putting the Blocks Together," the community can explore the potential for combining equipment, crews, billing, and routes for both trash collection and recycling pickup. Careful scheduling or innovative use of equipment could significantly reduce costs. The community should also use this step to examine the financial trade-offs of the two programs; for example, a recycling pickup program could lower the total amount of waste being landfilled or combusted, reducing the community's tipping fees to help cover the costs of providing recycling collection.

In Step 4, the community is presented with a variety of pricing options. These should be examined in light of your overall goals for unit pricing. For example, if one of your primary goals is to significantly reduce household waste generation, you can consider charging for all collection services. Setting substantial per-bag charges for both trash and recyclables will encourage households to reduce waste. If, however, recycling is provided for free, citizens would have less incentive to reduce the amounts of recyclables it generates and the municipal solid waste stream (trash plus recyclables) could actually rise in volume, driving collection costs up. Another pricing option consists of setting the per-bag charge for trash higher than the per-bag charge for recyclables. This rate structure encourages households to separate recyclables from other trash, thereby reducing the portion of their household waste that the community sends to the landfill.

These examples show how important it is to treat unit pricing rates as part of a comprehensive pricing system that takes into account all solid waste services. Charging citizens for both recycling and waste removal adds complexity and cost to providing municipal solid waste services. The alternative, however, a unit pricing rate structure that does not integrate waste collection charges with those for curbside recycling, can prove expensive, inequitable, and ineffective at achieving the community's goals.

Addressing Special Needs

A community that wishes to assist low-income households that might have trouble paying for unit pricing needs to make several adjustments to the basic model to develop a rate structure that meets its goals.

In Step 1, the community must first determine how to qualify households for lower collection charges. To make this decision, the community should collect information on the number of low-income households that could qualify for lower charges. The community can use these numbers to adjust revenue estimates and finally arrive at a rate structure that provides sufficient revenue. Rates should be set to provide an incentive for source reduction in both low- and high-income households. However, the community might anticipate that lower rates for low-income households will provide less incentive to use source reduction. If this is the case, estimates of the drop in demand for waste collection services should be revised to meet the effect of the low-income rate.

In Step 3, the community needs to examine the potentially greater costs of introducing a low-income rate. Such a rate not only will decrease anticipated revenues but also require additional administrative costs to identify and separately bill low-income households. Administrative costs can be kept down if an established income cutoff is used or other local agencies have already identified the low-income households in the community. Rent assistance or income assistance programs might have already identified the low-income households in a community.

APPENDIX C

Definitions

Bulky waste items - Large items of refuse including, but not limited to, appliances, furniture, large auto parts, nonhazardous construction and demolition materials, and trees that cannot be handled by normal solid waste processing, collection, and disposal methods.

Commercial sector - Includes schools, hospitals, retail establishments, hotels, and restaurants.

Compost - Discarded organic material that has been processed into a soil-like material used as a soil amendment or mulch.

Construction and demolition (C&D) debris - Includes concrete, asphalt, tree stumps and other wood wastes, metal, and bricks. (C&D debris is excluded from the definition of municipal solid waste used by EPA and the National Recycling Coalition.)

Disposal - Landfilling or combusting waste instead of recycling or composting it.

Diversion rate - A measure of the amount of waste material being diverted for recycling/composting compared with the total amount that was previously thrown away.

Enterprise fund - An independent budget dedicated for a special purpose or activity, such as a local municipal solid waste program. The local agency becomes reliant on the revenue it raises through unit pricing or tipping fees and does not receive financial support from the general fund of the local government.

Flow control - A legal or economic means by which waste is directed to particular destinations (for example, an ordinance requiring that certain wastes be sent to a particular landfill facility).

Full cost accounting - The total accounting of all costs and revenues involved in municipal solid waste management, allowing for a standard treatment of the capital costs, future obligations, and indirect costs.

Household hazardous waste - Products containing hazardous substances that are used and disposed of by individuals, not industrial consumers. These products include, but are not limited to, certain kinds of paints, solvents, batteries, and pesticides.

Integrated waste management - The complementary use of a variety of practices to handle municipal solid waste safely and effectively. Integrated waste management techniques include source reduction, recycling (including composting), combustion, and landfilling.

Landfilling - The disposal of solid waste at engineered facilities in a series of compacted layers on land that is covered with soil daily. Fill areas are carefully prepared to prevent nuisances or public health hazards, and clay and/or synthetic liners are used to prevent releases to ground water.

Municipal solid waste (MSW) - Waste generated in households, commercial establishments, institutions, and businesses. MSW includes used paper, discarded cans and bottles, food scraps, yard trimmings, and other items. Industrial process wastes, agricultural wastes, mining wastes, and sewage sludge are not MSW.

Participation rate - The portion of households that take part in a given program. Often refers to households actively participating in a curbside collection program for recyclable materials.

Recyclables - Products or materials that can be collected, separated, and processed to be used as raw materials in the manufacture of new products. The recyclable option should be available to the majority of residents through curbside recycling programs or fixed recycling centers.

Recycled content - The portion of a package's weight (excluding coatings, ink, labels, stickers, adhesives, or closures) that is composed of postconsumer recycled material.

Residential waste - Waste from single-family and multi-family residences and their yards.

Source reduction (Waste prevention) - The design, manufacture, purchase, or use of materials to reduce the amount and/or toxicity of waste. Source reduction techniques include reusing items, minimizing the use of products that contain hazardous compounds, using only what is needed, extending the useful life of a product, and reducing unneeded packaging.

Tipping fees - The fees, usually dollars per ton, charged to haulers for delivering materials at recovery or disposal facilities.

Waste generated - Sum of waste recovered and waste disposed of.

Waste stream - A term describing the total flow of solid waste from homes, businesses, institutions, and manufacturing plants that must be recycled, burned, or disposed of in landfills; or any segment thereof, such as the "residential or recyclable" waste stream.

Yard trimmings - The component of solid waste composed of grass clippings, leaves, twigs, branches, and garden refuse.

APPENDIX D

Bibliography

Blume, D. R. 1992. Under what conditions should cities adopt volume-based pricing for residential waste collection. Washington, DC: U.S. EPA Office of Management and Budget.

California Integrated Waste Management Board. 1991. Disposal cost fee study: final report. Boston, MA: Tellus Institute.

Goddard, H. C. 1990. Integrating solid waste management: incentives for reduced waste, increased recycling, and extension of landfill life. Proceedings from the First U.S. Conference of MSW Management: Solutions for the '90s. Washington, DC.

Howard, S. 1988. Financing integrated solid waste management systems. Paper presented at the Seventh Annual Resource Recovery Conference. Washington, DC: Shearson Lehman Hutton, Inc.

Hsieh, H-N. (No date.) Cost analysis of landfill and its alternatives. Unpublished paper. Newark, NJ: New Jersey Institute of Technology.

Jacalone, D. P. 1992. Per unit pricing: an overview of operational issues. Paper presented at EPA's Second U.S. Conference on MSW Management: Moving Ahead. Washington, DC.

League of California Cities. 1992. Financing strategies for integrated waste management programs: answers for communities. Sacramento, CA: League of California Cities.

Repetto, R., et al. 1992. Green fees: how a tax shift can work for the environment and the economy. Washington, DC: World Resources Institute.

U.S. Environmental Protection Agency. 1989. Discussion and summary of economic incentives to promote recycling and source reduction. Washington, DC: U.S. EPA Office of Policy Analysis.

U.S. Environmental Protection Agency. 1990. Charging households for waste collection and disposal: the effects of weight or volume-based pricing on solid waste management. NTIS PB91-111484. Washington, DC: U.S. EPA Office of Solid Waste and Emergency Response.

U.S. Environmental Protection Agency. (No date.) Methods of predicting solid waste characteristics. Stock no. 5502-0048. Washington, DC: U.S. Government Printing Office.

U.S. Environmental Protection Agency. 1990. Variable rates in solid waste: handbook for solid waste officials, Volume 1: Executive summary. EPA530-SW-90-084A. Washington, DC: U.S. EPA Office of Solid Waste and Emergency Response.