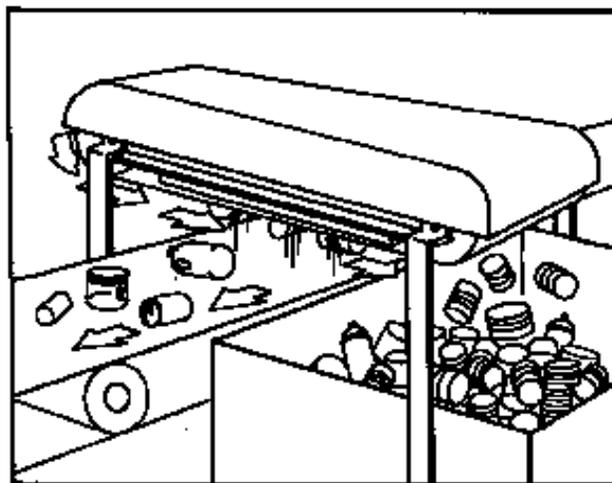


RECYCLING

A Planning Guide for Communities!



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Table of Contents

CHAPTER I Recycling and Solid Waste Management

Solid Waste Management Hierarchy	1
New York State Solid Waste Management Act	
DEC Part 360 Permit Requirements for Recyclables	
Handling Facilities (Summary)	
Recycling and Solid Waste Management	5
Benefits of Recycling	
How State Government Promotes Recycling	5
New York State Solid Waste Management Act Programs	
6 NYCRR Part 360 Regulation for Solid Waste Management Facilities	
Returnable Container Act	
Save That Office Paper (STOP) Program	
"3R's" Program	
Procurement of Recycled Materials and Remanufactured Components	

CHAPTER II Before You Begin

Building Blocks	9
Siting	14
Composting	15
Source Separation	15
Collection	16
Storage	17
Processing	17
Transfer	18

CHAPTER III Options for Recycling Programs

Separation	22
Source Separation	
Source Separation-Voluntary vs. Mandatory	
Separation of Comingled Recyclables	
Mixed Waste Recycling	
Collection	24
Curbside (or House-to-House) Collection	
Collection at Drop-off Facility	
Special Collection	
Buy-Back Facilities	
Collection of Unseparated Waste	

Collection Equipment	
Storage/Transfer of Recyclables	26
Storage of Recyclables	
Storage Facilities	
Processing to Attract Markets	28
Processing Recyclables	
The Materials Recovery Facility	
Processing Compostables	
Responsibility for Processing-Public or Private?	

CHAPTER IV Initiating and Expanding a Recycling Program

About This Planning Guide	36
Assumptions	
Background for Decisionmaking	
Recycling Program: Concept and Setup	37
Concept	
Setup	
Who Are the Planners?	
Making Program Design Decisions	38
Recycling Program Elements	
Who Are the Decisionmakers?	
Listening to the Public	39
Stage 1: Setting Goals and Objectives	39
Solid Waste Management Planning Goals	
Recycling Objectives	
Using Objectives to Evaluate Recycling Proposals	
Stage 2: Gathering Information	43
Waste Stream Information, Worksheets 1 and 2	
Market Information, Worksheets 3 and 4	
Existing Solid Waste Management System, Worksheets 5, 6, 7 and 8	
Community Characteristics, Worksheets 9 and 10	
Present Solid Waste Management Costs, Worksheet 11	
Stage 3: Evaluating Feasibility: Program Elements	58
Marketability, Worksheet 12	
Feasibility of Separation, Collection, Storage/Transfer, Worksheets 13, 14 and 15	
Feasibility of Processing, Worksheet 16	
Stage 4: Formulating and Evaluating Alternatives	67
Formulating Alternatives	
Evaluating Alternatives	
Developing A Recommendation	

Designing the Community Recycling Program	
Starting Up the Recycling Program	71
Startup Checklist	
For Pre-Existing Program	
Case Histories	72
New York City	
Rodman	
Hamburg	

CHAPTER V Marketing Recyclables

Finding Markets	78
Types of Markets	
Sources of Information About Markets	
Developing Markets	80
Contacting Potential Buyers	
Negotiating Market Contracts	81
Contract Elements	
Markets and the Local Economy	84
Community Development	
Long-Term Trends in Recyclables Markets	
Uses for Recyclable Materials	

CHAPTER VI Recycling Costs and Financing

What Do Recycling Programs Cost?	90
Planning	
Equipment	
Facilities and Land	
Personnel	
Citizen Involvement	
Estimated Costs (from Broome County)	
What Are the Alternatives for Financing	
Recycling Programs?	92
Local Revenue Sources	
Legal and Institutional Mechanisms for Recycling	
Financing Mechanisms for Recycling	
Summary of Financing Alternatives	

CHAPTER VII State Technical and Financial Assistance for Solid Waste Management

State Programs for Recycling	98
Technical Assistance for Recycling Activities	
State Financial Assistance for Recycling Activities	100
Financial Assistance for Localities	
Financial Assistance for Businesses	

CHAPTER VIII Maintaining a Recycling Program

Troubleshooting	104
Recordkeeping	104
Data Collection Worksheets	
Calculation of Avoided Costs Worksheets	105

Bibliography 111

Policy	
Markets	
Manuals	
Technical Books and Periodicals	
Information on Plastics	
List of Waste Reduction, Reuse, Recycling, Composting and Buy Recycled Educational Materials	
See Whiz Recycling Facts	

Executive Summary

More than 20 million tons of municipal solid waste are generated in New York State each year, approximately six and one-half pounds per person every day. Today's solid waste disposal facilities, consisting mostly of landfills, are incapable of handling the volume and, in many cases, inadequately designed for safeguarding public health and the environment.

The Benefits of Recycling

Many of the materials we now throw away are still useful and can be recycled for use as raw materials in manufacturing. By incorporating recycling into an integrated plan for solid waste management, local governments can significantly reduce the tonnage of waste to be landfilled or burned, extending the life of landfills, increasing the efficiency of waste-to-energy facilities, saving money in tipping fees and deferring the cost of new disposal facilities. Recycling minimizes the environmental impact (odors, emissions, leaching) of mixed waste disposal. Forest, water and energy resources are preserved when solid waste is managed as a resource. In addition, recycling has proven to be popular among citizens concerned about solid waste and its effect on the environment.

Planning For Recycling

Recycling: A Planning Guide for Communities was developed by the Department of Environmental Conservation at the request of local community officials. The guide's eight chapters provide information and planning approaches that local planners can use to design recycling programs that meet the needs and preferences of their communities. Because recycling is a changing field and because communities in New York State differ so widely, the guide does not prescribe one program concept to serve all localities. Rather it delineates a process through which recycling planners can creatively assess their communities' potential for recycling. As changes in recycling technologies and markets occur, the process developed in this guide can be used again to alter or modify recycling programs.

Chapter 1: Recycling and Solid Waste Management

New York State's Solid Waste Management Act of 1988 defines a state policy favoring waste reduction, followed by recycling, Waste-to-energy, and landfilling as approaches to solid waste management. The New York State Solid Waste Management Plan sets goals of 8 to 10 percent waste reduction and 40 to 42 percent recycling of the waste stream by 1997.

At present, only about 10 percent of the state's solid waste is recycled. To motivate communities to develop recycling programs, the Solid Waste Management Act requires source separation of recyclable or reuseable materials throughout the state by September 1, 1992. In addition, state regulations require a waste stream analysis and a comprehensive recycling plan as part of an application to construct or operate any solid waste management facility.

Chapter II: Before You Begin

Public involvement is an exchange of ideas, information, concerns or preferences related to decisions that government is making. Public involvement should affect decisions, but the public does not replace elected officials, program management or staff as decisionmakers. Public involvement means that interested and affected groups and individuals contribute to the identification of problems, definition of issues, gathering of information, and formulation and evaluation of alternatives from which the decisionmakers choose. People who have less time or interest to devote to recycling program development will need to be involved as participants during the program's operation. Well-planned public involvement results in the development of workable programs that the public can support and a greater likelihood that the programs will be successfully carried out.

Chapter III: Options For Recycling Programs

Every recycling program has four elements: separation, collection, storage/transfer and processing. For each element, there are at least two technical options.

Element 1: Separation

Option: In separate containers

Option: Co-mingled

Element 2: Collection

Option: Curbside

Option: Drop-off

Option: Special collection

Option: Buy-back

Element 3: Storage/Transfer

Option: Long-term storage

Option: Short-term storage Element

Element 4: Processing

Option: At drop-off

Option: At recycling center

Option: At Materials Recovery Facility

Option: Backyard composting

Option: Municipal composting

Option: Public (community) responsibility

Option: Private sector responsibility

To develop the most suitable recycling program for a particular community, this planning guide recommends that the four elements be considered first separately and then in combination.

Chapter IV: Initiating and Expanding a Recycling Program

The creation of a recycling program that suits the community is built around three assumptions:

- Assumption 1: Anything that can be recycled should be recycled.
- Assumption 2: A program developed with public involvement will be better suited to the needs and capabilities of the community.
- Assumption 3: Each community has its own way of making decisions.

The planning guide uses a four-stage process for developing a conceptual recycling program:

- Stage 1: Setting recycling program goals.
- Stage 2: Gathering information.
- Stage 3: Evaluating feasibility of possible program elements and options.
- Stage 4: Combining elements to formulate waste-by-waste alternatives for program design.

The guide provides worksheets to organize and systematize planning. The worksheets and the planner's lists of alternatives and evaluations clearly show the judgements underlying the conceptual program that planners recommend to community decisionmakers.

Once the basic structure of the program has been established by decisionmakers, a number of additional tasks must be completed before the first wastes can be recycled. Because community circumstances vary greatly, the planning guide does not provide detailed guidance for the technical aspects of recycling plans. However, the guide does supply a checklist of particulars to attend to before program startup.

Chapter V: Marketing Recyclables

Marketing is the driving factor for all of the decisions shaping municipal recycling programs. It is important for localities to be resourceful and imaginative in locating possible markets. Recycling planners should familiarize themselves with the needs, costs and limitations of prospective markets.

Possible markets for recyclables include:

1. Collectors that identify and transport recyclables;
2. Processors that perform simple processing, then resell to manufacturers;
3. Independent brokers;
4. End-users that process large quantities of recyclables for use in their own manufacturing operations.

The decision to recycle should be based on the recycling program's potential to lower the community's overall solid waste management costs, rather than on the expectation that the recycling program be financially self-sustaining or profitmaking. Markets may not pay

for recyclables, but solid waste management costs avoided may exceed the amount paid to the market.

Recycling planners should be aware that markets will fluctuate from time to time, and recyclables may have to be stockpiled or landfilled while new markets are found. Currently, glass and aluminum manufacturers are able to recycle all glass and aluminum waste that meets specifications. Other industries, such as plastics and papermaking, require new technologies or large capital investments to enable them to recycle all available waste. With interest in recycling on the rise and many states requiring communities to develop recycling programs, technologies are being developed that will encourage investment and growth in recycling industries.

Chapter VI: Recycling Costs and Financing

In 1989, costs for recycling ranged from \$15 to \$40 per ton of recyclables, including expenses for:

- Planning
- Equipment
- Facilities and land
- Personnel
- Citizen involvement

Financing alternatives for recycling programs include:

- Local revenue sources (taxation and tipping fees);
- Organizational alternatives (county agencies or refuse districts, local solid waste authorities and intermunicipal agreements.)

Financing mechanisms include:

- Environmental Facilities Corporation or the Urban Development Corporation (each can assist municipalities in planning and financing recycling programs and constructing facilities);
- Industrial Development Agency (must be established by an act of the state legislature; an IDA allows a private company to develop the facilities needed through tax-exempt financing).

Chapter VII: State Technical and Financial Assistance For Solid Waste Management

Advice and technical assistance on recycling are available from the Department of Environmental Conservation (DEC) Division of Solid Waste. The Department of Economic Development (DED) Energy Conservation Services Unit maintains a clearinghouse for information on markets for recyclables. Funding for recycling activities in communities is administered by the DEC Division of Solid Waste. Businesses may be eligible for recycling grants and loans administered by the DED Energy Conservation Services Unit or by the Research and Development Authority.

Chapter VIII: Maintaining a Recycling Program

Changes and adjustments are inevitable as community circumstances change and recycling markets and technologies develop. Chapter VIII suggests recordkeeping procedures and provides worksheets for data collection and analysis once a recycling program is in operation, including a method for calculating avoided costs.

The planning guide and its worksheets and checklists are intended to be used repeatedly to update and expand the recycling program as market conditions change and community factors warrant.

HOW TO USE THE RECYCLING MANUAL

When planning began for this recycling manual, the hope was to supply local officials and recycling coordinators with a pattern for a successful recycling program. Communities were asking the department for a recipe or formula for beginning a recycling program or expanding an existing one.

But to develop a "cookbook" for recycling programs turned out to be unrealistic because the communities of the state are so varied in area, population and decisionmaking style. Communities need a basic planning process applicable to all localities, regardless of differences, and it is that process that we have tried to articulate.

Recycling: A Planning Guide for Communities can be used whenever a community needs to: Start a recycling program; Evaluate the work of recycling consultants; Reshape an existing recycling program; Expand an existing recycling program; Incorporate new technology for recycling.

The planning process is intended to be used not once, but many times as the recycling program develops. Worksheets are provided for organizing and validating information and for evaluating alternatives. Planners who use them will avoid eliminating possible program elements before they have been fully considered and will build toward a program that recycles any waste that can be recycled.

Community recycling planners are encouraged to adapt the approaches in the planning guide to their own special needs and problems and consult with the public as they plan for a future in which recycling is here to stay.

Recycling and Solid Waste Management

- **The Solid Waste Management Hierarchy**
- **Recycling and Local Solid Waste Management**
- **How State Government Promotes Recycling**



More than 20 million tons of municipal solid waste are generated by residents, businesses, industries, hospitals, schools and government offices in New York State each year. The quantity per person has grown to six and one-half pounds every day. Presently, only about ten percent of this waste is recycled, half of this as a result of the Returnable Container Act.

THE SOLID WASTE MANAGEMENT HIERARCHY

In 1987, the NYS Department of Environmental Conservation (DEC) prepared the New York State Solid Waste Management Plan, which established a preferred order of methods for handling solid waste:

1. Waste reduction
2. Reuse and recycling (including composting)
3. Waste-to-energy
4. Landfilling of the residue of incineration and other wastes that cannot be recycled or treated. (All solid waste management practices not specifically identified in the hierarchy are considered to be on the same preference level as landfilling.)

In addition to establishing the hierarchy as state policy, the New York State Solid Waste Management Plan set goals of 8 to 10 percent reduction and 40 to 42 percent reuse/recycling of solid waste by 1997, cutting the waste stream in half.

New York State Solid Waste Management Act

In 1988, the Solid Waste Management Act was passed, requiring that municipalities develop solid waste management plans of their own and that they implement mandatory source separation programs no later than September 1, 1992. Since no single method will solve all solid waste management problems, most areas of the state will need to combine methods from the hierarchy in an integrated solid waste management program with recycling as a key element.

Although waste reuse and recycling have the same level of importance in the hierarchy, they require different approaches for implementation and are discussed separately here.

Waste Reduction - Waste reduction means never generating the waste at all. Waste reduction is achieved by both manufacturers and consumers before materials enter the waste stream.

Because approximately one-third of today's waste stream (by weight) is made up of packaging materials, packaging offers one of the best opportunities for waste reduction. Manufacturers can promote waste reduction by changing the way goods are packaged. Consumers should examine their buying habits and refuse to purchase excessively

packaged merchandise. Expressing concern about package design by writing manufacturers and talking to retailers can help bring about change.

Reuse - Finding ways to reuse items that would otherwise be discarded can substantially diminish the amount of waste requiring disposal. For example, rather than being discarded, durable goods, such as appliances, furniture or clothing can be repaired, sold or given away for someone else to use. Garage and rummage sales help promote reuse.

Recycling - Recycling means separating or extracting materials from the waste stream and using them in place of virgin feedstocks to manufacture new products. DEC's Solid Waste Management Regulations (6 NYCRR Part 360) require applicants to analyze the potential for recycling before a permit for a solid waste management facility will be issued. Local governments can put recycling programs in place in a relatively short period of time, even while long-range solid waste management planning is in progress.

Recycling, reuse and waste reduction measures significantly reduce the tonnage of waste to be landfilled or burned, thus extending the life of solid waste management facilities. They also minimize the environmental impact (odors, emissions and leaching) of mixed waste disposal and preserve forest, water and energy resources.

Waste-to-Energy - Waste-to-energy facilities burn solid waste to generate steam or electricity. While waste reduction and recycling are the preferred approaches to solid waste management, waste-to-energy is favored over landfilling as a disposal method for materials that cannot be recycled. Several local governments can share a waste-to-energy facility.

Landfilling - Presently, approximately 82 percent of the solid waste generated in New York State is disposed of in landfills. Landfills will be needed in the future to dispose of wastes that cannot be reduced, recycled, reused or burned. Part 360 Regulations for these facilities insure that new landfills minimize public health risks and damage to the environment.

DEC Part 360 Permit Requirements for Facilities that Handle or Recover Recyclables
Anyone wishing to construct and/or operate a facility used for the recovery, collection, storage or treatment of recyclables must obtain a Part 360 permit from the New York State Department of Environmental Conservation. Certain facilities are exempt from these regulations which are found within subdivision 360-1.7(b) and paragraphs 12.1 (c), (d), (e) and (f).

If it is determined that a permit is necessary, the applicant must comply with the

requirements in Part 360.1.9.(e) and (f) for engineering reporting and a comprehensive recycling analysis. The following general summary of the comprehensive recycling analysis is not intended as a substitute for the full 6 NYCRR Part 360 Regulations, which must be consulted for the most current regulatory information on all aspects of recycling and other solid waste management techniques. The recycling analysis includes:

1. Identification by type of the actual or estimated quantity of recyclables that could be recovered.
2. An evaluation of existing municipal, commercial, industrial and private programs to recover recyclables.
3. Identification of available and potential markets for recovered recyclables.
4. Identification of alternative source separation/recyclables recovery programs considered.
5. The implementation of the recyclables recovery program.
6. An identification of any existing laws, rules, regulations or ordinances which may exist that may hinder the implementation of a recyclables recovery program.
7. An identification of any local laws, rules, regulations or ordinances needed to facilitate the implementation of a recyclables recovery program.
8. A discussion of possible future actions in the facility's service area which will further the state's solid waste management objectives.

In addition to the above requirements, the applicant must comply with Part 360-12.2 (additional requirements for an initial permit to construct), 12.3 (additional application requirements for an initial permit to operate), and 12.4 (operational requirements). Please consult the Part 360 regulations for the specific regulatory requirements.

DEC central and regional offices can assist with any questions regarding regulatory requirements. Consult the DEC region map for telephone numbers of regional offices.

RECYCLING AND LOCAL SOLID WASTE MANAGEMENT

Landfills and waste-to-energy facilities that meet the requirements of Part 360 are expensive to build. Time is also a factor: siting and constructing a new solid waste facility can take six to ten years. Recycling can be implemented in a short time, but it may take several years to reach a point where a significant volume of recyclables is being diverted from the disposal facility. These facts, when combined with the resistance of residents to having a disposal facility sited in their community, result in a dilemma for local officials who must develop solutions to the solid waste disposal problem.

Since 1964, the number of landfills in New York State has decreased from about 1600 to only about 250. Disposal capacity is dwindling because many landfills have been closed,

most others are nearly full and the lost capacity has not been replaced by new facilities. Most existing landfills, because they were improperly sited, constructed and/or operated, are sources of pollution to groundwater, land and wildlife.

Long-range planning for integrated solid waste management with recycling as the key element is needed to meet the crisis of waste disposal. It is important to realize that recycling alone will not solve the solid waste disposal problem. Recycling is a key element, however, in a comprehensive solid waste management program.

DEC favors long-range solid waste management systems and projects that serve several towns, counties or regions, because such projects generally make the most efficient use of financing and facilities.

Benefits of Recycling

A community benefits from recycling, but the benefits will not necessarily show up on a balance sheet. The savings are in avoided costs for solid waste disposal and they are two-fold: first, the community no longer has to pay to dispose of the materials that are recycled; in addition, the useful life of existing disposal facilities is prolonged, and the cost of a new facility can be deferred. The more extensive the recycling program, the more these costs are reduced. Secondary economic benefits are also possible. Development of new jobs, increased use of local products and services and creation of new businesses are real benefits that can accrue locally as a result of recycling.

Recycling programs make citizens more aware of their purchasing and disposal habits and help them to realize that they ignore these at the expense of the environment. When citizens recycle, the amount of waste for disposal decreases significantly. Most important, recycling buys time with which a community can research options and investigate possibilities for county or regional cooperation in long-range solid waste management planning.

HOW STATE GOVERNMENT PROMOTES RECYCLING

New York State government laws, programs and regulations that help to promote recycling include:

New York State Solid Waste Management Act Programs

The New York State Solid Waste Management Act of 1988 expanded the roles of existing state agencies to promote recycling. Within the DEC Division of Solid Waste, the law established the Bureau of Waste Reduction and Recycling. The New York State Department of Economic Development was charged with developing markets for secondary materials. As another help to local governments, the act required that DEC create a data

base on recycling activities by local governments.

6 NYCRR Part 360 Regulations for Solid Waste Management Facilities

In 1988, the Department of Environmental Conservation completed the revision of the Part 360 Regulations, which specify the construction and operation standards for solid waste management facilities, including those that are related to recycling. The regulations require that anyone applying for a permit to construct or operate a solid waste management facility must submit a comprehensive recycling analysis.

Returnable Container Act

Some state programs involving recycling were already in existence before the NYS Solid Waste Management Act was passed. For instance, in September of 1983, the state's Returnable Container Act was passed. Originally drafted to address the problem of roadside litter, the act has fulfilled that purpose and accomplished another: DEC figures show that nearly all of the 24 billion returned containers (glass, plastic and aluminum) have been recycled, cutting solid waste five percent in volume and eight percent in weight.

Save That Office Paper (STOP) Program

In April, 1985, the Department of Environmental Conservation started the STOP program at the department's central offices in Albany. Each office sets aside a box for waste computer printouts, white paper and colored paper. The paper is collected once a week by clients from the NYS Association for Retarded Children (ARC). The ARC separates the paper and sells it to a local firm. In 1987, the ARC earned nearly \$5000 through the STOP program. STOP has been so successful that it has since been adopted throughout the state by local government, private industry and schools.

"3R's" Program

The Office of General Services operates the "3R's" program (Reduce, Reuse, Recycle) in all of its facilities. Workers deposit newspaper, office paper and envelopes, copier and computer paper, telephone books, cardboard and magazines into specially marked bins for recycling. Separate containers are provided for all other trash so that the paper wastes are not contaminated by other wastes.

Procurement of Recycled Materials and Re-manufactured Components

The Office of General Services has a program for purchasing recycled materials under state contract. These recycled materials and re-manufactured components can vary, depending upon the contract available. Additional information may be obtained by contacting the Office of General Services at (518)473-4352.

Suggestions For Waste Reduction

- Buy only what you really need, Do I need it? Will I use it? Can I make it out of materials I already have?
 - Buy products with a long life span Appliances that can be repaired.
 - Look for alternatives to paper products. Use cloth napkins instead of paper napkins.
 - Use regular dishes instead of paper plates and cups.
 - Use rags from worn clothing and bedding rather than paper towels.
 - Use cloth diapers instead of disposable diapers.
 - Avoid excess packaging. Buy brands packaged simply or not packaged.
 - Don't buy disposable products. Buy refillable lighters, razors, pens.
 - Buy large-size packages. Cost is usually less Only one package to recycle.
 - Encourage stores to sell unpackaged merchandise, Loose fruits and vegetables Food items sold from barrels.
 - Make your preferences known.
 - "Vote with your dollars."
 - Avoid buying products that are excessively packaged, buy another brand.
 - Speak to store manager.
 - Write to companies about wasteful packaging Write to legislators about waste reduction.
- (From Re/Uses, by Carolyn Jobs).

Suggestions For Reuse

- Buy refillable containers.
- Use returnable bottles and cans which will be recycled.
- Use glass containers that can be reused in the home.
- Buy recycled products when you can.
- Read labels on such items as motor oil, fabric and paper products.
- Repair before you replace large and small appliances, furniture.
- Pass on usable or repairable items to friends, charitable organizations or trade schools.
- Clothing, appliances, furniture Books, magazines.
- Reuse building materials.

(From Re/Uses, by Carolyn Jobs).

The Evolution of the Waste Can



Before You Begin

- Program Building Blocks
- Siting
- Composting
- Source Separation
- Collection
- Storage
- Processing
- Transfer

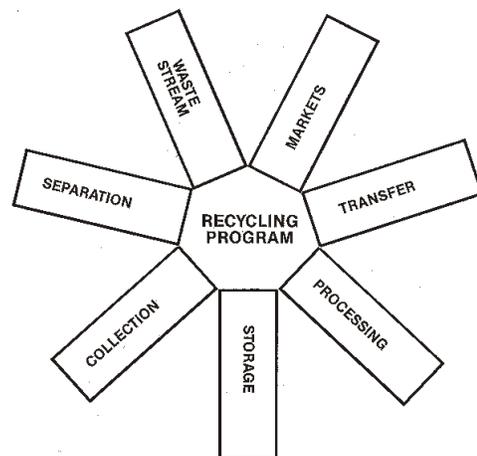


Development of a viable recycling program, like the development of any effective local government program, involves many interrelated "building blocks." Because the blocks are interrelated, and because each community and the people in it are unique, your recycling program will contain its own individual set of "blocks," but like most successful recycling programs, it will probably contain these:

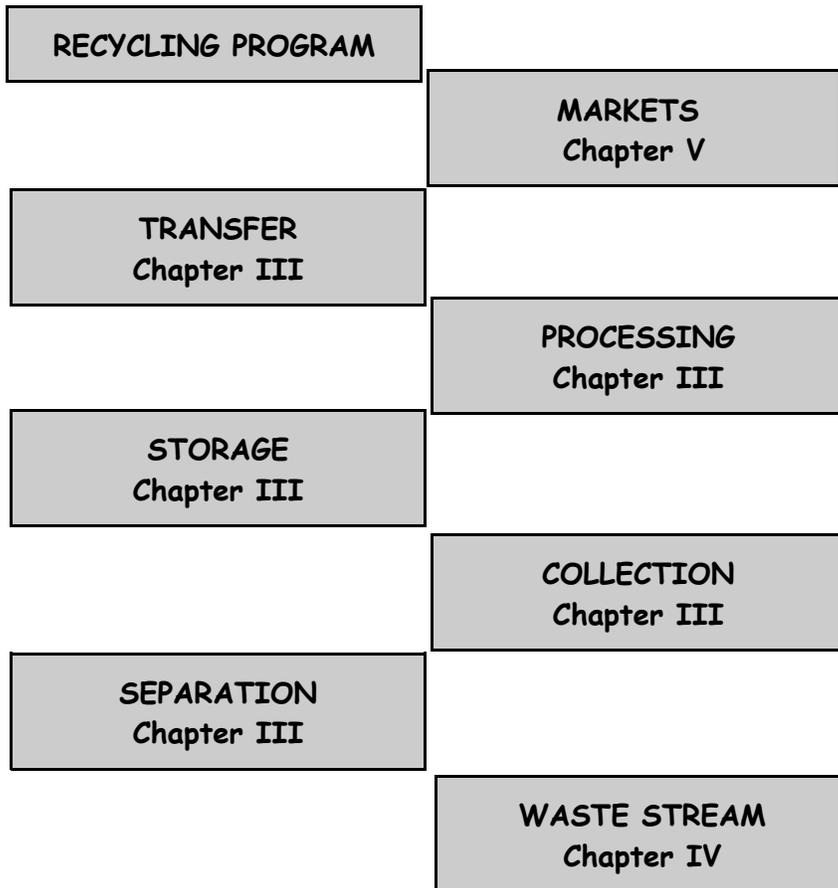
- Knowledge of the wastestream (Content, volume...)
- Source Separation (Choices - how many items to separate, what items)
- Storage (where, how long, covered, security)
- Collection System (kinds of trucks or trailers to use, schedule....)
- Post Collection Sorting/Processing (should there be some, what kind, who does it, where, how..)
- Transfer (who, how, when)
- Markets (available now, likely or possible in the future, unlikely to be practical for you-ever).

Even the arrangement of these universal blocks will be a bit different for you than for anyone else. Only you, and your associates in your local organization, can determine the proper mix and arrangement of blocks for your situation. We can give you the universal blocks and suggest some ways in which they can be arranged. The rest is up to you.

All of the universal blocks must be present as you build your plan, if it is to be balanced and stable.

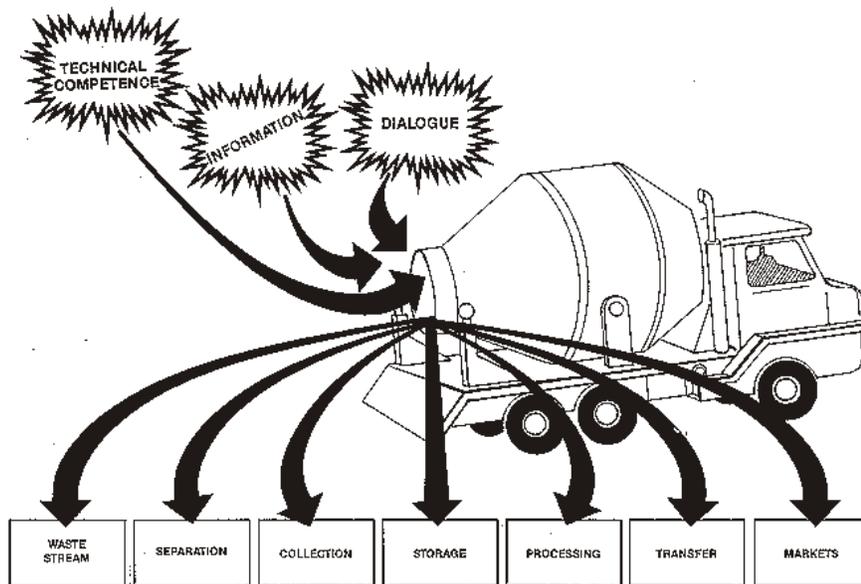


As you put your plan into operation, the blocks will seem to be stacked differently, for then if one slips, it will likely do more than just leave a gap in your program:



Before flipping to the chapter for the block that interests you the most, consider what is in every one of these "building blocks." Like a genuine concrete building block, each has a composition which makes it a strong block that won't crumble when a load is placed on it. The mixture of components can be adjusted slightly for either block-concrete or recycling-without an adverse effect on its strength. But, a drastic variation, or a missing component, will cause the block to crumble.

For a recycling (or nearly any government program) block the key components, instead of sand, water, and cement, are technical competence, abundant and clear information for all concerned, and a continuing dialogue with all affected.



Some readers will prefer to change the "dialogue" label to "public involvement" or to "citizen participation." No matter, as long as the ingredient is there. The important point is this is two way communication with those affected by the building block. It is hearing and understanding another's point of view, even if they do not wish to talk with you, and letting them know you have heard and you understand.

In building your program, the most important thing to remember is technical competence, information and dialogue are essential ingredients of each building block. You must make each a part of everything you do.

That technical competence is an essential ingredient of a recycling program is obvious. Less obvious is we are not really dealing with a "program;" we are engaging in a business endeavor. In that context, a missed detail can destroy all your efforts. Technical competence then must not just be present, it must reach into every part, every nook, every cranny of your recycling endeavor.

Further, what may be a valid technical approach in someone else's recycling project, may not be as valid for yours. You cannot afford to be a simple copy-cat, nor can you use a strict "cookbook approach." You must adapt and adjust what others have done and what others recommend in their manuals (including what we suggest in this one) to your locality's situation, needs, and goals.

To do that you need help. No single person can possibly be aware of all the ramifications of each part of anything as complicated as a full scale recycling program. Your partners in this undertaking must help you. "Partners" includes your associates in your recycling office, anyone else in the local government or governments in your territory that will be affected by (or that may affect) your efforts, and your "public": the people that must participate in your program—from those that supply your "raw material" by source separating in their homes, to those that (hopefully) view your "product" as a desirable raw material for their manufacturing process.

Information is critical to the success of your program. People need to know what you are trying to do, and why, so they can determine how it affects them. If you don't give them accurate, clear, understandable information early and continually for each building block, they will invent their own.

Getting information about your program to the people that should have it (everyone affected, or that thinks they are affected, by the program and anyone else that might have an impact on your efforts) is your job. You have to find these people and see they get the information they should have in a form they can, and do, comprehend. Simply making the information available accomplishes nothing. It must be received and understood by the target audience before it is useful. Your job is to see that happens.

Once your "partners" have the information they need to understand your plans and how they will be affected (and only then), it is possible for you to establish a continuing dialogue with them that will "close the circle" and provide you with the knowledge you need about how the technical components of the building block on which you are working need to be adjusted to make them work the way you need them to.

As with information, dialogue must be more than available, it must happen. Those affected by each element of your program have to know about it; and you and they must talk and listen to each other about how the program affects them and about how they will affect the program. It is not a question if people will affect the success of your program, it is a question of when and how. From your view point, the earlier the better. It is easier to adapt your program to people's needs early in the planning process.

Technical competence and content, information about it, and dialogue based on that information are not a section of your program, nor steps in it. They have to be in every part, every step. They are basic ingredients, not structural components. This is particularly true at certain points in your project development.

SITING

Any time someone proposes building something, anything, the neighbors will be concerned. Natural reaction. Think about it. Someone starts a house on an empty lot near your house: Will it "fit" with the neighborhood? Will it lower or raise the value of the neighborhood (and of your house)? Who will move in? Will they be pleasant neighbors?

What if it is a SOLID WASTE facility instead of a house? Now you really have worries. It will be an absentee landowner; there'll be more traffic; solid waste will mean litter, smells, noise-after all, all your life solid waste has meant the garbage can and the local dump. Remember what we said earlier about people inventing their own information if it is not supplied?

There is a public dialogue axiom that goes hand-in-hand with the one about people inventing information: A person is more likely to accept a decision, even if it is unfavorable to them, if they have been involved in the process that leads to the decision. "Involved" means they had accurate information early, engaged in a continuing dialogue with you about the choices you could make, they know you heard and understood their concerns and that you resolved as many as you could before you made your decision.

No question about it, that's a tall order; but if you want your transfer station, recycling center, processing center, storage facility, or whatever, accepted, involving the people affected is a job you must do. Find out who is affected, and if they don't realize it, tell them-as early as possible. They will get involved sooner or later, and you need it to be sooner, while you can modify your plans easily to resolve their concerns.

Remember we are talking about on going dialogue-conversation-between you and those you will affect with your project. Genuine information and view point exchange, the kind you need, occurs best in small groups; rarely in larger meetings, and almost never in public hearings. Find ways to talk with those affected one on one and in small gatherings of a few (less than ten) people.

Yes, it will take time, effort, and therefore cost some money. But, in the long run it is effort well invested because each piece of your program put in place this way will be a better piece. You will have identified and resolved many problems before they occurred.

As you proceed with your efforts, if you would like to talk over your planned approach to information and dialogue, call the solid waste engineer in your DEC regional office. He will introduce you to someone that can offer suggestions and be a "sounding board" for you.

COMPOSTING

Backyard composting can be effective in reducing the amount of yard waste entering your waste stream. It is a choice that avoids the problem of siting a major facility, but avoiding a major siting issue is the good news. The bad news is now you've got hundreds, perhaps thousands of siting issues! Don't despair, there may be a lot of them, but they are solvable. We have already accomplished the most important step on the way to the solution: recognizing that what you are facing is multiple siting issues instead of one.

Individual composting will do the job you need done only if most of your property owners actually start and continue with it. You'll need to go through the same steps you would in establishing any solid waste facility: provide early, understandable information and maintain a continuing dialogue with those involved. Concerns and fears will need to be identified and resolved. Since you are relying on individual efforts, you'll also need to help each individual with the technical competence they'll need to succeed.

Once you and they have resolved concerns about smell, appearance, location ("I don't have any place to put the ugly thing"), you will need to supply each property owner with the know-how they will need in order to succeed. In doing that, you also need to equip them with the confidence they need in their ability to succeed. A telephone number they can call for help is essential. Also essential is the help being more than just a voice on the other end of the phone. Sometimes an answer on the phone will suffice, but at other times a real person will have to show up at their door to help with a "hands-on" solution.

Fact of life: people move; property changes hands. You will always be implementing backyard composting. A continuing flow of information, continuing dialogue, and continuing readily available assistance must be there for your facility operators—yes, that is exactly what you have with backyard composting, multiple special purpose solid waste facilities. As long as you recognize that, and insure the three basic ingredients for this building block of your program are in it (technical competence, information, dialogue), backyard composting will be an extremely valuable part of your recycling program.

SOURCE SEPARATION

Be sure you tell your partners in this "building block" what you are thinking early in the development of the source separation program. They need to know what you will want them to separate, specifically what they will be asked to do, and why you picked the things you did for them to sort from their waste.

You need to know how they feel about what you are asking: Are they willing to sort out the

number of things you are suggesting? Do they anticipate storage problems? Will they rinse containers? What other problems do they see? What items do they feel should be sorted out that you are not asking for?

They also need to know your plans for the items they will sort, especially if you anticipate having to landfill some of the items periodically when markets are lacking. Nothing will destroy your working relationship with your partners in this endeavor more quickly than their discovery you are throwing out what they are sorting for you (unless they know why). Tell them of the possible need to do that at the beginning, and remind them once in a while.

Always remember this building block, like all others, has three essential ingredients: technical competence, information, dialogue. Insure all three are present on a continuing basis. Recognize that technical competence in this block is important for both sides of the partnership. Your partners will recognize this. They will want to be confident they are technically competent in what they have to do. No one likes to be responsible for a task for which they feel unprepared. Provide them with the preparation they need and give them the support (training; information; equipment-bins, bags, or whatever) they need to remain confident they are equipped for their half of the job. And, maintain a dialogue with them so you'll know when they need help, or a pat on the back.

Relatively few of your decisions throughout the development and operation of the recycling project will require consensus or nearly complete agreement from those affected. Most of the choices you make will require only acceptance. Knowing the difference is important!

Consensus is more likely to be needed in places where people must be actively involved for your project to succeed. Source separation is an example. Perhaps surprisingly, consensus is not an absolute must regarding what is to be separated. People will accept the choices you make regarding what to separate and will comply even if they don't fully agree with your selection IF they agree (this is the consensus part) recycling is a good decision for their community.

You won't be able to make everyone happy with your decisions, but if they know you understand the effect your choices will have on them, and that you tried to minimize the adverse effects, they will more likely accept them. This is especially true if they do agree with the basic decision that recycling should be a significant part of the area's solid waste management.

COLLECTION

Several groups of people will be affected by the choices you make in designing the

collection system. Each group will have its own needs, concerns, and ideas. As you begin the design of the collection system, identify all the groups and communicate with each one. Included will be current haulers, potential haulers, property owners, neighbors of drop off facilities, and those along the transportation routes.

Concerns will include potential (perceived) increase or decrease in hauling business, size of vehicles to be used, appearance of vehicles, potential for litter, schedule (early morning noise; mixing truck traffic with kids on the way to school, ...) and on and on. Your job is to find all those affected, make sure they know they are affected, talk with them, hear and understand how they feel about the collection job and the options for accomplishing it, insure they know you heard and understood them, and do everything you can to minimize the adverse impact on them. And, check back with them once in a while. Conditions change, opinions change, and the "actors" change. You must be ready to change as well.

STORAGE

Everything we said earlier about siting a facility obviously applies here. Establish an early, friendly, and continuing relationship with your neighbors. Understand their point of view and resolve their concerns. You can probably solve a number of problems "in one stroke" if you can convince them that, in the years to come, someone will always be available to work out problems and concerns with them. The difficulty here is two fold: convincing them, and delivering on that promise.

Discover all the concerns the neighbors have and help them identify any they have missed. Yes, help them find fault with your proposed storage facility. Knowing all the potential drawbacks now will let you avoid them as you design your facility. Be sure, in your mind as well as in theirs, that you have genuinely resolved the problems you and they have identified. Solving difficult problems now will avoid facing impossible ones later.

PROCESSING

By now, working with people affected by parts of your project, discovering what they really mean when they express concerns, and adapting your actions to accommodate their needs is probably "old hat." In fact, it may have become rather tiresome. You can't afford to be bored with the process.

Each time you begin a building block, carefully compile a new list of who is affected and who is likely to feel they are affected. (Another axiom: If someone thinks they are affected, then for your purposes they are.) Many of the people you have listed for your other building blocks will appear on your list for processing. But, there are some new candidates for the list; find them.

You may need two lists, for you really have a two step process here. First, you will be deciding whether to process and what, and second, you may be designing, siting, building,

and operating a processing facility. The lists for part one and part two will be similar, but not necessarily identical.

Take the time necessary to discuss this part of your project with all that are affected. When you make your decisions, you want to do so with full knowledge of the likely ramifications to all involved.

TRANSFER

There's not a great deal to add to what we have said earlier about working with those affected by each building block when we consider the transfer block. For the immediate neighbors of your storage or processing facility (whichever place transfer starts) the issue of trucks and traffic should already have been examined and resolved. But what about others further along the transportation route? If your organization is supplying the transportation, truck parking, maintenance, and cleaning may affect other people. Who? How?

If your markets are furnishing transportation, how are they affected? You will have agreed to certain conditions about traffic, noise, time of operation, and perhaps other items with the facility neighbors. Are those providing transportation for your material aware of these agreements; do they really understand them and what is meant by them; and can they comply-always-with the "letter and spirit" of them? They must. If they can't, you have some work to do. Whatever you do, don't let them break a promise you made to others.

Options for Recycling Programs

- Separation of Recyclables
- Collection of Recyclables
- Storage/Transfer of Recyclables
- Processing to Attract Markets



Recycling requires four types of activities:

1. Separation of recyclables from other wastes;
2. Collection of recyclables into centralized locations for shipment to processors or remanufacturers;
3. Storage of recyclables and transfer to processors or manufacturers;
4. Processing of recyclable wastes to make them easier to ship or prepare them for remanufacturing.

Each of these activities must be considered as a possible element in recycling program design.

This chapter describes the four types of recycling program elements, discusses options for accomplishing each one, and relates advantages, disadvantages and ideas learned from people who work in the recycling field.

SEPARATION OF RECYCLABLES

Separation of solid waste means setting aside certain waste materials to be recycled rather than discarded with other waste. Although it is possible to separate recyclables from mixed waste after collection, in practice "separation" is usually done at the source—the household, business or institution that generates the waste.

Source Separation

Source separation can be done in many different ways. Some communities mandate that recyclables be separated by type (for instance, glass from paper) or even by characteristic (clear glass from colored, or different colors from one another), while others accept clean, dry recyclables that are co-mingled in the same container, but separated from non-recyclable wastes.

Separation of recyclables at the source requires waste generators to set aside storage space and one or more containers to hold recyclables. The householder must provide a container for each different category of material to be separated. A business or institution needs to make arrangements to set aside recyclables in each office or other unit, to transport the materials to a small number of collection points within the building, and to store the materials.

One of the advantages of source separation is that the materials stay clean and uncontaminated by other wastes, making them more acceptable to markets. In addition, source separation does not require funding from government, unless the recycling program decides to provide containers to participants to encourage their cooperation.

The disadvantage most frequently cited is that people may object to source separation because it is time-consuming and too much trouble. Compliance rates of existing programs and the results of opinion polls, however, show that a majority of citizens are willing to participate in source separation.

Household Source Separation - Households generate several types of recyclable wastes: glass; metals, both ferrous (iron-based) and non-ferrous; newspaper and plastics are typical examples. Homeowners may be asked to separate and store one or more of these recyclables, either for set-out on recycling collection day or for dropoff at a central point.

Household hazardous wastes - leftover paints, pesticides and other materials that can contaminate environmental resources-present a special recycling problem. Some of these wastes are recyclable or reusable, if enough are accumulated. Communities sometimes arrange special collection for these wastes and transmit them to recyclers or reusers.

Source Separation in Businesses - Business offices and retail stores generate large quantities of waste paper and corrugated cardboard which are relatively easy to separate. The commercial portion of municipal waste also yields thousands of wood, cardboard or plastic pallets which can be recycled. DEC's STOP (Save That Office Paper) program illustrates a typical business source separation approach. Each office sets aside a box for waste computer printouts, white paper and colored paper. Once a week, the paper is collected from individual offices and separated for sale to a local firm.

Source Separation in Institutions - Educational and health care institutions generate waste paper and glass and aluminum beverage containers, as well as corrugated cardboard, pallets, leaves and yard waste. Users and employees of these facilities can participate in recycling if the institutions set aside receptacles for recyclable wastes. Schools provide an excellent environment for this endeavor. Since at least 50 percent of school waste is paper, collecting waste paper in each classroom is a logical place to start. Source separation in schools can serve as a focus for environmental education. Two school districts in Saratoga County are engaged in source separation projects and plan to develop a curriculum on recycling as an outgrowth of their source separation experience. In another instance, an elementary school in Kinderhook, Columbia County, used source separation as the basis for two recycling experiences: students recycled their own waste paper and made cardboard; they also combined food waste from their lunches with grass clippings from the school grounds to make compost.

EXPERIENCE SHOWS the source can be accomplished in any can community, regardless of area, population or collection system. Recycling programs should pay more attention to commercial, institutional and industrial sources of recyclables because these generate large quantities of materials at one location, simplifying collection and marketing. Most New Yorkers are aware of the crisis in solid waste disposal and express willingness to cooperate in recycling.

Industrial Source Separation - Many industrial wastes are recyclable, often with little or no processing, and can be sold to brokers or processors. Waste exchanges publish catalogs that list industrial waste materials for sale or trade. Hazardous industrial wastes, often generated from manufacturing processes, call for special handling during collection and storage.

Industrial plants also generate the same wastes as other segments of the community: food, beverage and paper wastes. Industries can set out bins or boxes to collect discarded containers, office paper and newspaper for recycling.

The process of source separation requires little time and effort, perhaps a few minutes each day to set aside recyclables in a household, business office or school. Every source of recyclables in a community should be encouraged to develop the habit of source separating.

Source Separation: Voluntary vs Mandatory

Voluntary Source Separation - New York State law says that municipalities Most New Yorkers must implement source separation recycling programs by September 1, 1992. Recycling programs initiated before that date can begin on a voluntary basis. Voluntary source separation programs request that all elements of the community participate in separating certain materials from the waste they generate without penalty for not cooperating. The decision to participate is left up to the individual resident, business or institution.

A voluntary program can appeal to and build community spirit, while minimizing costs to government. Most communities will not need additional collection capability to handle the volume of recyclables, because compliance is generally low in voluntary recycling programs. Since citizens are not required to participate, government does not have to provide a system and staff to enforce participation.

The disadvantage of a voluntary source separation program is that participation levels tend to be lower than in mandatory programs. If participation rates are very low, the quantity of recyclables may not be large enough to interest markets. A guaranteed volume of

materials is usually required to make a contract worthwhile for the market.

Mandatory Source Separation - If a community decides to begin recycling with mandatory source separation, local government must prepare and pass a resolution requiring that citizens participate and specifying penalties for noncompliance. For example, it is the policy of some mandatory programs that garbage will not be picked up unless recyclables are separated.

The principal advantage of mandatory source separation is that peer pressure and fear of penalty keep participation rates higher than in voluntary programs. As a result, mandatory programs divert a greater volume of waste from disposal and make larger and more predictable quantities of clean materials available to markets.

Enforcement becomes a consideration in a mandatory source separation program, because some individuals may consider source separation troublesome and time-consuming and refuse or forget to comply. Additionally, higher volumes of recyclables require early investment in additional collection equipment.

Separation of Co-mingled Recyclables (Sorting)

Co-mingled recyclables may be further separated, or sorted, either when collected at truckside or as part of processing. For instance, mixed glass can be sorted according to color. Some markets sort the incoming materials, but facilities such as drop-off stations or materials recovery plants can also perform this operation to make the recyclables more attractive to markets.

Truckside sorting is accomplished by collection staff using compartmentalized trucks. Each recyclable item is placed into a separate compartment in the truck. When co-mingled recyclables are collected, post-collection sorting makes the materials more attractive to markets. Markets pay higher prices for clean, sorted recyclables.

Some communities or waste collection companies have historically separated recyclables from mixed solid waste. This practice, known as "skimming," was done to take advantage of good prices for certain recyclables, to avoid high transportation costs or, more recently, to avoid high tipping fees.

Often, materials skimmed from wastes that are not source separated are contaminated by food and chemical wastes, making them difficult to clean and unacceptable to markets. Additionally, skimming tends to be done intermittently, which causes the volume of solid waste diverted from disposal to be unstable. Skimming is not a recommended method for recovering recyclables.

COLLECTION OF RECYCLABLES

Collection of municipal solid waste includes both pickup of wastes (either at curbside or from drop-off centers) and subsequent delivery to a processing, recycling or disposal facility. Wastes may be collected either unseparated or already separated for recycling. Many municipalities provide waste collection as a service to residents, financed by property taxes. Small communities often cannot afford to provide collection service to their residents, either because the expense is too great for the tax base or because settlement is not dense enough. Generally, small and rural areas are serviced by private waste companies or do not have waste collection services.

Curbside (or House-to-House) Collection Curbside collection means that recyclables are picked up at homes or businesses. Curbside service is usually offered in cities and suburbs, because it is most cost-effective in high-density population areas. A municipality or private waste hauler may collect recyclables either on the regular collection day or on another day as a special collection.

The principal advantage of curbside collection of recyclables is convenience is for generators of waste. Curbside collection also has the highest potential for keeping recyclables out of the disposal facility, because participation is easy. Curbside collection is the best means of encouraging participation, especially if collection of recyclables takes place on the same day as regular collection and if set-out containers are used.

The chief disadvantage of curbside collection of recyclables is that the community may have to invest in additional equipment and staff, either initially or as the program expands.

Set-Out Containers - An important innovation in residential recycling in recent years is the set-out container. A set-out container is usually made of plastic and is often box-shaped and stackable. Some large set-out containers hold 20 to 60 gallons and can be rolled to the curb. Communities distribute the containers to residents two or three weeks before the recycling program is scheduled to begin. Residents use the set-out container to store recyclables until pickup day.

Set-out containers encourage householders to source separate by serving as a convenient storage place for recyclables. They also make collection more efficient because they are easy to spot. Generally, the community purchases set-out containers for residents to use. This practice does increase costs for the recycling program.

Fee For Bags (or Pay As You Throw)- Some communities charge waste generators for disposal of waste that is not recycled, using an approach known as "fee for bags." Fee for

bags programs allow disposal only of waste in specially marked bags. The best way to manage a fee for bags system is to have the generators purchase the special bags for their waste and not charge them for recycling. Recyclables are collected in other containers.

Fee for bags programs encourage people to recycle, in order to save on garbage disposal costs. Proponents say fee for bags systems are more equitable than tax-financed programs because people pay according to the amount of garbage they generate.

Collection at Drop-off Facility

The second major collection option is the drop-off facility, which is a centrally located facility to receive and store recyclables brought by residents, businesses and institutions. They may be required to put different materials into each bin or be allowed to deposit them co-mingled, with all clean and dry recyclables mixed together in one container. Some drop-offs employ one or two persons whose duties may include sorting co-mingled recyclables.

Start-up costs for drop-off stations are relatively low because equipment, personnel and maintenance requirements are minimal and no change in existing waste collection is necessary. Participation rates tend to be low with drop-offs, however, since many people find it inconvenient to deliver their recyclables. Therefore, not much recyclable material is accumulated. Another drawback is that drop offs can become unsightly and collection bins can become contaminated if the site is not staffed and maintained.

Special Collection

In a curbside collection program, "special collection" indicates that recyclables are collected on a different schedule from regular garbage-a day of the week or time of day during which only recyclables will be picked up.

A variation on the special collection for both curbside and drop-off programs is to designate a day or week during which specific recyclables (construction and demolition debris, for instance) are accepted.

The advantage of special collection in a curbside program is that it allows pickup of "extra" recyclables without overburdening staff and equipment used for regular collection. Drop-offs are well suited to special collections of specific recyclables, since people seem willing to participate in a well-publicized occasional drop-off program.

Buy-Back Facilities

Buy-back facilities are similar to drop-off stations, because participants must transport their recyclables to the facility. The difference is that participants are paid in cash for the items they bring in. Many buy-backs are privately owned, but municipally-owned centers recyclables, such as do exist.

The advantage of buy-back facilities is the financial incentive, which attracts a core clientele and influences them to gather and deliver high-value materials such as aluminum.

The existence of private buy-backs is not always advantageous for government-run recycling programs. If a citizen can get cash for recyclables, he is less likely to give them to the local government which could realize a profit from these high-value materials. Moreover, participation rates are low for buy back systems, making them the most costly method per ton of materials recovered.

Collection of Unseparated Waste

The final option for collection is to pick up unseparated waste and separate recyclables after collection. This practice is not recommended because of the extreme difficulty of marketing recyclables contaminated by food and other wastes.

Collection Equipment

Equipment should be selected on the basis of efficiency, cost, safety, labor requirements and capacity. In many cases, existing equipment can be modified and used until new equipment is delivered.

Collection equipment choices include: vehicles designed specifically to hold separated materials, vehicles adaptable for recycling and equipment that modifies vehicles for recycling. Most manufacturers make available referral lists of owners of specific vehicles or equipment. Planners can use the list to contact owners and ask them about their experience with the equipment. In addition to questions about general usefulness, durability and maintenance, planners should ask about the area and population served and any problems or idiosyncracies encountered. A list of equipment options appears in Appendix E.

STORAGE/TRANSFER OF RECYCLABLES

Storage means accumulating recyclables in one location until they are transferred to the market. If recyclables are stored at a drop-off center, some sorting or cleaning may take place there, either by the individuals bringing them in or by staff. The same building may serve both as drop-off center and storage facility.

The need for and type of storage/transfer facilities will depend on many factors,

including: market specifications, the collection system, regulatory requirements (consult the Part 360 Regulations for applicable specifications), volume and weight of material to be collected, geographic area and total population served.

Storage of Recyclables

Most recycling programs will have to provide for storage of recyclables for periods ranging from a few days to one month. Accumulations of recyclables may be stored either on a short-term (one week or less) or long-term (up to 30 days) basis.

Long-Term Storage - Low-population communities often require long-term storage of recyclables, because the longer time is needed to accumulate enough materials to interest a market. Long-term, in this case, means storing recyclables for up to a month. Many small towns and villages use a trailer located at a town garage or other convenient spot to store recyclables brought in by residents. When the trailer is full, it can be attached to a truck tractor to transport the recyclables to market.

Short-Term Storage - Storing recyclables for a week or less is an option whether communities generate small or substantial amounts. For example, a small community may designate a day or a week for a special collection when residents can drop off recyclables. Whatever amount is accumulated by the end of that period is transported to or picked up by the buyer.

Storage Facilities

Facilities for storing recyclables must meet regulatory specifications for design and operation if more than five tons per day of source-separated, non-putrescible solid waste are handled. (Refer to Part 360 Regulations.)

Operating Standards for Storage Facilities - Storage facilities must be kept clean and secure. Containers should be covered and kept as clean as possible. The storage site should not be allowed to become littered and unsightly. Paving the storage area aids cleanliness.

Storage facility sites should be fenced to prevent vandalism and to insure the safety of visitors. It may be necessary to staff the site for security and maintenance.

Equipment Options for Storage Facilities - Storage facilities may use different types of equipment, depending on the volume of recyclables and the nature of materials collected. Options include trailer bodies, stationary bins, roll-off containers and sheds for weatherproof storage. Planners should ask equipment manufacturers about storage equipment.

Some storage equipment can be built, rather than purchased. For example, some recycling

programs have built storage bins from wood, cement blocks, cement or steel and modified them with watertight covers.

PROCESSING TO ATTRACT MARKETS

Processing yields clean, homogeneous materials, reduced in volume to facilitate transport. As a general rule, uncontaminated processed recyclables can be used in manufacturing in the same way as virgin materials. Providing processing is a good way to interest markets by meeting high quality specifications; processed recyclables can be marketed directly to the end user.

Materials recovered from the municipal waste stream will consist of:

Recyclables (residential) - glass, metals, papers (variety of types), corrugated cardboard and plastics (PET and HDPE).

Recyclables (commercial) - corrugated cardboard, papers (variety of types), plastic, glass and metals.

Compostables (residential and commercial) - leaves, yard waste, tree trimmings and wood pallets.

Processing Recyclables

Three basic processes can be performed at a drop-off station, recycling center or materials recycling facility:

Cleaning - Recyclables can be cleaned by rinsing bottles and cans

Sorting - Sorting divides recyclables into categories. For example, glass can be sorted by color. Light materials can be sorted from heavy ones, ferrous metals from non-ferrous metals, HDPE plastics from PET plastics and articles such as tires, white goods and batteries set aside from other recyclables.

Densifying - Densifying is a compacting process which reduces the volume of recyclables for storage and transport. Paper, plastic and yard waste can be shredded and baled, glass crushed, cans flattened, white goods crushed and shredded.

Processing recyclables generally involves a combination of manual and mechanical operations. Both public and private processing facilities are subject to regulation for health, safety and environmental reasons. Small-scale recycling programs may find that costs are too high to justify processing a small quantity of recyclables.

The Materials Recovery Facility (MRF)

Many communities choose to use a Materials Recovery Facility (MRF) or Intermediate Processing Facility (IPF) to process recyclables. Such facilities are intended to handle large volumes of materials and are designed and equipped to receive, process, ship and/or store recyclables.

A MRF consists of a building with a paved receiving area, space and equipment for processing and storage. The facility is staffed to operate equipment and help process materials.

MRFs are cost-effective for large-scale cooperative programs organized to serve, for example, a county or a region.

MRFs are expensive to construct and operate and special care must be taken to keep them as neat and clean as possible. Another drawback of MRFs is costs for energy use and equipment maintenance. In addition, siting disputes similar to those generated by other solid waste facilities may occur when an MRF is proposed.

The MRF is an industrial enterprise which must meet health, safety, environmental and production requirements. Regulatory information pertaining to MRFs is contained in the Department of Environmental Conservation's Part 360 Regulations.

Processes Performed In a MRF

A MRF is equipped to sort, clean and densify recyclables for transport and sale by manual and mechanical means. Machinery is also used to receive and convey recyclables.

MRF Cleaning Function. Remove contaminants, including metal rings and paper labels, lids, caps, dirt, ceramics.

Carried out by: Manually removing rings, lids, caps, labels. Using trommel screens to remove dust and dirt.

MRF Sorting Function. Further divide recyclables to prepare for processing.

Sort metals into ferrous and non-ferrous;

Sort paper by grades or from heavier recyclables;

Sort containers by material (plastic, glass and metal);

Sort glass according to color.

Carried out by: Hand sorting of white goods, glass, metals, heavy plastics, rugs, paper by grade;

Using trommel screens to pass lighter recyclables such as paper and plastic and drop out metals, glass and ceramic materials;

Using a magnetic separator to remove ferrous metal recyclables from comingled recyclables;

Using air classifiers and ballistic separators to sort light recyclables from heavier materials.

MRF Densifying Function. Reduce the volume of recyclables for storage and economical transport.

Carried out by: Baling newspaper, aluminum cans, plastics and metals;
 Shredding paper, plastics or metals;
 Crushing or densifying cans or white goods;
 Granulating plastic;
 Shearing metal.

Descriptions of types of equipment used in MRFs appear in Appendix E.

Processing Compostables

An estimated 15 to 20 percent of the average community's annual waste stream can be separated from municipal waste and processed by composting into a useful product, rather than being sent to the disposal facility. Organic wastes such as fallen leaves and other yard wastes, kitchen waste and sludge can be composted.

Composting takes advantage of the natural decay of organic matter to produce a dark, crumbly, earth-smelling mixture suitable for mulch, fertilizer or soil conditioner. The product is a valuable soil enricher which the municipality can use on landscaping and as landfill cover, or sell or give to residents for home use.

Municipal Composting - There are three ways to accomplish large-scale composting of leaves and yard waste:

Windrow composting - Windrows are piles of leaves and yard waste, usually approximately 20 feet wide and 10 feet high. The rows are kept moist and turned occasionally to promote decomposition and to ensure that the material decomposes fairly evenly. Windrows produce usable compost in six months to a year. To accelerate decomposition, the material should be shredded before or during the process and nitrogen added. If these additional operations are performed, the time needed for decomposition can be shortened to about two to three months.

In-vessel composting - Vessels are available that accelerate the decomposition process by circulating air and water. Some of these are airtight and pressurized, further speeding decomposition. Most of these units are modular.

Co-composting - Co-composting means the simultaneous composting of two or more diverse waste streams, for example, kitchen waste and yard waste or sludge and yard waste. Co-composting of municipal solid waste is best handled in a closed container because pests will be attracted to an open, longer-standing system that contains kitchen waste. Adding nitrogen-rich sludge to chipped yard wastes will accelerate decomposition. Any co-composting requires intensive management.

All large-scale composting methods are subject to regulation. DEC's Part 360 Regulations should be consulted by any community planning to compost.

Unless composting is done in-vessel, extensive open space is necessary for a compost facility site. Even with in-vessel composting, odors can be produced. Equipment and staff are needed to maintain both open and in-vessel composting, and especially co-composting. Composting of mixed municipal waste can result in a product containing contaminants such as heavy metals, which would require that use of the compost be restricted.

Planners should take into account that leaves and yard waste are seasonal, therefore collection and composting would take place only during certain periods of the year.

Backyard Composting - As part of an overall municipal solid waste management program, householders should be encouraged to compost in their own yards. Backyard composting is an excellent method of diverting grass clippings, leaves, tree trimmings and kitchen waste (without meat, bones or fatty foods) from the municipal collection system and disposal facility. A mixture of materials makes the best compost for plants.

There are three types of backyard composting:

Soil incorporation - Soil incorporation is the easiest method for limited space and a minimal amount of yard waste. Kitchen scraps (without meat, bones or fatty foods) and leaves can be buried six to eight inches below the surface of the soil in holes or in trenches between vegetable and flower rows. The best time to do this is after harvest. Using a rototiller to mix and break up the waste and mix it into the soil saves work.

Mulching - Spread grass clippings, shredded leaves and chipped twigs and branches around trees, shrubs and plants. The mulch reduces weed growth, retains moisture and provides nutrients. Note: Grass can be left on the lawn to add nitrogen back to the soil.

Compost bin or pile - A 4 X 4 foot or larger bin made of wire, pallets or wood can hold and compost most of the yard debris from the average yard. The waste should be layered with soil and an occasional handful of fertilizer to accelerate decomposition. The pile should be kept moist, but not soaking, and turned occasionally to allow air circulation. Decomposition

takes from six months to one year but can be speeded up with shredding and frequent watering. Watering is essential to stimulate the composting of leaves.

If residents compost in their yards, the municipality does not have to collect and dispose of the yard waste, saving costs for these services. In addition, backyard composting requires no regulatory oversight, and helps improve air quality by producing healthier plants and by cutting down on pollution from burning. Backyard composting also yields a valuable material for mulching and mixing with soil to nourish flowers, vegetables, trees and shrubs or for seeding new lawns or bare spots.

Composting requires some effort on the part of the householder and adequate yard space for a compost bin or pile.

Siting a Recyclables Storage, MRF or Composting Facility

Siting of any solid waste management facility is a difficult task, too complex to be treated in this planning manual. Some key considerations in siting facilities for a recycling program are:

Accessibility. Facilities must be sited near good roads to ease transportation of recyclables.

Flexibility. The site chosen should have room for expansion.

Environmental Appropriateness. The soils, topography and other site characteristics should be suitable for the activities or processes to be carried out on the site.

Siting of MRFs and composting facilities will be most successful if it is carried out in cooperation with citizens. Planners must be aware of existing zoning restrictions and of how adjacent land is being used, and should consult DEC's Part 360 regulations.

Responsibility for Processing—Public or Private?

Some communities assume responsibility for processing recyclables, but there are other alternatives.

Private Sector Processing - Private sector processors of recyclables include dealers and end-users, who may process recyclable materials either to use as raw material or to sell to manufacturers for reuse. "Merchant" MRFs owned and operated by private firms purchase recyclables from the collectors and process them, relieving the public sector of processing responsibility and making a profit.

Often, the private sector is better able than government to develop and implement technology for processing recyclables. Promoting private sector interest in the recycling industry can result in processing becoming the province of private enterprise rather than the responsibility of municipalities. The disadvantage is that the community loses control

of costs and schedules.

An assured supply from community recycling programs could make recyclable materials more desirable and competitive with virgin materials, especially since remanufacturing often requires less energy than manufacturing from virgin materials.

Public Sector Processing - A community may choose to undertake the processing of recyclables, especially if there is a large volume of waste to manage or if the community can cooperate with other communities in a regional program. Control of collection and marketing schedules and costs then remains within the public sector.

A disadvantage of public sector processing is that planning and constructing a processing facility requires a great deal of cooperation to accomplish within a reasonable time. The time necessary to complete such a project is often extended if it is publicly financed and implemented. Additionally, the expertise required to construct and operate a processing facility may be difficult to find within the public sector.

Public-Private Partnership - In this arrangement, the public sector goes out to bid for a private company to construct and operate a processing facility and to market the recyclables, or government purchases the land and the private sector builds and manages the facility, or government owns both land and facility while a private company operates and manages the facility. Trade-offs are part of the public-private partnership - the private sector pays taxes and lease fees, and government pays for recycling services.

Public-private partnership allows sharing of costs, expertise and experience and relieves the public sector of responsibility for managing the facility. A disadvantage of private sector involvement is that the community has less control of decisionmaking and must be sure that the private sector partner stands by its commitment. Public-private partnership can be more costly than other options.

EXPERIENCE SHOWS

- Municipalities should not think that taking responsibility for processing is their obligation. Many communities successfully obtain processing services from private companies or from markets.

Municipalities should start recycling immediately, whether or not long-range planning calls for the building of a materials recovery facility.

- Processing is essential to assure long-term marketability of materials.

- Processing requires a large population base to be cost effective, generally at least 50,000 persons. Regional processing is therefore appropriate.

Initiating and Expanding a Recycling Program

- About the Planning Guide
- Recycling program: Concept and Set-up
- Making Program Design Decisions
- Listening to the Public,
- Setting Goals and Objectives
- Gathering Information
- Evaluating Feasibility: Program Elements
- Formulating and Evaluating Alternatives
- Developing a Recommendation
- Starting Up the Recycling Program
- Case Studies



This chapter is a step-by-step planning guide to help create a recycling program that will divert waste from disposal and will be acceptable to the community it serves. The planning guide provides a framework for organizing and validating information and for evaluating alternatives, so that planners and decisionmakers have all available information as background for designing a recycling program. The conceptual program design that results from following the steps in this chapter will take into account the full range of possible program elements and prevent communities from eliminating alternatives before fully considering them.

If the community already has a recycling program, the planning guide can be used to shape future growth of the program.

ABOUT THIS PLANNING GUIDE

Assumptions

The planning guide is built around three assumptions:

Assumption 1: Anything that can be recycled should be recycled.

The planning guide uses marketability as the only factor limiting consideration of wastes for possible recycling. Planners who wish to base their programs on different assumptions, such as that cost should limit choices of waste to be recycled, may wish to modify the worksheets accordingly. It is best, however, not to allow costs to limit possible choices while the program concept is being developed.

Assumption 2. A program developed with public involvement will be better suited to the needs and capabilities of the community than one developed without input from the people affected.

The planning guide is structured to encourage public involvement in setting recycling goals, gathering information and developing and evaluating possible actions in a recycling program. Because it is unnecessary to take positions on program structure until recommendations are actually made, the approach suggested here minimizes conflicts during program development.

Assumption 3. Each community has its own way of making decisions.

The planning guide provides opportunity to take into account the characteristics of each individual community.

Background for Decisionmaking

This planning guide is a framework for planners to use in developing a conceptual recycling program. The guide divides the planning process into four stages:

Stage 1: Setting recycling program goals -Goals chart.

Stage 2: Gathering information -Worksheets 1-11.

- Stage 3: Evaluating feasibility of possible program elements -Worksheets 12-16.
Stage 4: Formulating waste-by-waste alternatives for program design decisions -
Worksheet 17.

The outcome of these four stages is the conceptual recycling program.

RECYCLING PROGRAM: CONCEPT AND SETUP

Concept

The conceptual recycling program outlines how the community intends to recycle, providing guidance for a multitude of technical, scheduling and budgetary choices. Conceptual planning should be carried out with as much public involvement as possible.

Once the planning process set out in this manual has been completed, the recycling program must still be developed and evaluated in detail. For instance, once a conceptual decision has been made to collect certain wastes for recycling, the number of vehicles, the schedule for collection and other technical aspects need to be determined. This detailed analysis should be conducted by people expert in recycling technologies, waste stream assessment and other technical subjects. Where possible, technical decisions should be based on the conclusions and advice of experts. A community should use its conceptual program to direct consultants in doing this work and to help evaluate and make decisions on the advice of consultants.

Setup

Program setup steps include:

- Selection of techniques to accomplish separation, collection, storage, processing. (Chapter III of this manual outlines options from which to choose.)
- Preparation and approval of budgets.
- Implementation steps.

These program setup steps, carried out by the recycling planner or by a consultant, are outlined in a checklist at the end of this chapter. If technical analysis shows any element of the planned program to be infeasible, the conceptual program design can be adjusted.

Who are the Planners?

This chapter uses the term "recycling planners" or "planners" to refer to the people charged with the task of setting up a recycling program. Concept background and setup background are the responsibility of "planners" -the recycling coordinators, consultants, public works directors-who will recommend both conceptual and detailed program designs. The individual or group functioning as recycling planners should have the following characteristics:

- Experience in the solid waste field

- Credibility in the community
- Organizational ability
- Budgeting experience
- Experience in working toward consensus
- Communications and public education skills.

Planners should identify regulators and sources of help to guide them in their work. (See chapters VI and VII for state agency contacts who can advise on financing, technical matters, state laws and regulatory requirements.)

MAKING PROGRAM DESIGN DECISIONS

To design the recycling program, community decisionmakers have to make choices on the following issues:

Which wastes can be marketed?

Will recyclables be separated from other wastes? How? Will recyclables be collected? How?

Will collected recyclables be stored or transferred? How?

Will recyclables be processed by the community and, if so, what processes will be used?

Recycling Program Elements

This planning guide provides a framework for determining marketability and for deciding whether and how to include the four elements of a recycling program:

- Separation
- Collection
- Storage/transfer and
- Processing.

A separate question for recycling decisionmakers is: Since source separation will become mandatory statewide in 1992, will the community begin with a voluntary or mandatory program? Will part of the program be mandatory and part voluntary?

Planners develop information, alternatives and recommendations to serve as the basis for decisionmakers' action on all these questions.

Who are the Decisionmakers?

Recycling programs affect virtually everyone in a community. For this reason, it is important that the decisionmaking process be made clear and the decisionmakers identified before recycling program design begins. In some communities, the mayor or other elected officials may be the recycling program decisionmakers. Other communities, however, may delegate this responsibility to the recycling coordinator, solid waste

department or public works department head, full legislative body, authority set up by one or more communities, or some combination of these.

LISTENING TO THE PUBLIC

Planners are encouraged to involve technical advisors and the public in the conceptual stages of recycling program development.

It is vitally important that the people affected by the recycling program taxpayers and anyone who generates waste take the most active possible role in designing the recycling program. This planning guide envisions extensive public involvement in goal-setting, information gathering, development and evaluation of alternatives.

It is up to the recycling planner to facilitate public involvement, and to take into account the information and evaluations contributed by the public. This guide provides a basis for constructive public involvement early in the development of the recycling program.

When conceptual program design begins, recycling planners should consider what kinds of citizen input they will seek. Householders, businesses, institutions and industries can provide important input in such areas as:

- Determining the community's recycling goals.
- Evaluating how recycling will affect different sectors of the community.
- Providing information about the people in the community or about technical matters.
- Suggesting possible program elements.

Citizens will seldom be able to provide technical advice for program setup, but should be informed and involved if technical evaluation leads to changes in program concept.

STAGE I

SETTING GOALS AND OBJECTIVES FOR RECYCLING PROGRAMS

Solid Waste Management Planning Goals

Most communities undertake recycling programs for very pragmatic reasons they are experiencing solid waste management problems which they believe recycling will help solve. Recycling planners, and the community as a whole, need to keep in mind that the underlying reason for recycling is always to solve the community's solid waste management problem.

This guide uses as planning goals broad, positive statements of outcomes that will solve solid waste management problems. For example, a very common solid waste management problem and related goal are:

- Solid Waste Management Problem - Landfill is running out of space.

- Solid Waste Management Goal - Prolong the life of the landfill.

In classical planning, the next step after formulating the solid waste management goal is to develop a set of objectives - measurable steps toward the goal. For the goal of prolonging landfill life, solid waste management objectives might include:

- Purchase enough land to increase landfill capacity by two years' waste.
- Reduce the waste stream by five percent of all waste now entering the landfill.
- Reuse five percent of all waste now entering the landfill.
- Recycle 30 percent of all waste now entering the landfill.

Note that only one of these solid waste management objectives relates to recycling. This objective, only one among many in a comprehensive solid waste management plan, will be a principal objective guiding development and operation of the recycling program. In this planning guide, we will refer to solid waste management objectives that relate to recycling as "recycling objectives."

Recycling Objectives

Recycling objectives follow from a community's overall solid waste management problems and goals. Examples of typical solid waste management problems goals and recycling objectives include:

- SWM Problem: Landfill is running out of space.
- SWM Goal: To prolong the life of the landfill.
- Recycling Objective: To recycle a volume of waste equal to 30 percent of the waste stream.

- SWM Problem: Landfill pollutes
- SWM Goal: To keep pollution-causing wastes out of landfill.
- Recycling Objectives: To recycle all possible pollution-causing wastes; to encourage development of new recycling processes using these wastes.

- SWM Problem: Waste-to-energy facility damage or inefficiency.
- SWM Goal: To remove from the waste stream materials that damage the facility or inhibit its operation.
- Recycling Objective: To recycle all possible abrasive, explosive and unburnable wastes.

- SWM Problem: Too much being spent on tipping fees.
- SWM Goal: To reduce weight of waste sent to solid waste management facility.
- Recycling Objective: To recycle all heavy materials, such as white goods and batteries.

To begin your community's recycling plan, fill in a copy of the goals chart for each solid waste management goal and recycling objective in your community's solid waste management plan. If your community has no solid waste management plan, develop goals from known problems, as illustrated above.

It is vital that recycling planners and the community remain aware of recycling objectives in their context of overall solid waste management needs - as part of a web of interrelated goals, objectives, sub-objectives and actions that constitute a solid waste management plan. As detailed planning for the recycling program proceeds, it will become apparent that the same actions and subobjectives will serve several different recycling objectives or goals.

Awareness of this web of actions, goals and objectives will give the recycling program flexibility, so that it can continue to fulfill solid waste management goals in the face of market fluctuations, waste stream changes and other variations in circumstances.

Using Objectives to Evaluate Recycling Proposals

This planning guide develops waste-by-waste "sub-objectives" and action alternatives, based on which wastes are feasible to market, separate, collect, store and process in the individual community. When the conceptual plan is finished, planners can return to the goals chart and fill in as sub-objectives their estimates of amounts of waste to be recycled, and as actions the related portions of their conceptual recycling programs. In this way, planners can check conceptual recycling programs against the community's solid waste management goals and problems. If solid waste management goals change, the goals chart can be used to guide and check expansions or changes to the recycling program. We suggest that you xerox extra copies of the worksheets.

Goals and Objectives

Make one copy of this worksheet for each recycling-related objective in your community's Solid Waste Management (SWM) Plan. Fill in the objective and the goal it serves, leaving sub-objectives and actions blank. If your community has no SWM plan, formulate SWM goals and recycling-related objectives that will solve SWM problems.

Community
SWM Goals

Recycling
Related
SWM
Objectives

Sub-
Objectives

Actions

STAGE 2 GATHERING INFORMATION

Worksheets 1 through 11 are provided to help planners organize the extensive and detailed information required to develop a recycling program.

Waste Stream Information (Worksheets 1 and 2)

(Reference: Chapter III, Options For Recycling Programs)

Use worksheets 1 and 2 to record information about your community's waste stream and its components. Worksheet 1 will show total tonnage of all wastes, recyclable and non-recyclable. Total tonnages show the magnitude of the waste stream daily and yearly. Monthly or quarterly totals will indicate any seasonal variations.

Worksheet 2 focuses on recyclables in the waste stream to show the percentage of each type of waste generated by the community and which generators produce what types of waste. An analysis of this information will determine the tonnage that could be diverted from disposal by recycling each material. Planners can use this information to guide their thinking about possible choices of materials to recycle, waste collection needs and the location of transfer, dropoff and storage facilities.

Planners can choose from several methods of estimating or assessing the waste stream:

- To gauge tonnage and components, planners can prepare a waste stream estimate broadly based on the national averages of municipal solid waste or other data already developed by other planning units, particularly those that are economically and demographically similar. (A sample waste stream assessment based on national averages is in Appendix B.)
- To obtain a more precise total of waste being disposed of, planners can use counting trucks entering the disposal facility and/or weighing the trucks before and after unloading.
- To obtain tonnages from commercial, industrial or institutional generators of waste, planners can ask the generator for an estimate or, if the generator employs a private hauler, consult the hauler.
- To obtain the most accurate and complete assessment, the community can hire a consulting or engineering firm to ascertain components, amounts and percentages of each type of waste and total waste tonnages.

It is important to consult with residents, business and industry to validate information about the types and amounts of waste.

Market Information (Worksheets 3 and 4)

(Reference: Chapter V, Marketing; contacts with markets)

The information learned from contacts with markets can be used to produce a "short list" of recyclables, consisting of the recyclables that are the most marketable. The short list is used in subsequent worksheets to evaluate the feasibility of recycling specific wastes, which will influence the formulation of alternatives. Fill out worksheet 4 for each waste and any time you hear about a new market.

Existing Solid Waste Management System (Worksheets 5, 6, 7 and 8)

(Reference: Municipal records; pilot program)

An inventory of the existing collection and storage system, public and private, will determine what vehicles, staff and storage capabilities are already available and how adaptable these are to recycling. Pilot programs can be useful in gathering information on the workability of collection and storage systems, as long as planners keep in mind that the information applies to a limited area and period of time. This information serves as a base for decisions on additional purchases and hiring and for scheduling pickup of recyclables. Planners will also discover what materials are not recycled by any group in the community.

Community Characteristics (Worksheets 9 and 10)

(Reference: Pilot program; community records)

Information about the community will guide decisions on what and how to separate, collection method and schedules, public information programs and incentives to promote interest and participation. Pilot programs can be a source of information on the acceptability of recycling, but planners should recognize that pilot results apply to a small segment of the community.

Present Solid Waste Management Costs (Worksheet 11)

(Reference: Community records)

Planners need collection and disposal cost breakdowns and totals to estimate how costs will change when a recycling program is added.

Worksheet 1
Total Waste Generated

Month _____ Year _____

Recyclables	Tonnage Collected	Percent of Total	Pounds Per Capita	Volume Collected*
Newspaper				
Corrugated Cardboard				
Office Magazine				
Mixed				
Other				
Glass				
Metal - Ferrous				
Metal - Non-Ferrous				
White Goods				
Plastic - PET				
Plastic - HDPE				
Yard Waste				
Tires				
Batteries - Household				
Batteries - Vehicle				
TOTAL				
Non-Recyclables				
Grand Total				

* To convert weight to volume, consult the Conversion Factors Table in Appendix B.

Worksheet 2: Recyclables

Use this worksheet to display recyclable wastes by waste type and generator type. Use actual measurements where available, or, if total waste stream figures are all you have, complete the table with estimates based on the sample waste stream analysis in Appendix B. If you are not confident of the information you have, conduct a more detailed waste stream assessment.

Worksheet 2: Recyclables

Recyclables	GENERATOR AND AMOUNT									
	Household		Commercial		Institutional		Industrial		Total	
	%	Tons/Yr	%	Tons/Yr	%	Tons/Yr	%	Tons/Yr	%	Tons/Yr
Newspaper										
Corrugated Cardboard										
Office										
Mixed										
Magazines										
Other										
Total										
Glass										
Total										
Metal - Ferrous										
Metal - Non-Ferrous										
White Goods										
Total										
Plastic - PET										

	GENERATOR AND AMOUNT									
Recyclables	Household		Commercial		Institutional		Industrial		Total	
Plastic - HDPE										
Total										
Tires										
Total										
Batteries - Household										
Batteries - Vehicle										
Total										
Kitchen Waste										
Yard Waste										
Total										
GRAND TOTAL										

It is important to update this matrix whenever new information about the waste stream becomes available.

Worksheet 3: Marketing (See Chapter III)

Use worksheets 3 and 4 to summarize the information obtained from calls or visits to recyclers or to industries that accept recyclables as raw materials. For each waste, try to find more than one market, write each name on the worksheet and the tonnage of recyclables the market will accept. Use a check mark in the last column to indicate whether bulk processing (bating, shredding or other processing that must be done after pickup) is required before the buyer will accept the material.

When seeking markets, be sure to contact users of large amounts of secondary materials or those who might be persuaded to use recycled rather than virgin materials. Some manufacturers can use materials from the commercial or industrial portions of the municipal waste streams which your community may be able to supply. Discuss whether to give away or even pay small amounts, if the secondary material user will take your recyclables.

In the case of yard waste, planners may not find a market but the community could compost it and distribute the product to residents or use the compost material on public lawns and gardens.

Recyclables	Name & Location of Markets	Amount Accepted (tons/year)	Processing Needed?
Newspaper			
Corrugated Cardboard			
Office Magazine			
Mixed			
Other			
Glass			
Metal - Ferrous			
Metal - Non-Ferrous			
White Goods			

Recyclables	Name & Location of Markets	Amount Accepted (tons/year)	Processing Needed?
Plastic - PET			
Plastic - HDPE			
Yard Waste			
Tires			
Batteries - Household			
Batteries - Vehicle			
Other			
Other			
Non-Recyclables			

Worksheet 4: Market Specifications

Make copies of this worksheet and fill one in for each waste for which you found markets. Each time you hear about a new a market, record the information on one of these worksheets for your file.

Type of Waste: _____

Identify each market and fill in the information required.

Market Name: _____

Who is the contact person? _____

How much of this material will the buyer take? _____

How often must that material be ready for transfer? _____

What condition must the material be in? _____

Will the market pay for the material? [] Yes [] No What amount? _____

Will the market charge to take the material? [] Yes [] No What amount? _____

How will the payment be made? _____

How long a contract will the market accept? _____

Notes:

Worksheet 5: Current Status of Recycling

Use the following worksheet to summarize information on what is being recycled in your community. I 'By whom" refers to the group or agency collecting and marketing the recyclables. Indicate whether materials are source separated or co-mingled. In the "How Collected" column, indicate whether materials are picked up or dropped off, or note locations for pickup or drop-off. Identify the market, and in the last column, note the tonnage marketed each year.

Recyclables	By Whom	How Separated	How Collected	Market	Ton/Year
Newspaper					
Corrugated Cardboard					
Office					
Mixed					
Magazines					
Other					
Total					
Glass					
Total					
Metal - Ferrous					
Metal - Non-Ferrous					
White Goods					
Total					
Plastic - PET					
Plastic - HDPE					
Total					
Tires					
Total					

Recyclables	By Whom	How Separated	How Collected	Market	Ton/Year
Batteries - Household					
Batteries - Vehicle					
Total					
Kitchen Waste					
Yard Waste					
Total					
GRAND TOTAL					

Worksheet 6: Collection Capacity

Enter the number and capacity of vehicles presently in use to collect solid waste. Be sure to include vehicles collecting from institutions, businesses and industries, as well as from households, and privately-owned as well as publicly-owned vehicles.

	Municipal		Private		Non-Profit		Total	
	#	Capacity	#	Capacity	#	Capacity	#	Capacity
Collection Vehicles								
Trailers								
Dump Trucks								
Compactors								
Compartmentalized Recycling Trucks								
Pickup Trucks								
Box-Bed Trucks								
Stake-Body Trucks								
Others								
Total								

Worksheet 7: Storage Capacity

Identify all facilities now used to store your community's solid waste.

	Number	Type of Waste Stored	Capacity	Area Served
Storage Facilities Drop -Off				
Transfer Stations				
Storage Equipment Trailers				
Bins				
Waterproof Areas				
TOTAL				

Worksheet 8: Collection and Storage Staffing

Count the number of employees presently involved in your collection system and enter below.

Number of employees in collection: _____

Number of drivers: _____

Number employed at transfer station(s), etc. _____

Number of employees in management: _____

Worksheet 9: Community Information

Total area of community: _____

Total population of community: _____

Sources of Large Quantities of a Single Waste - List the names and locations (general area is sufficient). Ask each of them for the amount and types of waste they produce. A pilot program can be useful for collecting this kind of information.

Waste Generated	Location	Waste Type	Amount of Waste
Factories			
Businesses			
Educational or Health Care			

Worksheet 10: Population Density

Use zoning maps and assessment records as sources for the information requested below. The percentages will be helpful in making decisions about collection and communications programs.

Land Use	Area	Approximate % of Total Area	Population	Approximate % of Total Population	Number of Districts
Single Family					
Multi-Family					
Business					
Industry					
Commercial					
TOTAL					

Population or cultural circumstances are important. For instance,

- Are there any changes in neighborhoods, such as deterioration causing people to move out?
- Or rehabilitation causing people to move in?
- Are there areas with an aging population where participation may be difficult?
- Are there any special factors dividing or uniting the community?

Incentives should be considered at this stage.

- What would stimulate interest in recycling by different sectors of the population?
- What would stimulate participation? For individuals? For businesses?

Worksheet 11: Current Solid Waste Management Annual Costs

Record overall annual costs (to taxpayers) for waste collection and disposal before recycling. Once recycling is established, avoided costs can be subtracted from solid waste management costs to show that recycling reduces overall costs.

ADMINISTRATION COSTS

Salary and benefits for management and clerical workers	\$	
Equipment Purchases	\$	
Vehicles	\$	
Finance Charge	\$	
Depreciation	\$	
Storage Equipment	\$	
Finance Charge	\$	
Depreciation	\$	
TOTAL: Administration Costs	\$	

OPERATION COSTS

Labor:		
Wages and benefits for collection and delivery personnel	\$	
Equipment Operation:		
Fuel (collection)	\$	
Fuel (delivery to disposal facility)	\$	
<small>(Miles roundtrip X number of trips on collection day X number of collections days/year X price/gallon divided by miles/gallon)</small>		
Maintenance, tires, repairs	\$	
<small>(Include percent of mechanic's wages and benefits for work on vehicles)</small>		
Insurance, licenses, etc.	\$	
TOTAL: Equipment Operation	\$	
DISPOSAL Tipping fees and facility operation	\$	
TOTAL: Operation Costs	\$	
TOTAL SOLID WASTE COLLECTION AND DISPOSAL COSTS	\$	

STAGE 3

EVALUATING FEASIBILITY: PROGRAM ELEMENTS

Worksheets 12 through 16 record the planner's initial judgements about feasibility, for the planner to use in making a "first cut" determination of where to focus detailed planning.

After the program element feasibility evaluation, planners should develop alternative ways of carrying out each program element judged feasible. Stage 4 of this planning guide contains advice for developing alternatives.

Marketability (Worksheet 12)

(Reference: Worksheets 3 and 4)

Worksheet 12 uses the information gathered from markets to determine which wastes are marketable (the "short list"). In this guide, judgement of whether a waste is marketable shapes program design.

Feasibility of Separation, Collection, Storage/Transfer (Worksheets 13 through 15)

(Reference: Worksheets 5,6,7 and 8)

Worksheets 13 through 15 consider how feasible it is to include in the recycling program separation, collection and storage/transfer of the marketable wastes on the short list. To avoid prematurely rejecting workable program elements, planners are encouraged to make independent evaluations of each possible program element for each waste, before working through how including each element will affect the feasibility of the others. The worksheets for each program element include space to record modifications of existing conditions that might increase feasibility. Modifications might include incentives to participation (or disincentives for nonparticipation), technical innovations, public education programs, increased taxpayer financing - the planner should think creatively and work with the public to develop modifications that might make important program elements work.

Feasibility of Processing (Worksheet 16)

(Reference: Worksheet 4)

Recycling programs can market a greater volume of materials, find new buyers and get a higher return by performing processing. The feasibility of processing for a particular waste depends on such factors as staff needed, whether the increased value of the materials justifies the purchase of processing equipment or whether the community will accept a processing plant.

Pilot Recycling Programs

Pilot recycling programs can help recycling planners gather information on recycling from a small segment of the community and are valuable in planning and implementing a full-scale recycling program.

Often, local governments choose to implement a pilot recycling program before committing to full-scale recycling. The pilot program serves as part of the planning process by providing planners with information on program elements and community acceptance. Planners should set up a pilot program to accomplish a specific purpose, for instance, to gather particular information, to promote acceptance of recycling or to arouse community interest in recycling.

Characteristics of a pilot recycling program: Limited to a certain number of households, government buildings or businesses in a defined area. For example, 100 or 1000 households in a residential section; one or several government office buildings.

- Limited types of recyclables. For example, newspaper and glass containers; glass and aluminum containers; newspaper and corrugated cardboard.
- Limited period of time. For example, three months or six months.

Information can be collected about participation rates, amounts of waste collected and marketed, community acceptance, collection schedules, equipment and staff efficiency and any problems that develop.

At the close of the pilot period, the information is analyzed and evaluated. Planners can then use the evaluation of the pilot experience to make recommendations and adjustments for a full-scale recycling program.

PRO

- Pilot recycling programs allow municipalities to try out a recycling plan in a limited way to gather information for full-scale programs.
- Pilot recycling programs permit problems to surface so that adjustments or changes can be made before full-scale recycling is in place.
- Pilot recycling programs are less expensive for municipalities to implement than full-scale recycling programs.

CON

- Pilot recycling programs end after a brief period, allowing participants to return to old habits and leaving the community without a recycling program of any kind,
- Equipment used for curbside pickup in the pilot program often can be lost or misplaced when program ends.
- Because a pilot recycling program is perceived as experimental, high participation rates and a substantial volume of recyclables diverted from the disposal facility are not necessarily indicative of the same degree of success for a full-scale recycling program,

Worksheet 12: Marketable Wastes

Use the percentages and tonnage totals summarized on worksheet 2 and the information from columns I and 2 on worksheet 3 to determine whether particular materials are marketable.

On the following matrix, indicate the amount your community generates of each material per year and the amounts that markets will accept. The outcome of this matrix is a "short list" of marketable material your program should consider recycling. Compare the total amount marketable to the total amount generated. In the "Short List" column, check each waste that your community generates in quantity and that can be marketed. Be sure to include wastes that are generated at one easy-to-collect source, even if the amount generated is relatively small.

Short List	Recyclables	Total Generated by Community	Market 1 Amount	Market 2 Amount	Market 3 Amount	Total Marketable
	Newspaper					
	Corrugated Cardboard					
	Office					
	Magazine					
	Mixed					
	Other					
	Glass					
	Metal - Ferrous					
	Metal - Non- Ferrous					
	White Goods					
	Plastic - PET					
	Plastic - HDPE					
	Yard Waste					
	Tires					
	Batteries -Household					
	Batteries - Vehicle					

Feasibility of Separation, Collection and Storage (Worksheets 13, 14 and 15)

References: Chapter 111, Separation, Collection and Storage sections, Worksheets 5, 6, 7 and 8 and your judgements about feasibility.

Use worksheets 13, 14 and 15 to summarize your judgements about the technical feasibility, cost and acceptability to the community of each type of separation, collection and storage for the recyclables on your I short list." "Feasible as is" means the method can be used with the existing solid waste management system, including collection method, equipment on hand and community acceptance. "Feasible with modifications" means the method would require modifications of existing conditions, such as public education programs, expenditures of money, incentives or requirements.

Surveying

Opinion surveys can be a valuable source of information for planners and decisionmakers if they ask themselves these questions first:

- Is a survey needed or is the information already available in the records?
- Do we have the staff expertise to conduct the survey or should we hire a consultant? (Consider area colleges and universities for help from survey research professors.)
- Will colleagues understand that we can get a solid reading on the audience by surveying only 400 people-whether the audience is 4,000 or 15,000,000? If not, be sure to have an expert's statement on this available.
- Are you and your colleagues too close to the survey content to frame unbiased questions? (Again, an expert can help.)
- If yours is a public agency, will you be comfortable sharing the results with the public? If not, don't invest the time and money on the survey.
- Will you be willing to change your position on a recommendation if data generated indicate a direction other than the one you supported before the survey?

(Source: Communication Briefings, charter issue. Published by Encoders, Inc., Community Square, 403 Sicklerville-Williamstown Rd., Sicklerville, N.J. 08081.)

STAGE 4 FORMULATING AND EVALUATING ALTERNATIVES

Formulating Alternatives

Statements about possible program actions that seem to be feasible and useful are termed "alternatives" in the usage of this book. Alternatives are formulated for program elements judged to be feasible in worksheets 13 through 16, by writing sets of statements about separation, collection, storage and processing of each material on the "short list." Some people call this creative and open-minded process of formulating alternatives "brainstorming."

Examples of alternatives might look like this:

Element 1: Source Separation

- Separate newspapers in homes; with incentives or other modifications (such as a mandatory ordinance).
- Separate newspapers from co-mingled waste generated by businesses.
- Separate aluminum in homes and stores.
- Do not source separate "tin" cans.

Element 2.- Collection (private, municipal or combination)

- Collect newspapers at curb from all sources.
- Collect newspapers at drop-off from all sources.

Element 3: Storage

- Store newspapers at existing facility.
- Store newspapers at facility to be rented or purchased.
- Send newspapers directly to market without storage.

Element 4: Processing

- Process newspapers by shredding and baling.
- Do not process newspapers.

Alternatives for each element can, and often will, be statements that are mutually contradictory. At this point, the planner is purposely keeping an open mind about alternatives; subsequent evaluation makes it clear which alternatives are workable.

Involving citizens in the formulation of alternatives often promotes creative thinking about possibilities, and helps citizens understand how program proposals were developed.

It is important not to become committed to any alternatives at this point, and to remind

elected officials and citizens that alternatives need to be "formally" evaluated before program decisions can be made.

Evaluating Alternatives

The next step is to evaluate the alternatives. Keep in mind that evaluation is not decision. Public involvement in evaluating alternatives is very productive and gives citizens a sense of "ownership" of the developing program.

Cost should be part of the evaluation, using whatever approximate estimates can be made without detailed technical analysis.

Evaluate each alternative by asking yourself and your community questions such as:

- What levels of participation will this alternative generate? How much waste will this alternative remove from the waste stream? What would be the consequences of this alternative: for taxpayers? for businesses? for hospitals? for schools? for homeowners? for apartment dwellers? for industries? for private solid waste management companies?
- How does this alternative fit my recycling objectives and solid waste management goals? (See Goals Chart.)
- How likely would each segment of the community be to participate?
- What kinds of incentives can we use to build participation?
- What effect would this alternative have on solid waste management costs?
- What effect would this alternative have on collection schedules and other local solid waste management activities?
- What effect would this alternative have on existing recycling efforts?
- What effect would this alternative have on the material's marketability?
- What effect would this alternative have on solid waste management costs and revenues?

Other pertinent questions will arise when alternatives are presented to the community. Responses to these and to other questions, as well as ideas generated from the public, can help in eliminating, modifying or generating additional alternatives. Don't be reluctant to innovate, to use common sense and to adapt elements to community needs, values and circumstances.

DEVELOPING A RECOMMENDATION

Having developed alternatives and evaluated them with maximum public involvement, planners now are ready to make recommendations about the program. It is important to realize that involving the public means that groups and individuals from the community contribute to the evaluation of the alternatives. They do not replace the officials who will actually make the decisions.

Designing the Community Recycling Program

Once the collection of information and the formulation and evaluation of alternatives are complete, the work of designing the recycling program can begin. There may be several good alternatives for some elements of the recycling program; for other elements, evaluation may reveal significant drawbacks to all alternatives.

To develop a conceptual recycling program, the planner makes combinations of alternatives and evaluates how well each combination might work. To do this, use the following steps:

For each waste on the short list, choose one or more alternatives for each of the four program elements—separation, collection, storage and processing—judged feasible. (More than one alternative may be needed for a particular waste if different markets for the same waste require different types of separation, collection or processing, or if waste from large single generators is to be handled outside the community wide program.)

Evaluate feasibility and impacts of the combination, and list any special conditions and commitments (e.g. incentives, purchase of new equipment, passage of legislation) needed to make the combination work. When evaluating the conceptual program proposal, be sure to take into account avoided disposal and transportation costs and the overall effect on solid waste management costs.

Look for problems that might arise when alternatives previously considered separately are combined. If there are many workable alternatives for some program elements, develop and evaluate more than one different combination.

Prepare a recommended conceptual recycling program for decisionmakers' consideration. For each marketable waste, the program should include all elements (separation, collection, storage and processing), if only to note that for certain wastes no program is recommended for a given element.

Decisionmakers may wish to explore the implications of the recommended program, or to experiment with other combinations of alternatives. Worksheets 12 through 16 and the planner's list of alternatives and evaluations clearly show the judgements underlying the recommended conceptual program and possible effects if decisionmakers accept or change the recommendation.

Worksheet 17: Alternatives

Make copies of this worksheet and use it to record alternatives for each type of waste on your short list.

Recyclable: _____

Source Separation Alternatives:

Collection Alternatives:

Storage Alternatives:

Processing Alternatives:

STARTING UP THE RECYCLING PROGRAM

After the conceptual recycling program has been selected, a number of additional tasks must be completed before the first wastes can be recycled. Since community circumstances vary greatly, this manual does not attempt to provide detailed guidance for selecting technical options. Chapter III provides a starting point for developing technical options-the basic catalog from which a planner can extract a list of techniques to investigate in detail.

Startup Checklist

Choose technical options.

- Select equipment, design, site and, if necessary, construct facilities for collection, storage and processing.
- Set schedules for collection and delivery.

Prepare a project schedule for the entire program.

- List each step, starting and completion dates for each step.
- Record time (in days, weeks or months) that each step will take.
- Record total time expected from start to completion of the project.

Prepare a budget for the recycling program. Costs

- Administration: Personnel, office and equipment, supplies, public involvement and publicity campaign,
- Collection and processing: Additional equipment, storage and processing sites and facilities, utilities, licenses, permits, insurance, fuel.

Revenues

- Sale of recyclables.
- Income from state grants for planning, equipment, personnel and promotion. Other: Such as bonds, fees added to tax bill, sale of containers for recyclables or bags for garbage to participants, or a per bag garbage dumping fee.

Note: Avoided disposal and transportation costs should also be taken into account because they will reduce overall solid waste management costs.

Obtain necessary approvals and permits. Check DEC's Part 360 Regulations to determine regulated or exempt status and requirements for application.

Prepare legal measures. (Samples of ordinances are in Appendix A.)

- Source separation ordinance.
- Definition of penalties for non-compliance.

- Provision against vandalism of sites and scavenging of recyclables.

Take pre-implementation actions.

- Confirm market agreements.
- Acquire land, buildings and equipment.
- Hire and train additional staff.
- Prepare publications, advertisements, etc. for publicity campaign.
- Set implementation and collection schedules.
- Insure site security.
- Put recordkeeping system in place.

For pre-existing program:

Evaluate the recycling program.

- Amount of waste actually diverted from disposal facility.
- Accuracy of estimates of amounts of recyclables collected.
- Ability to meet market specifications.
- Extent of community interest and participation.
- Avoided costs.

Expand the recycling program.

- Institute incentives to increase levels of participation.
- Separate more types of recyclables.
- If voluntary, make program mandatory.
- Make adjustments in program elements as needed to run smoothly.

Local Factors Affecting Solid Waste Management Facility Siting

- Are there existing land use and zoning restrictions that will affect the siting of a drop-off center or processing facility?
- Does the community have laws against importing waste?
- Is there local opposition to siting a solid waste facility nearby. Who is opposed? Where is the opposition located?

APARTMENT-HOUSE RECYCLING - NEW YORK CITY

Community type: Large city Community size: over seven million people Special problem:
Many apartment buildings with over four units

Programs for apartment buildings:

1. Department of Sanitation Curbside
2. Department of Sanitation Containerized

Status: On March 28, 1989, the City passed a mandatory citywide recycling bill which was signed into law by Mayor Koch on April 14. The law is scheduled to

go into effect over a five-year period beginning in summer 1989.

Materials recycled: Newspapers, bottles and cans as of June 1989.

Curbside Program: Recyclables separated within a building are emptied into large bins and set out at the curb by building maintenance staff. In summer 1989 curbside program collects from 500,000 households in 13 districts once or twice a week.

Source separation: Yes.

Residents separate newspapers, bottles and cans, take them to designated area on each floor where maintenance staff picks up recyclables and delivers to basement storage area. If there is no maintenance staff, residents deliver to storage area.

Storage: Bins in each building provided by Department of Sanitation for recyclables are kept in a designated storage area within the building.

Collection: Recyclables are emptied into larger bins and set out at curb by building maintenance people. Department of Sanitation collects curbside once or twice a week.

Processing: Currently at recycling center in East Harlem which has an estimated processing capacity of 100 tons a day of mixed glass and metal containers and newspaper. Some materials are sold to private vendors for processing.

Containerized Program: Cubic yard containers (dumpster-style) are provided by DOS for buildings under 150 units with access for the department's mechanized vehicles. In summer 1989, 200,000 households were being serviced.

Source separation: Yes.

Tenants separate recyclables and deliver to designated area in building based on the usual method of handling garbage in each building.

Storage: DOS provides steel shelters or dumpster-style containers for recyclables which are kept in an area accessible to recycling trucks. Maintenance workers get the recyclables ready for collection.

Collection: Sanitation Department mechanized vehicles collect recyclables once a week.

Processing: Sold to private vendors or processed at East Harlem recycling center.

Results: By June 1989 the program was recovering 400 tons of recyclable materials daily.

Future Plans: Recycling has received an increase in funding for fiscal 1989. Over five years, the program will expand to all five boroughs and collect newspapers, magazines, cardboard, metal, glass and plastic containers from high-rises and from buildings with less than 150 units.

The law requires homeowners and tenants to separate metal, glass and plastic containers and place them in a blue and white trash container provided by the Sanitation Department. Newspapers must be tied into bundles. The Sanitation Department will collect recyclables on a separate day from regular garbage pickup.

Most recyclable materials will be collected directly by the DOS or indirectly through contract with organizations providing recycling services to government agencies and tax-exempt institutions.

A goal of five percent of total garbage recycled has been set for the first year, with increments of five percent yearly. By the fifth year, New York will be recycling 25 percent of its garbage. The city plans to build more recycling centers to process the recyclables.

RURAL RECYCLING-RODMAN, JEFFERSON COUNTY

Community type: Rural

Community Size: 850 people

Program type: Drop-off

Program status: Mandatory

Materials recycled: Glass, newspapers, cardboard, plastics and cans

Source separation: Yes. Each family keeps five different bins to contain various recyclables and a sixth container for non-recyclable trash. Participants say the bins don't take up any more room than bags of unrecycled garbage used to. Recyclables must be separated into plastics, glass, cardboard, newspaper and cans. Garbage is put into the bins as it is created. For example, after opening a can of vegetables, a Rodman resident rinses it, removes the paper label and steps on the can to crush it before dropping it in its bin. The same is done for glass and plastics. Paper containers are flattened and stored in paper bags. Non-recyclable garbage has its own separate bag.

Storage: At transfer station/recycling center

Collection: None.

In Rodman, each family has always taken its garbage to the town dump. Recycling has not caused much change in that system, except that residents transport both garbage and recyclables to the town's solid waste transfer/recycling station, dropping off the recyclables and putting the garbage, into a dumpster. Residents say they do not make as many trips as they used to, and that they average one trip every two weeks. Because the

recyclables are compacted, they take up less room and require fewer trips to the recycling center.

Processing: By market

SUBURBAN RECYCLING-HAMBURG, ERIE COUNTY

Community type: Suburban

Community size: 10,450

Status: Mandatory since 1981

Hamburg, a village in Erie County, has a model recycling program. Hamburg began a voluntary drop-off recycling system in the 1970s to save landfill costs. Response to the original program was good, even though homeowners were required to drop off recyclables.

Materials recycled: Paper, cardboard, bottles, cans and motor oil.

Source separation: Yes. Residents separate recyclables from the rest of household trash. Rinsed cans and bottles are put in one container, garbage in another and newspapers separately. Even motor oil from changing the oil in their cars is saved and put out for recycling.

Collection: Curbside, weekly. Collection is accomplished by a crew of four per truck. Regular garbage goes into the garbage truck, recyclables are put in separate bins in a trailer towed by the truck. The recyclables are taken to a recycling building at the village complex.

Storage: At recycling building

Processing: By market. At recycling center three people from the Association for Retarded Children sort glass into clear and colored, cans into aluminum and tin and newspaper into newsprint and cardboard.

Costs and Financing: Expenses for recycling consisted of three trailers for \$7,500, bins for \$7,000, a loader at the recycling center for \$12,700 and the building plus a few other expenses another \$10,000. State grants covered part of the cost; the rest was paid over five years. Ongoing expenses are for utilities and the handicapped workers from ARC.

Results: Hamburg's recycling program has resulted in trash loads that are one-third smaller in volume.

From November 1986 to November 1987, the village made \$16,300 from the sale of paper, glass and metal. Savings in landfill costs were \$22,100, savings on fuel for transporting garbage to the landfill were \$1,700 because of smaller and fewer loads. Total savings amounted to \$40,100 compared with \$27,700 in expenses.

"The Hammer"

The village ran a strong publicity campaign to sell the idea of mandatory recycling and reinforced it by what they call "the hammer The hammer" refers to the part of the

law that helped pound home the practice of recycling-if people don't separate their garbage, it does not get picked up.

Cooperative Programs

Adjacent municipalities sharing similar wastes and other characteristics can benefit from cooperation on a recycling program. Sharing collection equipment and staff, storage facilities, costs and markets benefits each member community by lowering operation and administration costs. A cooperative program has market leverage because larger and more reliable supplies of recyclables are more attractive to buyers.

Locate nearby communities with similar characteristics and problems. What similarities indicate that cooperation might be mutually beneficial?

Communities with a low population.

Communities with a rural setting.

Communities with a low tax base or a low solid waste budget.

Communities with similar geographic or demographic factors.

Communities with shared interest in diverting waste from a landfill.

Communities with similar wastes.

Do any nearby communities already have recycling programs?

What benefits can we share by cooperating in recycling?

- Sharing costs brings down expense for all.
- Sharing equipment facilities and staff boosts efficiency and economy of program.
- A recycling program is more likely to obtain state funding if communities cooperate.
- Larger amounts of recyclables make markets easier to locate.

Marketing Recyclables

- Finding Markets
- Developing Markets
- Negotiating Market Contracts
- Markets and the Local Economy



Recyclables, or secondary materials, are those materials that have been bought and used for a specific purpose and are considered useless by the consumer. If free from contamination by food and other wastes, these "post-consumer" materials can be manufactured into new products.

The marketing of recyclables is the driving factor for all of the decisions shaping a municipal source separation program. Determining what materials to recycle, how to separate and collect the materials, how much preparation is required and how to accomplish it depends on the marketing options available.

This section explains the basic ideas planners must understand in order to design recycling programs that generate materials consistently accepted by manufacturers. It was prepared in cooperation with the Energy Conservation Services Unit of the New York State Department of Economic Development.

FINDING MARKETS

Marketing secondary materials involves contacting and coming to an agreement of sale with a business that can either take the material "as is" and manufacture it into a new product, or a buyer that can clean or otherwise process the material into commodities as useful to manufacturers as virgin materials.

Types of Markets

The recycling industry consists of many varied businesses, ranging from small-scale, one material outlets to multi-million dollar enterprises. Recycling businesses fall into the following types:

Collectors whose primary function is to identify recyclables and transport them from the customer's location.

Processors that buy materials, perform simple processing steps such as sorting or baling, then resell to a manufacturer. Some processors may perform extensive operations such as cleaning, shredding, crushing before selling materials to manufacturer.

Single-item market - Only takes one type of recyclable, such as paper or metal.

Multi-item market - Will accept most recyclables.

Independent brokers who buy or accept recyclables, then sell them to one or more end-users or arrange the transfer of materials for a fee. (This is an individual who is familiar with a wide range of market possibilities.)

End-user markets that accept and process larger quantities of specific recyclables for use in their manufacturing operation. For example, some paper mills buy waste paper and use it to make paper towels or blown-in insulation. Aluminum manufacturers have always reused scrap aluminum. Recently, plastics manufacturers have begun to recycle particular kinds of plastic.

Buyers, brokers and processors, known as "intermediates," take small, scattered, sometimes contaminated supplies of materials and make them into "mill specification" manufacturing feedstock for end-users, who use the materials to produce new, useful products. Intermediates are often able to assimilate municipally collected recyclables into their facilities quite efficiently.

Each end-user has specialized requirements for the materials it consumes which are determined by the product manufactured and the process used. Precise quality specifications must be met and a steady supply assured.

Recycling businesses operate by the same motives as any other free market enterprise. Their decisions are based on the dictates of the marketplace: supply, demand, price and costs.

Sources of Information About Markets

The NYS Department of Economic Development's Energy Conservation Services Unit is a clearinghouse for secondary materials market information. Planners and recycling coordinators can call with any type of marketing question. Chapter VII of this manual lists the telephone number and address of the agency,

Consult the yellow pages of the telephone directory to identify local markets. (Marketing locally minimizes transportation costs). Look under:

- Waste Paper
- Scrap Metals
- Junk Dealers
- Recycling Centers
- Recycling Equipment & Services Compactors
- Waste-Industrial & Commercial
- Rubbish & Garbage Removal

Manufacturers that might use recyclables, such as paper mills, plastics companies.

Consult directories such as the American Recycling Market Annual or the Northeast Industrial Waste Exchange which list markets nationwide for individual recyclable

materials. More information about these publications is in Chapter VII of this manual.

Among the best sources of market information are nearby communities that have recycling programs. If a connection is already in place between a nearby seller and an existing market, you may be able to make use of it to market your recyclables as well. This contact could develop into a cooperative program, in which neighboring communities work together to recycle, sharing collection and marketing responsibility as well as cost avoidance benefits and any revenues which result. Local recycling coordinators are listed in Appendix D of this manual.

DEVELOPING MARKETS

Persuade end-users to substitute recycled materials for virgin raw materials, or brokers and processors to expand their operations.

Contacting Potential Buyers

Eventually, every recycling coordinator will be concerned with marketing several materials, which will require knowledge of available buyers. It is important to be resourceful and imaginative in locating and conferring with potential buyers who are a reliable source of general market information and may provide leads to other markets. It is important to know their needs, costs and limitations as buyers to compare with your program goals and limitations as the supplier of materials.

If recycling program planners intend to market several different recyclables, they will be negotiating with several markets. However, even if the program begins with two materials, contacting several markets is wise. It may be advantageous to split the materials among buyers so that the program has more than one outlet to minimize the effect of market fluctuations.

Market Survey. The person responsible for marketing recyclables should call or visit each potential market to identify a contact person and to determine what specific recyclables the market accepts. Keep a record of their requirements for recyclables and how differences in the form, cleanliness and quantity of the materials affects the price or fee for handling. Also note the services they offer, such as transportation and provision of containers, and their cost.

Waste Analysis. The results of your survey should be compared with an estimate of the types and amounts of wastes generated in the community. Evaluating what is recoverable in light of your market survey should narrow the available choices. Your decision to recycle certain materials should not depend on the program being financially self-sustaining. It should be based on the recycling program's ability to lower the community's overall solid waste management costs and on the resource value of the recyclable material.

NEGOTIATING MARKET CONTRACTS

Negotiating the "best deal" does not necessarily mean getting the highest price. Market contracts should contain specific agreements on a number of factors. The best marketing arrangement for a particular recycling program may mean achieving reliable transfer of recyclables, lowering overall cost for solid waste management or some other program benefit rather than expecting recycling to be a money-making enterprise.

All of the details agreed upon should appear in the written contract to prevent misunderstanding. In the case of multiple contracts, written records are especially important because factors can vary from contract to contract.

A sample market contract is included in Appendix C.

Contract Elements

To achieve the most advantageous contract agreement, communities win have to negotiate with buyers. Several contract elements may be negotiable, and they may differ from buyer to buyer. For instance, buyers may be willing to provide a service important to the program, such as an on-site container or a particular schedule for pickup, in exchange for a concession from the community on another aspect of the agreement.

As the seller, the program representative wants a reliable outlet for recyclables, a fair price, a long-term agreement and specifications which allow for preparation and transfer of recyclables at minimum cost to the program. The buyer wants a specified quantity of high quality materials on a regular basis and at a fair price. Negotiations should result in a market contract in which all of the terms of the agreement are spelled out for both seller and purchaser.

The application kit for EQBA funding provides further guidelines for market agreements. Kits are available from DEC's Bureau of Waste Reduction and Recycling, 625 Broadway, Albany, NY 12233. Telephone: (518) 402-8705 or by email at dshmwrr@gw.dec.state.ny.us

Material Specification. One of the first questions recycling planners will want to ask each potential buyer is what specifications they require recyclable materials to meet. Buyers are primarily interested in a guaranteed quantity of recyclables which meet buyer standards for quality. The quality and quantity specifications agreed upon during negotiations should be included in any resulting contract.

Quality. The quality of materials to be supplied to the buyer should be spelled out in specific terms. Definitions should list prohibited contaminants as well as maximum allowable levels (expressed as a percentage or otherwise) of "acceptable" contaminants. If possible, buyer preferences, as opposed to requirements, should be stated. Price

differences attributable to inconsistencies in material quality should be agreed upon and included in the contract.

Quantity. The quantities of any given material that will be accepted by the buyer should be defined in specific terms and included in the contract. Quantities are often expressed in either container units or by weight. Newspapers, for example could be sold loose at one price, loose in filled "gaylord" boxes at another price or baled in tractor-trailer loads with different prices for trailers weighing more than or less than an agreed upon weight. Because there are so many different ways to transport a product to market, it is important to clearly define terms of the agreement, such as:

Type of containers to be used and their minimum required weights;
Minimum total weight or number of containers that will constitute an acceptable delivery;
Language establishing what adjustments will be made when deliveries vary from what is expected, including any difference in price paid.

Form. Materials that are processed in any way often command higher prices, since they can be transported more efficiently. The end-user usually receives material in very large quantities which requires that the material be very densely packed into a standard container, such as a 44 foot trailer, rail car or oversea container. Therefore, any work done by the seller which makes it easier for the intermediate handler to load a standard container raises the material's value. Any change in value should be clearly explained in the contract. For example, "loose aluminum cans-\$.50/lb., loose flattened cans-\$.58/lb., cans baled to Alcoa specifications-\$.71/lb. " Any minimum form requirements should be defined. For example, the contract could include the statement "No loose corrugated will be accepted."

Transportation. One of the parties should be assigned responsibility for providing or arranging the transportation of the materials. The answers to a few questions will determine how arrangements for transporting the materials should be written in the contract:

- Is the recycling program able to transport the materials?
 - How much will transportation cost the program?
 - Is the buyer able to provide transportation?
 - What will be the cost to the program?
- (Lower transportation costs and ease of communication are the principal advantages of marketing locally.)

Timetables. The parties must agree on a schedule for having recyclables ready for pickup or delivery. Depending on each party's storage situation, the success of the relationship

can turn on the smooth transfer of materials so that undue accumulations do not occur. Transfers can be pegged to time intervals, for example, the contract might say "To be picked up weekly upon confirmation by phone," or transfer might be based on accumulated quantities. All details and contingency procedures should be included in the contract.

Duration of Contract. Most sellers prefer a long-term contract to guarantee a market for their recyclables. Most buyers favor a term reflective of the market's normal cycles, or will agree to a longer term contract if allowance is made for price fluctuations. Buyers will usually specify lower prices on long-term contracts to protect themselves from price instability.

Price. Secondary materials are commodities. Like other commodities, the prices paid for various grades of these materials rise and fall in accordance with supply and demand. Planners can get an idea of current prices by calling the Department of Economic Development or by consulting market-tracking publications such as *Materials Recycling Markets*, *Official Board Markets* and others listed at the end of this chapter. Both parties might agree to use a particular independent source on prices so that swings in the overall market affect both parties fairly. The agreement should be explained clearly in the contract, including procedures to determine prices in extreme or upset conditions.

Payment. Buyers usually have a state-certified scale and/or truck scale that can be used to establish the amount of material being delivered. This weight is recorded on a "weigh slip," along with the date, grade, price and total value of the material. The weigh slip can serve as a record of the transaction. Agreement on this or any other system should be included in the contract. The contract should specify method of payment, whether by check upon transfer, a voucher system or by whatever means agreed upon, and include a specified amount of time for payment.

Special Services. Many buyers lend or rent containers and other equipment, including balers, to assist in the collection of materials. The advantage of such services is the short term lowered cost of equipment. The disadvantage is that such arrangements can make a program dependent upon a single buyer, thereby limiting market options. Use of such services generally makes more sense during a program's start-up phase.

Letter of Intent. Once you have selected a buyer and the most important contract elements have been agreed upon, a letter of intent including these contract elements should be required from the buyer. This letter commits both parties to a future sales and purchase agreement. Letters of intent are important because they allow a final clarification of the agreed upon terms before the legal process of drawing up a contract begins. The DEC requires a letter of intent with applications for recycling program grants and loans.

A sample letter of intent appears in Appendix C.

MARKETS AND THE LOCAL ECONOMY

Recycling produces many economic benefits for communities. Some are immediate; others accumulate over time as the recycling program grows.

Community Development

With the growth of a recycling program, the community gains some control over the volume of solid waste and costs for its management. Business and industry find good management of essential community services a powerful lure when deciding where to locate. Existing business and industry share the benefits when solid waste management costs are lower and essential services are reliable.

Using local buyers for recyclables has a significant positive effect on the community because dollars and expertise are kept within the area, especially if the buyer employs local labor, buys supplies locally and pays local taxes. In fact, encouraging recycling facilities or secondary materials manufacturers to locate in the community can add substantial revenue to the local economy. The New York State Department of Economic Development, along with county or city economic development agencies, should be consulted to help firms that process or use recycled products. These agencies have programs to assist with funding and siting as well as economic incentives for recycling businesses. (See Chapter VI and Chapter VII for more information on these programs.)

Long-Term Trends in Recyclables Markets

Handling the Volume. Current recycling markets may not have the capacity to deal with the volume of recyclables expected from mandatory recycling programs. Some manufacturers, glass and aluminum container makers, for example, are ready and able to consume all of the material that meets their specifications. Other industries, such as plastics and some sectors of papermaking, will require new technologies or large capital investments in order to consume the new material. Already entrepreneurs see that there is money to be made in recycling enterprises. New and more efficient technologies for processing recyclables are being developed which will stimulate interest and investment in salvage markets and in industries which remanufacture recyclables.

Encouraging Demand. The other side of the market growth coin is demand for recycled products. Governments can take the lead by purchasing products with recycled content, such as asphalt containing waste glass, paper and curbside recycling containers. In the long run, procurement policies that favor reusable products and products with recycled content can demonstrate the usefulness of such products to other consumers, while expanding the immediate demand. These policies can encourage industries to manufacture more products from secondary feedstocks and help existing products become more competitive.

Uses for Recyclable Materials

Newspaper (Used newspapers, telephone books without covers)

- Repulped for lower-grade uses including boxboard, chipboard, pad backing, file dividers, book covers, legal pads
- De-inked to produce recycled newsprint (can be sold as many different grades, depending on fiber content & brightness)
- Processed into cellulose insulation
- Shredded for use as animal bedding

Corrugated Cardboard (Used packing boxes)

- Reprocessed into cardboard

Computer and Office Paper (Used letter quality computer and copy machine sheets)

- Makes a better grade recycled paper used for printing documents
- Tissue products
- Paper towels
- Newsprint

Glass (Any glass container. Before processing, containers are usually separated according to color: clear, amber (or brown) and green.)

- Cleaned, crushed, melted and used to make new bottles
- Sterilized and refilled
- Crushed & combined with other materials, such as: sand, to make sand-blasting aggregate; asphalt, and other materials, for road surfacing; cement, for paving.

Aluminum (Food cans, aluminum foil, frozen food containers, storm windows, lawn furniture) Reprocessed into aluminum. (Used aluminum requires much less electricity to process, therefore recycling aluminum saves 95 percent of the energy required to extract the metal from bauxite. Recyclers pay highest prices for used aluminum.)

Ferrous Metal (Tin, iron, white goods such as used refrigerators, washing machines, stoves)

- Melted down to make new metal.

Used Asphalt

- Ground up & used in road surfacing

Tires (Worn automobile and truck tires)

- Shredded, compounded with other polymers and used in road paving or tire-derived fuel (has BTU content higher than coal)
- Remanufactured into new rubber items

Waste Oil - impurities removed and used as heating oil or re-refined and sold to industry as a motor lubricant.

PET Plastic (carbonated beverage bottles)-Chipped into small pieces, melted and used to make:

- Fiber for carpet backing, twine, filter material, apparel, rope
- Fiberfill for fiber insulation in down jackets, sleeping bags, pillows, cushions, automobile seats
- Tape for carton strapping
- Paint brushes
- Scouring pads
- Shower stalls
- Audio cassette tape cases
- Non-food containers, six-pack carriers
- Biodegradable plastic bags
- Plastic foam shredded and added to compost to improve soil texture
- Textiles for belts, webbing, sails, woven bags, tire cord
- Polyol (chemical component used by urethane foam manufacturers) for laminated board stocks for both wall and roof insulation, refrigeration truck paneling, home and commercial freezer insulation, storage tank insulation, automobile bumpers, furniture, skis and surfboards
- Polyester for bath tubs, boat hulls, swimming pools, corrugated awnings, marbelized material, automobile exterior panels.

HDPE Plastic (milk bottles and the black bottom cover of large soda bottles)Chipped and/or pelletized and used to make:

- Fatigue mats, plastic runners
- Soil stabilizer in embankments and to improve roadbeds
- Landfill liners
- Fiberglass
- The base cup of PET soda bottles

Plastic of all types can be formed into plastic lumber.

Fabric - Recycled polyester fabric scraps are used for carpet pads

Solvents - Recycled and used to clean equipment

Concrete - Pulverized and used as aggregate in new concrete construction or as sub-base or structural fill (valuable to contractors)

Coal Fly Ash - Can be used as aggregate in cement

Gypsum - (This is calcium sulfate, a waste by-product from "scrubbing" smokestacks to prevent acid rain.) Used in construction and as a valuable soil amendment.

Yard Waste

- Composted to make soil amendment
- Composted with sludge to produce soil enricher or fuel pellets

State Agencies Can Help

New York State agencies are involved in identifying and developing markets for recyclables. The Department of Economic Development collects, updates and distributes information about suppliers and consumers of secondary materials. State agencies, the help they offer and how they can be reached are presented in Chapter VII of this book.

Sources Of Information About Specifications

Recycling industries operate according to generally accepted rules. The following guides are important sources of market information and are available from the publishers and the Department of Economic Development.

Paper, Ferrous and Non-Ferrous Metals

ISRI (Institute of Scrap Recycling Industries) Scrap Specification Circular 1988.A compendium of specification and transaction information including:

Paper Stock Institute Circular-Lists and defines standard paper grades and maximum allowable contamination; provides guidelines for domestic and export transactions.

Guidelines for Metals Transactions-Provides definitions for all ferrous and nonferrous grades including processing specifications.

Newspaper Gordon State Paper's (GSP) Service Requirements-Defines GSP's interpretation of number 8 Special cle-ink grade newspaper with prohibited materials listed.

Aluminum Alcoa Product Data Rigid Container Sheet, Sect.FRP941 Seff-Generated Scrap and Used Beverage Scrop-Includes general information, preparation, pack-! ing, loading and shipping information.

Steel Cans

General Specifications for Steel Can Scrap by the Steel Recycling Institute (April 6, 1989)-includes forms acceptable for mill-direct shipments and other transactions,

references to applicable ASTM specifications and lists of detinners and steel companies that accept steel cans.

Glass

Although a standard ASTM specification for cullet exists, each manufacturer has particular specifications for the types of cullet used in its product. Container manufacturers in New York have fairly complete specifications that are available through the NYS Department of Economic Development:

Owens-Illinois' Quality Specification Sheet-Describes required color separation, types of contamination and acceptable forms of material,

Central New York Bottling Company's Operational Procedures- Describes required color separation, prohibited materials and acceptable forms of container glass.

Plastics

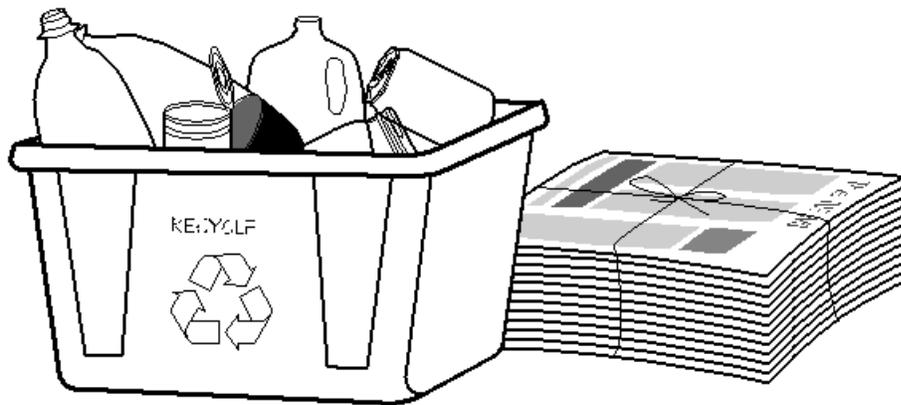
Because standard specifications are not available for the plastics-consuming industries, each buyer's and each consumer's individual specifications must be examined separately.

To locate these buyers consult:

Society of the Plastics Industries (SPI) 1989 Plastics Recycling Directory-Provides some general information on types of plastics, lists and cross references. Complete address information for all buyers and a list of plastics processing equipment vendors are included.

Recycling Costs and Financing

- What Do Recycling Programs Cost?
- What Are the Alternatives for Financing Recycling Programs?



WHAT DO RECYCLING PROGRAMS COST?

Municipalities should anticipate financial outlays for recycling. Costs for recycling can range from \$15 to \$40 per ton of recyclables. Although that may seem high, when costs are projected over a ten year period, in most cases recycling is far more economical than the long-term costs of landfill operation, expansion, closure procedures, and long-term liability and monitoring. Recycling costs include:

- Planning
- Equipment
- Facilities and land Personnel
- Citizen involvement

Planning

Planning must consist of a long-range strategy for solid waste management including the best estimates of alternatives to justify recycling as part of a comprehensive system. Included in planning costs are:

Waste composition study - Consultant cost can be anywhere from \$20 thousand to \$ 100 thousand and should be updated every year or two. Municipal personnel can conduct the study and save substantial cost to the community.

Market survey - Consultant cost ranges from \$20 thousand to \$ 100 thousand and also should be regularly updated to discover new market possibilities or changes in existing markets and prices. Smaller communities may find a cooperative effort with other communities will save costs.

Design - Consultant cost can run to \$100 thousand. Smaller communities' design costs will be minimal because their needs are simpler.

Equipment

Equipment expenses can include apparatus for collecting, separating, storing, processing and shipping recyclables. Planners should remember that more automated and higher capacity equipment results in lower operating costs. Planners can gather information about equipment options by:

Asking - Manufacturers for an equipment experience list with names, addresses, and telephone numbers of contacts with experience in operating and maintaining the equipment. Follow up by calling and asking about performance history.

Comparing - The equipment to specifications.

Talking - To several vendors about performance and price.

Facilities and Land

Facility and land costs can be minimized by using vacant land and buildings for transfer, storage and processing of recyclables. Implementation costs will be lower and the existing buildings and land will be put to productive use. Any land or facility should have enough room for expansion and modification, which is often necessary after three to five years.

Personnel

The number of existing personnel is usually inadequate to handle recycling, whether it is done by a municipal collection system or a private firm. More private firms are contracting to handle recycling for communities. Negotiating such contracts should be done with care to avoid expensive misunderstandings. Municipalities may require extra staff such as planners, a recycling coordinator, educators, transporters, maintenance people and marketers.

Citizen Involvement

Count citizen involvement as an ongoing and essential element in the recycling program and plan to fund it continuously whether it is handled by the municipality or by a consultant.

Costs include:

- Holding public meetings
- Producing and distributing publications
- Advertising through various media

Estimated Costs (from Broome County, 1986)

These costs are variable. The disposal costs of a community must be determined on the basis of site specifics. These costs should then be the basis of calculating cost avoidance for evaluating recycling economics.

- A. TO BUILD A LANDFILL: \$350,000 to \$450,000 per acre (in accordance with Part 360 regulations)
- B. TO DISPOSE OF TRASH IN A LANDFILL: \$40 to \$60 a ton
- C. TO BURN TRASH: \$70 to \$100 a ton
- D. TO CLOSE A LANDFILL: \$50,000 to \$100,000 per landfill acre

COMPARISON OF SOLID WASTE COSTS WITH AND WITHOUT RECYCLING

COST	WITHOUT RECYCLING	WITH RECYCLING	DIFFERENCE
Administrative	\$40,000	\$70,000	-\$30,000
Labor	\$100,000	\$150,000	-\$50,000
Equipment	\$250,000	\$270,000	-\$20,000

Disposal	\$300,000	\$250,000	+\$50,000
Revenues	\$0	\$60,000	+\$60,000
			+\$10,000
			\$690,000
			\$680,000
			\$10,000

WHAT ARE THE ALTERNATIVES FOR FINANCING RECYCLING PROGRAMS?

The costs for handling and disposal of solid waste continue to rise, causing communities throughout New York State to be concerned about financing programs and facilities. Along with reduction, waste-to-energy conversion and landfilling, recycling programs are an integral part of overall solid waste management.

The cost of a recycling program depends on the extent and complexity of the endeavor. The most successful programs, that is, those which have high rates of compliance and divert the greatest volume of material from disposal are organized on a county or regional level with several municipalities sharing costs and benefits. Cooperative programs generally build a materials recycling facility and/or a composting facility.

Many sources of financing are available to fund recycling programs.

Local Revenue Sources

Taxation. Tax levies can be in the form of income tax, sales tax, property taxes, service charges, user charges, special and ad valorem (full value) tax. Taxation produces a solid base of revenue. General taxes provide a wider base while special levies can be used for specific items or services. User fees, such as tipping fees, can generate funds for a special purpose. However, taxes are difficult to impose because of taxpayer opposition. Some taxes are limited to specific purposes. For example, taxes on services used to retire revenue bonds can only be used for that purpose.

Tipping (user or waste generator) fees. A tipping fee is a charge levied on all wastes brought to a disposal facility or materials brought to a processing facility. Charges are generally on a weight or volume basis with special charges for certain kinds of materials. For example, bulky items such as white goods or particular items which are difficult to store, such as tires, may have a special fee imposed. These charges can cover capital, operating and maintenance costs for processing and disposal facilities.

Tipping fees are based on actual costs and can be adjusted as costs decrease or increase. There is generally an established rate schedule to provide a flexible revenue-producing mechanism. Tipping fees can be employed by either a private or public developer or

operator. However, the facility or service must be in use to collect the fee. Charges may be unfairly distributed unless equity of rates is carefully calculated.

Legal and Institutional Mechanisms for Recycling

Beyond the municipal level, other avenues are available to finance recycling and other solid waste management endeavors.

County. The purpose is to develop a recycling program or other solid waste management technique or facility as part of an integrated solid waste management plan. The county legislative body may appropriate and disburse funds for the management of solid waste. The county may acquire, construct, operate and maintain the necessary facilities and services for solid waste management such as: recycling centers, transfer stations, hauling facilities, processing systems and other solid waste reduction, treatment, disposal or conversion systems. The county may contract for development directly or go through a public authority and must comply with general municipal law and municipal finance law to construct facilities.

County Agency. The purpose of a County Agency is to compile information related to the development of a county solid waste management program. The county may appoint, establish or designate an existing administrative body or public authority to act as its agent to assemble data on a solid waste management project. The powers of a County Agency include collecting data on the problems of collection, conveyance, treatment and disposal of solid waste within the county and engineering, legal and other professional advice as may be necessary and budgeted. The Agency also may give technical assistance to local municipalities.

County Refuse District. The purpose of a County Refuse District is to implement programs for solid waste management. A county may establish a refuse district for the purposes of collecting and disposing of garbage and other wastes from two or more non-contiguous areas within the county. It can act as an agent, when designated by the county, to plan and develop a recycling program.

The district designates the service area of the program and carries out the functions delegated to it by the county. A refuse district requires the approval of the State Comptroller.

Local Solid Waste Authority. The purpose of a Local Solid Waste Authority is to implement, develop and finance, through revenue bonds, a county or local solid waste management program. A local Solid Waste Authority is a special public authority established by an act of the state legislature. The act identifies the purposes and powers given to the local authority. The local authority may be granted the powers to collect,

transport, process and dispose of solid wastes; design, construct and operate a materials recycling facility and a disposal facility; contract for loans or grants with other municipalities, public corporations or persons; contract for the design, construction, operation, maintenance and financing of a recycling or disposal facility.

Intermunicipal Agreement. An intermunicipal agreement between two or more municipalities binds them by contract to cooperate in areas in which they are entitled by law to perform individually. An intermunicipal agreement can provide for apportionment of costs and revenues and for contracting, acquisition and sale of property. It can apply for grants and take action on behalf of the individual participants.

Financing Mechanisms for Recycling

New York State Environmental Facilities Corporation (EFC). EFC assists in the planning and development of recycling and other facilities, and is empowered to issue both general obligation and special obligation bonds and notes.

The Environmental Facilities Corporation is a public authority with broad powers to plan, design, construct, operate, maintain and finance solid waste management facilities such as materials recovery facilities, transfer stations, waste-to-energy facilities and landfills. EFC can take action in the area of solid waste management on behalf of a municipality, make loans for the construction of facilities and lease or rent its corporate projects in accordance with contracts with municipalities or state agencies. EFC has flexibility for financing because, as a public benefit corporation, it is not subject to the restrictions that govern municipalities.

New York State Urban Development Corporation (UDC). UDC accesses financial markets useful for project development. UDC affords flexibility in opportunities for financing and management of facilities since the corporation is not subject to the restrictions related to financing which can inhibit municipalities from developing projects.

UDC is a public benefit corporation which works closely with state agencies and engages in a wide range of development and improvement projects. UDC can use its broad powers to finance and construct development projects, such as residential, industrial, civic or land-use improvement. UDC can issue general obligation and project revenue bonds and notes.

Industrial Development Agency (IDA). Unlike EFC or UDC, an IDA does not engage in the actual construction and operation of facilities. IDA enters into a contract with a private corporation with IDA holding title to facilities constructed by the private company. To finance the project, IDA issues tax-exempt bonds which are paid back from the revenues of the project and secured by the credit of the private company.

An IDA is a public benefit corporation established by special act of the legislature. An IDA is a vehicle through which a project, such as a materials recovery facility, can be constructed and operated by a private company and still enjoy the advantages of tax-exempt financing. The agency is authorized to acquire real and personal property for corporate purposes and to make contracts with any public or private person or corporation. IDAs can also issue bonds and notes which are obligations of the agency. Neither the state nor the municipality is liable.

Summary of Financing Alternatives

Listed below are the legally sanctioned financing options available to municipalities and those available to public benefit corporations.

Procuring Body and Bond Issuer -Permitted Financing Options

Municipality -Municipal Bonds

Industrial Development Authority -Project Revenue Bonds

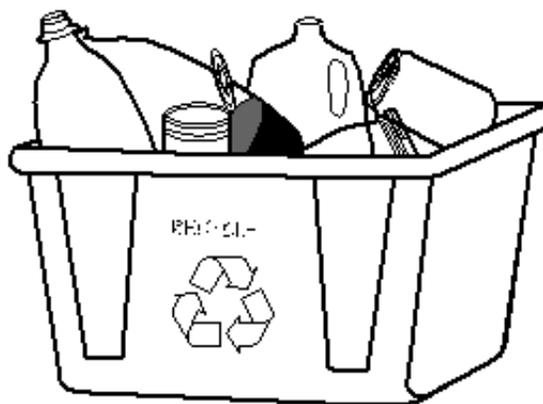
County- "Special District"
- zones of assessment
- ad valorem tax on benefitted real property
- user charges
Countywide
- tax revenues
- general obligation bonds
- ad valorem real property taxes

New York State Environmental Facilities Corporation - General Obligation Bonds
-Special Obligation Bonds

NYS Urban Development Corporation - General Obligation
-Project Revenue Bonds,
subject to specific legislative approval

State Technical and Financial Assistance for Solid Waste Management

- State Programs for Recycling
- State Financial Assistance for Recycling Activities



Historically, state policy has left solid waste management in the hands of local governments. To help municipalities comply with revised regulations and recent legislation, the state has instituted programs offering technical assistance and grants for solid waste management including recycling.

STATE PROGRAMS FOR RECYCLING

New York State Environmental Quality Bond Act of 1972 and the New York State Solid Waste Management Act of 1988 established programs to help local officials plan and finance recycling systems. The new programs also target market development for recyclables (secondary materials) and provide assistance to businesses and industries for recycling their wastes and for developing methods for recycling municipal waste. Local officials, businesses and industries can take advantage of these services.

Technical Assistance for Recycling Activities

Information on grants for local recycling programs is available from:

New York State Department of Environmental Conservation
Division of Solid Waste Bureau of Waste Reduction and Recycling
625 Broadway
Albany, New York 12233-4015
Telephone: (518) 402-8705

In addition to providing information on grants, the bureau provides:

- Help with solid waste management planning
- Information on individual recyclables
- Data about facilities for collection, processing, storage and marketing of recyclables
- Information about recycling exemptions, regulations and permitting rules
- Advice and guidance for setting up recycling programs
- Information on existing recycling facilities, alternative systems for recycling and on the volume and composition of solid waste generated
- Information on the STOP program (Save That Office Paper) which is practiced in state and local government offices, private industry and schools.

Information on markets for recyclables is available from:

New York State Department of Economic Development
Energy Conservation Services Unit One Commerce Plaza Albany, New York 12245
Telephone: (518) 486-6291

In addition, the Department of Economic Development provides:

- Assistance to commercial and industrial firms in establishing and implementing waste reduction techniques.

- Information about suppliers and consumers of secondary materials
- Financial assistance to business to encourage expansion of capacity for processing recyclables and manufacturing finished products from secondary materials
- Assistance in developing and establishing markets for local recycling programs
- Markets research

Copies of the New York State Part 360 Regulations governing recycling and other phases of solid waste management may be obtained from the New York State Department of Environmental Conservation.

A source of market information on industrial materials is:
 New York State Environmental Facilities Corporation (EFC)
 625 Broadway, New York 12233 Telephone: (518) 402-7455

EFC maintains a directory of markets specifically for the exchange of industrial materials and information on methods and technology for reduction, recycling and reuse of industrial materials. Also, EFC can identify markets for other types of recyclables.

EFC can be retained for management services such as:

- Financing, regulatory analysis, lab services, technical assistance and information on alternatives for local governments or businesses
- Feasibility reports for local governments which characterize and quantify waste streams and evaluate solid waste management options
- Overseeing plans and construction for recycling and incineration facilities
- Identifying haulers of hazardous waste
- Issuing notes and bonds to finance projects for business and industry

Funding for research related to recycling is available from:

New York State Energy Research and Development Authority (NYSERDA)
 Agency Building 2 Empire State Plaza Albany, New York 12223 Telephone: (518) 465-6251

NYSERDA grants include:

- * \$70,000 for innovative recycling systems
- * Funds for waste oil technology studies

NYSERDA also issues Public Opportunity Notices (PONS) which announce to municipalities, private industries, small businesses and individuals that partial funding is available for research, development and demonstration projects on specific energy-related problems.

Information on the New York State Solid Waste Management Act and state policy:

New York State Legislative Commission on Solid Waste Management (Assembly)

150 State Street 5th floor

Albany, NY 12207

Telephone: (518) 455-3711

In addition, the Commission prepares background reports on subjects such as recycling incentives, waste tires and environmental liability insurance. The Commission also has copies of the proceedings from several solid waste conferences sponsored by the Legislature, two video tapes on solid waste and nearly twenty publications on solid waste management and recycling.

STATE FINANCIAL ASSISTANCE FOR RECYCLING ACTIVITIES

Financial Assistance for Localities

The cost of a recycling program depends on the extent and complexity of the endeavor. Funds for recycling are available to municipalities from state government programs.

Grants for recycling equipment. The 1972 Environmental Quality Bond Act (EQBA) provides grants to pay half the costs of recycling equipment such as shredders, balers, can crushers, conveyor belts, and temporary storage facilities.

Grants for costs of various recycling activities.

Municipal Waste Reduction and Recycling Program (MWR&R)

Capital Projects (Since 1993) - DEC is authorized to provide State assistance for projects that enhance municipal recycling infrastructure through purchasing of equipment or construction of facilities. Some communities used funding to construct materials recycling facilities and others are constructing state-of-the-art composting facilities. Other communities have been able to purchase recycling containers and new recycling vehicles with their MWR&R funding.

Recycling Coordinators (Since July 2000) - DEC is authorized to provide State assistance for Recycling Coordinator salaries and public education programs to municipalities to expand local recycling and waste reduction programs and increase participation in those programs.

Household Hazardous Waste State Assistance Program (HHWSAP) (Since 1995) - The HHWSAP is an Environmental Protection Fund (EPF) program administered by DEC. The HHWSAP provides State assistance for HHW collection days, and construction of permanent HHW collection facilities in order to provide a safe alternative for recycling or disposal of household hazardous materials.

Funding Sources

Environmental Protection Fund (EPF)(since 1993):

Passage of the Environmental Protection Act in 1993 created the Environmental Protection Fund (EPF), a continuing source of funds dedicated specifically for environmental projects, including programs such as the Municipal Waste Reduction and Recycling (MWR&R) Program to help municipalities meet environmental goals and mandates.

Municipal Waste Reduction & Recycling Program - As of July 1, 2003, DEC awarded approximately \$25 million to 194 projects.

Household Hazardous Waste State Assistance Program (HHWSAP)(since 1995) - As of July 1, 2003, DEC awarded approximately \$15.5 million to 294 projects.

Clean Water/Clean Air Bond Act of 1996: Municipal Recycling Projects Program (since 1996)

The Clean Water/Clean Air Bond Act of 1996 provides additional State assistance to continue the enhancement of local government investment in recycling equipment, infrastructure and facilities. The Municipal Recycling Projects Program will provide \$50 million in 1996 Bond Act authorized State assistance to local governments. DEC will utilize 1996 Bond Act monies to fund eligible recycling capital projects on the MWR&R waiting list. As of July 1, 2003, DEC awarded \$47.2 million to 106 projects.

Financial Assistance for Businesses

State financial assistance is available to businesses involved in recycling or engaged in developing technologies for recycling.

Grants and loans for: Development of new recycling processes/technology feasibility studies. New processors and end users of recyclable materials Expansion of existing processor and end user enterprises Skills training, improving competitiveness and a range of other applications

Contact: NYS Department of Economic Development Energy Conservation Services Unit
One Commerce Plaza Albany 12245 Telephone: (518) 486-6291

Applicable programs in the Job Development Authority, Urban Development Corporation and Science and Technology Foundation are available through the Energy Conservation Services Unit.

Grants for: Innovative recycling systems Waste oil recovery systems Waste oil technology

Contact: NYS Research and Development Authority (NYSERDA) Agency Building 2 Empire State Plaza Albany 12223 Telephone: (518) 465-6251

Maintaining a Recycling Program

- Troubleshooting
- Recordkeeping
- Calculations of Avoided Costs



After the recycling program is in operation, maintaining and improving it must be an ongoing effort. Even though a recycling program seems to be operating well, its effectiveness and efficiency can only be determined by detailed analysis of productivity and recovery data and calculation of avoided costs.

Troubleshooting

Recognizing and working out problems in the early stages of the recycling program may mean the difference between the program's success or failure. Typical problems include:

- Poor participation
- Fluctuation in markets
- Change in separation or collection requirements

Changing behavioral habits in a community is a slow process. Minimize problems with participation through public involvement, promotional and educational campaigns. If municipal leaders are committed and enthusiastic about recycling, residents will be more inclined to participate. (Samples of promotional and educational materials appear in Appendix G.)

The effect of market fluctuation can be mitigated if planners develop several marketing options and keep in touch with market contact persons. Then, if the original market fails, planners will be prepared to identify other marketing alternatives.

Alert residents to any change in separation requirements or collection schedules and issue frequent reminders through the public education campaign.

Recordkeeping

Record the amounts of materials recovered from the waste stream and the amounts of materials diverted from the disposal facility. The figures are needed to calculate the costs the solid waste management program avoids by recycling. In addition, the figures are useful for informing the community of the progress of the recycling program to stimulate interest and participation.

**RECYCLING IN NEW HAMPSHIRE. AN IMPLEMENTATION GUIDE
WORKSHEET: AVOIDED DISPOSAL & TRANSPORT COSTS/REVENUES**

Calculation of Avoided Costs

On the following worksheet, enter the amounts of each material recovered. Then use the formulas to determine the total avoided costs.

Recycling Revenues = Amt. Of Recovered Materials x Revenue/Ton of Materials			
Recyclables	Amt. Of Recovered Materials (tons) From Worksheet 1	Revenue /Ton From Sale of Material	Recycling Revenue
Newspaper			
Corrugated Cardboard			
Office Magazine			
Mixed			
Other			
Glass			
Metal - Ferrous			
Metal - Non-Ferrous			
White Goods			
Plastic - PET			
Plastic - HDPE			
Yard Waste			
Tires			
Amt. Of Recovered Materials		Recycling Revenues	\$

Worksheet continued on next page.

RECYCLING IN NEW HAMPSHIRE: AN IMPLEMENTATION GUIDE
Worksheet continued

Total Amount of Recovered Materials (tons) x Tipping/Disposal Fee (per ton) = Avoided Disposal Costs

X =

Total Amount of Recovered Materials (tons) x Waste Transport Fee (per ton) = Avoided Transport

X =

Recycling Revenues + Avoided Disposal Costs + Avoided Transport Costs = TOTAL REVENUES

+ +

= \$

Make use of the following worksheets to collect data on the recycling program.
 (From Recycling in New Hampshire: An Implementation Guide.)

Recycling Evaluation Chart

Month _____ Year _____

Recyclables	First		Second		Third		Fourth	
		%		%		%		%
Newspaper								
Corrugated Cardboard								
Office Magazine								
Mixed								
Other								
Glass								
Metal - Ferrous								
Metal - Non-Ferrous								
White Goods								
Plastic - PET								
Plastic - HDPE								
Yard Waste								
Tires								
Batteries - Household								
Batteries - Vehicle								
TOTAL								

Data Collection Chart

Month _____ Year _____

Collection

1. Number of collection routes
2. Average number of loads per route
3. Average time to complete route
4. Average overtime per route
5. Average set out per route
6. Average number of stops per route

- Route:
 Loads/Route:
 Hours/Route:
 OT/Route:
 Lbs./Set out:
 Stops/Route:

Recovery Rates

Recyclables	Tons Collected	% of Weight	Lbs. Per Capital	Volume Collected	% of Total Cu. Yds.	Cost per Unit
Newspaper						
Corrugated Cardboard						
Office						
Magazines						
Mixed						
Other						
Glass						
Metal - Ferrous						
Metal - Non- Ferrous						
White Goods						
Plastic - PET						
Plastic - HDPE						
Yard Waste						
Tires						
Batteries - Household						
Batteries - Vehicle						
TOTAL						

Convert tonnage to volume using volume conversion factors in Appendix B.

Recycling Costs

	Monthly	Route Average
1. Direct labor costs	\$	\$
2. Total over-time paid	\$	\$
3. Fuel costs	\$	\$
4. Maintenance	\$	\$
5. Total revenue from sale of materials	\$	\$
NET COSTS	\$	\$

6. Cost per unit equals: $\text{Net recycling costs} / \text{Tonnage} / \text{Volume recovered}$

BIBLIOGRAPHY

FOR MORE INFORMATION

Check out our website:

www.dec.state.ny.us

Conduct a web search on the material of interest.

MARKETS

New York State Department of Economic Development Energy Conservation Services Newsletter-Current information on markets in New York State and the progress of state and local efforts to expand markets. Available summer 1989. Write: NYS Department of Economic Development Energy Conservation Services One Commerce Plaza Albany 12245 or call: (518) 486-6291

American Recycling Market Annual Directory-Lists recycling centers, auto dismantlers, paper mills and demolition contractors. (\$95.00 per copy) Write: Recoup P.O. Box 577 Ogdensburg, NY 13669 or call: 1-800-267-0707

Fiber Market News-Weekly newsletter of paper stock prices including major cities on the east coast. (\$95/year) Write: 4012 Bridge Ave. Cleveland, Ohio 44113 Call: (216) 961-4130
Materials Recycling Markets (MRM)-Monthly listing of current prices for all recyclables for northeastern markets, (\$75/year) Write: P.O. Box 577 Ogdensburg, N.Y. 13669 Call: 1-800-267-0707

MANUALS

Re/Uses, 2133 Ways to Recycle and Reuse the Things You Would Ordinarily Throw Away, by Carolyn Jobs. 178 pages. 1982. (\$9.95) Write: Crown Publishers One Park Avenue New York, NY 10016

Keep America Beautiful System and Recycling-Ring-bound, tab-separated book which contains information on recycling program development and recovery of materials. (\$40/copy) Write: 9 West Broad St. Stamford, Conn. 06902 Call: (202) 323-8987

TECHNICAL BOOKS AND PERIODICALS

Bio-Cycle magazine-journal of waste recycling with articles on composting, Materials Recovery Facilities (MRFs) and processing techniques. Write: J,G. Press, Inc. Box 351 18 South 7th St. Emmaus, Pa. 18049 Call: (215) 967-4135

Phoenix Quarterly-Principally information on scrap metal (Complimentary subscription) Write: Institute of Scrap Recycling Industries, Inc. 1627 K Street, N.W. Washington, D.C. 20006 Call: (202) 466-4050

Plastic Bottle Recycling Directory and Reference Guide-published by the Plastic Bottle

Institute. Lists firms nationwide which recycle plastic (intermediate processors, manufacturers, brokers and equipment manufacturers). (Free) Write: Plastic Bottle Information Bureau 1275 K St., NW Washington, D.C. 20005 Call: (202) 371-5244
Recycling Times- Newspaper of recycling markets, including articles on recycling and prices for recyclables. Published every two weeks by Waste Age. (Subscription only, \$95.00/year) Write: Recycling Times 5615 Cermak Road Cicero, Illinois 60650
Recycling Today-Recycling news; focuses on metals. (\$22/year) Write: P.O, Box 5817 Cleveland, Ohio 44101-9599

Resource Recycling Magazine-A recycling journal which contains information on markets, new recycling developments, technologies and controversies. Also publishes an annual equipment issue, Subscription: \$27/year) Write: 1206 N.W. 21st St. P.O. Box 10540 Portland, Ore. 97210 Call: (503) 227-1319

Users Directory of Waste Handling Equipment (WEMI Directory)-Pictures and describes types of trucks, trailers and other gear useful in collecting and processing recyclables and cites the companies which manufacture them. 15 to 25 pages. (\$3/copy) Write: National Solid Waste Management Association Publications Dept. P.O, Box 5000 Washington, D.C. 20061-5000 Call: (202) 659-4613

Waste Age-Monthly magazine on waste issues. (\$27/year) For subscriptions: 555 Broad Hollow Rd. Suite 214 Melville, N.Y. 11747 Call: (202) 861-0708
Central Office: Suite 1000 1730 Rhode Island Ave. Washington, D.C. 20036 Call: (516) 755-2222

World Wastes-General industry magazine; focuses on solid waste management. (\$27/year) Write: 6255 Barfield Rd. Atlanta, Georgia 30328 Call: (404) 256-9800
104 Recycling: A Planning Guide for Communities

INFORMATION ON PLASTICS

Center for Plastics Recycling Research Rutgers, The State University of New Jersey Busch Campus, Building 3529 Piscataway, New Jersey 08855 Telephone: (201) 932-3683
Plastics Recycling Foundation, Inc. 1275 K Street NW Suite 400 Washington, D.C. 20005 Telephone: (202) 371-5200

Many of these pamphlets are available on our website, check them out at
www.dec.state.ny.us/website/dshm/redrecy/order.htm

Waste Reduction Materials

Let's Precycle
Do You Get Too Much Junk Mail?
Practical Source Reduction Tips for Businesses

Reuse Materials

Reuse It!
Reuse it or Lose It!
The Reusable Lunch Box

Recycling Materials

Reduce, Reuse, Recycle, Compost and Buy
Recycled!
Reduce, Reuse, Recycle This Holiday Season!
STOP (Save That Office Paper) Handbook
Your School Can STOP (Save That Outgoing Paper)
Don't Let Your Tires, Used Oil or Lead-Acid
Batteries Pollute the Environment!
Plastic Recycling
Buy Recycled
Anglers Wastes
Electronics Recycling

Composting

Everything You Have Always Wanted to Know
About Home Composting, But Were Afraid to
Ask!
Easy Backyard Composting
Leave it on The Lawn
Composting Activity Book (Grades 1 - 5)

School Materials

A School Waste Reduction, Reuse, Recycling,
Composting and Buy Recycled Resource Book
New York Recycles! Materials - Listed Below
Gee Whiz Recycling Facts
Earth Day Tips

New York Recycles!

New York Recycles! Pamphlet
New York Recycles! Petition Cards
New York Recycles! Bookmarks

New York Recycles! Posters (limited number)
New York Recycles! Teacher Lessons and
Activities
New York Recycles! Activity Book
(Grades 3 - 6)

Returnable Container Act

New York State Returnable Container Act
Get Your Money Back
The Great Bottle Round-Up Guidebook
The Great Bottle Round-Up Pamphlet

Household Hazardous Waste Pamphlets

Reduce Your Use!
Managing & Disposing of Household Hazardous
Waste

Litter

Let's Pick It Up New York! Guidebook
Let's Pick It Up New York! Pamphlet
Let's Pick It Up New York! Activity Book
(Grades 3 - 6)

Mercury

A Guide for Managing Mercury and Amalgam
Wastes at Dental Facilities
Cleaning up Small Mercury Spills

General Information

Multi-Residence Recycling
Reduce, Reuse, Recycle, Compost & Buy
Recycled for State Agencies
The Recycling Bulletin
Annual Report - Household Hazardous Waste

Regulations

6 NYCRR Part 360 Solid Waste Regulations
6 NYCRR Part 364 Waste Transporter Permits
6 NYCRR Part 367 Returnable Beverage
Containers
6 NYCRR Part 368 Recycling Emblem
Regulations



Recycling Paper... Environmental Savings

For every ton of paper recycled, we...

Save 463 gallons of oil.

Save 7,000 gallons of water.

Make 60 pounds less of air pollution.

Save 3 cubic yards of landfill space.

Save 4,100 kilowatt hours of energy.

Save 17 trees.

Reduce carbon dioxide emissions by 850 pounds per year!



Recycling Steel... Environmental Savings

For every ton of steel (metal) recycled, we...

Use 40 percent less water than used to make virgin steel.

Reduce air pollution by 86 percent.

Reduce water pollution by 76 percent.

Save enough energy to run a 60 watt light bulb for 26 hours.

Save 2,500 pounds of iron ore, 1,000 pounds of coal and 40 pounds of limestone.



Recycling Aluminum... Environmental Savings

For every ton of aluminum recycled, we...

Reduce energy use by 90 percent.

Save enough energy recycling just one can to run a TV for 3 hours.

Reduce air pollution by 95 percent.

Reduce carbon dioxide emissions by 13 tons!

Recycling Glass... Environmental Savings

For every ton of glass recycled, we...

Save enough energy to light a 100 watt light bulb for 4 hours.

Save 9 gallons of fuel oil.

Save 25 percent of the energy necessary to make glass with virgin materials.