Regional Solid Waste Management Plan

Waste Reduction Chapter

November 1989

NOTICE

This document was rescinded in November 1995 when the new 1995-2005 Regional Solid Waste Management Plan was adopted by the Metro Council (Ordinance No. 95-624A).

Although this document no longer has current legal or planning status, it is important from a historical standpoint and as a technical resource.

METRO

BEFORE THE COUNCIL OF THE
METROPOLITAN SERVICE DISTRICT

FOR THE PURPOSE OF AMENDING ORDINANCE NO. 88-266B ADOPTING THE REGIONAL SOLID WASTE MANAGEMENT PLAN TO INCORPORATE THE WASTE REDUCTION CHAPTER	)))))	ORDINANCE NO.89-315 Introduced by Councilor Hansen

WHEREAS, Metropolitan Service District Ordinance No. 88-266B adopted the Regional Solid Waste Management Plan as a functional plan; and

WHEREAS, The Solid Waste Management Plan incorporated Metro's 1986 Waste Reduction Program with 1989 Amendments as the Waste Reduction Chapter; and

WHEREAS, There is a need 1) to consolidate existing waste reduction documents, 2) to revise the amended 1986 Waste Reduction Program to respond to changing conditions over the past three years, and 3) to incorporate provisions from the Environmental Quality Commission's Unilateral Order; now therefore,

THE COUNCIL OF THE METROPOLITAN SERVICE DISTRICT HEREBY ORDAINS:

1. That the Regional Solid Waste Management Plan is amended as shown in Exhibit A to this ordinance.

2. That Ordinance No. 86-199, Ordinance No. 89-290 and Ordinance No. 89-297 adopting the 1986 Waste Reduction Program and amending that Program are hereby rescinded.

3. That the Waste Reduction Chapter as amended by Exhibit A shall supersede and take precedence over any prior ordinances and resolutions previously adopted that are inconsistent with its provisions.

ADOPTED by the Council of the Metropolitan Service District 9th day of November, 1989.

Mike Ragsdale

Mike Ragsdale, Presiding Officer

ATTEST:

Gwen Ware-Barrett

Clerk of the Council

STAFF REPORT

CONSIDERATION OF ORDINANCE NO. 89-315 FOR THE PURPOSE OF AMENDING THE REGIONAL SOLID WASTE MANAGEMENT PLAN TO INCORPORATE THE WASTE REDUCTION CHAPTER

DATE: September 13, 1989 Presented by: Richard Carson
Becky Crockett

PROPOSED ACTION

Ordinance No. 89-315 amends the Regional Solid Waste Management Plan to incorporate the revised Waste Reduction Chapter. It also rescinds prior ordinances adopting the 1986 Waste Reduction Program and the 1989 amendments to that Program. The revised chapter consolidates prior waste reduction work and includes additional elements which are summarized below.

FACTUAL BACKGROUND AND ANALYSIS

The Waste Reduction Chapter of the Regional Solid Waste Management Plan consolidates Metro's 1986 Waste Reduction Program with 1989 amendments and the System Measurement Study. This study, completed in July 1988, recommended five programs that would be the most technically and economically feasible to implement in the Metro region. The Council has already reviewed the System Measurement Study and has adopted the 1989 amendments to the 1986 Waste Reduction Program.

In addition to this consolidation of existing work, the Waste Reduction Chapter responds to the provisions of the Local Collection Service Coordination Program in DEQ's Unilateral Order. Specifically the chapter accomplishes the following:

- Establishes a 20-year (through the year 2010) waste reduction goal of 56 percent for the region, which includes recycling and alternative technology.

- Establishes a Five-Year Work Program for Metro and local governments which includes the specific activities that must be accomplished to achieve waste reduction goals.

- Establishes a cooperative process for implementing the Five-Year Program where Metro and local governments adopt Annual Work Programs for the waste reduction activities they will undertake in a given year.

Metro's Annual Work Program will be its FY 89-90 Waste Reduction budget. Staff will assist local governments in developing their work programs.

- Determines a process for monitoring performance and evaluating program effectiveness. This will include a standardized reporting procedure for all local governments.

- Determines a system for updating the program requirements on an annual basis and for conducting a comprehensive system analysis every five years.

Two elements of the waste reduction work have yet to be completed. Metro and the solid waste planning committees continue to address the issues of financing of waste reduction activities and enforcement by Metro if the voluntary, cooperative approach to implementation is not successful.

Identification of financing mechanisms is critical to the success of local government waste reduction program implementation in the region. Therefore, the Metro Council intends to adopt financing options for carrying out these programs by March, 1990 or earlier. It is expected that this will allow Metro and local governments adequate time to incorporate any necessary budget adjustments into their perspective FY 90/91 budgets. This will allow for local government program implementation to effectively begin in July, 1990. The Planning and Development Department will work with the Planning Committees to address this issues. Staff will update the Council Solid Waste Committee on the progress of this project in January, 1990.

The Five Year Work Program states that financing for some local government activities will have to be identified prior to requiring local government compliance. An analysis of funding options and other financing issues will be undertaken as part of the Financing Chapter of the Regional Solid Waste Management Plan.

Staff and the planning committees will continue to analyze how specific enforcement measures such as functional planning authority, flow control and rates can be used to ensure that programs are implemented and maximum feasible waste reduction achieved. The enforcement section of the chapter will be completed by July 1, 1990.

Decision Process

The Technical and Policy Committees for the Regional Solid Waste Management Plan project have reviewed and approved the draft Waste Reduction Chapter, including the specific program requirements for local governments and the implementation process. The draft chapter incorporates the amendments requested by those committees.

Attached to this staff report is a summary of the Five-Year Work Program for Metro and local governments and a flow diagram depicting the implementation and evaluation process. Copies of the complete Waste Reduction Chapter (Exhibit A of the ordinance) can be obtained from the Clerk of the Council.

EXECUTIVE OFFICER'S RECOMMENDATION

The Executive Officer recommends approval of Ordinance No. 89-315.

SOLID WASTE COMMITTEE REPORT

ORDINANCE NO. 89-315, FOR THE PURPOSE OF AMENDING THE REGIONAL SOLID WASTE MANAGEMENT PLAN TO INCORPORATE THE WASTE REDUCTION CHAPTER

Date: November 1, 1989 Presented by: Councilor Gary Hansen

Committee Recommendation: The Solid Waste Committee voted 4 to 0 to recommend Council adoption of Ordinance No. 89-315. Voting: Councilors Hansen, Buchanan, DeJardin and Wyers. Absent: Ragsdale. This action taken October 31, 1989.

Committee Discussion/Issues: The Solid Waste Committee held a public hearing on October 17, 1989. Two individuals testified. Peter Spendalow, DEQ, stated that the proposed ordinance will satisfy all of the elements of the EQC Order. He suggested that Metro identify funding mechanisms for various programs.

T. R. Factor indicated that she liked the proposed waste reduction plan. She asked if we were penalized by the landfill contract if we reduce the waste flow to the landfill through additional recycling. The Solid Waste Director said we are not penalized.

The Committee noted that financing mechanisms for program implementation will be included in a separate financing chapter in the Solid Waste Management Plan (SWMP). The Committee asked for a progress report in January.

The Committee recommended that the section on Program Implementation (p. 51 of Plan) be made more specific regarding dates, and to change the language from "wills" to "shalls."

The Committee questioned why the projected recycling rate for the year 2010 was not higher than 56 percent. The Solid Waste staff stated that they would like to see a higher recycling rate, but they felt that this was a realistic goal.

The Committee noted that enforcement of the plan was not fully addressed in the ordinance at this time. The Planning Department will prepare proposed enforcement language.

The Solid Waste Committee considered Ordinance No. 89-315 again on October 31, 1989. One individual testified. Jeanne Roy recommended that the use of the words "20 year waste reduction goal" be changed to read: "Waste reduction projection based on identified programs." The Committee agreed with her recommendation and amended the Waste Reduction Chapter to reflect the new language.

There were no other issues raised or discussed by the Committee and the Committee voted unanimously to recommend Council adoption of Ordinance No. 89-315.

GH:RB:pa--A:\RB.121

CHAPTER 1 - WASTE REDUCTION

I. POLICIES

1.0 The Solid Waste Management System shall achieve in an environmentally safe manner the maximum feasible reduction of solid waste being landfilled, in accord with the state hierarchy under ORS 459.015, and through the cooperative efforts of Metro, the cities and counties, and the community.

1.1 Metro shall set annual waste reduction goals to achieve the maximum feasible reduction based on an evaluation of: a) the amount of waste which is recoverable, b) the available technical methods, and c) the cost for recovery.

1.2 The annual goals will include evaluation of local participation rates and will provide a consistent method of data gathering and distribution of waste reduction information.

1.3 Metro shall support a higher system cost for waste reduction techniques over landfilling based on the state hierarchy (ORS 459.015) in order to accomplish the maximum feasible reduction of waste to the extent it is determined to be environmentally safe, technically and economically feasible.

1.4 An integrated system of waste reduction techniques shall be developed with emphasis on source separation, not to preclude the need for other forms of recovery such as post collection material recovery.

1.5 Metro, the cities and counties shall assure a provision for public education and promotion for waste reduction.

WASTE REDUCTION CHAPTER

TABLE OF CONTENTS

II. PURPOSE

State statute (ORS 459.015) requires that waste be managed to achieve maximum feasible reduction of materials going to landfills. The statute also establishes a hierarchy for managing waste which requires that if technically and economically feasible, management methods must first reduce the amount of waste generated; second, reuse the material for the purpose for which it was originally intended; third recycle material that cannot be reused; fourth, recover energy; and finally landfill wastes that cannot be handled in another way. All waste management programs in the Regional Solid Waste Management Plan are developed to be consistent with the state hierarchy. The Waste Reduction Chapter accomplishes the following:

1. Examines various approaches to waste reduction used throughout the nation and in the state of Oregon.

2. Describes roles and responsibilities in waste reduction in the tri-county area for Metro, the state Department of Environmental Quality (DEQ), cities and counties, and the solid waste industry.

3. Establishes the tri-county area's long-term (20 year) waste reduction goal and its short-term (five year) waste reduction program.

4. Establishes the approach the region will employ to implement and evaluate the waste reduction programs of Metro and local governments.

5. Identifies the enforcement mechanisms available to Metro to ensure that implementation occurs.

III. BACKGROUND

A. National Context

Solid waste management has become a national priority. Existing landfills are closing. Finding replacement sites that meet federal environmental standards and are acceptable to neighboring communities is becoming increasingly difficult. While landfill space becomes more scarce, the volume of municipal solid waste continues to grow. In 1987, the nation produced 160 million tons of solid waste. This means every person produced nearly 3.5 pounds of waste per day. The amount of municipal refuse has increased 80 percent since 1960 and is expected to increased another 20 percent by the year 2000.[1]

The Environmental Protection Agency (EPA) estimates that about 10 percent of the country's solid waste is being recycled. They have proposed a national strategy that targets 25 percent of the waste stream for reduction and recycling by 1992. This strategy recommends an integrated waste management system that includes source reduction, recycling, safe incineration, and sound use of disposal technology.

Most state and local plans also emphasize a solid waste system which integrates these elements. However, uncertainties regarding the environmental and health impacts of waste-to-energy facilities and landfilling have resulted in an increased emphasis on recycling as a method to reduce the amount of material going to landfills. The following section describes legislation enacted in several states to increase waste reduction.

1. Recycling Legislation

As of 1989, nine states have passed various forms of mandatory recycling legislation. Seven of these require that at least the majority of waste generators recycle some portion of the waste stream.[2] In New Jersey, each county must recycle leaves and three other materials such as newsprint, aluminum containers and glass. The state's goal is to recycle 25 percent of the waste stream within two years.

In Connecticut, municipalities are required to recycle newspaper, office paper and glass. By 1991, designated

---

[1]Environmental Protection Agency. "EPA Proposes National Strategy for Managing Solid Wastes." Cooperative Environmental Management Message. p.2.

[2]Glenn, Jim and Riggle, David. "How States Make Recycling Work." Biocycle. May, 1989. p. 47-48.

recyclables will not be accepted at landfills or waste-to-energy facilities. Rhode Island's law requires cities and townships to divert a minimum of 15 percent of their solid waste through various recycling processes over the next three years.

Other states, such as Oregon, Washington and Wisconsin, have not enacted mandatory recycling but stipulate that local governments and operators of disposal facilities provide the "opportunity to recycle" either through curbside collection programs or disposal facilities. *In Oregon, the legislature* may institute mandatory recycling if the voluntary approach is not successful.

A third, less direct approach to recycling legislation is to stipulate that local governments consider recycling before pursuing other alternatives. Iowa, Minnesota and New York have policies requiring local governments to develop solid waste management plans that address source reduction, recycling and resource recovery before landfill permits will be issued.

Finally, many states rely on voluntary programs established by local governments, community groups, and private companies. Citizen participation is also voluntary. In San Jose, California 60 percent of eligible households voluntarily participate in the curbside collection program. According to the city of Seattle's Solid Waste Utility, their voluntary curbside collection program started in 1988 had a 64 percent participation rate after its first year.

The effectiveness of mandatory versus voluntary recycling varies depending on community characteristics and types of recycling programs. Frequency of pick-up, availability of curbside containers for recyclables and rate incentives are examples of variables that influence recycling participation.

A recent survey conducted for the National Solid Waste Management Association indicates higher participation rates in mandatory programs. The survey found the average participation level to be 55 percent for 13 mandatory programs compared to 34 percent participation for 26 voluntary programs. The highest level of participation achieved in a voluntary program was 70 percent compared to 90 percent for a mandatory program.[3]

---

[3]Environmental Defense Fund. Coming Full Circle. 1988. p. 47.

2. Deposit Legislation

In 1988, ten states also had "deposit legislation" commonly known as "bottle bills." These programs provide an incentive for consumers, retailers, distributors and manufacturers to reuse or recycle by adding a deposit fee to the price of beverage containers. According to a 1988 report by the Environmental Defense Council, deposit legislation has resulted in significant reductions in the waste stream and a corresponding increase in recycling. The report states that bottle bills generally divert approximately five percent of the waste stream from the disposal system.[4]

A study of the impact of New York state's bottle bill indicates a significant increase in recycling. Before the law was passed, recycling rates were 15 percent for cans, three percent for glass and one percent for plastic. After the deposit legislation was enacted, recycling rates increased to 60 percent for cans, 80 percent for glass and 50 percent for plastic.[5] Other states that have enacted deposit legislation include Connecticut, Delaware, Iowa, Maine, Massachusetts, Michigan, Vermont and Oregon.

In addition to the state bottle bills, there have been attempts in Congress to pass a "National Beverage Container Reuse and Recycling Act." This national legislation would amend the Resource Conservation Recovery Act (RCRA) and would require a nationwide, five-cent minimum deposit on glass, metal, and plastic containers in which beer, wine coolers, and soft drinks are sold. The program would be administered by the EPA. States with existing deposit legislation would not be required to change their programs.

3. Packaging and Product Regulation

Several states have initiated product regulation as a means to increase waste reduction. This legislation generally applies to packaging but several states have enacted or are considering bills that require certain products or classes of products be made in reusable, recyclable or biodegradable form.

As of 1988, eleven states require that plastic six-pack loops be biodegradable. In Minnesota, the state pollution control agency reviews new or revised packages or

---

[4]Ibid., p.70.

[5]Department of Environmental Conservation. New York State. Impact of New York's Bottle Bill on Beverage Container Recycling Rate. 1987.

containers, and in South Dakota no beverage containers can be sold unless they are reusable, recyclable or biodegradable. Other states are examining potential legislation that would require fast food restaurants to use biodegradable containers or laws that would increase the sales tax on non-recyclable packaging.

Attachment 1 describes a range of waste reduction programs that as of 1989 were being implemented throughout the country to increase waste reduction. The descriptions are organized according to reduce, reuse, recycle and recover energy to be consistent with the state hierarchy. The attachment also includes a summary of the most commonly used implementation tools.

B. Oregon Context

In addition to the state hierarchy governing waste management, Oregon has adopted recycling legislation which includes the "Bottle Bill," the "Opportunity to Recycle Act," and tax credits to encourage investment in recycling facilities.

1. Oregon Bottle Bill

Oregon passed its "Bottle Bill" in 1971. The legislation creating this program provides incentives for manufacturers, distributors, retailers and consumers to reuse or recycle beverage containers. Beverage distributors charge retailers the required deposit for each container. This deposit is passed on to the consumer who receives a refund of this deposit when he or she returns the empty beverage container to the retail store.

Deposit legislation in Oregon currently applies to beer, and soft drink bottles and cans, including some plastic beverage containers. It was estimated that in 1987, 86,000 tons of beer and soft drink beverage containers were reused or recycled, contributing 12-20 percent to the total amount of materials recycled in the state.[6] More than 90 percent of the containers are returned for reuse or recycling. A significant number of glass bottles are reused consistent with the state hierarchy for waste management.

2. The Opportunity of Recycle Act

In 1983, the Oregon legislature passed Senate Bill 405, known as the "Oregon Opportunity to Recycle Act." This

---

[6]Department of Environmental Quality. Based partially on Liquor Control Commission sales figures.

law requires that local governments in Oregon offer the opportunity to recycle by providing a place for source-separated recyclables at disposal sites or another location more convenient to the population being served. Cities with a population of 4,000 or more must also provide, at a minimum, monthly collection of recyclable materials for their collection customers. An alternative method to provide an opportunity to recycle may be used if approved by the Department of Environmental Quality (DEQ). The statute also requires that local governments conduct public education and promotion programs which notify individuals that the opportunity to recycle is available and encourage source separation of recyclable materials.

Oregon Administrative Rules (OAR 340-60-010) define "recyclable materials" as those that can be collected and sold for recycling at a net cost equal to or less than the cost of collection and disposal of the same material. The specific materials for which an opportunity to recycle must be offered are called "principal recyclable materials."

Materials that meet the definition of "principal recyclable material" vary throughout the state. Within the Portland metropolitan area's urban growth boundary the following have been designated as "principal recyclable materials": newsprint, ferrous scrap metal, non-ferrous scrap metal, used motor oil, corrugated cardboard and kraft paper, aluminum containers, container glass, hi-grade office paper, and tin cans. In 1988, the Environmental Quality Commission (EQC) added yard debris to the list of principal recyclable materials in the five Portland area wastesheds.

Most local government programs that implement the "Opportunity to Recycle Act" have been in place since July, 1986. The average participation rate in curbside collection programs was approximately 14 percent statewide in 1987.[7]

3. Tax Credits

Oregon also has programs that promote recycling and resource recovery by providing tax credits for companies investing in recycling facilities and equipment. The "Pollution Control Tax Credit Program" can be used to help offset financing costs for recycling and resource recovery facilities by offering a 50 percent credit against corporate income tax each

[7]Oregon Department of Environmental Quality. "Oregon Recycling Opportunity Act: a Report to the Oregon Legislature." December 1988.

year for a ten year period. According to the DEQ, between 1972 and 1988, the state certified 117 solid waste facilities for tax credits, including 17 recycling projects.

Oregon's "Business Energy Tax Credit" applies to equipment used in recycling. Companies are allowed to write off 35 percent of the cost of recycling equipment over five years. The program is administered by the Oregon Department of Energy. Equipment handling all types of materials including yard debris, glass, oil, tires, corrugated containers and newspapers have received tax credits from this program. Limited surveys on these two tax credit programs suggest that they improve the profitability and marketing position of companies involved in recycling and resource recovery activities.

4. Other Programs

In addition to the programs described above, Oregon has passed legislation requiring that used oil be collected and recycled to the maximum extent possible. The DEQ conducts a public education program to promote oil recycling. State agencies in Oregon must also establish programs to separate waste that can be recycled and reused, and adopt procurement practices that encourage the use of recovered resources or recycled materials.

C. The Tri-County Region

In 1988, the tri-county region generated approximately 1.4 million tons of garbage. About 373,000 tons of this waste was recovered resulting in a 26 percent recycling rate. This percentage reflects recycling achieved through the Oregon Bottle Bill, the opportunity to recycle program, commercial/industrial recycling, and yard debris recycling.

Figure 1 depicts the increase in recycling in the metropolitan region since 1979. These rates are determined by analyzing the amount of waste generated and landfilled, and amounts recovered through waste reduction programs. Several factors that contribute to increases in waste generation include population growth, post-recession consumer spending, increased packaging and the production of more non-biodegradable materials. The amount recovered is based on surveys of secondary materials markets and recovery operators in the Metro region. (Surveys of recycling markets conducted in different years used slightly different methodologies, and therefore quantity estimates are not completely comparable between years.)

Achieving maximum feasible waste reduction in the Metro region requires the cooperation of government, garbage haulers/recyclers, private industry and citizens. The following section describes the specific roles and responsibilities of Metro, cities and counties, the solid waste industry, and the State Department of Environmental Quality in waste reduction for the Metro area.

1. Metro

Metro has the following responsibilities that affect waste reduction in the tri-county region: 1) solid waste management planning authority for Clackamas, Multnomah and Washington Counties, 2) responsibility for implementing the region's Waste Reduction Program, 3) responsibility for waste disposal within the Metropolitan Service District boundary, and 4) functional planning authority for areas and activities which impact the orderly and responsible development of the metropolitan area.

Executive Order 78-16 gave Metro responsibility for solid waste planning in the tri-county area. This requires developing programs and facilities that reduce the amount of waste going to landfills in a manner consistent with the state hierarchy. In addition, Chapter 679, Oregon Laws, 1985 required that Metro develop and implement a comprehensive Waste Reduction Program for the region.

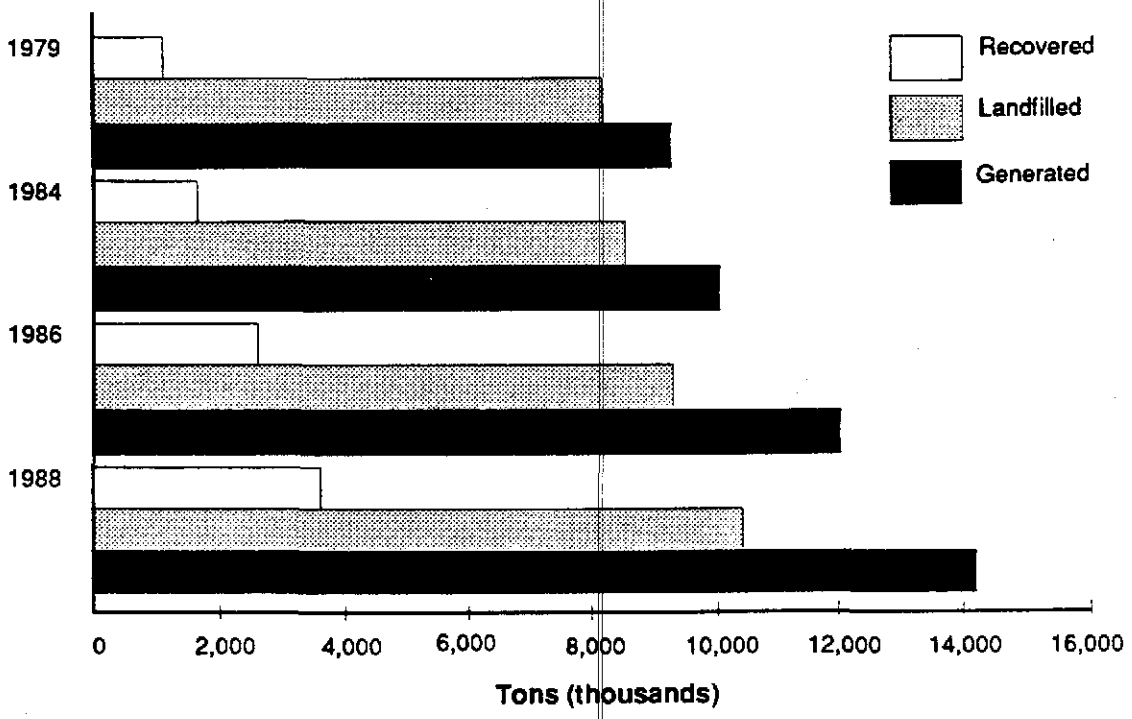
This program reflects a commitment to substantially reduce the volume of solid waste disposed in landfills through techniques including source separation and post collection recycling, rate structures and resource recovery. It also establishes a 20 year regional recycling goal. An approved Waste Reduction Program is required before DEQ will issue a permit for a landfill disposal site in an area zoned for exclusive farm use (EFU). The region's new landfill in Gilliam County is located in an EFU zone.

Metro also has responsibility for solid waste disposal (ORS 268.317) which includes rate setting, franchising, flow control and other regulatory authorities. These powers can be used to influence waste reduction levels by establishing needed waste reduction facilities, setting rates that encourage waste reduction or by controlling the amounts and types of waste going to various facilities.

Metro's functional planning authority, delineated in ORS 268.390, enables Metro to 1) prepare and adopt functional plans for areas and activities that have a significant impact on the orderly and responsible development of the metropolitan area, and 2) to recommend or require that plans of cities and counties within the District be consistent with these functional plans. The Regional Solid Waste

Figure 1

Estimate of Recycling in the Metro Region
1979 – 1988



Year	Waste Recovered (tons)	Waste Landfilled (tons)	Waste* Generated (tons)	Per Capita** Generated (tons)	Percent Recycled
1979	120,293	822,300	942,597	0.91	13%
1984	169,104	848,588	1,017,692	0.95	17%
1986	268,082	940,405	1,208,487	1.11	22%
1988	372,008	1,055,431	1,427,439	1.27	26%

Sources and notes:

(1) Metro, Solid Waste Department
(2) Metro Region Recycling Conditions prepared by Resource Conservation Consultants (1980,1985,1987)
(3) Metro Survey of Recycling Markets, September 1988, prepared by Brennan & Associates (1988)
(4) Regional Factbook, Metro, 1988

* Assumes that all waste disposed in the Metro region was generated inside the region .

** Based on tri-county population figures (Regional Factbook, Metro, 1988):

1979 – 1,033,550
1984 – 1,068,800
1986 – 1,086,000
1988 – 1,119,700

Management Plan has been adopted as a functional plan and therefore local comprehensive plans must be consistent with its provisions relating to waste management and waste reduction.

2. Cities and Counties

Cities and counties have responsibility for solid waste collection in the tri-county region. Collection service is provided by private haulers who are regulated by local governments. In all of Clackamas and Washington Counties and many cities in Multnomah County haulers are franchised and have distinct service areas. In the City of Portland and unincorporated Multnomah County, haulers do not have franchised service areas but are issued permits requiring they meet certain service standards.

Cities and counties must also ensure that the opportunity to recycle is provided, as stipulated in state statute. Specific local government responsibilities to carry out the "Opportunity to Recycle Act" include the following:

- Ensure that curbside collection of recyclables is provided, where required, to customers requesting recycling service.

- Provide a promotion and education program which notifies individuals about the importance of recycling, recycling opportunities that are available, the materials that can be recycled, and how to prepare those materials.

- Prepare annual recycling reports (wasteshed reports) for DEQ. These reports must include the materials that are recyclable, the manner in which these materials are collected, public education and promotion activities, the number of recycling set-outs by each on-route collection program, and the amount of materials recycled in the previous year for each program.

The wasteshed report is prepared by a representative from each of the five wastesheds in the tri-county area (Clackamas, Multnomah, Portland, Washington and West Linn). These wasteshed representatives are selected by cities and the county in each wasteshed to serve as the contact person for the DEQ. Some wasteshed representatives have also taken on additional non-statutory responsibilities such as classroom programs and promotional activities.

State Administrative Rules developed in 1988, require local governments to plan and implement yard debris

recycling through a curbside collection program, depot collection or another alternative approved by DEQ. Rather than develop their own yard debris plans, local governments can participate with Metro in preparing and implementing a regional plan (OAR 340-60-035).

Local governments are also required by Statewide Planning Goal #11 (Public Facilities and Services) "to plan and provide for the timely, orderly and efficient arrangement of public facilities and services" in their comprehensive land use plans. This includes solid waste facilities to meet current and long-term needs. According to ORS 268.390, the provisions for solid waste facilities in local comprehensive plans must also be consistent with the Regional Solid Waste Management Plan. City and county land use plans therefore impact waste reduction to the extent that they provide for waste reduction facilities and have appropriate zoning to accommodate those facilities.

3. Garbage Haulers

In the Metro region, local governments have designated garbage hauling companies as being responsible for providing the on-route recycling collection programs required under the Opportunity to Recycle Act. In franchised areas, the recycling requirement is contained in the garbage hauling franchise. In the City of Portland, haulers are required by ordinance to provide recycling collection. Many of the garbage haulers also offer commercial recycling programs.

4. Private Recyclers

The Opportunity to Recycle Act, and state law in general, places no specific requirements on private companies that collect or process recyclable materials. The Act specifically excludes materials" purchased or exchanged for fair market value" and materials collected at recycling depots (other than disposal site recycling depots) from regulation or franchise requirements. The DEQ does have the authority to require recycling permits for private recyclers, but has not exercised that authority. Some local governments do regulate private recyclers. For example, Clackamas County requires all private recyclers to register with the county and purchase a recycling license.

4. State Department of Environmental Quality

The DEQ is responsible for developing legislation and

administrative rules relating to waste reduction. The agency also oversees the waste reduction activities of Metro and cities and counties. The Regional Solid Waste Management Plan and the Waste Reduction Program must be approved by the DEQ. It monitors the "Opportunity to Recycle Act" by reviewing wasteshed reports prepared by cities and counties to determine the effectiveness of local government curbside collection programs. Finally, DEQ provides grants, loans and technical assistance to local governments, and administers the Pollution Control Bonds program, which helps finance recycling and resource recovery facilities.

IV. THE REGION'S WASTE REDUCTION PROGRAM

The tri-county area's waste reduction program establishes an integrated set of activities which follow the state hierarchy for waste management. The program emphasizes enhancement of existing source separation techniques, increased efforts in post-collection material recovery, and incorporates alternative technology through a municipal solid waste composting facility. The five-year program is based in part on an analysis of which waste reduction techniques will yield the greatest reduction over time.

Due to the dynamics of waste reduction activities nation-wide, this program will undergo extensive re-evaluation on a five-year cycle. Results will be reviewed in light of new program possibilities and other changing circumstances. This five-year evaluation may result in program amendments that will be reflected in this plan.

A. History and Background

The region's current waste reduction program has evolved over time and reflects a number of factors. These include statutory requirements, experience and knowledge derived from other programs nationwide, the result of continued analysis of various program options, and sometimes simply trial and error.

The region's first Waste Reduction Plan was adopted in 1981. This program was required by statute in order to site a landfill in an area zoned for exclusive farm use. The statute and accompanying administrative rules identified specific criteria to be addressed in waste reduction plans. In 1986, Metro adopted and the DEQ approved, a second Waste Reduction Program prepared in response to state legislation relating to siting a regional landfill in the tri-county area. This legislation required that the region's Waste Reduction Program substantially reduce the amount of waste going to landfills by identifying waste reduction techniques including but not limited to, source separation, rate structures, recycling, reuse and resource recovery.

The 1986 Program established a long-term recycling goal of 52 percent. The remaining 48 percent of the waste stream would be available for alternative technology/resource recovery projects. It included eleven specific programs based upon statutory requirements. One component of the 1986 Waste Reduction Program was a System Measurement Study. The purpose of the study was to determine waste reduction activities that would be the most economically and technically feasible in the tri-county area. The program recommendations resulting from the extensive analysis of the study are the nucleus of this regional waste reduction program. They include commercial recycling, lumber recovery, apartment recycling, residential curbside containers and material recovery.

The System Measurement Study, including descriptions of the program recommendations, is contained in the Appendix of the Solid Waste Management Plan. The performance goals determined by this study have been adjusted to incorporate the 1988 recycling level and a 20 year planning horizon. This forecast is described in the next section of the chapter.

In March 1989, the Metro Council amended the 1986 Waste Reduction Program to reflect current planning priorities and to incorporate new timelines and methodologies for program implementation. These amendments were premised on EQC Order #SW-WR-89-01, that directed Metro to implement provisions of the Waste Reduction Program.

This Solid Waste Management Plan chapter consolidates these earlier waste reduction plan efforts, as appropriate, in carrying out current regional waste reduction activities. This revised waste reduction program also identifies current program activities to be carried out by both Metro and local governments in the region.

B. 20-YEAR WASTE REDUCTION FORECAST FOR IDENTIFIED PROGRAMS

THE FORECAST FOR THE TRI-COUNTY AREA IS TO ACHIEVE A 56 PERCENT WASTE REDUCTION RATE BY THE YEAR 2010.

This forecast is based on the following assumptions:

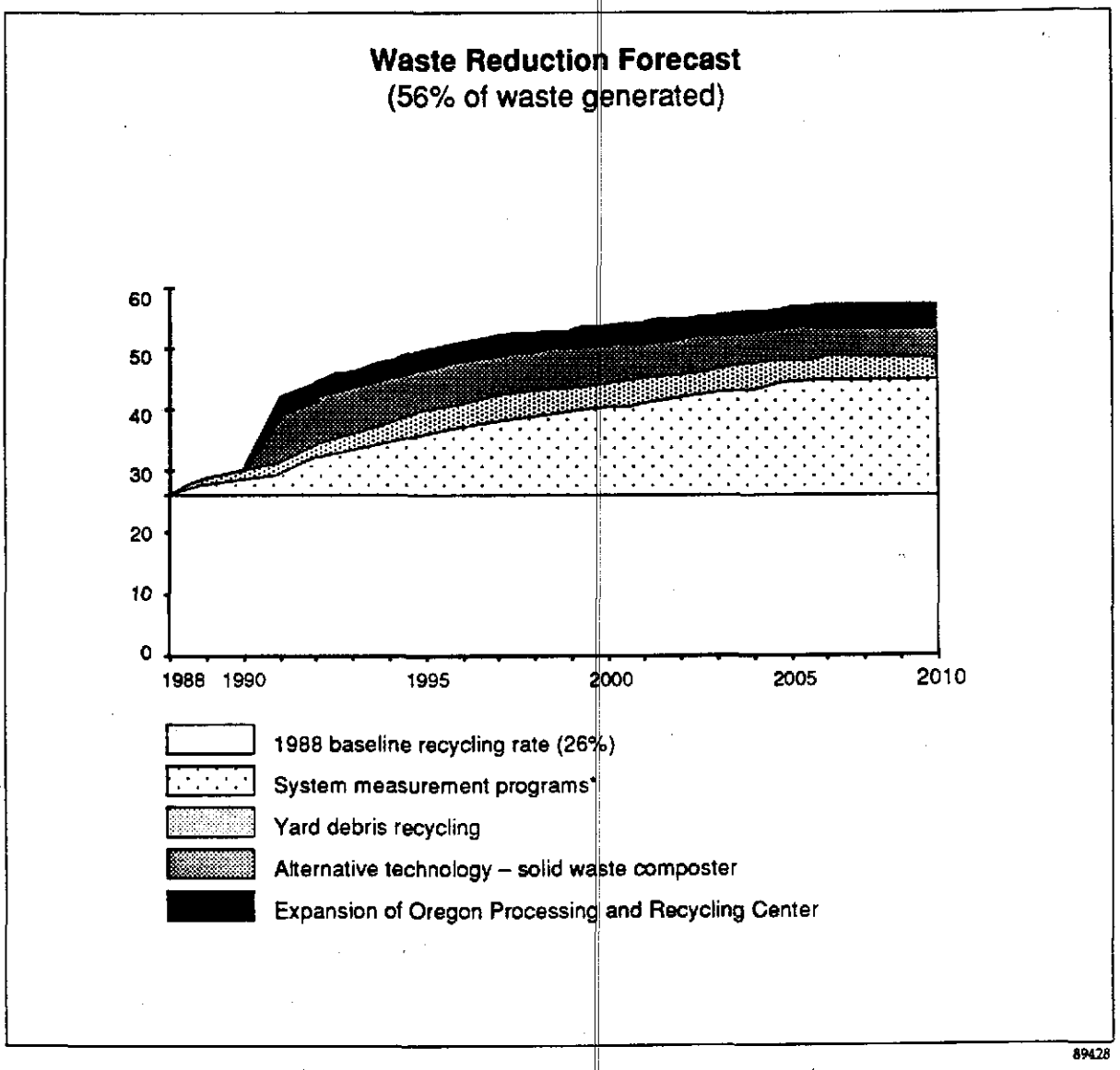
1)	1988 recycling rate in the region	26%
2)	Implementation of System Measurement Programs[8]	19%
3)	Increased recycling of yard debris[9]	4%
4)	A municipal solid waste composting facility	4%
5)	Expansion of North Portland Material Recovery Facility (OPRC)	3%
	Total Waste Reduction Forecast	56%

The combined effects of these programs and facilities results in an estimated waste reduction rate of approximately 50 percent by the year 2000. Figure 2 illustrates the projected increase in recycling and the contributions of specific programs and alternative technology through the year 2010.

[8] These programs include commercial recycling, lumber recovery, apartment recycling, residential curbside containers and post collection material recovery.

[9] The forecast for yard debris recycling will be adjusted based on the conclusions of the Regional Yard Debris Plan currently underway.

Figure 2



*• Commercial recycling
• lumber recycling
• apartment recycling
• residential curbside containers
• post-collection material recovery

C. Regional Programs

In order to achieve the above stated waste reduction forecasts, the region must implement new and enhance existing waste reduction program efforts. Since waste reduction responsibilities and authorities are shared by Metro, cities and counties, and the DEQ, successful implementation requires the participation of all parties.

Metro is responsible for implementing programs which relate to solid waste disposal and those which are area-wide in scope, such as regional promotion and education, technical assistance, and market development. Cities and counties have responsibility for implementing those activities directly impacting the solid waste collection system, such as curbside containers. They are also responsible for adopting legislation that supports regional programs, such as institutional purchasing policies.

The following section describes the specific waste reduction program responsibilities for Metro and local governments for the next five years (from FY 89-90 through FY 94-95). A summmary of these activities follows the Five Year Work Program.

REGIONAL WASTE REDUCTION PROGRAM
FIVE YEAR WORK PROGRAM
Metro Programs

1. PROGRAM NAME: PROMOTION, EDUCATION AND PUBLIC INVOLVEMENT

PROGRAM DESCRIPTION:

Purpose: To develop a comprehensive program to reach the general public and special interest groups with information and other opportunities to increase their awareness of the participation in waste reduction activities.

A. Market Research: Promotion and education activities will be designed in light of market research findings to reach selected target populations with information they are most likely to respond to. Market surveys will be taken at regular intervals so we can evaluate the effectiveness of the promotion and education activities we undertake.

B. Theme and Graphic Look: A professionally developed theme, or slogan, and graphic look will tie together all elements of Metro's waste reduction promotion and education.

C. Multi-Year Campaign Plan: This will provide a detailed plan, schedule and budget to assure coordination of all Metro waste reduction promotion and education activities. The initial plan will cover a three-year period, focusing on the first year's effort. The plan will be updated and revised yearly.

D. Specific Campaigns: Two major promotions will be undertaken every year. Each will utilize a broad range of information outlets -- including such measures as newspaper and magazine articles and advertising; billboards and transit advertising; radio ads; radio and television public service announcements and station promotions; and various direct contact approaches such as direct mail. In addition, Metro staff will carry out at least eight promotions in the community each year such as exhibits and displays in trade shows and shopping centers.

E. Recycling Information Center: The RIC will continue to be the main point of public contact for inquiries on recycling and waste reduction.

F. Support for Local Jurisdictions: Metro's promotion and education activities are intended to supplement those of the local governments. Metro will use primarily regional outlets and will cover topics and themes of interest across the region. Local jurisdictions will take the lead in providing educational information with specifics about pick up, schedules and requirements. Metro will offer support by (1) compiling and distributing a monthly calendar of events, (2) developing, upon request, ready-to-print promotional materials incorporating Metro's overall logo and theme; and (3) providing general information and assistance on how to work with the media, also upon request from local governments.

G. Public Involvement: Several elements of the Waste Reduction Program require ongoing efforts to involve the public and special interest groups from the metropolitan area. Examples include scheduling public meetings to review alternative technology proposals, and arranging meetings with local governments and private business to arrive at workable recycling goals. These public involvement activities are referenced in the Work Plans for each program area. They will be planned, coordinated and carried out as part of this promotion, education and public involvement work program.

2. PROGRAM NAME: REDUCE AND REUSE PROGRAMS

PROGRAM DESCRIPTION:

Purpose: Develop programs to achieve the maximum feasible reduction of materials that eventually become waste; and the salvage and reuse of reusable products retrievable from the waste stream.

A. Plastics Reduction Task Force: Participate in a statewide or regional task force to research strategies for reducing plastic material in the waste stream.

B. Packaging Reduction: Promote consumer attention to packaging issues, develop legislative action to address degree of packaging-type waste in waste stream. (See Promotion and Education.)

C. Salvageable Building Materials and Items: Evaluate alternative methods for reusing salvageable building materials and items from the residential waste stream. Based on evaluation, implement recovery program/s.

(1) Develop management options to recover salvageable building materials from the waste stream. This shall be done so that it is consistent with the development of the select waste provisions of the Solid Waste Management Plan.

Est. Completion January 1, 1990

(2) If determined to be feasible, develop a regional system for recovery of these materials from the residential waste stream.

Est. Completion January 1, 1991

(3) Conduct a promotion campaign for reusable building materials.

Est. completion April 1, 1990

3. PROGRAM NAME: RECYCLE

PROGRAM DESCRIPTION:

PURPOSE: Establish and aggressively promote a variety of programs to assist local governments and other parties in developing curbside collection programs as required under the Oregon Opportunity to Recycle Act; to meet standards developed by the Department of Environmental Quality; and to achieve maximum feasible reduction through those programs.

A. Technical Assistance: Provide technical assistance to generators, haulers and local governments to increase recycling from the commercial waste stream and from multi-family dwellings.

(1) Identify areas where commercial and multi-family recycling is not currently provided and where technical assistance is needed to establish recycling programs.

Est. Completion January 1, 1990

(2) Metro staff shall consult with local government officials and collectors in areas identified in (1) to establish effective multi-family and commercial recycling programs

Est. Completion July 1, 1990

B. Recycling Information Center Enhancement: A program to facilitate the development of recycling habits, attitudes and awareness in the general public; and to upgrade the information services for the RIC in response to the development of curbside collection programs. Specific activities include:

Computer Capability: Develop a computerized information storage and retrieval system to manage the resources of the center.

Public Education Materials: Develop a series of educational flyers and handbooks on waste reduction and recycling issues for distribution to the general public.

Library Development: Develop a library of audio-visual and printed materials on recycling and waste reduction issues for use by the general public.

Volunteer Development: Develop volunteer and/or internship program to provide opportunity for volunteers to learn community information management techniques and awareness of recycling habits, attitudes and issues.

Community Recycling Projects: Develop active partnerships with community groups and citizens to develop small-scale, neighborhood-based community recycling projects such as neighborhood clean-ups and compost programs, workshops, speakers bureau and others. Extend networking capabilities with community organizations.

Salvageable Materials and Waste Exchange: Appropriate functions related to waste exchange and salvageable material database and hot line will be expanded.

C. Local Recycling Service Coordination: In cooperation with local governments, the solid waste industry and citizens, develop a mechanism to ensure that local governments carry out recycling programs consistent with those in the Solid Waste Management Plan.

(1) Establish performance standards for local government recycling programs.

Est. Completion July 1, 1990

(2) Design a reporting procedure for local governments, including data requirements for determining participation levels and quantities of materials recycled. Metro will produce reports on regional data.

Est. Completion July 1, 1990

(3) Measure the performance of local jurisdictions against the standards established in (1).

Est. start-up July 1, 1990

(4) Establish mechanisms to ensure that the performance standards are achieved by local governments. A variety of options exist to accomplish this including: rate incentives, certification, flow control, functional planning authority and cooperative compliance, with implementation by local governments.

Est. Completion July 1, 1990

(5) Prepare model annual work programs for local governments. Assist local governments in developing and adopting these work programs.

D. Regional Promotion and Education: A multi-year regional recycling promotion campaign. (See Promotion and Education Work Plan.)

E. Source Separation Technology Development: The distribution of home or office recycling containers. Work with local jurisdictions to implement a regional curbside container recycling program for both single family and multi-family dwellings.

(1) Implement a pilot project utilizing curbside recycling containers at single family dwellings.

Est. Completion October 1, 1989

(2) If pilot project in (1) demonstrates that the use of recycling containers is feasible, Metro shall work with local governments to implement a curbside container recycling program, including assistance with financing alternatives,

distribution techniques and promotion and education.

Est. Completion (for one county) August 1, 1990

(3) Implement a recycling pilot project for multi-family dwellings.

Est. Completion January 1, 1991

F. Grants and Loans: Targeted to local governments, businesses and/or recyclers to support waste reduction and recycling programs.

4. PROGRAM NAME: RECYCLE -- YARD DEBRIS

PROGRAM DESCRIPTION:

Purpose: To achieve maximum feasible reduction of yard debris currently being landfilled through the use of regional processing facilities and on-route collection of source separated yard debris.

A. Materials Markets Assistance: Provide technical assistance to existing and potential markets to stimulate use of yard debris compost materials.

(1) Continue to manage quarterly yard debris compost tests for herbicides, nutrients, toxicity and seed identification.

(2) Continue to coordinate demonstration plots to test the effects of yard debris compost on plant growth.

(3) Continue annual yard debris compost marketing campaign.

B. Financial Incentives - Payments, Loans and Grants: Metro may provide limited and selected payments to private sector yard debris processors to encourage market demand for yard debris compost. In limited circumstances, loan or grant monies may be given to processors for capital expenditures.

C. Technical Assistance: Provide technical assistance to local governments, haulers, processors and communities to increase yard debris recycling.

(1) Organize and expand database and library on collection and processing of yard debris.

Est. Completion January 1, 1990

(2) Promote the use of the Recycling Information Center (RIC) resources on yard debris recycling. Provide technical assistance through the RIC to local governments, haulers and small scale processors such as chipping and gardening services.

D. Promotion and Education: Use to promote home composting, source separation, and market development. (See Promotion, Education and Public Involvement Work Plan.)

E. Rate Incentives: Utilize rate incentives to encourage source separation of yard debris.

(1) Adopt a rate structure at appropriate Metro disposal sites that will provide an incentive for yard debris recycling. This rate will be less for clean, source separated yard debris than for contaminated yard debris and mixed waste.

Est. Completion July 1, 1989

(2) Adopt a rate structure at appropriate regional disposal sites that will provide an incentive for yard debris recycling. This rate will be less for clean, source separated yard debris than for contaminated yard debris and mixed waste.

Est. Completion January 1, 1990

F. Local Yard Debris Recycling Coordination: Develop and implement a regional yard debris recycling plan in cooperation with local governments, the solid waste industry, citizens and the Department of Environmental Quality.

(1) Determine which local governments are to participate in regional plan; establish local government/Metro committee process to develop plan; hire employees to develop the plan.

Est. Completion April 1, 1989

(2) Complete assessment of existing local government programs; education for local government committees; new employee training.

Est. Completion May 1,1989

(3) Conduct assessment of market capacity, processing capacity, local government collection alternatives, facility impacts, local government financing options, data collection options to evaluate programs and tools to effectively implement the regional plan.

Est. Completion November 1,1989

(4) Write the regional yard debris plan. Includes incorporating local government plans developed outside of regional process into the regional plan, local government/Metro decisions regarding collection alternatives, financing, establishing goals, facility changes (possible new facilities), roles, responsibilities and time frames to implement the plan.

Est. Completion July 1, 1990

(5) Establish local government program standards to carry out the regional yard debris plan.

I. Bans on Disposal: Assess appropriate disposal bans of source separated yard debris at regional facilities.

(1) Evaluate all Metro-area disposal facilities to determine feasibility of establishing a set-aside area for recycling clean, source separated yard debris. Further, evaluate potential yard debris processing capabilities at Metro-area disposal facilities.

Est. Completion September 1, 1989

(2) Based on evaluation in (1), establish set-aside area to receive and recycle clean, source separated yard debris at appropriate Metro-area disposal facilities.

Est. Completion January 1, 1990

(3) Based on evaluation in (1), prohibit disposal of uncontaminated source separated yard debris at appropriate Metro-area disposal facilities.

Est. Completion January 1, 1990

5. **PROGRAM NAME: POST-COLLECTION RECYCLING/MATERIALS RECOVERY**

PROGRAM DESCRIPTION:

Purpose: To recover recyclable materials and reusable items from the waste stream through facilities that process waste that contains a high percentage of economically recoverable material.

A. Materials Recovery: Establish disposal facility capacity throughout region for maximum feasible recovery of recyclable materials including construction debris and paper products.

(1) Conduct analysis to determine the need for, capacity and location of materials recovery facilities. This shall be done as part of the system design development of the Solid Waste Management Plan.

Est. Completion April 1, 1990

(2) Based on analysis in (1), proceed to retrofit existing facilities and/or establish new facilities.
Est. Completion January 1, 1991

(3) Construct at least one new facility or modify an existing facility and have material recovery on-line.

Est. Completion January 1, 1992

(4) If analysis in (1) determines modifications are necessary at Metro South to achieve greater high grade recycling, such materials recovery shall be on line.

Est. Completion July 1, 1992

(5) All facilities called for in (1) shall be on line.

Est. Completion January 1, 1993

B. Waste Auditing and Consulting: Advise and assist with waste audits and design programs for waste generators in cooperation with collectors to assist in the generation of high-grade loads of recyclable material.

(1) Develop waste audit survey form.

Est. Completion July 1, 1989

(2) Perform twenty-five commercial waste audits to demonstrate what materials can effectively be recovered through a source separation program.

Est. Completion October 1, 1989

(3) Report to DEQ and Metro Council on effectiveness of audits.

Est. Completion January 1, 1990

(4) If initial twenty-five audits effectively reduce commercial waste, continue to offer waste audit and consulting service.

(5) Develop waste audit training seminar for generators and collectors.

Est. Completion January 1, 1990

(6) Conduct three waste audit seminars.

Est. Completion July 1, 1990

C. Rate Incentives For Post-Collection Recycling: Establish rate incentives to encourage recovery of recyclable materials at material recovery facilities.

(1) Evaluate the impact of current rate incentives on recycling. Based on evaluation, recommend expansion of current incentives program.

Est. Completion January 1, 1990

(2) Based on evaluation in (1), adopt rate structure amendments.

Est. Start-up — October 1, 1990 (or) when new facilities come on-line

6. PROGRAM NAME: ALTERNATIVE TECHNOLOGIES

PROGRAM DESCRIPTION:

Purpose: To recover material and/or energy from the implementation of Alternative Technologies.

Material and Energy Recovery: Discarded material from material recovery/transfer facilities will be available for this purpose. Material which the waste substream composition and recovery analysis demonstrates has no economically viable material recovery options will be available for energy recovery. A portion of the processed waste stream may be allocated to a developmental technology.

7. PROGRAM NAME: MATERIALS MARKETS ASSISTANCE PROGRAM

PROGRAM DESCRIPTION:

Purpose: To develop programs and services designed to stimulate demand for certain recyclable materials to meet expected increased supply of those materials generated through the implementation of SB 405 and Waste Reduction Program; to develop an annual information base on market conditions from which to evaluate market assistance programs.

A. Annual Market Analysis: Annual evaluation of markets to identify strengths and weaknesses and impediments to their future growth.

B. Annual Market Survey: Annual survey of companies which purchase recycled materials as service to material brokers.

C. Recycled Products Survey: Conduct survey of products available in the Metro area markets that are made from recycled materials.

(1) Complete a survey and report on products available for purchase that are made from recycled paper, yard debris, tires and used oil. Distribute results to local governments and businesses upon request.

Est. Completion July 1, 1989

(2) Complete a survey and report on products available for purchase that are made from other recycled materials such as paving and construction materials, insulation and building materials, reusable containers, fuels derived from recycled materials and recycled plastic products.

Est. Completion January 1, 1990

D. Consumer Education: Education program for consumers on advantages of purchasing products made from recycled materials. (See Promotion & Education Work Plan.)

E. Institutional Purchasing: Provide technical assistance and promotion for developing institutional purchasing policies that favor the use of recycled materials.

(1) Develop a model procurement policy for the purchase of recycled paper products, composted yard debris products and other products made from recycled materials.

Est. Completion July 1, 1989

(2) Provide model recycled products procurement policies to local governments and major businesses; encourage and assist them in adopting such policies.

Est. Completion January 1, 1990

(3) Provide technical assistance to governments, businesses and public institutions on purchase of products made from recycled materials.

Est. Completion January 1, 1990

(4) Continue to promote purchase of yard debris compost.

(5) Report to DEQ on effectiveness of program.

Est. Completion July 1, 1990

F. Legislative Action: Advocate legislative support for recycling tax credits and other legislative measures supporting development of recycling markets.

G. Grants and Loans: Research and Development: Target monies for research and development of new methods for utilizing secondary materials.

H. Grants and Loans: User Assistance: Target monies to users of secondary materials to encourage the expansion of their use of recycled materials.

8. PROGRAM NAME: SYSTEM MEASUREMENT

PROGRAM DESCRIPTION:

Purpose: To establish a system, based on analyses of waste compositions to determine which programs and projects will obtain maximum economically and technically feasible waste reduction through each level of the hierarchy.

A. Waste Substream Composition Study: This study will survey the volumes, composition and places of origin of waste generated by distinct generator types. The goals of the study will be to:

- Identify and define a list of individual waste substreams from different types of generators which have distinct and economically feasible resource recovery potentials.
- Measure the volumes and composition of materials of each defined waste substream. The potential for reducing the contamination of recoverable resources will also be assessed.
- Identify the generalized geographic distribution of the points of origin of each waste substream for the purpose of defining methods for its separate collection.

Specifically, the study will provide data concerning:

- o types, composition and numbers of loads which can be generated for processing, and

- o the quantities of different materials which will be generated.

B. Substream Resource Recovery Study: Based on the composition study, a set of waste substreams will be selected for a study of methods for the recovery of resources from those waste substreams. This study will:

- o identify processes for the recovery of selected materials;

- o evaluate the need for additional facilities, based upon technical and economic feasibility, and will be used to determine the number and general location of such facilities;

C. Set Waste Reduction Performance Goals: Establish waste reduction goals, defined as a percentage of the total wastestream. Re-examine periodically to assure the goals are achievable.

(1) Perform analyses of waste composition and programs that are technically and economically feasible. Establish waste reduction goal, based on the analysis. Present results to Metro Council for adoption.

Est. Completion May 1,1989

D. Ongoing System Measurement: Establish on ongoing system for measuring composition of disposed waste to use as tool for evaluating waste reduction program effectiveness.

(1) Conduct periodic waste composition studies to monitor the quantity and composition of waste disposed in the region, develop periodic update reports

(2) Complete one sort in 1989.

Est. Completion July 1, 1989

(3) Complete three additional sorts.

Est. Completion April 1, 1990

(4) Publish results of 89/90 study.

Est. Completion July 1, 1990

(5) Perform annual recycling surveys to determine quantity of materials recycled in the region.

(6) Conduct annual evaluation report of waste reduction programs in the region. At a minimum this evaluation shall include Metro's programs, local government programs, impact of programs on regional waste reduction goal and recycling participation rates, Recommendations will be made if adjustments are necessary in Annual Work Programs or if enforcement measures need to be taken.

Tools to be used for this evaluation shall include data reports from local governments premised upon established reporting procedures by Metro, Waste Composition Studies and the annual recycling survey.

(7) Conduct a comprehensive system measurement evaluation on all aspects of the regional waste reduction program every five years. This evaluation shall be modeled upon the 1988/89 System Measurement Study. The results of the evaluation shall be reflected in appropriate revisions to the waste reduction chapter of the Solid Waste Management Plan (regional waste reduction 5-year plan).

REGIONAL WASTE REDUCTION PROGRAM
FIVE YEAR WORK PROGRAM

Local Government Programs

(The Regional Solid Waste Planning Committees have determined that the following activities from the region's Five Year Work Program should be implemented by cities and counties in order to achieve the region's 56 percent waste reduction forecast. The region needs to identify funding mechanisms for those programs with significant expenditures prior to requiring local government implementation. Local governments will continue to be responsible for meeting the requirements of the "Opportunity to Recycle Act." An analysis of potential funding mechanisms for waste reduction programs will be undertaken as part of the regional planning process. The results of this analysis will be incorporated in the Financing Chapter of the Regional Solid Waste Management Plan.)

1. PROGRAM NAME: PROMOTION AND EDUCATION

   A. 405 Recycling Program Requirements: Provide promotion and education programs for curbside recycling as required by the "Opportunity to Recycle Act." These include notifying citizens about recycling opportunities that are available, the materials that can be recycled, and the proper preparation of those materials. Other specific promotion and education requirements are listed in OAR 340-60-040.

   B. Salvageable Building Materials:* Develop promotion and education programs which notify citizens and businesses about drop-off/processing facilities for source separated lumber and other salvageable building materials. Coordinate with Metro's regional promotion campaign for reusable building materials. This program is contingent upon Metro completing its evaluation under 2.C in its Waste Reduction Program.

   C. Commercial High-Grading:* Develop commercial high-grading promotion and education programs for businesses. This may be achieved by person-to-person contacts, working with haulers, waste audits, or other means. Coordinate this activity with Metro's Waste Auditing and Consulting and Materials Recovery Programs.

*Implementation contingent upon identifying financing mechanism.

D. Multi-Family Dwelling Recycling:* Develop and carry out promotion and education activities for multi-family dwelling programs.

E. Curbside Container Program:* Develop and carry out promotion and education activities to inform citizens about the availability of curbside containers.

2. REDUCE AND REUSE PROGRAMS

A. Waste Reduction Task Forces: Participate either directly, or through a designated representative, on regional task forces addressing source reduction issues, such as packaging reduction or other forms of product regulation.

B. Commercial Routing: Work with garbage haulers to set up commercial collection routes that pick up source separated lumber to be delivered to drop-off/processing centers for salvageable building materials. This program is contingent upon Metro completing the evaluation under 2.C in its Waste Reduction Program.

3. RECYCLE

A. 405 Requirements: Work with haulers to ensure that 405 curbside recycling programs are available for residents who receive garbage service. Prepare annual recycling reports for DEQ as specified in OAR 340-60-045.

B. Technical Assistance: Identify projects/programs for multi-family recycling, commercial recycling and/or residential recycling which can utilize technical assistance from Metro. This assistance will be used to help establish new programs where recycling is currently not provided.

C. Multi-Family Dwelling Recycling:* Based on the results of Metro's pilot project, develop and carry out multi-family dwelling recycling programs. Specific activities associated with this program include promotion and education, and working with apartment owners to place containers on the grounds of apartment complexes to collect at least three of the following materials: newspaper, cardboard, glass, food cans, aluminum and/or scrap metal.

*Implementation contingent upon identifying financing mechanism.

Ensure that local design review standards require builders to include space for recycling containers at new apartment complexes.

D. Curbside Containers:* Develop and implement residential curbside container program. Based on the results of Metro's pilot project, provide residents with containers for storage and pick-up of recyclables. Specific activities associated with this program include promotion and education to inform citizens about the availability of containers, setting up a distribution system and ongoing program administration.

Implement monthly pick-up on the same day as garbage collection. Introduce weekly pick-up on the same day as collection, as feasible.

E. Recycling Coordination with Metro

Annual Work Programs: Work with Metro to develop and adopt Annual Work Programs for local governments which incorporate specific tasks, and staffing and budget needs to implement waste reduction activities. Adopt model work program prepared by Metro or work with Metro to develop individual program. These programs will be consistent with the policies and programs identified in the Regional Solid Waste Management Plan.

Reporting: Using standardized and consolidated procedures established in conjunction with Metro and DEQ, report annually on the effectiveness of waste reduction programs contained in Annual Work Programs. Effectiveness will be measured using program standards developed by Metro and local governments in the Annual Work Programs. Establish appropriate reporting mechanisms for haulers based on data requirements determined through the regional planning process.

4. RECYCLE - YARD DEBRIS

A. Technical Assistance: Identify projects/programs to increase yard debris recycling which require technical assistance from Metro.

*Implementation contingent upon identifying financing mechanism.

B. Yard Debris Plans: Participate in regional yard debris planning process, or develop and implement a local yard debris plan which is coordinated with the regional plan. Local yard debris plans must meet the requirements specified in state administrative rules (OAR 340-60-075).

C. Yard Debris Implementation:* Following approval of local or regional plans, implement a yard debris recycling program. This program must offer the opportunity to recycle by providing on-route collection of source-separated yard debris at least once a month, or by providing an alternative method approved by the DEQ.

D. Reporting: Using standardized procedures established in conjunction with Metro and DEQ, report annually on the effectiveness of yard debris recycling programs. Standards to measure performance will be developed through the regional planning process.

5. POST-COLLECTION/MATERIALS RECOVERY

Commercial Collection Routing: Work with haulers to ensure pick-up of commercial high-grade loads for delivery to material processing facilities, where technically and economically feasible. This may require separate pick-up routes for businesses which produce loads rich in used office paper, cardboard and mixed waste paper. This program is closely tied to Metro providing adequate material recovery processing capacity in the region.

6. ALTERNATIVE TECHNOLOGIES

Local governments will participate in alternative technology facility development and siting through the regional planning process.

7. MATERIALS MARKETS ASSISTANCE

A. Technical Assistance: Identify projects/programs relating to institutional purchasing which could utilize technical assistance from Metro.

*Implementation contingent upon identifying financing mechanism.

B. Institutional Purchasing Policies: Adopt and carry out institutional purchasing policies which promote the use of recycled products, such as office paper and yard debris compost. Utilize Metro's model procurement policies or develop specific local policies, as appropriate.

8. SYSTEM MEASUREMENT

A. Ongoing Analysis: Participate in ongoing system analysis through the regional planning process, which identifies programs that are economically and technically feasible to implement, and which establishes waste reduction goals for these programs. Results of analysis will be used to evaluate and update the Five Year Work Program and to determine the regional recycling goal.

B. Annual Work Programs: Adopt work programs each year which incorporate local government waste reduction activities recommended through system measurement. Using reporting procedures developed through the regional planning process, achieve local program standards or revise Annual Work Programs, as appropriate.

Waste Reduction Chapter
Summary of Five-year Work Program

Program	Metro	Local Governments
Promotion and Education	Regional campaigns for waste reduction	Opportunity to Recycle Act requirements
	Specific campaigns promoting recycling, yard debris composting and market development	Promotion and education for salvageable building materials, commercial high-grading, multi-family recycling and curbside containers.*
	Support for local governments promotion and education activities	
	Public involvement activities	
Reduce and reuse	Plastics reduction task force	Participation on regional tasks forces studying packaging, product regulation and other source reduction issues
	Packaging reduction legislation	
	Salvageable building materials and items	Commercial collection routing for source separated lumber/building materials
Recycle	Technical assistance to local governments for multi-family, commercial and residential programs	Opportunity to Recycle Act – curbside recycling requirements
	Recycling Information Center	Identification of technical assistance needs from Metro
	Local government recycling coordination, including developing model Annual Work Programs, reporting procedures and an evaluation system	Multi-family recycling*
		Curbside containers*
	Pilot project for curbside containers	Develop and adopt of Annual Work Programs
	Pilot project for multi-family	
Recycle – Yard Debris	Materials markets assistance for yard debris compost	Identification of technical assistance needs from Metro
	Financial incentives to private sector to encourage market demand for yard debris compost	Participation in (or coordination with) regional yard debris planning process
	Technical assistance to local governments, haulers and communities	Yard debris program inplementation based on regional plan*
	Rate incentives to encourage source separation of yard debris	
	Development of regional yard debris plan and local government program standards	
	Disposal ban assessment	

* *Implementation contingent upon financing being identified*

Waste Reduction Chapter
Summary of Five-year Work Program

Program	Metro	Local Governments
Post-collection material recovery	Material recovery capacity for waste with high percentage of economically recoverable material Waste auditing and consulting Rate incentives to encourage recovery of recyclables at material recovery facilities	Commercial collection routing to produce high grade loads
Alternative Technologies	Alternative technology development for materials not economically viable for material recovery	Participation in regional planning process as it relates to alternative technology facilities and programs
Materials Markets Assistance	Annual market analysis Annual market and recycled products surveys Institutional purchasing – model policies and technical assistance to governments, public and businesses Legislative programs supporting market development Grants and loans to users of secondary materials	Identification of technical assistance needs from Metro for developing insititutional purchasing policies Institutional purchasing policies
System Measurement	Waste Substream Composition Study Substream Resource Recovery Study Determination of regional recycling goals Ongoing system measurement, including waste sorts, annual evaluation of local government recycling programs and five year evaluation of regional waste reduction program	Annual Work Programs Annual evaluation and reporting to Metro Compliance with program standards Participation in comprehensive system measurement analysis (every five years) through regional planning process

D. **Program Implementation**

Metro and local governments shall implement waste reduction activities by means of Annual Work Programs. These programs shall be derived from the Five Year Work Program adopted in the Waste Reduction Chapter of the Regional Solid Waste Management Plan. The Annual Work Program shall establish specific tasks, time frames, staffing and budgets for waste reduction activities during a given fiscal year. They shall also: 1) identify minimum standards that Metro and local governments must meet to achieve program objectives; and 2) identify a reporting procedure for local governments.

In order to meet minimum standards, local governments shall be required to implement the specific waste reduction activities included in their Annual Work Programs. The specific procedures that haulers will use to report to local governments and that local governments will use to report to Metro shall be established during the development of the local work programs. These shall be standardized and shall consolidate existing reporting procedures in order to receive comparable data from throughout the region.

Metro's Annual Work Program shall be its fiscal year budget for waste reduction. Metro shall work with local governments to develop their Annual Work Programs by preparing "model programs" that identify minimum requirements for cities and counties.

Local governments may adopt this model or prepare their own program. However, all programs shall be reviewed to ensure they are consistent with the Solid Waste Management Plan.

The annual model work program to be completed by Metro shall be available to local governments by December 1st of each year. Local governments shall have their corresponding annual waste reduction programs adopted by July 1 of each year. The planning cycle for local governments shall begin on July 1, 1990. This is the date upon which their first annual work programs shall be adopted.

Each year Metro and local governments shall officially adopt their work programs. Local governments (cities and counties) will not be required to implement new programs that are not included in the Five Year Work Program unless these have been approved through an official amendment process. This process includes the participation of the planning committees and is described in Chapter 17 of the Solid Waste Management Plan. However, Metro may adopt additional programs for Metro to carry out without review by the planning committees.

Adoption of the annual waste reduction work program is a program requirement for cities and counties as stated under the System

Measurement Program. The failure of a city or county to adopt their annual work program shall be considered failure to have satisfied this waste reduction program standard. Metro shall carry out enforcement provisions as identified in Section F of this chapter on local governments if annual work programs are not adopted and carried out. Metro shall allow a maximum of six (6) months after the local government program is adopted to negotiate any inadequacies of the adopted program prior to using enforcement to carry out the regional waste reduction programs.

A primary consideration that relates to successful implementation of the region's waste reduction program is the issue of adequate funding for local government programs. As explained in the Five Year Work Program, financing for some local government activities will have to be identified prior to requiring local government compliance. The analysis of financing options will be addressed as part of the solid waste system financing chapter of the Solid Waste Management Plan.

E. **Evaluation**

The effectiveness of Metro's and local governments' waste reduction activities shall be evaluated annually. A Waste Reduction Evaluation Report shall be compiled which includes:

1) the status of Metro's programs;

2) the status of local government programs;

3) the impact of program implementation on the regional waste reduction goal, the recycling rate and participation rates; and

4) recommendations for program adjustments or enforcement options.

In order to develop this report, Metro and the Waste Reduction Subcommittee for the solid waste planning project shall:

1) review local government reports to Metro;

2) review the status of Metro and local government implementation efforts;

3) conduct waste composition studies; and

4) perform annual recycling surveys.

The subcommittee shall evaluate programs to determine their impact on the region's overall waste reduction rate, recycling goal and participation rates. If Metro and local governments have fulfilled program requirements but the waste reduction goal has not been met, the region will analyze other factors such as funding or market availability. Depending on the results of this annual evaluation, adjustments to Annual Work Programs shall be made as appropriate.

In addition to this annual evaluation, every five years the region shall perform a comprehensive system measurement analysis. This analysis shall be based on the 1988 System Measurement Study and the evaluation of Annual Work Programs. The results shall be used to update the Five Year Work Program, the five year and 20 year waste reduction forecasts, and other parts of the Waste Reduction Chapter as necessary. Chapter and program revisions shall also reflect current population and employment projections for the region.

F. Enforcement

If it is determined that local governments are not voluntarily complying with the program requirements established in their Annual Work Programs, Metro has several enforcement tools it may employ to ensure that programs are implemented. At a minimum, these include functional planning authority, rate setting and flow control.

Functional planning authority is derived from ORS 268.390 which states that Metro can request or require local comprehensive plans to conform to the region's functional plans for areas and activities having a significant impact on the orderly and responsible development of the metropolitan area. Metro Ordinance No. 87-740 designates solid waste as an activity appropriate for functional planning, and the Solid Waste Management Plan was adopted by the Metro Council as such a plan (Ordinance No. 88-266B). Therefore, if voluntary compliance from local governments cannot be achieved, Metro may require them to incorporate necessary waste reduction activities into their local plans and to implement those activities.

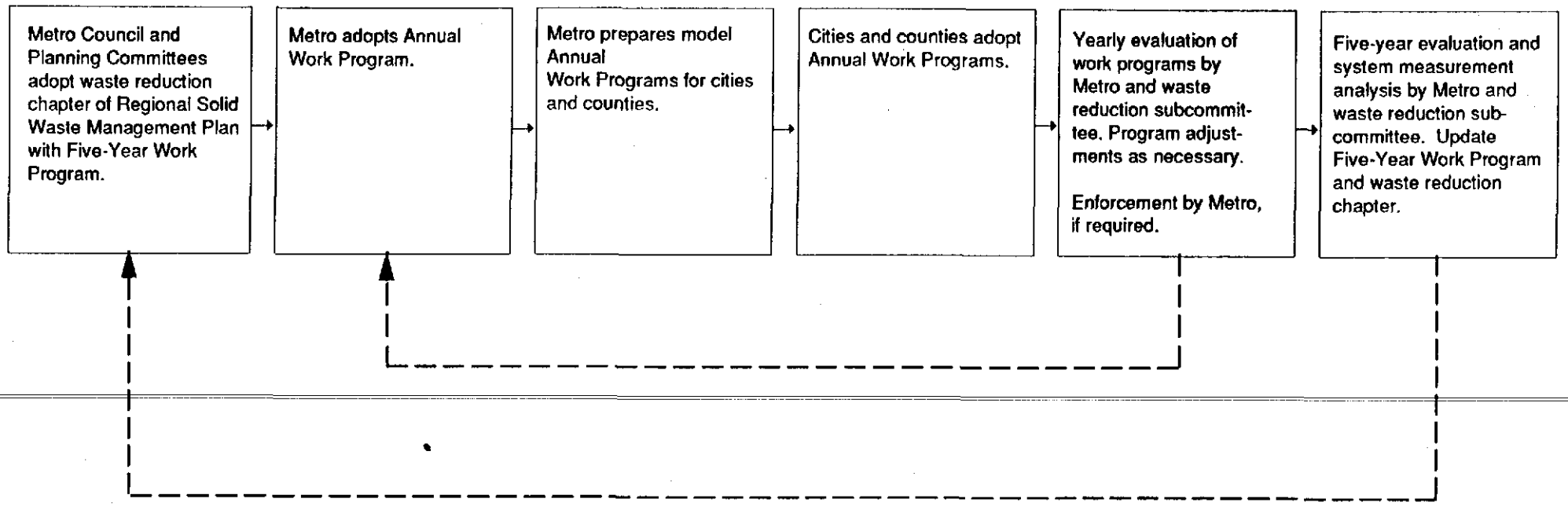
Metro's enabling legislation also allows it to establish disposal rates at the solid waste disposal facilities it owns or franchises, and to impose flow control on commercial haulers and the public to direct waste to certain facilities. Metro is currently investigating how these authorities could be utilized to ensure that waste reduction goals are achieved. A more detailed description of how these enforcement tools could be applied will be developed with the Solid Waste Policy Committee by July, 1990.

G. Timing and Sequence

Figure 3 depicts the sequencing for adoption of Metro's and local governments' Annual Work Programs. In addition it shows the relationship between these documents and the Evaluation and Enforcement phases for the region's waste reduction program.

Figure 3

Waste Reduction Implementation and Evaluation Process



98216

ATTACHMENT 1

WASTE REDUCTION PROGRAMS AND IMPLEMENTATION TOOLS

PROGRAM DESCRIPTIONS

REDUCE AND REUSE

Reduce and reuse programs attempt to minimize the amount of material that enters the waste stream. Examples include those that encourage:

1) packaging reduction and waste-conscious buying habits;

2) reusing materials or products, such as construction materials, returnable/refillable glass bottles, or durable goods.

The following programs fall under the REDUCE/REUSE category:

- **Salvageable Materials**

  Certain products or materials can be retrieved from the waste stream and reused. These include durable goods such as furniture and appliances or reusable building materials such as recovered lumber. Programs that salvage durable goods generally pick up used items or collect them at reclamation centers. They can be managed by private companies or charitable organizations that repair the items for resale.

  Building materials can be recovered and reused by providing drop-off centers or setting aside special areas at material processing centers, transfer stations or landfills to receive these materials. Recovered materials can be given away or sold to individuals or construction companies.

- **Waste Exchange**

  Industrial and commercial firms often discard waste that could be a useful material to other firms. Examples of industrial waste which may have reuse value include residues from manufacturing processes, such as solvents, oils, acids and waxes; or raw materials, such as iron, bauxite and plastic scrap.

  A waste exchange program provides an information clearinghouse for specific industrial materials. Through the clearinghouse, waste generators can be matched with companies that might reuse these materials.

- **Product Regulation/Packaging Reduction**

  Regulation of the kinds of materials used in manufacturing products can reduce the overall quantity of waste generated or increase the ability to reuse products. Examples of product regulation include bans on materials that are not recyclable,reusable or biodegradable and laws that discourage excess packaging. Although regulation of product manufacturing is most likely to be initiated by federal or state governments, some local legislation has been enacted that bans products such as polystyrene foam. Promotion and education programs can also be used to draw consumers' attention to packaging issues.

RECYCLE

Recycling is the conversion of materials otherwise destined for disposal into useful raw materials or products. Examples of materials that can be recycled include newspaper, ferrous metals, aluminum, glass, paper, plastics, rubber, yard waste, wood waste, asphalt, and concrete. Recyclable materials can be recovered from the residential, commercial and industrial waste streams.

Recycling generally takes place by separating specific recyclable materials such as newspaper, glass or tin from the mixed waste stream before collection. A variation of source separation is co-mingling where all recyclable materials are separated by the waste stream but are intermingled rather than separated into specific components. Source separating produces a cleaner, less contaminated product than co-mingling and generally has a higher value in the marketplace.

Recyclables can also be removed from the waste stream after collection. This is called post-collection recycling and it occurs at material recovery centers or transfer stations. Recyclable materials are removed mechanically and/or manually at these facilities. Source separation and post-collection techniques can be combined to increase recovery levels.

Source separation and post-collection recycling methods can be used on the commercial/industrial waste stream as well as the residential waste stream. Companies may source separate recyclable materials such as office paper. They may generate waste that has a high percentage of recyclable material that can be collected and transported to material recovery centers for processing. The separation and processing of waste materials into recyclable products is not complete without consideration of available markets for collected materials. Without these markets recycling cannot occur.

Other factors that affect recycling include collection and processing costs, avoided disposal costs, and fluctuation in

market prices paid for recycled materials. The relationship between these factors determines the economic feasibility of various recycling programs. A range of recycling programs currently being implemented in the U.S. and abroad are described below.

- o **Residential Curbside Collection**

Curbside collection of source separated or co-mingled recyclables can increase residential recycling. Generally curbside programs work by having residents of single family dwellings put out designated recyclable materials at the curb. Garbage haulers or recycling companies pick up these materials on a regular basis. Pick up can be combined with regular garbage collection or it can be a completely separate activity.

Some of the factors that contribute to the success or failure of curbside programs are frequency of collection, convenience to the resident, availability of containers, and cost. It has been demonstrated that participation increases if recyclables are collected weekly on the same day as garbage pick up.

- o **Recycling Containers**

Studies indicate that participation in recycling increases if containers are provided to make it more convenient to source separate materials. Containers also serve as a reminder to recycle and they help identify who in a given neighborhood is actually participating in the program. A variety of container types are being used nationwide. Five-gallon buckets, plastic mesh sacks, stackable plastic crates and plastic rectangular boxes are examples of containers that are commonly used. Larger toter carts are often used for collecting commingled recyclables. Depending on the type of container used, some programs may require utilizing special collection trucks.

Key factors affecting the selection of a container include durability, aesthetics, convenience for the resident and collectors, as well as the cost of containers and collection.

- o **Multi-family Dwelling Recycling**

Recycling programs can also be designed for multi-family dwellings. This generally means providing large containers outside of apartment buildings to collect tenants' recyclables. The containers can be a permanent feature of a multi-family complex or a drop box set out on a specific recycling pick up day.

The most significant factor contributing to successful multi-family recycling is manager motivation and support. The major barriers are uncooperative managers and tenants, lack of recycling containers or lack of space for containers, and failure to meeting building or fire code regulations.

o **Recycling Centers**

Some communities provide recycling drop-off centers rather than curbside collection or they combine the two programs. Recycling centers may simply collect one material such as newspaper or glass bottles, or they may be large, multi-material facilities. Drop-off centers can be mobile or stationary and are generally located in shopping centers or other convenient locations within the community. Recycling centers can be run by charitable organizations. Others known as redemption or buy-back centers pay consumers for the recyclable materials they bring in, based on market demand.

o **Yard Debris Recycling and Composting**

Yard debris is a significant portion of waste going to landfills. Current estimates indicate that it accounts for 18 percent of municipal solid waste nationwide.[10] The composition and amount of yard waste varies depending on geographic location and season of the year.

Yard debris can be separated from garbage and turned into compost. Composting reduces its volume by a factor of five or more and converts yard waste to an enriching product for gardens and parks.[11] It can be used as a soil amendment or a groundcover. Individuals can compost in their backyards or it can be chipped, ground and produced on a large scale by private companies or government agencies.

There are several options for collecting yard debris for composting. These include curbside pick up, drop-off facilities and neighborhood clean-ups. Because of its volume, yard waste is usually collected separately from garbage and other recyclable materials. Key issues that must be addressed when implementing yard debris recycling programs are:

---

[10]Characterization of Municipal Solid Waste in the United States, 1960 to 2000. Franklin Associates, March 30, 1988.

[11]Susan Fine, "Composting Nature's Garbage." World Watch. January/February 1989. p. 5.

1) generation rates;

2) collection method;

3) costs;

4) processing capacity; and

5) markets.

o **Office Paper Recycling**

Many offices, such as banks, insurance companies and educational institutions, generate waste with a high percentage of recyclable paper that can be targeted for office recycling programs. These programs recover a variety of materials including white and colored paper, stationery, typing paper, manila file folders, computer printouts, corrugated cardboard cartons and newspaper. These materials are a valuable source of fiber for paper manufacturers.

Successful office paper recycling programs stress source separating paper by color and type in order to get the highest value in secondary materials markets. Starting an office recycling program generally involves selecting a recycling coordinator, surveying what employees are throwing away, determining what materials to recycle, selecting the type and location of recycling containers and choosing a company to collect the materials on a regular basis. Key components of an office recycling program are employer endorsement and employee awareness and cooperation.

o **Plastics Recycling**

Another material that can be recycled is plastic. In 1986, plastics accounted for 6.5 percent of the nation's waste stream.[12] Because plastics use non-renewable fossil fuel, and generally are not biodegradable, efforts to promote plastics recycling have increased over the past few years. A number of different resins are used to produce plastic. This results in a wide range of products including milk jugs and detergent bottles, pipes and siding, storage bags and polystyrene foam. Some forms of plastic are easier to recycle than others. Therefore most programs source separate each type of plastic. However, some mixed plastics are being recovered and processed in Europe.

---

[12]Characterization of Municipal Solid Waste in the United States, 1960 to 2000. Franklin Associates, March 30, 1988.

Major issues that still need to be addressed in plastics recycling include labeling for resin content, developing cost-effective collection techniques and processing technologies, and finding uses and markets for recycled plastic materials.

o **Material Recovery Centers**

Post-collection material recovery centers extract materials that did not enter the recycling stream through curbside collection, drop-off centers or buy-back centers. At these facilities recyclables are mechanically and/or hand sorted from the mixed waste stream or from loads that contain a high percentage of recyclable materials (high grade loads).

Material recovery centers can sort a wide range of materials including newspapers, corrugated paper, office paper, mixed scrap paper, tin and aluminum cans, glass, plastics and construction materials. After recovery, recyclables are baled or otherwise prepared for delivery to secondary materials markets.

Post-collection processing can occur at separate facilities or in a special area designated at transfer stations. Combined with source separation, post-collection material recovery can increase recycling rates.

o **Commercial High-Grade Material Recovery**

In 1986, approximately 41 percent of the nation's solid waste was paper and paperboard.[13] Much of this was produced by supermarkets, regional shopping malls, insurance companies, government offices and retail outlets. Programs that can recycle these commercial wastes with a high percentage of recoverable material can greatly increase waste reduction.

Successful commercial high-grade programs require conducting waste audits for companies (see description below), developing routes that maximize efficient collection of materials, and providing sufficient material recovery processing capacity.

o **Waste Audits and Consulting**

Waste audits are conducted by consulting firms or other experts to help companies increase recycling. A waste audit entails performing an analysis of the kinds and amounts of waste generated by individual companies and then determining

[13]Ibid.

management options that will maximize recovery of those materials.

Waste audits may identify the generation of large quantities of office paper, corrugated cardboard or construction/demolition debris. Specific management options might include an office recycling or commercial high-grading program.

- **Recycling Market Studies**

Studies of existing and potential markets for recyclables increase the chances of a successful recycling program. Markets may be local, regional or international and they will vary depending on the commodity. Waste paper, for example, is traded internationally, whereas markets for recycled motor oil are more likely to be local. Prices for recycled commodities also vary depending on demand for a specific material and/or the value of the dollar relative to other currencies.

Market studies may involve surveying collectors, intermediate processors and end users to determine the effective size of a marketing area. The results of market surveys can be used for the following:

1) to develop market directories which link buyers and sellers of secondary materials;

2) to determine impacts on competitive virgin material markets; and

3) to fill a new product niche.

Market studies can also identify market development strategies such as government procurement, new product development, export promotion, economic development programs and tax credits/exemptions.

- **Institutional Purchasing Policies**

The purchasing policies of the public and private sectors can stimulate market demand for recycled products. The most common purchasing policies include those that require or encourage procurement of recycled paper products, motor oil, tires, concrete and compost for landscaping.

Procurement programs are generally implemented through set-asides or price preferences. A set-aside requires that a certain percentage of purchases contain recycled products. Price preferences stipulate that recycled products be

purchased as long as the cost is within a given percentage of the lowest bid on the contract.

Government procurement policies are especially effective in increasing market demand for secondary materials, since government spending constitutes a significant portion of the gross national product. Public policy can not only create a demand for recycled materials, but can serve as a model for the private sector.

- o **Cooperative Marketing**

  Recycling programs, especially those run by small companies or volunteer groups, often have difficulty because they are unable to produce the quality or quantity of materials required by the secondary materials markets. By pooling their resources through cooperative marketing programs these groups can change their role in the marketplace. Some of the advantages of cooperative marketing include more efficient transportation routing, a broader network linking buyers and sellers and increased staff.

RECOVER ENERGY

The primary objective of energy recovery technologies is to reduce the volume of waste going to landfills and to convert portions of solid waste to a useful form of energy. Solid waste can be an additional source of energy replacing gas, oil and coal currently used to produce steam or electricity.

The United States sends approximately five percent of the total waste generated daily to waste-to-energy facilities.[14] According to a recent study by Combustion Engineering, the U.S. could convert as much as 18 percent of its municipal solid waste to energy over the next three years and has the potential to process as much as 30 to 40 percent by the end of the century.

Technologies which recover energy from solid waste fall into two major categories: combustion and non-combustion. Many incineration technologies exist including fast internally circulating bed combustion (FICB), fluidized bed, waterwall mass burn, modular incineration and refuse-derived fuel incineration. The three major types of combustion systems include mass burn, refuse-derived fuel (RDF), and modular incineration. Non-combustion resource recovery technologies include composting, pyrolysis, gasification, conversion to alcohol, and conversion to

---

[14]Brown, Michael D. and Walters, Jamie T. "Integrated Resource Recovery: An Overview." Resource Recovery/Cogeneration World, 1988, No. 1, p. 3.

methane.

o **Combustion Technologies**

Combustion technologies produce steam heat or steam that turns a turbine to produce electricity. Steam can be used for space heating, industrial process heating or drying, and electrical generation. One particularly effective application uses supersaturated steam to drive a turbine generator to produce electricity (cogeneration).

Although producing energy from solid waste reduces the volume of waste going to landfills and recovers energy for productive use, facilities are difficult to site. Advantages of these technologies must be weighed against environmental and health impacts. The major environmental impact from combustion technologies is the potential for air pollution from particulate matter, acid gases, carbon monoxide and other substances contained in combustion furnace exhaust gases. New energy recovery facilities have incorporated sophisticated and expensive air pollution control equipment to mitigate this impact. However, the Environmental Protection Agency and community groups have expressed significant concern about potential for toxic heavy metals in ash residue and dioxins in air emissions.Another factor affecting the success of large-scale energy recovery projects is economic feasibility. A number of complex economic relationships should be examined prior to implementing an energy recovery project. Ultimately, to be cost effective the capital and operating costs must be offset by revenue from the sale of recovered materials and energy produced, and the tipping fees charged to those utilizing the facility to dispose of waste.

Mass Burn

Mass burning refers to the incineration of municipal solid waste which is received at an energy recovery facility with little or no prior processing or treatment. The primary objective of this technology is to reduce the volume of refuse prior to landfilling, while at the same time recovering energy in the form of steam. Burners use either refractory-lined units or a waterwall system.

In refractory-lined furnaces, temperature is controlled by the introduction of combustion air. Heat recovery occurs as the exhaust gases are vented from the furnace in waste heat boilers. Waterwall furnaces have tubes of water in the wall to help control the temperature of combustion. These tubes absorb the heat from which steam is generated.
The residue produced from mass burn technology consists of ash, noncombustible metals, and glass. It typically represents about 25 percent by weight or 10 percent by volume of the solid waste burned. The metallic portion of

the residue can be recovered and sold if markets exist. The remaining ash must be landfilled. Approximately 40 percent of existing waste-to-energy facilities use the mass burn technology.

Refuse-Derived Fuel

The refuse-derived fuel (RDF) incineration process separates the combustible fraction of solid waste from the total waste stream and processes it into a uniform, more homogeneous fuel. RDF can be produced in a number of different forms including fluff, dust, densified and wet RDF. Processing varies in complexity depending on how the fuel will be used. In general, the production of any form of RDF involves primary shredding to reduce the particle size of the waste, separation of the combustible and noncombustible fraction of waste, and secondary shredding. Approximately 24 percent of existing energy recovery facilities utilize the RDF technology.

Modular Incineration

Modular incineration technology is similar to mass burning in that the solid waste is used in its delivered state without preprocessing. Modular facilities generally have less capacity than mass burn incinerators and are frequently fabricated off-site and assembled on-site.
Modular combustion units typically consist of a primary and a secondary combustion chamber. The complete combustion of the waste material is accomplished by controlling the amount of oxygen. Similar to large mass burning units, the smaller modular units have been operated to produce both hot water for heating and steam for heat and electrical generation.

- **Non-Combustion Technologies**

Composting

In the composting process organic matter is aerobically or anaerobically decomposed by a variety of microorganisms. Material is either piled in open windrows or contained in digesters. Oxygen is consumed, heat is produced, and carbon dioxide and water vapor are given off. When composting has proceeded to a point of stabilization, the material is reduced in volume and displays a uniform humus-like consistency. Compost is rich in plant nutrients and may be used as a soil
amendment. It can be produced from a variety of products including yard debris, sewage sludge and municipal solid waste or a combination of all three materials.

Conversion to Alcohol

A fraction of municipal solid waste can be processed to produce alcohol (ethanol). This process separates cellulose, food and other organics from the waste stream and converts the high cellulose fraction into sugar which is fermented to ethyl alcohol.

Approximately 41 gallons of 200 proof ethyl alcohol can be produced from one ton of MSW.[15] This technology is still in the developmental stages, but it has met with some success in demonstration projects. If economical, the process could yield sizable quantities of fuel to be used for commercial and industrial use.

Gasification

Gasification is the process whereby complex molecules such as solids or liquids or converted to gases. Gasification can occur through biological activity or by heating an organic
substance with little or no oxygen. Examples of how gasification techniques can be used to process solid wastes include Methane Conversion and Pyrolysis.

In conversion to methane gas is produced through the anaerobic decomposition of solid waste in a process which resembles that used for sewage sludge treatment. MSW is processed, mixed with sewage sludge and held in a digester tank for a number of days. During that time microbes in the sludge digest the material giving off carbon dioxide and methane.

Pyrolysis is the heating of an organic substance in the absence of oxygen to produce a gaseous or liquid fuel. Through pyrolysis, a low-grade synthetic fuel oil can be produced from the organic portion of mixed solid waste. A number of commercial processes have been developed which pyrolyze the organics to varying combinations of oil and gas.

The shredded waste is fed into a reactor, where the material is subjected to a high-temperature, low-oxygen environment. Volatile components are released, condensed, and recovered as liquid. The gas produced is either recovered or recycled. The liquid component is the principal product. It can be used to replace fuel oil and is primarily used for large utility boilers.

---

[15]Metro. "Waste Reduction Program: Appendix 1, Alternative Technologies." December 1985. p. 39.

IMPLEMENTATION TOOLS

A number of tools can be used to help implement the specific programs described above. These include, but are not limited to:

1) promotion and education;

2) financial incentives or disincentives;

3) regulating waste disposal;

4) legislation; and

5) technical assistance.

A brief summary of each of these implementation tools and how they are used follows.

- **Promotion and Education**

  Promotion and education can be applied throughout the hierarchy to help implement waste reduction programs. General promotion and education campaigns inform the public and special interest groups about solid waste problems and the importance of reducing the amount of waste generated, reusing products and recycling.

  Promotion and education also informs individuals about what materials can be recycled, how to prepare materials for recycling, and what recycling opportunities are available. Promotion and education provides a link between providing recycling opportunities and getting the public and business to take advantage of them.

  In addition to general promotional campaigns to increase awareness, educational programs can be tailored to specific segments of the community such as schools, neighborhoods, offices and industry. Market development for secondary materials relies heavily on promotion and education to inform the community about the uses for recycled materials and their availability.

- **Financial Incentives/Disincentives**

  Economic incentives, whether market driven or government imposed, can promote recycling. As landfill disposal costs increase, both generators and waste collectors look to less costly alternatives. If market conditions afford collectors an avenue to recycle source separated material at a lesser cost than landfill disposal, there is a positive economic incentive to recycle. If collectors provide their customers a lower cost collection option based upon how much material

is source separated, and therefore not to be landfilled, there is a positive economic incentive for generators to source separate their recyclables.

If government sets a rate structure whereby disposal fees are discounted to collectors who participate in a recycling program or use material recovery facilities, a positive economic incentive may or may not exist. The ability of the collector to retain participation by his or her customers and market the recyclables determines whether a positive economic incentive is operative.

State and local governments or private industry can also provide grants or loans as incentives for waste reduction activities. Grant/loan monies can be used to finance pilot projects, as "seed money" to undertake new projects or to encourage the development of innovative technologies.

- **Disposal Regulation**

Another way to promote waste reduction is to prohibit disposal of materials that can be recycled, particularly those materials that contain a high percentage of recyclables that can easily be separated from the mixed waste stream. Yard debris, for example, can be recycled if separated from household trash. By banning yard debris disposal at a landfill and providing alternative yard debris processing facilities, waste reduction can be increased.

Other examples of materials that could be banned from landfills include loads containing large amounts of corrugated cardboard, tin or aluminum cans. Regulations can also require that separate areas be provided at disposal facilities to deposit recyclable materials.

Flow control is the regulatory tool that empowers governments to control the flow of waste between solid waste facilities. By requiring individuals or haulers to use particular landfills, transfer stations, or resource recovery facilities local governments can more effectively manage the flow of waste and determine the kinds of materials that go to each. Flow control can be used to ensure that recyclable materials are delivered to material processing centers or to ensure that waste-to-energy facilities receive a steady flow of trash.

- **Legislative Actions**

Federal, state and local governments have the ability to affect waste reduction through specific legislative actions. Many government actions relating to disposal regulation and

financial incentives can be considered legislative, but for the purposes of this chapter legislative actions include:

1) policies affecting packaging and product content;

2) policies affecting purchasing/procurement; and

3) mandatory recycling.

Legislation, particularly at the federal and state levels, can influence waste quantities by taxing packaging to pay for the cost of disposal. An economic disincentive is therefore created for excessive packaging. Legislation can require standardized packaging and/or labels which indicate product recyclability, can totally ban the use of certain products such as polystyrene foam, or require that certain products be made in recyclable, reusable or biodegradable form. As discussed above, legislation regarding institutional purchasing policies, which encourage or require the use of recycled materials, can increase waste reduction by providing additional market demand for secondary materials.

State and local governments can enact mandatory recycling legislation requiring separate collection and processing of designated recyclable materials. These laws are generally enforced by imposing fines or refusing to pick-up unseparated garbage. According to a 1985 study by the Massachusetts Department of Environmental Quality and Energy, even if unenforced, mandatory recycling ordinances will have some effect simply through their inherent authority and because they communicate the importance of participation.

o <u>Technical Assistance</u>

Technical Assistance is another tool used to implement waste reduction programs. This involves the sharing of technical expertise and resources among governments, private industry, community groups and citizens. Examples of technical assistance activities include:

1) providing data bases for industrial exchange programs or on markets for secondary materials;

2) providing telephone information services on recycling programs;

3) maintaining waste reduction libraries;

4) conducting waste audits;

5) developing model recycling ordinances; and

6) conducting research and encouraging innovative programs and technologies.

FINANCING MECHANISMS

A variety of financing mechanisms are being used throughout the country to carry out waste reduction programs. The type of program a community decides to implement will largely determine the kind and extent of financing required. For example, curbside collection of recyclables may be funded differently than material processing facilities. Most communities use a combination of revenue sources to pay for waste reduction programs.

The most common financing tools include garbage collection rates, surcharges on disposal fees, taxes or special assessments, grants/loans and sale of recycled materials. General obligation bonds, revenue bonds, private equity and leveraged leases can be used to help finance the initial capital costs for material or energy recovery facilities.