



Required Recycling and Incentive Program Survey Summary of Findings

April 2002

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Terminology

Commercial/ Institutional Waste:	municipal solid waste from the commercial sector. The commercial sector includes theaters, offices, retail establishments, hotels, and restaurants. The institutional sector includes establishments such as government agencies, hospitals, and schools.
Composting:	recovering and processing discarded organic materials into a soil amendment, fertilizer and/or mulch. Composting is a form of recycling.
Construction and Demolition Debris:	any recyclable or non-recyclable waste that results from construction, remodeling, repair, or demolition of buildings, roads, or other structures or from land clearing for development and requires the removal from the site of construction, demolition or land clearing.
Corrugated Paper:	paper or cardboard manufactured in a series of wrinkles or folds or into alternating ridges and grooves.
Disposal Facility:	a facility where any final treatment, utilization, processing or disposition of solid waste occurs.
Diversion:	source reduction, reuse, recycling, and composting. Used interchangeably with “waste reduction.”
Diversion Level:	the sum of materials recovered divided by the total waste generated equals the waste reduction level.
Ferrous Metals:	ferrous and alloyed ferrous scrap materials derived from iron including household, industrial, and commercial products including other cans and containers.
Flow Controls:	legal authority used by state and local governments to designate where municipal solid waste must be taken for processing, treatment or disposal.
Franchise System:	an arrangement whereby municipal government grants contractors exclusive rights to provide services in all or part of the municipality in return for a fee.
Free Market :	an economic market in which supply and demand are not regulated or are regulated with only minor restrictions.
Generator:	a person, business, and/or residence that generates materials that must be handled for recovery or disposal.
Hauler:	a company that offers solid waste handling services including curbside collection of solid waste and recyclable materials, solid waste transfer and solid waste disposal.

HDPE Bottles:	all bottles made of high-density polyethylene (HDPE), such as milk, juice, detergent, and other bottles.
Landfill:	a disposal facility or part of a facility at which solid waste is permanently placed in or on land and which is not a land spreading disposal facility.
Level of Service:	the level and degree of service provided at facilities including hours of operation, classes of customers served and recyclables collection available.
Mandatory Recycling:	programs that, by law, require consumers to separate solid waste so that some or all recyclable materials are not burned or dumped in landfills.
Materials Recovery Facility (MRF):	facility where recyclables are sorted, baled or otherwise processed so as to prepare them for end users.
Nonexclusive Franchise System:	an arrangement whereby municipal government grants contractors nonexclusive rights to provide services in all or part of the municipality in return for a fee.
Participation Rate:	the portion of households or businesses that take part in a program.
PET Containers:	all bottles made from polyethylene terephthalate (PET), such as pop, oil, liquor, and other types of bottles.
Primary/Principal Recyclables:	recyclable materials that are commonly collected and are included under the minimum service levels for recycling programs. These may include paper, cardboard, glass, tin and aluminum beverage containers, and plastic bottles.
Putrescible Waste:	solid waste that contains material capable of being rapidly decomposed by micro-organisms.
Recyclables:	materials separated from the solid waste stream and transported to a processor for end user recycling.
Recycling:	the series of activities by which discarded materials are collected, sorted, processed, and converted into raw materials and used in the production of new products.
Recycling Rate:	the tonnage of source-separated materials collected for recycling divided by the tonnage of waste generated.
Residential Waste:	municipal solid waste from single-family and multi-unit residences and their yards.
Reuse:	the repair, refurbishing, washing, or just the simple recovering of discarded products, appliances, furniture, and textiles for use again as originally intended.

Solid Waste:	all putrescible and nonputrescible solid and semisolid wastes, including garbage, rubbish, ashes, industrial wastes, biomedical waste, swill and landclearing waste.
Source Reduction:	the design, manufacture, purchase, or use of materials, such as products and packaging, to reduce the amount of materials before they enter the municipal solid waste management system.
Source-separated:	divided by consumers into different fractions for disposal, recycling and composting.
Tip Fees:	the fees charged to haulers for delivering materials at recovery or disposal facilities. Typically the price paid per ton, cubic yard, or other measurement to dispose of waste at a transfer station, composting, facility, incinerator, or landfill.
Transfer Station:	a permanent fixed, supplemental collection and transportation facility, used by persons and route collection vehicles to deposit collected solid waste from off-site into a larger transfer station vehicle for transport to a solid waste handling facility.
Waste Reduction:	source reduction, reuse, recycling, and composting; diversion.
Waste Stream:	the total flow of solid waste from homes, businesses, institutions, and manufacturing plants that must be recycled, or disposed in landfills, or any segment thereof.
Yard Debris:	leaves, grass clippings, brush, and/or plant clippings; yard trimmings.

Introduction

The Regional Solid Waste Management Plan (RSWMP) provides the region with the direction on how to meet its solid waste needs through 2005. RSWMP establishes goals and objectives, including a commitment to a 62 percent recovery rate by 2000 and 64 percent by 2005. In 2001, the recovery rate for the region was 55 percent. The region's overall progress in waste reduction has failed to keep pace with growing waste generation rates. Strong economic growth, particularly in the construction and demolition and commercial sectors, has fueled the growth in waste generation. Commercial waste makes the largest contribution to the region's total waste, and the construction and demolition sector is responsible for generating approximately a quarter of the region's waste. According to revised recovery rates, the region must recover an additional 50,000 tons of construction and demolition debris and 120,000 tons of source-separated business recyclables in order to meet the established goals. As a part of the next planning stages, a survey of North America was conducted of programs that focus on required recycling or incentives for materials generated by the commercial and construction and demolition waste streams.

This report profiles 15 communities with required recycling or incentive programs targeting materials in the commercial and construction and demolition waste streams. The resulting information may be used to establish policy and program approaches for increased recovery in the Metro region. Main components of this report include:

- a summary of key findings that highlights the critical elements, barriers and major lessons learned from the surveyed programs;
- an overview of the profiled programs and their required recycling and incentive strategies;
- summary tables of the profiled programs that include general characteristics and major elements of each program;
- in-depth profiles on each surveyed program that details the program's development, implementation and results to date;
- copies of available policies and rules for the surveyed programs; and
- a contact listing that includes contact name, phone, address, and web site for the surveyed programs.

Methodology

This report is based on document research and interviews with agencies involved with required recycling and incentive programs for materials in the commercial and construction and demolition waste streams. Required recycling is defined in this report as local or statewide material disposal bans and mandatory recycling requirements. Economic incentives for generators, haulers, material recovery facilities and landfills to increase recovery examined in this report include diversion or recycling deposits, tax incentives, reduced fees, recognition or assistance programs, and grants for recycling infrastructure development.

The programs featured in this report were selected from an inventory of commercial and construction and demolition required recycling and incentive programs in North America. The programs profiled were selected based on information available, survey response and program success with required recycling and incentive policies. A survey instrument was designed to help track contact information and program details (See Appendix Q). The purpose of the survey was to obtain basic information on how the communities developed and implemented commercial and

construction and demolition required recycling and incentive policies. Information was gathered through telephone interviews and e-mails from program managers as well as document research. Main sources include *Recycling Laws Update 2000*, *Biocycle*, *Resource Recycling*, and reports published by municipalities on individual policies and programs. Based on the information gathered in the survey and document research, individual summaries were written about each program and matrices developed on general program characteristics.

Key Findings

In communities throughout the United States and Canada, required recycling and incentive strategies for the commercial and construction and demolition debris waste streams have been successfully implemented. Key findings of the programs profiled in this report including critical elements, barriers and major lessons learned are detailed below.

- ***Required recycling programs have the potential to divert a significant portion of the waste stream and help communities meet recovery goals.*** Seven of the nine communities directly attribute their increase in recovery to required recycling programs. Since the implementation of required recycling in Dane County, the county's diversion rates for specific materials are more than 50 percent for cardboard, steel cans, plastic, glass, newspaper, and cardboard.
- ***Education and technical assistance are key factors to the implementation of mandatory recycling requirements.*** Virtually all of the program managers stressed the importance of education as a key element to a successful program. All of the surveyed programs provide the commercial sector with some level of technical assistance and education. Program managers noted it is important to have these components in place before the implementation of a required recycling program. Education and technical assistance provide incentives to participate, ensure that materials are separated properly and encourage public acceptance and willingness to participate. A strong education and technical assistance program will most likely require increased staff, budget and constant reinforcement.
- ***Using a cooperative approach to required recycling can build program support and influence participation.*** Program managers emphasized the importance of working with businesses, haulers and other stakeholder groups to develop the most attractive program.
- ***Strong commodity markets ultimately determine what is recyclable and influence participation.*** Nearly all of the communities noted the importance of reliable commodity markets. Program managers stressed that it is not practical to mandate materials unless the markets exist for the materials, and to only include recyclables with developed and stable markets to prevent having to change policies in the future. Identifying outlets for collected material is an important component in the planning process. A number of programs require the recycling of materials for which the cost of recycling is less than or equal to the costs of proper disposal at a solid waste facility.
- ***No required recycling or incentive program is identical.*** Each of the profiled programs is unique to their community and reflects the economics and infrastructure of their region. Nearly all of the communities implemented required recycling or incentive programs to help meet waste diversion or recycling goals.
- ***Enforcement is a key component of mandatory recycling requirements and disposal bans.*** All the communities with required recycling have some level of enforcement measures. The most common enforcement measures used in the profiled programs include random business inspections and landfill load inspections. Penalties for noncompliance include warnings and

finances that range from \$25 to \$10,000. The majority of the programs offer an assistance period to help businesses meet the requirements.

- ***Adequate resources need to be budgeted to support required recycling programs.*** A major impediment for communities implementing effective mandatory recycling requirements or disposal bans is sufficient resources for enforcement measures. Five of the nine programs noted lack of resources for enforcement measures as an obstacle to the program's success. Program managers stressed businesses will not adhere to required recycling policies unless they fear repercussions of noncompliance. In contrast, programs that have full-time enforcement officers stated that strong enforcement can boost both the quantity and quality of participation. Onondaga County's required recycling program has 4.0 FTE that provide business education, technical assistance and enforcement. The program has a business participation rate over 90 percent and the recycling rate was 68 percent in 2001.
- ***Enforcement measures have the ability to target a broad range of service providers from landfill operators to haulers to generators.*** Enforcement targets varied in the surveyed communities. The City of Portland's program focuses enforcement on the generator level with random business inspections. Including a generator requirement in the mandatory recycling requirement or disposal ban can emphasize business responsibility.
- ***Disposal bans are an effective means to reduce landfill waste and push recovery of selected items if markets or uses exist for the targeted materials.*** The majority of the bans targeted materials that are economically feasible to recycle in their community. Five of the profiled programs have material disposal bans that affect more than 14 materials. All five of the programs surveyed ban newspaper, aluminum and glass. Three ban yard debris, plastic, corrugated cardboard, whole tires, office paper, lead-acid batteries, and white goods. A number of the communities gradually phased-in the required recycling materials.
- ***Landfill bans can spur the market development for some materials.*** For example, landfill bans of yard debris have led to the development of composting infrastructure at the local and regional levels. In Vancouver, B.C. the ban on drywall has enabled recyclers and salvagers to competitively bid on the demolition of buildings, which has led to an increase in construction and demolition diversion from the local landfill¹.
- ***Landfill bans can be used as a means of flow control to impact those waste streams not controlled or managed directly by a city or a county particularly self-hauled wastes.*** Program managers noted that landfill bans are more easily enacted when a public agency owns a transfer station or landfill.
- ***Disposal bans require extensive promotion and education campaigns targeting the affected parties.*** Durham, North Carolina conducted a two-year education period before enforcement of the ban, although the city noted a concentrated campaign six-months prior to enforcement would be sufficient.
- ***Local government can influence the marketplace by the way it structures its garbage collection rates, franchise fees, and permit fees.*** A number of the surveyed communities utilize multiple incentives to reward recycling over disposal. Program managers indicated that one of the best voluntary incentives for businesses to recycle is an economic incentive.

¹Mosher, Carl W. Memorandum to the Transportation and Environment Committee. 25 May 2000.

- ***Infrastructure development grant programs are an effective means to increase processing capacity and waste reduction efforts.*** Program managers indicated that grant assistance was one of the most cost effective waste diversion strategies.
- ***Diversion deposits provide sufficient incentive to encourage businesses to recycle.*** A number of communities in California have adopted diversion or recycling deposit systems to encourage the recovery of construction and demolition materials. Program approaches vary and deposits range from a flat fee based on the a project's total cost to fees based on square footage and the type of project.
- ***The largest barrier to a diversion deposit system is the administration of the transaction and refund process.*** Program managers commented that the refund turn-around process is slow and managing the financial components of the program requires additional resources and time. For example, San Jose's Construction and Demolition Diversion Deposit Program's refund process takes approximately 3 weeks, which is longer than the city originally anticipated.

Overview of Program Profiles

The 15 communities profiled in this report were selected from an inventory of commercial and construction and demolition required recycling and incentive programs in North America. The programs profiled were selected based on information available and program success with required recycling and incentive policies. Five of the communities profiled are counties. Chicago, Illinois is the largest city with a population of 2,896,016 people; Santa Monica, California is the smallest with 84,084. Nine are jurisdictions with more than 400,000 residents. Ten states in the United States and one regional municipality in Nova Scotia, Canada are represented.

The communities surveyed are using the following required recycling and incentive strategies to encourage the recovery of materials in the commercial and construction and demolition waste streams:

- mandating businesses and institutions to recover a wide range of recyclables, prohibiting the disposal of specific materials, requiring business to submit reports on the amount of material recovered, enforcing program requirements by inspections and fines;
- requiring haulers to provide a minimal level of recycling services for a wide range of materials;
- instituting economic incentives for businesses and private haulers including charging reduced or no tipping fees at recycling drop-off centers, instituting a diversion or recycling deposit system, charging reduced franchise fees, and providing tax incentives on commercial source-separated recyclables; and
- providing technical assistance such as waste audits, disseminating listings of drop-off sites and providing educational materials.

An overview of these strategies and the surveyed programs is described in the following pages.

State and Local Mandates

Policies at the state level encourage governments at the local level to implement waste reduction programs. Recycling goals set at the state level provided stimulus for a number of the profiled communities to implement mandatory recycling requirements. Table 1 summarizes the recycling or diversion goals of the profiled communities.

Mandatory recycling requirements can assist communities in meeting recycling goals and encourage the development of private recycling infrastructure. These programs can include waste diversion requirements that require businesses to achieve a certain waste diversion goal, to participate in a specific recycling program, or to source-separate designated recyclable materials. Of the surveyed programs, nine have mandatory recycling requirements for commercial recyclables including four communities that have additional requirements for construction and demolition materials.

Disposal bans have been another impetus for communities to develop alternative methods to deal with specific materials. Disposal bans can be utilized to push the recovery of target materials and may also be used as a de facto alternative to flow control for some state and local governments. Five of the profiled programs have material disposal bans.

Cambridge, Massachusetts

Massachusetts prohibits the disposal of lead-acid batteries, white goods, whole tires, leaves, yard waste, glass, metal and plastic containers, recyclable paper, and cathode ray tubes in landfills or combustion facilities. There is no statewide mandatory recycling law, but 168 of 351 municipalities have mandatory recycling ordinances, bylaws or regulations as of March 2000. Cambridge, Massachusetts adopted a mandatory recycling ordinance in 1991. The ordinance requires businesses and institutions to conduct a waste audit and source-separate for recycling any material that constitutes more than 5 percent of their refuse. Businesses must develop and file a recycling plan for those items in excess of 5 percent.

Chicago, Illinois

Chicago's City Council adopted the Workplace and Residential Recycling Ordinance in 1994, requiring all property managers and building owners to implement an effective recycling program. Businesses are required to source-separate three recyclable materials, or source-separate two recyclable materials and conduct two source reduction measures. Source reduction measures include double-side copying, reducing packaging, energy efficient light bulbs, and reusing supplies. Businesses must also develop an education program and a written recycling plan.

Dane County, Wisconsin

Under the state's comprehensive recycling law, SB 300 enacted in 1990, the state bans lead-acid batteries, tires, yard waste, major appliances, motor oil, newspaper, magazines, corrugated, office paper, glass, aluminum cans, bimetal cans, plastic containers, and polystyrene (PS) foam from landfill disposal. The ban required cities, towns and villages to adopt a mandatory recycling ordinance that requires the recycling of specific materials. Counties were allowed to take over the implementation of recycling systems if given approval by their cities, villages and towns. Dane County dictates that in order to use the county-owned landfill municipalities must implement source separation and mandatory recycling of specific items for all generators. Since 1987, the county gradually added specific materials that are required to be recycled including newspapers, yard waste, corrugated cardboard, steel cans, aluminum cans, glass bottles and jars, plastic bottles, used oil, lead-acid batteries, appliances, magazines, office paper, and tires.

Durham, North Carolina

In order to reach recovery goals set forth in the Solid Waste Management Plan, Durham City Council directed solid waste staff to develop an ordinance that bans the disposal of target materials. Durham implemented a disposal ban on target recyclables including glass bottles, aluminum cans, steel cans, newspapers and corrugated cardboard in January 1998. The state bans the landfill disposal of lead-acid batteries, used oil, whole tires, white goods, aluminum cans, anti-freeze and yard waste.

Halifax Regional Municipality, Nova Scotia

The provincial disposal ban on specific materials was implemented between 1996-1998, banned materials were gradually increased over the three-year period. The municipal integrated waste management plan and recycling requirements for the Halifax region were adopted in 1996 and implemented in 1998. Additional requirements for construction and demolition debris processing were added in July 2001. Materials that are banned from landfill disposal include corrugated cardboard, newsprint, automotive lead-acid batteries, yard debris, steel/tin cans, glass jars, waste paint, used tires, antifreeze, #2 HDPE non-hazardous plastic containers, stretch wrap, and compostable organic material.

Monmouth County, New Jersey

Monmouth County formally adopted its initial District Recycling Plan in February 1987, two months before the Statewide Mandatory Source Separation and Recycling Act was signed into law. The statewide act requires each municipality to source-separate and recycle at least three materials in addition to leaves. The county's program goes beyond the basic requirements of the state's mandate and requires the recycling of additional materials. The county evaluated the waste stream to determine what materials would be mandated. Required recycling materials include newspaper, glass, aluminum, leaves, bimetal food and beverage cans, high-grade paper corrugated cardboard, asphalt, concrete, and certain wood wastes.

Onondaga County, New York

New York State's Solid Waste and Management Act of 1988 required municipalities to adopt ordinances that require source separation for residential and commercial waste streams by September 1, 1992. The act mandates municipalities require the separation of those materials for which the cost of recycling is less than or equal to the costs of proper disposal at a solid waste facility. Onondaga County implemented a Source Separation Law in 1990 that requires households and businesses to recycle corrugated cardboard and paper, glass, metal, newspapers, magazines, plastics, beverage cartons, and paperboard if the quantity generated economically justifies a separate collection. Waste audits are conducted at businesses to determine which materials they will be required to recycle.

Portland, Oregon

The City of Portland implemented mandatory recycling requirements in 1996 for materials in the commercial and construction and demolition waste streams. Portland requires businesses, multi-family residents and construction projects valued at \$50,000 or more to source-separate recyclable materials in order to achieve a recovery level of at least 50 percent of their waste. Businesses may select which material to recycle.

San Diego County, California

In 1991, the San Diego County Board of Supervisors adopted a mandatory recycling ordinance (MRO). The MRO requires designated recyclables be source-separated. Each city was required to adopt an MRO of its own. The county introduced surcharges in phases to a maximum of \$100 per load of solid waste to a county landfill. The MRO includes enforcement by disposal bans on specific materials at county-owned landfills. Required recycling materials include newspaper, metals, glass, bimetal cans aluminum, corrugated cardboard, tin, magazines, high-grade office paper, yard debris, white goods, asphalt, concrete, land-clearing debris, sand, and rock.

Economic Incentives

In contrast to mandatory recycling requirements, some communities encourage the development of waste reduction programs through incentives. Of the profiled programs, seven utilize incentives to encourage waste reduction and diversion. An incentive-based approach to commercial recycling may include the adoption of policies and the structuring of the marketplace for commercial generators, haulers, material recovery facilities and landfill operators to reward recovery over disposal. Economic incentives used by the communities highlighted in this report include reduced tipping fees for delivering recyclable materials to drop-off sites, grants for infrastructure development, advanced recycling fees or diversion deposits, tax incentives and reduced franchise fees. The surveyed communities with incentive programs are highlighted below.

Iowa

Iowa's Solid Waste Alternative Program is a \$3.2 million annual statewide financial assistance program, which funds the development and expansion of waste reduction and recycling projects to help increase diversion. Any entity that is interested in or responsible for reducing the amount of waste going to Iowa's landfills is eligible. Proposals are accepted year round. Awards are announced quarterly after a competitive review.

King County, Washington

King County uses a recognition program and free technical assistance to aid with green building certification as incentive for contractors to increase construction and demolition project recovery. The Construction Works Recognition Program publicizes construction companies that recycle, reduce waste and use recycled products on the construction job site. Contractors can receive free assistance and recognition for successfully recycling at least 60 percent of their construction waste, purchasing recycled content building materials for the project and practicing several waste prevention strategies.

San Jose, California

In San Jose, diversion deposit and infrastructure grant programs are used as financial incentives to increase construction and demolition project waste diversion. The Construction and Demolition Diversion Deposit Program (CDDD) requires a clearance document and recycling deposit (based on project square footage) before a building permit is issued for construction, demolition or remodeling projects that fall under specified thresholds. The deposit is returned when applicants provide receipts or records that materials from the project have been diverted. The Construction and Demolition Infrastructure Program was developed and adopted as a component of the CDDD to infuse any unclaimed deposits into the development of additional construction and demolition processing infrastructure. Grants are used to encourage processors to invest in construction and demolition sorting capabilities to maximize the quantities recovered.

Santa Clara, California

In Santa Clara, financial incentives are used to encourage haulers to collect recyclables from the institutional sector. All nonexclusive franchised haulers collecting waste from the industrial area (heavy industry, office buildings and high tech) of Santa Clara must pay the city a franchise fee of 25 percent of their total gross billings (including bin and rental charges). The city charges a reduced franchise fee to haulers on businesses that they collect at least 50 percent of recyclable materials. Haulers file quarterly reports to the city documenting the amount of recyclable materials collected by weight and type.

Santa Monica, California

Santa Monica's Construction and Material Waste Recycling Ordinance requires all construction and demolition projects that fall under specified thresholds to divert at least 60 percent of their construction and demolition waste. Applicants are required to submit a Waste Management Plan and a deposit of three percent of the total project cost. The deposit is refunded with documentation that materials have been recycled.

Seattle, Washington

Seattle uses both reduced tipping fees and tax incentives to encourage commercial recycling. At city transfer stations, the per ton tip fee for solid waste is \$96.25 per ton. Businesses that self-haul recyclables to city transfer stations can tip them for free and tip fee for yard debris is 25 percent lower than solid waste. In addition, the city excludes revenues from collection of commercial recyclables from the city's Business and Occupation Tax (SMC 5.48.055) of \$12.05 per ton that haulers must pay on solid waste collection revenues.

The following section includes in-depth profiles on each surveyed program that details the program's development, implementation and results to date. Summary data tables highlight the profiled program characteristics.

Table 1. General Characteristics of Profiled Communities

Jurisdiction	Population	# of Businesses	Recycling Goal	Recycling Rate	Commercial Recycling & Garbage Collection								Targeted Waste Stream	
						Mandatory recycling requirement	Disposal ban	Processing requirement	Reduced fees and/or tax incentives	Grant/loan program	Diversification program	Reconciliation/assistance		
Cambridge, MA	101,355	/	45% by 2000	/	Private (recycling); Municipal (garbage)	X	X							Commercial.
Chicago, IL	2,896,016	/	40% by 2000	44.89%, 2000	Free market	X								Commercial, Multi-family residences.
Dane County, WI	426,526	12,000	/	**	Free market	X	X							Commercial, Residential.
Durham, NC	187,035	/	25% by 2001; 40% by 2006	38%, 1998	Contract		X							Commercial, Residential.
Iowa	2,926,324	/	50% by 2000*	34.37%, 2000*	Varies per municipality					X				Commercial, Construction and Demolition.
King County, WA	1,737,034	/	/	/	Varies per municipality								X	Construction and Demolition.
Monmouth County, NJ	615,301	/	65% by 2001	55%, 2000	Varies per municipality	X								Commercial, Construction and Demolition.
Onondaga County, NY	458,336	15,000	50% by 1997	68%, 2001	Varies per municipality	X								Commercial.
Halifax Regional Municipality, Nova Scotia	358,000	/	65% by 2004*	58%, 2001*	Free market		X	X						Construction and Demolition.
Portland, Oregon	531,600	15,500	60% by 2005	54%, 2000	Free market	X								Commercial, Multi-family residences, Construction and Demolition.
San Diego County, CA	2,813,833	/	50% by 2000*	44%, 2000*	Nonexclusive franchise	X	X							Commercial, Construction and Demolition and Residential.
San Jose, CA	894,973	27,000	50% by 2000*	53%, 2000*	Nonexclusive franchise					X	X			Construction and Demolition.
Santa Clara, CA	102,361	5,592	50% by 2000*	40%, 1998*	Franchise				X					Commercial.
Santa Monica, CA	84,084	99,771	50% by 2000*	55%, 2000*	Municipal and Contract							X		Construction and Demolition.
Seattle, WA	563,374	/	60% by 2008 (city); 63% by 2008 (commercial)	44%, 1998 (city); 48%, 1998 (commercial)	Free market (recycling); Contract (garbage)				X					Commercial, Residential.

* = Diversion goal or rate.

/ = No data available or not applicable.

** = See Dane County Program Profile for diversion rates by material.

All the recycling or diversion rates include construction and demolition debris in their calculations with the exception of Dane County, WI.

Table 2. Commercial Required Recycling Programs

Jurisdiction	Start Date			Target Materials	Target Generators	Education & Technical Assistance	Enforcement Measures	Results to Date
		Mandatory recycling requirement	Disposal ban					
Cambridge, MA	July 1992	X	X	Corrugated cardboard, newspaper, glass, aluminum, plastic bottles, white office paper, steel or tin cans, used oil, vehicle batteries, yard debris, scrap metal, and wood waste.	Businesses, institutions and multi-family residences with <1 resident.	Yes	Yes	No data.
Chicago, IL	January 1995	X		Principal recyclables including newspaper, glass, plastic bottles, aluminum, tin, and paper.	Businesses, institutions and multi-family residences.	Yes	Yes	44.89% recycling rate in 2000.
Dane County, WI	1978	X	X	Corrugated cardboard, newspaper, magazines, steel, office paper, glass, plastic bottles (PETE and HDPE), yard debris, used oil, aluminum, tires, appliances and lead-acid batteries.	All generators.	Yes	Yes	Diversion rate increase of more than 50% for cardboard, newspaper, steel, plastic, and glass.
Durham, NC	January 1998		X	Corrugated cardboard, newspaper, glass bottles and jars, aluminum, and steel cans.	All generators.	Yes	Yes	Commercial tonnage remained relatively unchanged.
Monmouth County, NJ	April 1998	X		Newspaper, glass containers, aluminum cans, high-grade paper, corrugated paper, bi-metal food and beverage cans, leaves, asphalt, concrete, and certain wood wastes (paluminum lets, clean lumber, stumps).	All generators.	Yes	Yes	25% recycling rate in 1988 to 55% in 2000.
Onondaga County, NY	July 1990	X		High-grade office paper, mixed paper, corrugated cardboard, paperboard, plastic bottles (HDPE and PET), metal (non-ferrous and ferrous), newspaper, magazines, beverage containers, and Kraft paper.	All generators.	Yes	Yes	90% business participation rate.
Halifax Regional Municipality, Nova Scotia	April 1996	X	X	Corrugated cardboard, newspaper, redeemable beverage containers, steel/tin cans, glass jars, plastic bottles (#2 HDPE), leaves, yard waste, compostable organic material, used tires, waste paint, stretch wrap, antifreeze, lead-acid batteries, asphalt pavin	All generators.	Yes	Yes	90% participation rate and 58% diversion rate in 2001.
Portland, OR	January 1996	X		Recyclables including newspaper, metals, glass, aluminum, corrugated cardboard, steel, tin cans, high-grade office paper, magazines, mixed waste paper, plastic bottles, rubble, land-clearing debris, and wood.	All businesses, multi-family residences and building projects valued at \$50K or more.	Yes	Yes	Recovery rate in commercial sector went from 46.2% in 1996 to 54% in 2000.
San Diego County, CA	1991	X	X	Newspaper, bi-metal cans, glass bottles, aluminum, corrugated cardboard, office paper, plastic bottles, yard debris, white goods, asphalt, concrete, land-clearing debris, sand, and rock.	Multi-family residences, businesses and institutions with office buildings <20K square feet.	Yes	Yes	Achieved diversion goal of 50% 3 years early in 1997.

Note: Enforcement measures include random business and landfill load inspections. Penalties for noncompliance include warning and fines that range from \$25 to \$10,000. Education and technical assistance elements include outreach programs and on-site assistance.

Table 3. Construction and Demolition Required Recycling Programs

Jurisdiction	Start Date				Target Materials	Target	Education & Technical Assistance	Enforcement Measures	Results to Date
		Mandatory recycling requirement	Disposal ban	Processing requirement					
Halifax Regional Municipality, Nova Scotia	July 2001		X	X	Asphalt paving, aggregate and soil, brush and leaves, concrete, milled wood free of adhesives coatings and preservatives, porcelain, ceramic, root balls and stumps, scrap metal, window glass.	All generators and processors.	Yes	Yes	TBD
Monmouth County, NJ	October 1998	X			Certain wood waste (pallets, clean lumber, stumps), asphalt and concrete.	All generators	Yes	Yes	25% recycling rate in 1988 to 55% in 2000.
Portland, OR	January 1996	X			Rubble (concrete/asphalt), land-clearing debris, corrugated cardboard, metals, plastic, glass, and wood.	Building projects valued at \$50K.	Yes	Yes	Recovery rate in commercial sector went from 46.2% in 1996 to 54% in 2000.
San Diego County, CA	1991	X	X		Asphalt, concrete, dirt, land-clearing brush, sand, and rock.	Industrial loads consisting of 90% or more of the target materials.	Yes	Yes	Achieved diversion goal of 50% 3 years early in 1997.

Note: Enforcement measures include random business and landfill load inspections. Penalties for noncompliance include warning and fines that range from \$25 to \$10,000. Education and technical assistance elements include outreach programs and on-site assistance.

Table 4. Economic Incentive Programs

Jurisdiction	Start Date	Incentive Type				Description	Waste Stream	Target	Results to Date
		Reduced fees/tax incentives	Grant/loan program	Diversion Deposit	Recognition/assistance				
Iowa	July 1999	X				The Solid Waste Alternatives Program (SWAP) provides financial assistance in grants and loans to expand waste reduction and recycling projects.	Commerical, Construction & Demolition Debris	All generators.	\$42 million funds dispersed to date to more than 350 recycling and waste reduction projects.
King County, WA	1997			X		The Construction Works Program publicizes C&D companies that recycle and provide them with free assistance and aid them in getting point towards green building certification.	Construction & Demolition Debris	All construction projects.	22 projects.
San Jose, CA	July 2001			X		The Construction and Demolition Diversion Deposit Program (CDDD) is based on a system in which the city collects a recycling deposit (based on square footage of project) when a building permit is issued for construction, demolition or remodeling projects.	Construction & Demolition Debris	Construction, demolition and remodeling projects. Certain exemptions based on project value and square footage.	22 certified facilities. Data indicates the CDDD program has been effective at capturing self-haul mixed C&D loads.
San Jose, CA	1999		X			Construction and Demolition Debris Infrastructure Grant Program provides funding to facilities to expand processing capacity.	Construction & Demolition Debris	All C&D processors.	FY 99-00 \$250,000 dispersed and FY 00-01 \$500,000 dispersed.
Santa Clara, CA	1980	X				The city reduces the franchise fee on businesses that haulers collect at least 50 percent of recyclable materials.	Commerical	Industrial sector and haulers.	15 haulers have been certified to obtain the reduced hauling fee.
Santa Monica, CA	May 2001			X		The Construction and Material Waste Recycling Ordinance requires all construction and demolition projects that fall under specified thresholds to divert at least 60% of their C&D project related material. Applicants are required to submit a Waste Management Plan.	Construction & Demolition Debris	Construction and demolition projects that are +\$50k or are <1,000 square feet.	To date, 10% to 15% increase in diversion.
Seattle, WA	1994	X				Seattle excludes revenues from collection of commercial recyclables from the city's Business and Occupation Tax (SMC 5.48.055) of \$12.05 that haulers must pay on trash collection revenues. Seattle also uses reduced tipping fees for self-haul recyclables.	Commerical	All generators.	48% recovery rate in 1996 up from 44% in 1989.

Profiles of Required Recycling and Incentive Programs

The program profiles, pages 14 to 51, provide comprehensive information about each program's development, implementation and results to date. Each profile lists a primary contact for the information that is provided in the summary. The profiles follow a similar structure and format. Copies of the relevant program policies and rules are included based on availability in the Appendices. Summary data tables highlight the general characteristics of each surveyed program (See Tables 1, 2, 3, and 4).

The profiles are organized in alphabetical order as follows:

- Cambridge, Massachusetts
- Chicago, Illinois
- Dane County, Wisconsin
- Durham, North Carolina
- Halifax Regional Municipality, Nova Scotia
- Iowa
- King County, Washington
- Monmouth County , New Jersey
- Onondaga County, New York
- Portland, Oregon
- San Diego County, California
- San Jose, California
- Santa Clara, California
- Santa Monica, California
- Seattle, Washington

Cambridge, MA

General Information

Location: Cambridge, Massachusetts
Program Type: Mandatory recycling requirements and statewide disposal ban on designated materials
Population: 101,355 (U.S. Census, 2000)

Contact Information

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Commercial Recycling Program

Recycling Goal: No current data.

Current Recycling Rate: No current data.

Collection System: The city sponsors a commercial curbside recycling program for small to medium size businesses. The price for this is set in the city's contract. The city-owned recycling drop-off center is free to businesses with less than 50 employees. The city also provides businesses with a list of private haulers who they can call and negotiate rates and services.

Program:

- Mandatory Recycling Ordinance
- Massachusetts Waste Bans

Start Date: The City of Cambridge Mandatory Commercial Recycling Program was adopted in March 1991 and implemented in July 1992.

Target Generators: All businesses, institutions and multi-family residences with more than one tenant.

Target Materials:

- Corrugated cardboard
- Newspapers
- Glass
- White office paper
- Plastic
- Steel or tin cans
- Waste oil (kitchen/car)
- Vehicle batteries
- Leaves & yard waste
- Scrap metal
- Wood waste
- Aluminum

General Description: The mandatory recycling ordinance requires generators to separate certain recyclable materials from refuse. Businesses and institutions are required to conduct a waste audit and source-separate for recycling any material that constitutes more than five percent of their trash. A recycling plan must then be developed and filed for those items in excess of five percent. Landlords/management companies that coordinate garbage service for more

than one tenant in a building must file a recycling plan on behalf of the building.

Adoption Process: The State of Massachusetts prohibits the disposal of lead-acid batteries, white goods, whole tires, leaves and yard waste, glass, metal and plastic containers, recyclable paper and cathode ray tubes in landfill or combustion facilities. There is no statewide mandatory recycling law, but nearly half of the municipalities have elected to adopt mandatory recycling requirements.

Recycling was mandated by the Cambridge City Council in March of 1991 and implemented in July 1992. The rules and regulations governing the commercial requirements were put into effect by the Commissioner of the Department of Public Works.

Implementation: The mandatory recycling requirements were implemented all at once. Commercial recycling staff provide businesses and multi-family residences with technical assistance. A Commercial Recycling Guide was provided to every business in Cambridge. The guide includes the instructions on establishing a recycling program, instructions on how to fill out the recycling plan, a resource list of haulers, a matrix of waste composition by business type, a conversion table of volume to weight of recyclables, sample recycling announcement memo, sample office recycling instructions, commercial recycling regulations, recipients of business recycling awards, business recycling award nomination procedure, and schedules for commercial recycling workshops.

Enforcement: Public Works Department staff randomly inspect businesses. A \$25 fine is issued for noncompliance. During the implementation of the ordinance in July 1992, there was one full-time city employee with a part-time assistant. By July 1994 there were two full-time city employees working on commercial recycling. There are now no city employees whose jobs are dedicated to commercial recycling. Currently, there is no active enforcement due to staff resources.

At the state-level, facilities are required to submit Waste Ban Compliance Plans to the Department of Environmental Protection (DEP). Waste loads with unacceptable amounts of banned materials may be fined by the facility. Facilities are also inspected by the DEP and may be issued fines up to \$10,000 for violations.

Evaluation: No current waste compositions studies have been conducted.

Results to date: During initial roll out of the program the majority of the large businesses became participants, and by most indications, are still recycling.

Problems: The main problem with the program is lack of staff to stay on top of recruitment, enforcement and data collection.

Lessons learned:

- A database is an effective method to track compliance and rates.
- Without full-time commercial recycling staff it is impossible to track program progress.

Next steps: The next steps of the program involve working to get the city to approve dedicated commercial recycling staff of at least two full-time persons.

Chicago, IL

General Information

Location: Chicago, Illinois
Program Type: City-level mandatory recycling requirements
Population: 2,896,016 (U.S. Census, 2000)

Contact Information

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Commercial Recycling Program

Recycling Goal: 40 percent by 2000
Current Recycling Rate: 44.89 percent, 2000
Collection System: The commercial sector has an open and competitive garbage and recycling collection system. Haulers process, set their own fees competitively and set service levels.
Program: Workplace and Residential Recycling Ordinance.
Start Date: 1994, adopted.
January 1995, implemented.
Target Generators: All businesses and multi-family residences.
Target Materials: Principal recyclables including newspaper, glass, plastic, tin, aluminum, and paper.
General Description: Chicago's City Council adopted the Workplace and Residential Recycling Ordinance in 1994, requiring all property managers and building owners to implement an effective recycling program. Businesses are required to source-separate three recyclable materials, or source-separate two recyclable materials and conduct two source reduction measures. Source reduction measures include double-side copying, reducing packaging, energy efficient light bulbs and reusable materials. Businesses must also develop an education program and a written recycling plan.
Adoption: A work group comprised of business and property owners, haulers and local government representatives went through a one-year process that led to the recommendation that businesses would be required to recycle. The details and requirements of the ordinance were developed in this work group.
Implementation: Public notices and education materials were distributed the year before the ordinance went into effect. The ordinance was implemented in two phases. During the first year businesses only had to recycle two materials, thereafter the businesses had to recycle three materials or two materials and conduct two source reduction measures. Limited enforcement was implemented prior to 1997.

Enforcement: The Department of Environment inspects businesses and apartments buildings to ensure compliance and issues citations for noncompliance. Fines for noncompliance violations range from \$25 to \$100. Each day the violation continues constitutes a separate distinct violation. The city offers technical assistance for businesses not in compliance.

Evaluation: The city conducts participation studies to evaluate programs.

Results to date: The city's recycling rate is attributed to the mandatory recycling program. It is difficult to determine the success of commercial program because commercial and residential solid waste and recycling are collected together.

- Problems:**
- Hard to measure effectiveness of public education.
 - Lack of resources and staff for enforcement measures.

Lessons learned:

- Valuable to include stakeholder in the policy development process.

- Next steps:**
- Working on additional education materials to promote recycling programs.

Dane County, WI

General Information

Location: Dane County, Wisconsin
 Program Type: County-level mandatory recycling ordinance
 State-level disposal ban and mandatory recycling requirements
 Population: 426,526 (U.S. Census, 2000)
 Number of businesses: Approximately 12,000

Contact Information

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Commercial Recycling Program

Recycling Goal: Not applicable.

Current Recycling Rate: Communities report their recycling rates to the state – with the county average at 40 percent, and some communities at over 50 percent -- but there is no requirement for the reporting of data from the commercial sector, nor from the private recycling drop-off centers or buy-back centers. The county has conducted waste composition studies before and after its last expansion of mandatory recycling to estimate diversion rates for specific materials, which generally fall in the range of 75-85 percent for paper and containers, and nearly 100 percent for yard materials, tires, appliances and automotive batteries.

Collection System: Most communities in Dane County contract with a hauler for the collection of solid waste and recyclables from households; for commercial generators, it is a free market system. There are two large haulers, one medium size hauler and several small haulers who handle solid waste. Recyclables are collected by the three largest solid waste haulers as well as several of the traditional scrap dealers. There are two material recovery facilities in the county and several traditional scrap dealers who process the recyclables. The service providers set the rates. Service requirements are established by both state statute, county ordinance and ultimately, by city, village and town ordinance.

Program: Dane County Mandatory Recycling Ordinance (Ord. 41.12) and Wisconsin Mandatory Recycling Law, Chapter 287, state statutes, and Wisconsin Administrative Codes 540 to 590.

Start Date: Landfill bans were first enacted in the late 1970's. Materials were gradually added over the next thirteen years. The materials and their implementation date are listed below:

- Brush and tires, approximately 1978
- Newspapers, 1987
- Yard material, 1989
- Corrugated cardboard, steel cans, aluminum cans, glass bottles and jars and plastic bottles (PETE and HDPE), used oil, lead-acid batteries and appliances, 1991
- Magazines and office paper, 1995

Target Generators: All generators.

Target Materials: Newspaper, corrugated cardboard, magazines, office paper, yard materials, tires, used oil, appliances, lead-acid batteries, steel cans, aluminum cans, bimetal cans, glass bottles and jars and plastic bottles (PETE and HDPE) are included in the mandatory program. In addition, computers, mercury containing products, construction and demolition debris and food residues are being targeted for voluntary programs. The county has adopted an ordinance banning the sale of mercury fever thermometers as a measure for the reduction of toxic waste.

General Description: Dane County includes 61 municipalities. The county dictates that in order to use the county-owned landfill, municipalities must implement source separation and mandatory recycling of specific items for all generators. Over time, the county gradually added specific materials that were required to be recycled. The state adopted mandatory recycling subsequent to the county program.

Adoption Process: Under the state's comprehensive recycling law, SB 300 enacted in 1990, the state bans lead-acid batteries, tires, yard waste, major appliances, motor oil, newspaper, magazines, corrugated, office paper, glass, aluminum cans, bimetal cans, plastic containers, and polystyrene (PS) foam from landfill disposal. The ban requires cities, towns and villages to adopt a mandatory recycling ordinance that requires the recycling of specific materials. Counties were allowed to take over the implementation of recycling systems if given approval by their cities, villages and towns. The ban for plastic containers has been limited to HDPE and PET containers and the ban on PS foam has been granted a waiver.

Implementation: The required recycling of specific materials was phased in over a thirteen-year period in which the county gradually increased required recycling materials.

Enforcement: The county only has enforcement powers at the landfill. It is up to the individual municipalities to enforce. Warnings and fines may be issued for noncompliance.

Evaluation: Waste composition studies have been done by the county pre- and post-law. Municipalities also conduct waste composition studies and participation surveys.

Results to date: There has been a dramatic change in the materials removed from waste stream. However, the county cannot determine the recovery rate because they do not have data of how much was previously recycled. Neither the county nor local units of government collect this information from the commercial sector. However, waste composition studies conducted in 1990 and 1994 showed that the commercial sector had diversion rates similar or better than residential diversion rates, as shown here:

Material	Residential	Commercial
Cardboard	62%	93%
Newspaper	67%	78%
Steel cans	80%	66%
Aluminum cans	45%	46%
Plastic bottles	78%	66%
Glass bottles	77%	76%

Note that these percentages are measurements of what was in the waste in 1994 as compared to 1990. For items already being recycled in 1990 (aluminum cans, newspapers, etc), the diversion rates are much higher. The above rates only show the changes in diversion.

- Problems:
- Enforcement is not an active part of the program. Dane County does limited enforcement at its own landfill, but does not have jurisdiction to enforce elsewhere. Local municipalities do not have the resources to enforce.
 - Business sector participation is unknown, but according to the data from the waste composition studies, the diversion rate is similar to or exceeding the rate for the residential sector.
 - An incidental amount of recyclable material ends up in the landfill.

- Lessons learned:
- Residential compliance has been very high; an active enforcement program is not needed.
 - Commercial participation (as determined by waste composition studies) has resulted in diversion rates similar to or exceeding residential diversion rates.
 - A phased-in approach works well with public acceptance (i.e. gradually increasing required recycling materials).
 - It is important to work to use a cooperative approach and work with haulers and facilities to determine the best collection and processing system.
 - Education is a key factor to the implementation of recycling requirements.

- Next steps:
- Encourage food waste diversion from both residential and commercial sources.
 - Promote the recovery of construction and demolition materials, including both the reuse of materials at Habitat for Humanity's ReStore, waste reduction and recycling as part of Green Building, and expanding markets for specific materials, with a focus on drywall.
 - Require retailers of mercury thermostats and fluorescent bulbs to take them back from the public for recycling.
 - Work with the dentists within the county to improve their management of mercury amalgam waste and other products.

Durham, NC

General Information

Location: Durham, North Carolina
Program Type: City-level disposal ban on target recyclables
Population: 187,035 (U.S. Census Bureau, 2000)

Contact Information

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Commercial Recycling Program

Recycling Goal: 25 percent by 2001, 40 percent by 2006

Current Recycling Rate: 38 percent, 1998

Collection System: The City of Durham provides solid waste collection services to residential, multi-family and some commercial establishments. The city collects cardboard from commercial establishments and yard debris from residential customers who purchase carts from the city. The city contracts out its recycling collection services through a competitive bid process that is renewed every four years for a maximum of 20 years.

Program: Disposal ban on target recyclables (Ord. Sec. 10-72).

Dates: November 20, 1997, adopted.
January 1, 1998, implemented.

Target Generators: Residential, institutional and commercial sectors.

Target Materials:

- Glass bottles and jars
- Aluminum cans
- Steel cans
- Newspapers
- Corrugated cardboard

Adoption Process: In order to reach recovery goals set forth in the Solid Waste Management Plan, Durham City Council directed solid waste staff to develop an ordinance that bans the disposal of target materials. Since there are recycling programs available, which include curbside collection for residents, drop-off sites for residents and small businesses, and commercial firms to perform the services for large businesses, there are reasonable alternatives to disposal of target recyclables for the community. The alternative to the disposal ban was to educate the public, but omit any enforcement that requires participation in recycling programs.

Implementation: Durham passed the disposal ban in 1997, and it became effective on a voluntary basis on January 1, 1998. Throughout the next two years, the city's Environmental Resource Department conducted an educational campaign to inform residents of the ban. After passing three previous dates

to initiate enforcement due to resistance and lack of knowledge, Durham finally began to enforce the ordinance on January 1, 2000.

- Enforcement: Enforcement of the ban was phased in gradually, with specially targeted education efforts as the initial step. Violations are subject to fees. The penalty on trucks bringing target recyclables is double the tipping fee. The current tip fee for refuse is \$39.50 per ton.
- Evaluation: Participation surveys and annual recycling tonnage are used in program evaluation.
- Results to date: Per capita residential recycling increased 27 percent as of 2000. Commercial tonnage remained relatively unchanged.
- Problems: The ordinance did not seem to have a strong impact on commercial recycling participation. City sanitation employees inspect residential containers, but until an enforcement officer is hired, the city has limited ability to regulate commercial compliance.
- Lessons learned:
- Effective enforcement is needed to back up the ordinance requirements. Businesses will not adhere to a new ordinance unless they fear the repercussions of noncompliance.
 - Only include recyclables with reliable markets to prevent having to change the ordinance in the future.
 - Education is the most important aspect of the program, requiring increased staff and budget. A six-month campaign prior to enforcement would be sufficient.
 - Have infrastructure in place before beginning the program. Conduct in-depth planning that considers staffing, equipment, education, and costs.
- Next steps:
- Hire an enforcement officer.

Halifax Regional Municipality, Nova Scotia

General Information

Location: Halifax Regional Municipality, Nova Scotia, Canada
Program Type: Mandatory recycling requirements
Province-level and municipal-level disposal ban
Population: 358,000

Contact Information

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*Throughout profile currency is measured in Canadian dollars and volume is measured in metric tons.

Commercial Recycling Program

Recycling Goal: 65 percent by 2004 (diversion goal)

Current Recycling Rate: 58 percent, 2001 (diversion rate)

Collection System: All waste generated by any industrial, commercial or institutional premise is not eligible for municipal collection. Commercial and institutional sector businesses are required to hire private haulers to collect recyclables. Halifax Regional Municipality provides collection for the residential sector.

Program: Commercial Recycling and Composting Program.

Start Date: The provincial disposal ban on specific materials was implemented between 1996-1998. The municipal integrated waste management plan and recycling requirements were adopted in 1996 and implemented in 1998. Additional requirements for construction and demolition debris processing were added in July 2001.

Target Generators: All generators.

Target Materials: The Province of Nova Scotia has disposal bans on the following materials, which are listed with their ban implementation date:

- Redeemable beverage containers, 1996
- Corrugated cardboard, 1996
- Newsprint, 1996
- Automotive lead-acid batteries, 1996
- Leaf and yard waste, 1996
- Steel/tin cans, 1998
- Glass jars, 1998
- Waste paint, 1997
- Used tires, 1996
- Antifreeze, 1997
- #2 HDPE non-hazardous plastic containers, 1998
- Stretch wrap, 1998
- Compostable organic material, 1998

In addition to the above items Halifax Regional Municipality bans the landfill disposal of specific construction and demolition debris materials.

- General Description:** Halifax Regional Municipality (HRM) developed its community-based waste management strategy through a year-long consultation process with residents and businesses that was adopted in 1996. Fully operational since 1999, the Waste Resources Collection System includes the composting and recycling through the on-site separation of wet, dry and recyclable waste in home and businesses. HRM's waste management system also complies with Nova Scotia's Solid Waste Resource Management Strategy that bans the disposal specific materials that can be recycled or composted.
- Adoption Process:** Four municipalities merged and formed Halifax Regional Municipality in 1996. Prior to the formation of the regional government, a Community Stakeholders Committee (CSC) was formed to address the siting of a new landfill. The CSC, a consensus-based committee, developed criteria for the new landfill that banned any raw materials in the new landfill. The CSC strategy specified that waste be separated into four streams: recyclables, compostables, trash, and household hazardous waste. The plan also called for the development of a household hazardous waste facility, a state of the art landfill, front-end mixed waste processing and back-end stabilization facility and composting plants.
- After 13 months and more than 50 meetings that included more than 500 individuals, the CSC strategy was presented and approved by the four municipalities. When the municipalities merged into HRM and a regional council was elected, the council approved the strategy in 1996. The HRM staff and council were responsible for carrying out the strategy and the CSC members became watchdogs to ensure that the strategy was implemented correctly.
- Implementation:** The fully integrated waste management strategy became fully operational in 1999. Pilot projects were conducted the previous two years to determine the appropriate collection method for residential and commercial sectors. The final solid waste management system includes the following:
- Source separation of organics, recyclables and trash, with biweekly collection of organics and trash; weekly collection of recyclables (biweekly in the rural areas of the county);
 - Creation of eight collection zones (from 25 before amalgamation) with six haulers;
 - Use of aerated carts for organics collection;
 - One site that includes a mixed waste processing facility designed to handle 119,000 metric tons/year of MSW; a 13-channel agitated bed composting system to process the mixed waste after recyclables are removed; and a landfill for stabilized waste. HRM owns these facilities, with design/build/operation given to Mirror Nova Scotia;
 - Two separate composting facilities with total processing capacity of 61,000 metric tons/year. Both facilities are privately owned and operated, each with put or pay guarantees (\$68.60/metric ton to one compost facility and \$65.50 to the other) by HRM of 20,000 metric tons/year;
 - Expansion of an existing materials recovery facility; and
 - Household Hazardous Waste Public Drop-Off Depot that is open two Saturdays a month.

HRM decided to adopt biweekly collection of organics and recyclables alternating each week. Due to the change in curbside collection frequency in the new system, HRM decided to no longer provide service to the commercial and institutional sector. A notice was sent out to the businesses to inform them of the service change. The Halifax Businesses Commission that has more than 800 member businesses helped inform local businesses and set up a new collection program with private haulers to collect organics, recyclables and trash.

Enforcement: All loads are subject to landfill inspection for unacceptable materials. Enforcement officers conduct random inspections and fines are issued for noncompliance.

Evaluation: Waste compositions studies, participation surveys and reports from the HRM facilities are used to evaluate the program.

Results to date: The program has achieved a 90 percent participation rate and 58 percent diversion rate in 2001.

Problems:

- Contamination has not really been an issue for organics collection.
- Facility and collection odor was the biggest concern among residents when the new program was implemented.

Lessons learned:

- Community-based strategies are effective.
- Education is a key component.

Next steps:

- Constant monitoring and evaluation.

Construction and Demolition Program

Collection System: Commercial and institutional sectors are required to arrange collection of construction and demolition materials through private haulers. The majority of construction and demolition waste goes to private processors for processing. A number of the materials are banned from the region's landfill.

Program: Construction and demolition recycling requirements (By-law L 200 and Administrative Order 27).

Start date: July 2001

Target Generators: Commercial sector and construction and demolition processors.

Target Materials: The following materials are not allowed to be disposed of in a construction and demolition disposal site:

- Asphalt paving
- Aggregate and soil
- Brush and leaves
- Concrete
- Milled wood free of adhesives, coatings and preservatives
- Porcelain, ceramic
- Root balls and stumps
- Scrap metal
- Window glass

- General Description:** Construction and demolition recovery components such as standards of operation and zoning designations for processing facilities were not fully integrated into Halifax Regional Municipality's waste management strategy. HRM developed standards of operation and recycling requirements for processing facilities. In addition, zoning designations are currently being developed for construction and demolition processing facilities.
- Adoption Process:** In 1999, the HRM Council agreed that additional strategies were needed to manage construction and demolition materials. Through a public involvement process, HRM has developed a two-prong approach to revise the standards of operation and zoning designations for processing facilities. By-Law L-200 was adopted in July 2001 to set licensing requirements for construction and demolition recycling and disposal operations. Administrative Order 27 was also adopted, which outlines recycling requirements for the processing of construction and demolition debris and operators must comply with these laws to get licensed. See Appendix F. HRM is currently going through a public process to amend by-laws to create zoning designations for construction and demolition facilities.
- Implementation:** The construction and demolition processing facilities were notified of the new requirements and assistance is provided by HRM.
- Enforcement:** There is 1.0 FTE enforcement officer assigned to the construction and demolition bylaw. HRM currently has three licensed facilities and anticipates the addition of three more facilities. Noncompliance to landfill bans or the by-laws results in a violation that is subject to fine or license revocation.
- Evaluation:** Construction and demolition processing facilities are required to submit a monthly report. Waste compositions studies will also be used to evaluate progress.
- Results to date:** To date, the facilities are in compliance.
- Problems:**
- Illegal dumping.
 - Establishing zoning requirements has been a lengthy process.
- Lessons learned:** The construction and demolition waste stream is a critical component of diversion and solid waste planning.
- Next steps:**
- Public involvement process.
 - Constant monitoring and evaluation.

Iowa

General Information

Location: Iowa
Program Type: Financial assistance program
Population: 2,926,324 (U.S. Census, 2000)

Contact Information

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Commercial Recycling Program

Recycling Goal: The State of Iowa has waste diversion goals instead of recycling goals. The most recent goal is 50 percent by 2000.

Current Recycling Rate: 34.37 percent, 2000 (diversion rate)

Program: Solid Waste Alternatives Program (SWAP)

Start Date: July 1999

Eligibility: Local governments, public or private groups, businesses, and individuals interested in or responsible for Iowa's solid waste management are eligible. There is a preference for projects involving regionalization. Projects involving two or more units of local government or public or private groups are examples of regionalization.

Beginning in July 2002, the Department of Natural Resources (DNR) will target certain waste streams and/or generators. These entities will receive special consideration through the review and selection process. In addition, a financial incentive in the form of an increased forgivable loan portion may be offered.

Target Materials: Previously, no specific materials were targeted. However, beginning with fiscal year 2003 (July 2002 – June 2003), DNR will be targeting electronics, organics and construction and demolition debris. These targeted materials and/or generators will be given preference during the selection and review process. They may also be chosen to receive an increase in the forgivable loan portion of any award offered.

General Description: SWAP is a \$3.2 million annual statewide financial assistance program that funds the development and expansion of waste reduction and recycling projects. Any entity that is interested in or responsible for reducing the amount of waste going to Iowa's landfills is eligible. Proposals are accepted year round and reviewed quarterly. Awards are announced quarterly after a competitive review.

SWAP is designed to reduce the amount of solid waste generated and landfilled in Iowa and to alter people's attitudes about generating, managing and disposing of solid waste. Financial assistance aids in the implementation

of various pollution prevention and solid waste management projects in three targeted areas:

1. BEST PRACTICES- Assists in implementing practices and programs that will move Iowa toward long-term pollution prevention waste reduction and recycling sustainability.
2. EDUCATION- Facilitates the coordination of consistent statewide pollution prevention, waste reduction and recycling messages to ensure ongoing support of these activities.
3. MARKET DEVELOPMENT- Develops a demand for value-added recyclables sufficient to provide increased and stable commodity market prices.

Program Development Process: In 1987, the Groundwater Protection Act established a solid waste policy that included a hierarchy of solid waste management options. The solid waste hierarchy placed waste reduction at the source as the most preferred method of solid waste management. Recycling and reuse were the next most preferred methods followed by other approved techniques of solid waste management including, but not limited to, combustion with energy recovery, combustion for waste disposal, and disposal in sanitary landfills.

In 1989, the Waste Reduction and Recycling Act established a goal of reducing the amount of solid waste being landfilled by 25 percent by 1994 and 50 percent by the year 2000 through implementation of waste reduction at the source and recycling/reuse initiatives. To that end, several state programs were established, including the Landfill Alternatives Grant Program (LAG), one of SWAP's predecessors.

In December of 1994, LAG was re-named the Landfill Alternatives Financial Assistance Program (LAFA) to better reflect the fact that loans as well as grants would be offered to applicants.

In July of 1999, the SWAP replaced the LAFA. SWAP was developed in response to the evolution of waste reduction, recycling, and other landfill diversion activities currently in place across the state. An advisory committee with members representing the Environmental Protection Commission, counties, municipalities, business and industry, regional councils, and solid waste associations gave valuable input to the DNR. The advisory committee offered contributions on how the former LAFA program could be modified to best reflect current and future solid waste management issues and market development for recycled materials through landfill alternatives projects.

Key Elements: Depending on revenue from the state's tonnage fee and loan repayments from contracts, SWAP's annual budget ranges from \$2 to \$4 million.

Three individuals are key in the administration of SWAP, although only 2.0 FTE is assigned. The third person is not a State of Iowa employee and works through a temporary agency.

Evaluation: DNR evaluates the program based on individual project success.

Results to date: DNR assesses that SWAP and its predecessors have been very successful. The department estimates that the program has had the single largest impact on tonnage reduction to date. In addition, the program has a 96 percent success rate, with success meaning that a project fulfilled its contractual obligations and continues to operate.

Cumulatively, SWAP and its predecessors have awarded more than \$42 million in financial assistance to more than 350 recycling, waste reduction, pollution prevention, market development, education and other projects designed to reduce the amount of solid waste entering Iowa's landfills. The breakdown for financial assistance is as follows:

- Since its first round in July of 1999, SWAP has awarded over \$9.2 million for 104 projects.
- From December 1994 to February 1999, LAFA awarded \$15,320,917 to 107 projects as grants or zero-interest loans or a combination thereof.
- From 1988 to June 1994, LAG awarded \$18,205,400 in grants to 157 projects.

Problems: SWAP's revenue source has come under attack in the last few legislative sessions. As a result, the funding source has continually been reduced. Also, some projects have discontinued operations or failed and as a result, defaulted on contractual obligations.

Lessons learned:

- Financial assistance programs are a successful means to increase diversion.
- It is important to require businesses and/or marketing plans from specific applicants to ensure they have the expertise and know-how required for the proposed project.
- Use outreach and promotion to encourage additional applicants from targeted areas.

Next steps: SWAP will continue to award financial assistance to applicants on a quarterly basis. DNR will begin to target specific waste streams. To address the program's decreasing source of revenue, DNR is examining the importance of issuing more loans than grants to ensure short-term viability. In the long-term, Iowa is looking at other funding mechanisms besides the tonnage fee for this and other waste management programs.

King County, WA

General Information

Location: King County, Washington
Program Type: Construction and demolition incentive program
Population: 1,737,034 (U.S. Census, 2000)

Contact Information

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Construction and Demolition Recycling

Recycling Goal: Not applicable.

Current Recycling Rate: Not applicable.

Program: King County Construction Works Recognition Program.

Start Date: 1997

Eligibility: All businesses and organizations in King County are eligible to apply.

Target Materials:

- Rubble (concrete/asphalt)
- Drywall
- Land-clearing debris
- Corrugated cardboard
- Metals
- Wood
- Roofing
- Plastic

General Description: The Construction Works Recognition Program publicizes construction companies that recycle, reduce waste and use recycled products on the construction job site and can apply for multiple awards. Contractors receive free assistance and recognition for successfully recycling at least 60 percent of their construction waste, purchasing recycled content building materials for the project, and practicing several waste prevention strategies.

Key Elements:

- Technical assistance
- One-on-one recruitment
- Publications

Program Development Process: The Construction Works program evolved from the business recognition program, Green Works. The construction program was developed based on the framework of the business program. The Solid Waste Division held a focus group with construction industry representatives to discuss what recognition would be useful and to establish criteria.

Implementation: Approximately ten percent of builders are responsible for the majority of the construction in the county. The division focused on recruiting the top 15 to 20 companies through one-on-one personal recruitment, providing free

15 to 20 companies through one-on-one personal recruitment, providing free technical assistance and attending industry meetings. Several publications are also available to assist builders with construction and demolition waste diversion.

Evaluation: The program is evaluated based on membership. Individual case studies are developed that provide estimates on the amount of material that can be diverted from different projects. Also, the county conducts waste composition studies and surveys the construction and demolition industry every few years.

Results to date: Six new members joined in 2000-2001. To date, there have been 22 projects.

Problems:

- It is a challenge to get construction and demolition companies to join because waste management is such a small portion of the project.
- It is labor intensive to recruit members.

Lessons learned:

- In order to get participation, programs need to be extremely convenient and easy for industry people.
- Need to provide assistance in completing paperwork and membership forms.

Next steps:

- Hired new 1.0 FTE this year to focus on CDL Recycling and Green Building issues.
- Work to make program more compatible with the LEED and Built Green Certification
- Revisit original members and ask them to requalify based on new projects
- Develop additional publications and promotional materials including banners for job sites.

Monmouth County, NJ

General Information

Location: Monmouth County, New Jersey
Program Type: State level mandatory recycling requirements
Population: 615,301 (U.S. Census, 2000)

Contact Information

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Commercial Recycling Program

Recycling Goal: 65 percent by 2001
Current Recycling Rate: 55 percent, 2000
Collection System: Monmouth is a flow-controlled county where waste generated by the 53 municipalities within its borders is consistently directed to a single, county-owned and operated landfill.

Program: District Recycling Plan.
Start Date: Commercial, April 1988
Construction and Demolition Debris, October 1988
Target Generators: Commercial, institutional and residential sectors.

Target Materials:

- Newspaper
- Glass containers
- Aluminum cans
- Leaves
- Bimetal food and beverage cans
- High-grade paper
- Corrugated paper
- Asphalt
- Concrete
- Certain wood wastes (pallets, clean lumber, stumps)

General Description: In New Jersey, the state mandates the source separation and recycling in the residential, commercial and institutional sectors. Counties adopt recycling plans mandating specific materials and direct cities and towns to enact ordinances. Monmouth County mandates the recycling of specific materials in the residential, commercial and construction and demolition waste streams.

Adoption Process: Monmouth County formally adopted its initial District Recycling Plan in February 1987, two months before the Statewide Mandatory Source Separation and Recycling Act was signed into law. The statewide act requires each municipality to recycle at least three materials plus leaves. The county's program goes beyond the basic requirements of the state's mandate and requires the recycling of additional materials. The county evaluated the waste stream to determine what materials would be mandated.

- Implementation:** The program was implemented in a phased approach for the residential, commercial and construction and demolition debris waste streams.
- The residential requirements, in effect since October 1987, include newspaper, glass containers, aluminum cans and leaves. Phase 2 residential requirements, as of April 1, 1988 includes bimetal food and beverage cans.
 - The commercial requirements, in effect since 1988, include newspaper, glass containers, aluminum cans, leaves, bimetal food and beverage cans, high-grade paper, and corrugated paper.
 - The construction and demolition debris requirements as of October 1988, include required recycling of asphalt, concrete, and certain wood wastes (pallets, clean lumber, stumps).
- The county relied on the municipalities to provide notice and inform businesses and residents of the mandate. The county also required each municipality to designate a recycling coordinator to provide technical assistance and education.
- Enforcement:** Monmouth County has a Solid Waste Enforcement Team, part of the Monmouth County Health Department, stationed at the landfill to monitor compliance with all state and county requirements. Fines are issued for noncompliance.
- Evaluation:** In 1987, Monmouth County retained a consulting firm to plan and implement a waste composition and characterization study that would be used to help guide planning efforts. The study had multiple goals including: the assessment of the impact of a three-phase recycling program initiated in Monmouth County; use of the data in planning for landfill use, residue or reject disposal; and the identification of trends in the waste stream. Waste composition studies were conducted pre and post mandatory recycling. The last waste composition study was done in 1993. The county relies on annual reports from the municipalities to evaluate the program's progress.
- Results to date:** Over the five-year study period 1987-1992 recycling rates in Monmouth County increased from approximately 25 percent in 1988 to 43.5 percent in 1991. While recycling rates increased throughout the study period, tonnage of waste generated dropped only slightly by 3.7 percent. The most recent recycling rate of 55 percent in 2000 is attributed to mandatory recycling.
- Problems:**
- Weak markets for recyclables hinders participation.
 - Lack of resources for enforcement.
- Lessons learned:**
- Education is the a key element to a required recycling program.
 - Commodity markets determine participation.
- Next steps:**
- Increasing enforcement.
 - Providing more education to encourage residents and businesses to recycle.

Onondaga County, NY

General Information

Location: Onondaga County, New York (including the City of Syracuse)
 Program: County-level generator-based recycling requirements
 Population: 458,336 (U.S. Census, 2000)
 Number of businesses: 15,000

Contact Information

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Commercial Recycling Program

Recycling Goal: 50 percent by 1997
 40 percent by 1997 (processable waste)

Current Recycling Rate: 68 percent, 2001
 42.8 percent, 2000 (processable waste)

Collection System: Onondaga County Resource Recovery Agency (OCRRA) manages the solid waste and recycling program for 33 municipalities in the county. Some municipalities provide solid waste and recycling collection through their own public employees, some contract with one or more private waste hauling firms to provide services for their residents and still others require residents to arrange for disposal and recycling by contracting with a private hauler or bring their MSW and recyclables to one of the two OCCRA transfer stations. OCRRA maintains two drop-off centers for waste and recyclables where recyclables are accepted at no cost.

Recyclables collected at the curbside are taken for processing and marketing to a material recovery facility (MRF). The OCRRA/MRF contract provides for a variable payment to the privately owned MRF, which receives curbside recyclables collected by the 13 private haulers, 6 municipal haulers and 8 municipalities with private hauling contracts. The MRF accepts residential recyclables at no charge to the waste hauler, and then sorts, bales and markets the recyclables.

Program: Source Separation Law (Local Law No. 12) as known as Operation Separation.

Start Date: July 1, 1990, implemented

Target Generators: All commercial and residential generators.

Target Materials: Office paper, corrugated cardboard, paperboard, plastic (HDPE AND PET) bottles, metal (all ferrous and non-ferrous), newspaper, magazines, beverage cartons, mixed paper, and Kraft paper.

General Description: Ononodaga County's Source Separation Law requires households and businesses to recycle corrugated cardboard and paper as well as other mandatory recyclables if the quantity generated economically justifies a

separate collection. Waste audits are conducted at businesses to determine which materials they will be required to recycle.

Adoption Process: New York State's Solid Waste and Management Act of 1988 required municipalities to adopt ordinances that require source separation for residential and commercial waste streams by September 1, 1992. The act mandates municipalities require the separation of those materials for which the cost of recycling is less than or equal to the costs of proper disposal at a solid waste facility. Municipalities may require the separation of other materials to preserve landfill space, conserve natural resources or create new jobs. Onondaga County's Source Separation Law was adopted to comply with the state's mandate.

Implementation: The recycling requirements of specific materials was phased-in over time. Initially, the county mandated the recycling of paper and corrugated cardboard. Additional materials were gradually mandated based on the existing markets. Public notice, education and technical assistance were used throughout the implementation of the recycling law.

Enforcement: OCCRA enforces the source separation law through a system of public education and surveillance. Fines are issued for noncompliance. The first violation is \$15.00; \$30.00 for the second violation; \$50.00 for the third; and \$100 for each subsequent violation. The fines collected for enforcement are retained by the municipality to support enforcement and recycling education programs.

There is 1.0 FTE business-recycling specialist and 1.0 FTE apartment recycling specialist that follows through on complaints and inquiries about business and apartment recycling. The specialists are on the road five days a week calling on businesses and apartments. During 2001, OCCRA continued to employ the services of a former VISTA member to supplement the work of the recycling business specialist by calling on smaller businesses. In 2001, OCCRA's business recycling specialist visited hundreds of businesses.

When needed an enforcement officer supplements the efforts of the business and apartment recycling specialists. An enforcement officer calls on businesses and apartment buildings where it is determined other venues have not resulted in cooperation. The enforcement officer also spends a portion of the week inspecting loads of solid waste at the waste-to-energy plants and issues warning and/or violations.

Education and outreach is also a large part of enforcement. OCCRA also has 1.0 FTE certified teacher that educates students throughout the county. In 2001, the teacher spoke to 12,000 students in 537 classrooms.

Evaluation: The Operation Separation program efficiency is measured in participation, separation and processing efficiencies against the original program definition projections, which were developed in 1987 in the recycling program design.

- The participation rate is the percent of waste generators who are recycling.
- The separation/efficiency is the percent of accuracy the waste generators have in correctly recycling.
- The processing rate/efficiency is the percent of recyclable material collected that is available for markets after handling and sorting the recyclables for the ultimate markets, processing which usually takes place at the MRF.

Program effectiveness is documented in the recyclables recovery rate of 68 percent. It is a result of the participation rate and affected by the separation and processing efficiency. The residue fraction is a combination of material placed incorrectly by the generator, non-recyclables placed in the bin which are separation factors and processing efficiency, losses caused as a result of sorting and processing the material for sale. The residue quantity has no impact on the reported recycling rate. However, the residue quantity is a measure of the separation efficiency and the processing efficiency.

OCRRA examines trucks delivering recyclables, bin set outs and MRF processing to calculate the separation efficiency and the processing efficiency.

Results to date: OCRRA calculates the separation efficiency at 97 percent and the processing efficiency at 95.1 percent. Through visual inspection and survey, Operation Separation has documented a participation rate of 98 percent in most neighborhoods and determined that over 95 percent of the 177,898 households and over 90 percent of the estimated 15,000 businesses are participating in the program.

Problems: The main challenge is the need for constant education.

Lessons learned:

- It is not practical to mandate materials unless developed and stable markets exist for the materials.
- Education needs to be constantly reinforced.
- Focus education on schools. Kids are the best ambassadors.
- Mandating recycling is an effective means to increase recovery, but the program should focus on education rather than enforcement.

Next steps: The next steps for the recycling program in Onondaga County include additional efforts in businesses, targeting additional recovery of paper from the residential sector by adding a second recycling bin, computer recycling programs, and targeting the inner city for increased recovery.

Portland, OR

General Information

Location: Portland, Oregon
Program Type: City-level mandatory recycling requirements
Population: 531,600 (U.S. Census, 2000)
Number of businesses: 15,500

Contact Information

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Commercial Recycling Program

Recycling Goal: 60 percent by 2005

Current Recycling Rate: 54 percent, 2000

Collection System: The commercial sector has an open and competitive garbage and recycling collection system allowing commercial customers to choose between 64 permitted haulers in the city and negotiate rates for service.

Program: Administrative Rules for Commercial Solid Waste and Recycling 17.102, Section 17.102.180.

Start Date: January 1996

Target Generators: All commercial businesses including multi-family complexes as well as construction projects with a permit value of \$50,000 or more.

Target Materials: Target materials vary by generator but may include various paper grades for offices, glass and tin from restaurants and wood, corrugated cardboard, metal, rubble and land clearing debris from construction sites.

General Description: All businesses, multi-family complexes and construction projects valued at \$50,000 or more must separate recyclable materials from mixed waste and set out a minimum amount of their recyclable materials. The following general principles apply:

- Businesses must separate recyclable materials from mixed waste and set out for recycling a minimum of 50 percent of their waste, given practical limitations.
- Multi-family complexes must set up recycling systems that are convenient to tenants, for a least five recyclable materials and to notify tenants about recycling.
- Where a building project is valued at \$50,000 or more, including both construction and demolition phases, the general contractor is required to ensure that materials produced on the job site are recycled. Where no

general contractor is named on an affected building permit, then this requirement is applicable to the property owner.

- Adoption Process:** A “Commercial Workgroup” was put together in 1993 (15 members) with representation from businesses, haulers, multi-family sector, and the public. The group went through a two-year process that ultimately led to the recommendation that businesses be required to recycle. After that determination, another group the “Commercial Implementation Team” was formed to flesh out the specific requirements of the program. That group contained some members of the “Commercial Workgroup” with the addition of recycling managers from selected businesses and some additional haulers.
- Implementation:** Notices went out to every business in November of 1995. The ordinance implementation date was January 1, 1996. Haulers distributed Recycling Plan Forms to their commercial customers late in 1995. Enforcement began in July of 1996.
- Enforcement:** To ensure compliance with the ordinance, the Office of Sustainable Development (OSD) may ask a permittee to produce a copy of their Recycling Plan Forms or may initiate an inquiry upon receiving a complaint or on its own. In cases where a business, multi-family complex or construction project is not in compliance, the city must offer an assistance period of at least 30 days. If compliance is not achieved after 30 days, a penalty of up to \$500 may be imposed.
- Evaluation:** Results are measured through generator surveys, annual waste composition studies and data reported by haulers and independent commercial recyclers.
- Results to date:** In 1999, a generator survey found that 82 percent of all businesses reported recycling four or more materials, an increase from 55 percent in 1996. The recovery rate in the commercial sector went from 46.2 percent in 1996 to 54 percent in 2000.
- Problems:** The city encountered no opposition when the ordinance was brought before Council for approval. A cost of service study conducted in 1994 showed that a required recycling system would not increase the system cost of collecting refuse and recycling.
- Lessons learned:**
- In order to change the behavior of a group, provide an forum to ask them what it will take to make the desired change.
- Next steps:**
- Develop program to collect and process food waste.
 - Educate contractors about existing construction and demolition requirements and inform them of recycling opportunities.
 - Improve technical assistance program and outreach to businesses and create a comprehensive waste prevention program.
 - Educate multi-family tenants on recycling and provide them with more opportunities to recycle.

San Diego County, CA

General Information

Location: San Diego County, California
Program Type: County-level mandatory recycling requirements
Population: 2,813,833 (U.S. Census, 2000)

Contact Information

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Commercial Recycling Program

- Recycling Goal: 50 percent by 2000 (diversion goal)
- Current Recycling Rate: 44 percent, 2000 (diversion rate)
- Collection System: Nonexclusive franchise collections are provided by 29 permitted haulers. The franchise fee is \$2.35/ton, which goes to diversion programs, solid waste enforcement and household hazardous waste programs. Haulers process, set their own fees competitively and meet service requirements established by code and by the franchise agreement.
- Program: Mandatory Recycling Ordinance (MRO).
- Start Date: The ordinance was adopted in 1991 and phased-in over a three-year period.
- Target Generators: The program targets residential, commercial and industrial sectors. The residential program includes all residences (single and multi-family). The commercial includes all hospitality (restaurants, bars, hotels) and office buildings above 20,000 square feet. The industrial includes generators of certain types of loads.
- Target Materials:
- Residential recyclables including newspaper, glass bottles and jars, plastic beverage bottles, aluminum cans, tins cans, bimetal cans, white goods and yard waste.
 - Commercial recyclables including office paper, aluminum, cardboard, glass jars and bottles, plastic beverage bottles, tin and bimetal cans, and white goods from hospitality facilities.
 - Industrial loads consisting of 90 percent or more of any one of the following: asphalt, concrete, dirt, land clearing brush, sand or rock.
- General Description: In 1991, the San Diego County Board of Supervisors adopted a mandatory recycling ordinance (MRO). The MRO required designated recyclables be source-separated. Each city was required to adopt an MRO of its own. The county introduced surcharges in phases to a maximum of \$100 per load of solid waste to a county landfill. The MRO includes enforcement by disposal bans on specific materials in county-owned landfills.

Adoption Process: There was an extensive public involvement process to gather input from businesses, residents and haulers. The ordinance was developed as a waste reduction strategy and component of the Countywide Integrated Waste Management Plan. The state-mandated advisory bodies, the Technical Advisory Committee (jurisdictions) and the Citizens Advisory are consulted when the drafts of the countywide CIWMP elements are ready for approval. Formal comments and public hearings are required in this process, until County Board of Supervisors adopts, and a majority of cities with a majority of the population pass the countywide elements.

Implementation: The program was implemented in phases as follows:

1. The residential program was phased in by geographical areas and by single and multi-family housing.
2. The commercial and industrial came in at once.
3. The disposal bans were phased in over a three-year period.

The county allocated \$250,000 for an aggressive promotional and educational campaign during the implementation of the ordinance. The campaign included public briefings, workshops on recycling education and enforcement techniques for cities, recycling collectors and haulers. A public relations handbook also helped cities implement their local MROs. In addition, the county provided recycling tonnage grants to cities to stimulate residential recycling programs. The county also introduced Technical Assistance Program (TAP) grants for public and private entities to expand recycling opportunities in the county.

Enforcement: Hauler fines were phased in through increasing dollar amounts over time. Enforcement has never been severe, although notices were sent to violating generators. Commercial enforcement is done by county officers. Enforcement has been light in the last few years due to lack of resources. A new effort will be implemented in 2002-2003. Administrative citations may be used, along with incentive programs for voluntary compliance.

Currently, much of the county is collected single-stream for recyclables, so drivers do not get out to inspect. The county will probably institute a spot check system using county staff.

Evaluation: Evaluation has been done primarily through the state diversion rate calculations.

Results to date: In March 1992, the county outreach contractor conducted a residential survey. The survey found that 88 percent of the county residents supported the adoption of an MRO in their community. The county met its diversion goal of 50 percent three years early, in 1997, however it has fallen since then.

Problems: The county lost flow control in the mid-1990's, resulting in a large failure to send tonnage to MRF. The financial losses caused the county to sell the entire solid waste system including landfills, and the diversion program lost a lot of its control and funding. Landfill bans are no longer in effect because the county no longer owns the landfills. Countywide approaches have since been hard to achieve.

Lessons learned: Constant evaluation and enforcement are necessary for major public behavioral and technological changes such as recycling. A continuous commitment at all levels is needed for program adjustments.

Next steps:

- Focus more on commercial and industrial to increase participation.
- Increase market development efforts.

San Jose, CA

General Information

Location: San Jose, California
ProgramType: Diversion deposit and grant program
Population: 894,973 (U.S. Census, 2000)
Number of businesses: 27,000

Contact Information

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Commercial Recycling Program

Recycling Goal: 50 percent by 2000 (diversion goal)
Current Recycling Rate: 53 percent, 2000 (diversion rate)
Collection System: San Jose has an exclusive franchise system for residential wastes and a nonexclusive franchised solid waste collection system for commercially-generated wastes. Businesses can select any franchised or permitted hauler for refuse and recycling collection. The city does not operate or set tip fees for the landfill. The city also waives franchise fees on the collection of source-separated recyclables as an incentive for businesses to recycle.

Program: Construction and Demolition Diversion Deposit Program (CDDD).

Key Elements:

- Clearance document
- Diversion deposit
- Certified facilities
- Infrastructure grant program

Start Date:

- November 7, 2000, CDDD ordinance adopted
- March 1, 2001, clearance document requirement implemented
- July 1, 2001, diversion deposit implemented

Target Generators: Any residential and non-residential new construction, alteration and demolition project and roofing tear-off.

Target Materials: Construction and demolition materials including rubble (concrete/asphalt), land-clearing debris, corrugated cardboard, metals, and wood.

General Description: The Environmental Services Department (ESD) of Integrated Waste Management Division developed the Construction and Demolition Diversion Deposit Program to divert construction and demolition material from landfills in order to meet the state-mandated 50 percent diversion target.

The CDDD is based on a system in which the city collects a recycling deposit for a construction, demolition or remodeling project when the project permit is issued. The intent of the deposit is to at least equalize any differential economic costs to contractors and developers between diverting and landfilling materials.

All residential and non-residential new construction, alteration and demolition projects require a CDDD clearance document and diversion deposit before a building permit is issued unless the project is specified as exempt. Exemptions include: new residential construction projects less than \$135,000 in value; residential alteration and non-residential alterations less than \$2,000 and \$5,000 in value respectively; and work for which only a plumbing, electrical or mechanical permit is required. Roofing projects with tear-offs are exempt until July 2002.

A clearance document is created prior to issuance of the permit. The deposit rate is based on the project square footage and the type and quantity of material generated by the project, in conjunction with the costs of recycling or processing the material. See Appendix M.

In order for a permit applicant to have their deposit returned, they must provide receipts or records demonstrating that the material from the project has been sufficiently diverted via a city-certified facility or other approved diversion methods such as on-site use. Non-diversion of the materials generated from the project or lack of records satisfactorily demonstrating diversion of the materials may result in no refund of the deposit amount.

Adoption Process: The city conducted a waste composition study and two landfill gate surveys in 1998 and 1999 that indicated the amount of construction and demolition debris landfilled from San Jose projects each year was more than an estimated 160,000 tons. Further analysis showed the majority of the material came from non-franchised self-haul activities. Self-haul construction and demolition debris escapes the general requirement that all non-residential solid waste generated in San Jose be hauled for disposal by a city franchised hauler, since most of it is hauled incidentally to the generator's primary activity of construction and demolition. Therefore, construction and demolition contractors and the self-haul community are not influenced to divert waste by the commercial solid waste fee system.

In November 1998, the IWM presented to City Council an updated diversion strategy with numerous program and activities to boost the city's diversion rate. One of the proposed programs included the use of an "advanced recycling fee." The concept, while relatively new, had been implemented elsewhere in the Bay Area and was being considered by other cities. Council accepted this strategy and directed staff to continue developing the new solid waste diversion strategy.

The program's development included the following components: an economic study, certification of facilities, deposit and transaction process, and infrastructure grants. The economic study was commissioned by ESD to develop a model to analyze the effects of the deposit program would have on the building and housing industry, other costs and impacts associated with the transportation of wastes to processing facilities, and analysis of diversion levels at various deposit rates. The primary objective of the model was to determine how much to charge for a deposit to provide sufficient incentive for generators to recycle. The study focused on determining what amount was needed to assess on a square foot basis for a particular type of job to provide an incentive to make the costs of recycling competitive with disposal. The study results and recommendations are described in detail in the CDDD Memorandum to the Transportation and Environment Committee (See Appendix M).

Since May 1999, extensive public outreach was conducted to gather input and support for the development of the CDDD program. From conducting formal focus groups, meetings with haulers, landfills, processors, contractors, and associations, to participation in the San Jose's Green Building program, ESD

attempted to reach the stakeholder groups of the CDDD program.

ESD considered several alternatives to implementing the CDDD program. The alternatives evaluated included additional fees at the landfill for construction and demolition materials, bans at the landfill on construction and demolition materials and mandates for construction and demolition recycling. Material bans and mandates on specific materials were presented to the City Council in November 1998. Neither was approved and ESD was directed to explore an incentive approach to achieve additional diversion, which led to the development of the CDDD program.

The implementation of the CDDD program required Council approval of an ordinance to establish a clearance document process for the program and adoption of a resolution setting the deposit rates. The rate resolution was adopted on October 24, 2000 and ordinance for the clearance document was adopted on November 7, 2000.

Implementation: Through the outreach and public involvement process industry representatives and other stakeholders were informed of the program's development. A test version of the program was initiated from March 1 to June 30, 2001. The test phase had a moneyless transaction that enabled staff to distribute information on reuse and recycling and on the transaction process. The test period allowed for staff to collect data, coordinate with the Building's Permit Center and get feedback from the facilities to better prepare for the actual start of the program. The full program was phased in with the first phase requiring the clearance document prior to issuance of a permit. Five months later the diversion deposit requirement was implemented. The full program became effective on July 1, 2001.

After six months of taking deposits the ESD found that a number of project types were missed in their initial research that generate very little excess materials, i.e., seismic tie-downs and pre-manufactured accessories such as signs and patio covers. Additional exemptions were added and the code was changed to reduce the administrative workload. ESD anticipates the program will be updated as it evolves.

Resources: Approximately \$144,000 was included in the FY 99-00 budget for the development of the CDDD program, which included the consultant contracts for the gate survey, facility certification, and economic study. The management of the CDDD program is included in the existing allocated staff time.

Evaluation: Success of the program is measured by how much money is returned to permit applicants. The city also tracks recovery through the state's reporting system from landfills and reports they receive from the processing facilities.

Results to date: San Jose's recovery goal for the program is 80,000 tons. San Jose has calculated the following data for the first six months:

- Total project value — \$432,454,000, with the average project value at \$247,000 (median at \$25,317);
- Total square feet – 5,126,000, with the average of 2,900 sq. ft. (median at 400 sq.ft.); and
- Total deposit value — \$1,430,000, with the average deposit of \$815 (median at \$350).

Though several very large projects have skewed the averages upward, the data so far indicates that the CDDD program has been effective at capturing the projects that generate the majority of the self-haul mixed construction and demolition loads.

To date, San Jose has certified 22 facilities that will recover at least 50 percent of the construction and demolition materials received. At least seven of the 22 accept mixed loads of construction and demolition.

Problems: Two main issues have developed as a result of the program regarding the refund process and administration. To date, ESD has not refused any refund requests but has had to make extra efforts with some customers to see that they get their refund, mainly because they initially neglected to provide receipts or adequate documentation that materials were recycled. Additionally, permit applicants often forget the requirements of the refund process. The refund process takes approximately 3 weeks, which is longer than ESD originally anticipated. Managing the financial aspects of the program has also proven to be more difficult and time consuming than ESD originally expected. There is a larger burden on the department to absorb the refund process and the depositing and distribution of funds.

Lessons learned:

- The main motivation for the construction and demolition processing facilities to get certified is competition.
- Based on discussions with other jurisdictions, bans and mandates appear to be more easily implemented in cities where there is local government management or ownership of the facility.

Next steps:

- Develop San Jose's construction and demolition web site.
- Develop construction and demolition case studies for outreach and education.
- Expand grant program and enhance processing infrastructure in the region especially for drywall and roofing materials.
- Better integrate deposit system with permit center.

Construction and Demolition Infrastructure Grant Program

Program Type: Incentive program

Start date: December 1, 1999

Target: Construction and demolition processors

Target Materials: Construction and demolition debris including rubble (concrete/asphalt), land-clearing debris, corrugated cardboard, metals, and wood.

General Description: San Jose created a Construction and Demolition Infrastructure Grant program to encourage processors to invest in construction and demolition sorting capabilities to maximize the quantities recovered. The grant program was developed and adopted as a component of the Construction and Demolition Diversion Deposit Program (CDDD) to infuse any unclaimed deposits into the development of additional construction and demolition processing infrastructure.

- Adoption Process: The grant program was adopted as a component of the CDDD program.
- Implementation: The grant program was initiated prior to the implementation of the CDDD transaction and diversion process. The grant program was allocated funds in the city's budget for FY 99-00 and FY 00-01. ESD solicited proposals from all interested businesses wishing to compete for funding to increase construction and demolition processing infrastructure in San Jose. Unclaimed deposits will provide subsequent year funding.
- Evaluation: Cost-benefit analysis based on funds dispersed and tons recovered are used to evaluate the effectiveness of the program.
- Results to date: Based on staff's analysis, the construction and demolition infrastructure grants have proven to be one of the most cost-effective methods to achieve higher diversion, primarily because of the high density of construction and demolition debris. In FY 99-00, the grant program distributed \$250,000 and in FY 00-01 the program was funded at \$500,000. Examples of grant recipients include, the Zanker Materials Processing Facility in San Jose received a total of \$193,000 in funding — \$64,000 for its "Rocket" water separation system, and \$129,000 to install an air knife. The Guadalupe Landfill, owned by Waste Management, received \$140,000 for the mixed debris sorting line. No funds were allocated for FY 01-02.
- Problems: ESD has no clear estimate how much money would be left in unclaimed deposits from year to year.
- Lessons learned: The grant program is one of the most cost-effective methods to achieve higher diversion.
- Next steps: ESD plans to continue the program contingent on funds provided by unclaimed deposits.

Santa Clara, CA

General Information

Location: Santa Clara, California
Program Type: Franchise fee incentives
Population: 102,361 (2000)
Number of businesses: 5,592 (1995)

Contact Information

Contact: Rick Mock, Director of Streets and Auto Services
Agency: City of Santa Clara
Address: 1500 Warburton Ave. Santa Clara, CA 95050
Phone: (408) 615-2051
Web site: www.ci.santa-clara.ca.us

Commercial Recycling Program

- Recycling Goal: 50 percent by 2000
- Current Recycling Rate: 40 percent, 1998
- Collection System: Private collectors, franchised with the city, collect a total of approximately 65 percent of the volume from commercially zoned areas (22 percent), industrially zoned areas (38 percent), and residentially zoned areas (5 percent). Self-hauling by private businesses, the public and institutionally zoned organizations account for the remaining 29 percent. Only 520 tons per day is deposited at the city's all purpose landfill; the remainder is either recycled or disposed of at other landfill sites outside the city limits.
- Program: City of Santa Clara Municipal Code Chapter 6.6.5 Solid Waste
- Start Date: 1980
- Target Group: Nonexclusive franchise haulers.
- Target Materials: All recyclable materials.
- General Description: The City of Santa Clara charges a differential franchise fee to haulers based on whether or not they have a city-approved recycling program. All nonexclusive franchised haulers collecting waste from the industrial area (heavy industry, office buildings and high tech) of Santa Clara must pay the city a franchise fee of 25 percent of their total gross billings (including bin and rental charges). To obtain a reduction of the franchise fee to 10 percent, haulers must meet at least two of the following conditions:
1. Provide a waste audit and containers, and collect 50 percent by weight of customer's recyclable materials for industrial customers who regularly set out more than nine cubic yards of refuse per week for collection.
 2. Provide a recycling service program and a designated recycling representative to perform specified tasks including:
 - Contact each of the industrial customers at least once every year to discuss the various types of recycling possibilities available to the customers.

- Work with each new customer concerning new recycling options.
 - Keep written documentation of customer contact and any recycling option implemented.
 - Submit quarterly report to the city documenting the amount of recycled materials collected by weight and type, and the number of recycling customers in the city.
 - Maintain a list of customers serviced by name and service address for the city's review.
3. Provide another certified and documentable recycling or resource recovery program that reduces the amount of waste collected by at least 50 percent. Hauler needs to document waste flow for processing and disposal to all facilities and landfills. Certified quarterly reports must be submitted to the city with specific waste flow detail and documentation.

Haulers must pay the 25 percent franchise fee each quarter for all generators with greater than a 50 percent recoverable waste in their refuse set out for collection and disposal until less than 50 percent is achieved. The hauler may submit a new waste audit to the city at any time, to reduce the franchise fees paid for those customers that achieve less than 50 percent recoverable wastes.

The waste audit must be performed and certified by a qualified individual. The city reviews and determines the adequacy and completeness of the waste audit reports. Comments are submitted to the contractor for response, revision, update, and re-submittal of the report until it is approved by the city.

- Adoption: Prior to presenting the incentive rate structure to city council, staff had a roundtable discussion with haulers to discuss ideas, provide notice and develop the incentive system.
- Implementation: Notice to haulers was provided at the stakeholder meeting. The rate structure is reviewed and updated every three years.
- Enforcement: Voluntary participation.
- Evaluation: The program is evaluated based on the participation of haulers and businesses that report to the city. Haulers also conduct individual waste audit at businesses and report results to the city.
- Results to date: Santa Clara has authorized fifteen haulers under its nonexclusive franchise system to collect waste from the industrial areas of Santa Clara. All of the haulers have been certified to obtain the reduced franchise fee. The city has noted an increase in recovery from the businesses served by these haulers.
- Problems: The main problem with the incentive program is getting the haulers to report properly.
- Lessons learned:
 - With good market conditions, reduced franchise fees can be successful in increasing diversion.
 - Some haulers will choose to pay the franchise fee if it requires too many resources to implement recycling programs.
- Next steps: Evaluate and update the program every three years.

Santa Monica, CA

General Information

Location: Santa Monica, California
Program Type: Construction and demolition requirements
Population: 84,084 (U.S. Census, 2000)
Number of businesses: 9,771 (1995)

Contact Information

Contact: Gus Guzzetti, Superintendent
Agency: City of Santa Monica
Address: 2500 Michigan Ave Santa Monica, CA 90404
Phone: (310) 458-2223
E-mail: gus-guzzetti@santa-monica.org
Web site: <http://www.ci.santa-monica.ca.us/environment/policy/solid/>

Commercial Recycling Program

- Recycling Goal: 50 percent by 2000
Current Recycling Rate: 55 percent, 2000
- Collection System: Santa Monica's Environmental and Public Works Management Department Solid Waste Management Division collects approximately 50 percent of the waste generated by commercial and industrial operations within Santa Monica. The remainder of the commercial and industrial waste is collected by private waste haulers under contract with the city. Waste collected by the city is taken to a city-owned transfer station. Private haulers dispose of waste they collect in Santa Monica at several landfills located throughout the Los Angeles area. The city collects approximately 14 percent of the recyclable material generated by the commercial sector. The remaining 86 percent of commercial recyclables are collected by private recyclers.
- Program: Construction and Material Waste Recycling Ordinance (895 CCS).
- Start Date:
 - December 2000, adopted
 - May 2001, implemented
- Target Generators: Private projects including all construction and demolition projects with total costs that are \$50,000 or greater, or are 1,000 square feet and all city-sponsored construction, demolition and renovation projects.
- Target Materials: Construction and demolition debris including rubble (concrete/asphalt), land-clearing debris, corrugated cardboard, metals, and wood.
- Program Description: Applicants for construction or demolition permits involving a private or city project must complete and submit a Waste Management Plan (WMP), as part of the application packet for the construction or demolition permit. The WMP includes the following:
- The estimated volume or weight of the project construction and demolition material, by material type, to be generated;
 - The maximum volume or weight of such materials that can feasibly be diverted via reuse or recycling. No more than 20 percent of the 60 percent

diversion rate can be achieved through the recycling or reuse of inert materials unless applicant can demonstrate to the satisfaction of the WMP Compliance Official that sufficient structural materials do not exist for recycling or that 40 percent diversion of total waste through non-inert materials is not feasible.

- The vendor or facility where the applicant proposes to use to collect or receive that material; and
- The estimated volume or weight of construction and demolition materials that will be landfilled in Class III landfills and inert disposal facilities.

Project applicants are required to submit a performance security deposit with the WMP. The amount of the performance security is calculated 3 percent of the total project's cost. The WMP Compliance Official may waive deposit if the total deposit required is \$50 or less. Within 30 days after the completion of the project, the applicant must submit documentation that it has met the diversion requirement for the project. Documentation includes:

- Receipts from the vendor or facility that collected or received each material showing the actual weight or volume of that material.
- Weight slips/count of material salvaged or reused in current project.
- A copy of the previously approved WMP for the project adding the actual volume or weight of each material diverted and landfilled.

If the applicant has fully complied with diversion requirement, the performance security deposit is returned. Non-diversion of the materials generated from the project or lack of records satisfactorily demonstrating diversion of the materials may result in no refund or partial refund of the deposit amount

Adoption Process: The ordinance was modeled after the City of San Mateo's ordinance and other cities in California.

Implementation: The diversion requirements of the ordinance were phased-in over a 6-month period. Over-the-counter projects required a deposit starting May 2001 and more extensive projects required the deposit in October 2001.

Enforcement: Failure to comply with the program results in forfeiture of the security deposit.

Evaluation: Success of the program is measured by how much money is returned to applicants and tonnage diverted to the landfills.

Results to date: Santa Monica has noted an increase in diversion. To date, the city estimates approximately 10 percent to 15 percent increase in diversion as a result of the program.

Problems:

- Some projects do not fall under the project thresholds, but still generate a large amount of tonnage.
- Applicant's dissatisfaction of turn-around time of deposit refund.
- Hired additional 1.0 FTE to handle additional administration of program.

Next steps:

- Explore potential of expanding program to include all construction and demolition projects.
- Explore option of paying interest on deposits.
- Hire an inspector to inspect projects and ensure compliance as well as audit facilities.

Seattle, WA

General Information

Location: Seattle, WA
ProgramType: Reduced fees and tax incentives
Population: 563,374 (U.S. Census, 2000)

Contact Information

Contact: Chris Luboff, Supervisor of Waste Planning
Agency: Seattle Public Utilities Resource Planning Division
Address: 710 Second Avenue, 11th floor Seattle, WA 98104
Phone: (206) 684-7644
E-mail: chris.luboff@ci.seattle.wa.us
Web site: www.ci.seattle.wa.us

Commercial Recycling Program

Recycling Goal: City-wide goal of 60 percent by 2008
Commercial recycling goal of 63 percent by 2008

Current Recycling Rate: City-wide rate of 44 percent, 1998
Commercial rate of 48 percent, 1998

Collection System: The city contracts commercial garbage collection with two private haulers. The city defines collection routes and set rates, and owns and operates two of the four transfer stations in Seattle. Commercial recyclables are collected by private companies in a free-market environment and set their own rates. Five firms predominately provide recycling service.

Commercial garbage collection is not mandatory. Commercial and institutional waste generators can self-haul their trash and recyclables to a transfer station or contract privately. Businesses that generate 96 gallons or less of garbage per week may be able to receive free recycling collection with the Small Business Curbside Recycling Program.

Program: Seattle Municipal Code 5.48.055

Start Date: 1994

Target: Haulers.

Target Materials: Recyclable materials including newspaper, plastic, bottles, aluminum, tin, corrugated cardboard and office paper.

General Description: Reduced tipping fees and tax incentives are used to encourage businesses to recycle. At city transfer stations, the per ton tip fee for solid waste is \$96.25 per ton. Businesses that self-haul recyclables to city transfer stations can tip them for free and tip fee for yard debris is 25 percent lower than solid waste.

Seattle excludes revenues from collection of commercial recyclables from the city's Business and Occupation Tax (SMC 5.48.055) of \$12.05 that haulers must pay on trash collection revenues. See Appendix P.

Private solid waste haulers offer their customers separate recycling service for source-separated materials. A number of private recycling companies provide collection service. These companies range from local paper companies collecting only high-grade paper to companies collection a broad range of materials. The rate schedule for recycling is generally lower than for solid waste service. In addition, solid waste haulers and recycling companies sometimes pay businesses for high-value recovered materials.

Adoption Process: Cost was identified as a barrier to recycling by businesses. The city removed the Business and Occupation Tax on recyclables to create an incentive to recycling in the private sector. Haulers pass the savings on to the customer.

Implementation: The tax removal coincided with the development of their commercial technical assistance program, the Business and Industry Recycling Venture (BIRV), with the major message being recycling saves money. The program encourages waste prevention, recycling and purchasing of recycled-content products within Seattle's business community. BIRV offers businesses a hotline, informational materials, technical assistance and conducts presentations and seminars.

Evaluation: The city conducts waste composition studies and participation surveys to measure their progress.

Results to date: In 1996, Seattle diverted 48 percent of its commercial and institutional waste through private recyclers, up from 44 percent in 1989 and 1993. In Seattle, it costs less to recycle than to landfill waste. Between 1988 and 1995 Seattle residents saved over \$12 million by recycling and composting rather than sending waste to the landfill.

Problems: There were no problems associated with the incentive program. The tax incentives were received with a positive response by both haulers and businesses.

Lessons learned:

- Major barrier for business recycling is cost.
- Commodity markets can impact the recycling and participation rate.

Next steps:

- Develop options to ensure on-site space for recycling containers in new and remodeled multi-family dwellings.
- Provide a voluntary food waste collection program for residents if it can be done safely and economically.
- Provide collection for small businesses through the residential curbside program.
- Promote more recycling of mixed paper, plastic film and clean wood waste.
- Build a recycling center at the South Recycling and Disposal Station, and provide for increased recycling of construction materials.
- Create incentives for contractors and residents to use the recycling center.
- Expand the City's own "Green Procurement" program and promoting buy-recycled by residents and businesses.

Metro Region Solid Waste and Recycling Collection

Overview of the Regional Solid Waste System

Metro is responsible for planning and managing the recycling and disposal of solid waste generated in the region. Metro is the watershed representative to the state and is responsible for ensuring that the region meets its designated recovery goals of 62 percent by the end of 2005 and 64 percent by the end 2009. The Regional Solid Waste Management Plan (RSWMP) guides Metro's solid waste planning and recycling efforts. Local governments work cooperatively with Metro to implement the RSWMP and to plan the region's waste reduction and recycling programs with the goal of maximizing recovery and regional program continuity.

Metro is also responsible for ensuring proper disposal of solid waste collected and delivered to the region's solid waste facilities and provides hazardous wastes facilities and services for Metro area households. Part of the tipping fee paid to dispose of garbage is used to fund recycling programs, recycling education and provide household hazardous waste services.

Local governments are responsible for regulating and managing solid waste and recycling collection within their jurisdictional boundaries- including setting franchise boundaries, reviewing and collection rates and service standards. Local governments are also responsible for implementing waste reduction and recycling programs for residents and businesses in compliance with the state "Opportunity to Recycle" law as set forth in OAR Chapter 340, Division 90. With the exception of Portland, which requires businesses to recycle, local governments follow the "opportunity" model for business recycling collection service. Under the opportunity model local jurisdictions require haulers to offer recycling services to businesses for the collection of principal recyclable materials; it is up to the generators to participate. All jurisdictions require haulers to provide appropriate outdoor containers to all businesses that want to recycle.

Metro Region Collection Services

Solid Waste

Solid waste collection in the Metro region is provided solely by private haulers; however, jurisdictions handle collection differently. With the exception of the City of Portland's commercial sector, all of the Metro region jurisdictions have a franchised collection system, which means that the jurisdiction is divided into zones, with one hauler serving all residences, multi-family properties and businesses in each zone. The jurisdiction is responsible for setting rates, franchise boundaries, service levels and implementing waste reduction and recycling programs.

Recycling

All jurisdictions have weekly curbside collection of recyclables on the same day as garbage service. Haulers are required to offer recycling services to households and businesses and provide appropriate outdoor containers to all generators that want to recycle. With the exception of Portland, which requires businesses to recycle 50 percent of their waste, it is up to the generator to participate. In almost all the jurisdictions rates include the collection of recyclables. The solid waste and recycling collection services for residential and commercial sectors are detailed on the following page.

Residential

Residential garbage and recycling service is franchised in all jurisdictions in the Metro region. Each city is responsible for their own hauler franchising, while the counties administer franchises in the unincorporated areas.

Commercial

Except for the City of Portland, commercial garbage and recycling service is franchised in all jurisdictions in the Metro region.

Portland's commercial recycling collection system is not franchised. The commercial sector has an open and competitive garbage and recycling collection system that allows commercial customers to choose among 64 permitted haulers in the city and negotiate rates for service. Portland garbage haulers are required to offer recycling collection for the most common recyclables. There are also independent recyclers that specialize in various recyclables. The City of Portland is the only city in the Metro region that has mandatory recycling requirements for the commercial and construction and demolition waste streams.

Rates

Rates include collection of recyclables in all of the jurisdictions with the exception of Washington County. According to 1995 program rules, haulers in unincorporated Washington County will collect up to four recyclable materials from commercial businesses. If generators want to recycle additional materials, rates are negotiated with the hauler and additional fees may be imposed.

A selection of Metro region jurisdictions rates and collection services are highlighted in Table 5 and 6.

Table 5.

Metro Region Summary of Comparative Rates 2001 for Selected Jurisdictions

Service	Portland	Gresham	Clackamas County	Beaverton	Washington County
COMMERCIAL WEEKLY					
1 can 32 Gal.	NOT	14.3	16.2		17.3
2 Cans 32 Gal.	REGULATED	25.9	30.2		34.6
35 Gal. Cart		15.4		16.5	
60 Gal. Cart		21.85	25.1		26.01
90 Gal. Cart		25.1	27.3		31.12
1-1/2 Yd. Container		95.38	103.13	110.21	
2 Yd. Container		121.3	128.87	145.88	98.27
3 Yd. Container		160	170.29	203.1	118.08
					157.48
Drop Box + Disposal					
20 Yard		110	80.55	93.94	95.76
30 Yard		126.5	98.1	130.12	132.06
40 Yard		126.5	113.35	159.41	158.27
Franchise Fee		5% +2%	5%	4%	3%
Free Service/Clean-up		CU			
Full Recycling		Yes	Yes	Yes	Yes
Principal Recyclables					
Milk Jugs + Plastic Bottles (neck)+Magazines + Scrap Paer +Aerosol Cans					

Transfer, Processing and Recovery

A number of facilities make up the region's solid waste and recycling system. Some handle mixed waste, while others act as processors for specific kinds of materials that can be recycled.

Most solid waste and recycling facilities are privately owned. Only Metro South and Metro Central transfer stations are publicly owned. The facilities that transfer and process solid waste and recycling are detailed below.

Transfer Station Services

Transfer stations accept the waste from haulers and transfer the waste to tractor trailers for delivery to landfills. Waste that is delivered to the transfer stations is sorted by employees to remove recyclable material. Materials are sorted by type and marketed as individual commodities locally, nationally and internationally. Waste is transferred from the Metro transfer stations to the Columbia Ridge Landfill, which is a general-purpose landfill located in Arlington, Oregon, owned and operated by Waste Management.

Material Recovery Facilities

Material Recovery Facilities (or MRFs) are sorting facilities that receive household and business source-separated recyclables. Materials are sorted by type and marketed as individual commodities locally, nationally and internationally. Approximately 95 percent of a load taken to a MRF is recovered for recycling.

Mixed Dry-Waste Processing Facilities

Mixed dry-waste facilities accept loads of mixed dry waste (paper, wood, metal, glass) for processing. Dry waste does not include food or other putrescible waste. Mixed construction and demolition debris is accepted at mixed dry-waste processing facilities that sort materials for recycling. On average, 25 to 30 percent of mixed dry waste loads are recovered for recycling. There are four facilities in the region that accept mixed dry waste. Some facilities accept both source-separated recyclables and dry waste.

Household Hazardous Waste Facilities

There are currently two permanent household hazardous waste facilities in the Metro region, located at the Metro South and Metro Central transfer stations. Residents can bring unwanted hazardous household products such as pesticides, leftover paint, solvents and automotive fluids to one of Metro's hazardous waste facilities. Call Metro at (503) 234-3000 for information on the disposal of business-generated hazardous waste.

Conclusion

The survey of required recycling and incentive programs indicates that implementing these types of strategies may serve as an effective means to achieve the region's recovery goals. Economic incentives continue to be one of the most effective incentives for businesses to voluntarily recycle. Local governments in the Metro region currently offer education materials and technical assistance to businesses. To complement these programs, economic incentives may encourage businesses to reduce waste and recycle. Local governments can influence the marketplace by the way it structures its garbage collection rates, franchise fees and permit fees.

Seattle's reduced fees and taxes to reward recovery over disposal has been successful in encouraging business participation. Santa Clara uses reduced franchise fees to encourage haulers and businesses to recycle. Other incentives the surveyed programs use to encourage businesses to recycle include grant assistance, recognition and recycling deposit programs. Program managers indicated that infrastructure development grant programs are one of the most effective methods to increasing processing capacity and waste reduction efforts. Iowa's and San Jose's grant programs have been successful in expanding processing capacity and recovery. King County's recognition program is an alternative incentive program that publicly acknowledges construction companies that recycle and helps develop community norms. The diversion or recycling deposit system is a relatively new incentive strategy being used by a number of communities in California. Data on the success of these programs is still being collected and evaluated. The largest barrier is the administration of the transaction and refund process that requires additional resources and time.

If providing information, technical assistance and incentives do not produce adequate waste diversion, required recycling programs are additional measures that may help the region meet its recovery goals. Required recycling and incentive programs enacted by the surveyed communities are diverse. Each profiled program is unique to their community and reflects the economics and infrastructure of their region. Targeted materials vary by community and are directly tied to commodity markets. However, the programs share some common elements.

All of the surveyed programs provide the commercial and institutional sector with some level of technical assistance and education. A number of the programs provide on-site assistance including waste audits to determine where waste reduction efforts are most needed. Education is a key factor in all of the programs. Nearly all the program managers stressed the importance of constant education throughout a program's development and implementation.

In addition, all the communities with required recycling have some level of enforcement. The most common enforcement measures being used in the profiled programs include random business inspections and landfill load inspections. Penalties for noncompliance include warnings and fines that range from \$25 to \$10,000. The majority of the programs offer an assistance period to help businesses meet the requirements. Five of the nine programs noted lack of resources for enforcement measures as an obstacle to a program's success.

High diversion and participation rates in communities with strong education and technical assistance for required recycling programs indicates people are willing to separate recyclables and programs can be designed to efficiently collect these materials. The major elements to developing and implementing a successful required recycling program include:

- An evaluation of the waste stream to determine the recyclables that economically justifies a separate collection.
- A cooperative approach to the program design to help build program support and create the most incentives for participation.
- Extensive public outreach and education that is ongoing throughout the design and implementation of the program.
- Technical assistance that is available to help businesses comply with requirements.
- Enforcement measures supported by adequate resources to ensure business participation.

The development of required recycling and incentive programs for commercial and construction and demolition materials has the potential to divert a significant portion of the waste stream. An evaluation of the commercial and construction and demolition waste streams coupled with an

examination of commodity markets will help determine priorities for collection and the design of programs using required recycling and incentive strategies. Metro's role in the solid waste system provides the opportunity to implement disposal bans and/or processing requirements at Metro transfer stations or designated facilities. Based on the information provided in this report, Metro, in cooperation with local governments, may continue to explore the potential for developing required recycling and incentive strategies in the region.

Appendix A: Program Profile Contact Listing

Jurisdiction	Contact	Agency	Address	Phone	E-mail	Website	Publications
Cambridge, Massachusetts	Rick Leandro, Recycling Manager	Department of Public Works	147 Hampshire Street, Cambridge, MA 02139	(617) 349-4879	Rleandro@ci.cambridge.ma.us	www.ci.cambridge.ma.us	
Chicago, Illinois	Erin Keane, Waste Reduction Specialist	City of Chicago Department of Environment	30 N. LaSalle Street Chicago, IL 60602	(312) 774-1614 (312) 744-7606	ekeane@cityofchicago.org	www.ci.chi.il.us	
Dane County, Wisconsin	John Reindl, Recycling Manager	Dane County Department of Public Works	1919 Alliant Energy Center Way Madison, WI 53713	(608) 267-8815	Reindl@co.dane.wi.us	www.co.dane.wi.us	http://www.co.dane.wi.us/ord/ord041.pdf
Durham, North Carolina	Alison Fiori, Waste Reduction Specialist	Environmental Resource Department	1833 Camden Avenue, Durham, NC 27704	(919) 560-4185	afiori@ci.durham.nc.us	www.ci.durham.nc.us	www.ci.durham.nc.us/departments/solid/ordinance.pdf
Halifax Regional Municipality, Nova Scotia	Jim Bauld, Diversion Planning Coordinator	Halifax Regional Municipality	P.O. Box 1749 Halifax, N.S. Canada B3J 3A5	(902) 490-7176	bauldj@region.halifax.ns.ca	www.region.halifax.ns.ca/wms	www.on.ec.gc.ca/epb/fpd/en/epb/compro09.html
Iowa	Valerie Drew, Environmental Specialist	Iowa Department of Natural Resources	502 E. 9th Street Wallace Stae Offices Des Moines, IA 50319	(515) 281-8672	valerie.drew@dnr.state.ia.us	www.iowadnr.wmad.org	www.iowadnr.org/wmabureau/solidwaste/swap/index.htm
King County, Washington	Theresa Koppang	King County Solid Waste Division	201 S. Jackson Street, Suite 701 Seattle, WA 98104	(206) 296-8480	Theresa.Koppang@metrokc.gov	www.co.king.wa.us	
Monmouth County, New Jersey	Fran Metzger, District Recycling Coordinator	Monmouth County Health Department	3435 Hwy. 9 Freehold, NJ 07728	(732) 431-7460	fmetzger@shore.co.monmouth.nj.us	www.monmouthplanning.com	www.visitmonmouth.com/03230planboard/solid.htm
Onondaga County, New York	Andy Brigham	Onondaga County Resource Recovery Agency	100 Elwood Davis Road R.d North Syracuse, NY 13412	(315) 453-2866	ocra@ocra.org	www.ocra.org	www.ocra.org/Annual%20Recycling%20Report%202001.PDF
Portland, Oregon	Bruce Walker, Recycling Program Manager	City of Portland Office of Sustainability	721 NW 9th Ave., Ste. 350 Portland, OR 97209	(503) 823-7772	bwalker@ci.portland.or.us	www.sustainableportland.org	www.sustainableportland.org/recycle_com_breq.html
San Diego County, California	J Taylor, Recycling Specialist	San Diego County	5469 Kearny Villa Rd. Suite 305 San Diego, CA 92123	(658) 694-2794	J.Taylor@sdcounty.ca.gov	www.co.san-diego.ca.us	www.ciwmb.ca.gov/LGLibrary/Innovations/BizRecycle/
San Jose, California	Stephen Bantillo, Recycling Coordinator	City of San Jose	777 N. 1st St. Suite 450 San Jose, CA 95112	(408) 277-5533	Stephen.Bantillo@ci.sj.ca.us	www.sjrecycles.org/business/cddd.htm	
Santa Clara, California	Rick Mauck, Director of Streets and Auto Services	City of Santa Clara	1500 Warburton Ave Santa Clara, CA 95050	(408) 615-2051		www.ci.santa-clara.ca.us	www.ci.wmb.ca.gov/LGLibrary/Innovations/Incentive/SantaClara.htm
Santa Monica, California	Gus Guzzetti, Superintendent	City of Santa Monica	2500 Michigan Ave Santa Monica, CA 90404	(310) 458-8511 (310) 458-2223	gus-guzzetti@santamonica.org	www.greenbuildings-santamonica.org	greenbuildings.santamonica.org/whatsnew/waste.ordinance.html
Seattle, Washington	Chris Luboff, Supervisor of Waste Planning	Resource Planning Division Seattle Public Utilities	710 Second Avenue 11th floor Seattle, WA 98104	(206) 684-7644	chris.luboff@ci.seattle.wa.us	www.ci.seattle.wa.us	www.cityofseattle.net/util/solidwaste/SWPlan/documents.htm

Appendix Q: Survey Instrument

Required Recycling and Incentive Program Survey

Jurisdiction:

Program Type:

Population:

Number of Businesses (if available):

Contact Name:

Address:

Phone:

E-mail:

Web site:

Recycling Goal

What is the current recycling goal? List rate and year.

Current Recycling Rate

What is the current recycling rate? List rate and year.

Collection System

Describe current collection system including customer allocation (franchised, free market), who collects, who processes, who sets rates, who sets service requirements.

Program Start Date

List implementation date of program.

Target Generators

Who is the program targeted towards (i.e. all businesses, businesses above a certain size, etc.)?

Target Materials

List materials that are targeted.

General Description

Provide short description of program and roles and responsibilities.

Adoption Process

What was the adoption process including the stakeholder groups involved, time period, key research, alternatives considered?

Implementation

How was the program implemented (i.e. notification/outreach, grace period, phase-in by type or size or all at once)?

Enforcement

How is the program enforced (staff, budget, point of enforcement, process (warnings, fines))?

Evaluation

Has the program been successful (recovery, participation)? If so, how measured (annual recovery reports, waste composition studies, participation surveys)?

Results to Date

Did you reach your goal, change in recovery, change in cost of service?

Problems

What problems/barriers were encountered (effect on rates, political, legal challenges, loss of waste)?

Lessons Learned

What were the major lessons learned?

Next Steps

What are the next steps?