



Compendium of Model Sustainability Practices

solid waste

ECO-CITY ALEXANDRIA
environment | economy | community



SOLID WASTE

INTRODUCTION

“The goal of urban solid waste management is to collect, treat and dispose of solid wastes generated by all urban population groups in an environmentally and socially satisfactory manner using the most economical means available.”⁵⁴ While local governments usually have the responsibility of providing solid waste management services, many community groups, businesses, and individuals across the country have also found creative ways to reduce and better manage Municipal Solid Waste (MSW) through a coordinated mix of practices that includes source reduction, recycling (including composting), and disposal. The U.S. Environmental Protection Agency promotes environmentally sound management of MSW in the following order: source reduction first; recycling, reuse, and composting second; and disposal at waste combustors or in landfills last.⁵⁵

- **Reduction:** Source reduction includes grasscycling, backyard composting, two-sided copying of paper, transport packaging reduction by industry, and other means that minimize waste disposal and thus the amount of energy needed to treat waste.
- **Recycling, Reuse and Compositing:** If sources of waste cannot be reduced, recycling and composting can also help to minimize the amount of waste entering landfills. Recycling diverted 79 million tons of material away from disposal in 2005, up from 15 million tons in 1980.⁵⁶ In many localities, including Alexandria, materials are recycled through curbside programs, drop-off centers, buy-back programs, and/or deposit systems.
- **Incineration:** If waste cannot be reduced or recycled, the EPA recommends that it be incinerated at a Waste-to-Energy (WTE) facility, which not only help to limit the amount of methane-producing waste entering landfills, but also supply localities with a virtually renewable source of energy. The Covanta WTE facility, which is shared by Alexandria and Arlington, processes 975 tons of solid waste per day, producing enough electrical energy to power 20,000 households.
- **Landfills:** Finally, the EPA recommends that waste that cannot be treated in any of the above manners be sent to landfills. While the number of landfills in the U.S. is steadily declining, the volume of waste entering them is remaining nearly constant, as landfills today are much larger than they have been in the past.⁵⁷

As the amount of land for landfills becomes scarce, it will become more important for municipalities to focus on waste reduction and recycling. Furthermore, in minimizing the volume of waste, use of fossil fuels for transport of waste is also minimized. As communities

⁵⁴ The World Bank

⁵⁵ Ibid.

⁵⁶ U.S. EPA

⁵⁷ Ibid.

move towards sustainability, close-looped systems that promote waste reduction and reuse will be crucial.

Alexandria is heading in the direction of sustainable waste management by sharing the Covanta Waste to Energy Plant. The City also has a household and business recycling program, collects household hazardous wastes, and has various outreach and educational programs related to waste management. This section of the compendium of model practices includes programs and policies which could serve to enhance Alexandria's current solid waste management program. Many of the practices in this section focus on the EPA's two preferred methods of waste management – source reduction and recycling/composting. Following this section is a list of useful links related to waste management to assist in further research.

COMPOSTING

1. Green Bin Composting

Location: City of Toronto

Department: The City Division of Solid Waste Management, including a Waste Diversion Task Force, which is part of the City's overall Community Environmental Assessment Team.

Start Date: The Green Bin Program was phased in to the metropolitan area of Toronto. It began with a four-year implementation of the new program in 2002, starting with 170,000 single residences, equal to the number of households that are participating in a similar program in the entire City of Halifax.

Budget and Staffing: Twenty two members sit on the Community Environmental Assessment team, and the Waste Diversion Task Force is chaired by two people.

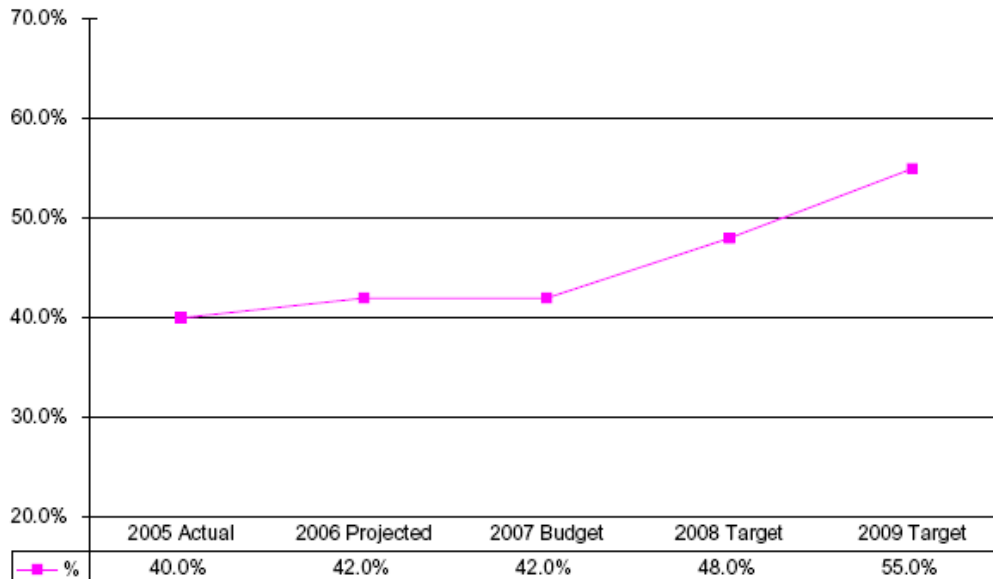
City residents purchase official recycling containers at local home hardware stores, 11 City of Toronto Recycling Container pick-up locations or at the City sponsored Community Environment Days. The total recommended operating budget for all solid waste management programs 2007 is CD\$237.9 million (gross), which would equate to \$214.9 million U.S. dollars. Toronto's population, however, as per the 2001 Census, is 2,481,494, and the greater Toronto population is 4,682,897. Therefore, this figure would be scaled down greatly to support the population in Alexandria, VA.

The actual budget for the Green Bin pick up program is captured in the portion for transfer stations for recycling (10% of the budget) and for processing of solid waste (16% of the budget). The Transfer Service operates 7 transfer stations effectively and efficiently to maintain a clean and healthy City and to transfer waste, recyclables, source separated

organics and leaf and yard waste safely to appropriate processing or disposal facilities. Processing includes that pertaining to recyclables, source separated organic and leaf and yard waste materials to protect and to minimize the impact of waste on the environment in order to maintain a clean and healthy City. The Task Force states in their report, that the net operating costs of the new system are about \$157 million per year (2006) or \$160 per household per year.⁵⁸ The Task Force compared this with other approaches to resource diversion, and reported that it compares almost equally. The costs per household are the base costs and do not include debt service and indirect corporate charges.

The chart below, as depicted in the City’s solid waste operating budget, shows that the residential waste diversion rate from the actual in 2005 to a projection in 2009.⁵⁸ The City’s budget states that the residential diversion rate is expected to continue to trend upward as the Green Bin and other waste programs are completely implemented in single residences across the City and other diversion initiatives are implemented.

**Chart 3
Residential Waste Diversion Rate**



Description: Since the City-owned Keele Valley landfill site closed on December 31, 2002, all the City's garbage is trucked to a private landfill in Michigan. Closing Toronto's landfill site increased disposal costs by more than 300 per cent. About one-third of their garbage is organic material, i.e. material that can be processed into compost for use on farms and parklands instead

⁵⁸ See the Waste Diversion Task Force for 2010 Report (2006) <http://www.toronto.ca/taskforce2010/report.pdf>

of being sent to landfill. The purpose of the Green Bin Program is to divert these organic materials from Michigan landfill and turn them into compost.

In January 2001, the Waste Diversion Task Force began work on a 'made in Toronto' solution for waste diversion. The Task Force targeted a goal of 30% diversion by 2003, 60% by 2006, and 100% by 2010.

The Green Bin Program changes the way single-family households participate in the City's garbage and recycling programs: The City delivered two new containers to residents' doors (a smaller one for the kitchen and a larger green bin for the curb). Instructions were delivered to houses explaining in detail about how the Green Bin Program works. One collection truck collects material from the resident's street on the same day each week. The truck contains two compartments. On one week the truck collects organics from a hard, animal-proof container placed at the curb, and also picks up recyclables which are put out on the curbside in one or more containers or bags. All dry recyclables can be mixed, and no separation is needed. On the second week the organics are picked up again, this time along with the residuals (anything that cannot be recycled or composted).

The green bin is lined with a plastic bag, such as a reused plastic grocery bag. If overflow of green bin material occurs, it can be put in a see-through plastic bag beside the bin, or a person can buy a second bin. Examples of what goes in the green bin include fruits, vegetable scraps, egg shells, coffee grounds, filters, tea bags, soiled paper towels, tissues, diapers, sanitary products, animal waste, bedding from pet cages, and even kitty litter. A full listing of what can be placed into the bin and what should not be placed into the bin, as well as an informative video, can be found on the web site in several places, making it easier for the public to find. View the video at: <http://www.toronto.ca/greenbin/video/index.htm>

Organic materials collected are taken to the Dufferin Organics Processing Facility⁵⁹ in Toronto, which was built specifically for the Green Bin Organics Program. From there, it is used as a soil amendment for farmland and parkland.

Provincial legislation does not give the City the collection power to issue a separate resource bill. The City could bill separately, but could not guarantee collection, as they can with water. The City is also struggling with the implementation of the program in apartments and condominiums.

Strong participation in the Green Bin Program has led to growing support and goals for expansion. The City is considering building new facilities to

⁵⁹ See <http://www.toronto.ca/greenbin/opf.htm>

process Green Bin organic material, and has short-listed five potential City-owned properties within Toronto to potentially locate these facilities. The City has made huge efforts to consult with the public and has provided a great deal of educational materials for this program. They continue to revisit their goals, budget, and methods of implementation so that City residents continue to utilize these services. The City also creates benchmarks for achieving success, and aims to reduce the City's waste and consumption by instilling a 'mode' of thought and awareness for how much waste they create on a daily basis. By seeing the reduced amount of landfill waste, City residents can feel as though they are contributing to the management of the City's environment. This has created a methodology that is both adaptive and sustainable.

Alexandria

Match:

The program could be transferable if the City of Alexandria is able to produce, either by contract or other means, green bins for its residents. The City would also have to determine where to take organic material for composting. Staff may want to evaluate its current locations for their existing mulching program, the feasibility of using the waste-to-energy facility, or the possibility of using an off-site location. Furthermore, a cost/benefit analysis would have to be done. Alexandria could partner with other localities, like they have for the waste-to-energy facility, to take advantages of economies of scale.

References:

Toronto posts extensive information about this program on its web site, including a video (see in Description below). The web site can be found at: <http://www.toronto.ca/greenbin/index.htm>.

2. Biosolids Composting

Location:

Abingdon, Charlottesville and Hampton Roads, Virginia

Department:

Municipal waste water treatment facility

Start Date:

mid-1990s

Budget and

Staffing:

0-2 additional staff; \$300,000 - \$1 million capital cost, \$35-55,000 net annual O&M.

Description:

Municipal Solid Waste facilities produce essentially two outputs: treated water and stabilized organic solid waste ("biosolids"). These biosolids are typically disposed of in landfills, and are occasionally a controversial local issue. Beginning in the mid 1990s, several Virginia localities experimented with composting their biosolids instead. In simplified form, the compost process involves adding a "bulking agent" (wood chip or leaf mulch, recycled paper or other fibrous materials) after which the mixture is placed onto an impermeable concrete or asphalt pad and allowed to

compost naturally. Because of its large size, the compost pile may also be aerated using a system of pipes and blowers.

The facilities in Virginia produce approximately 300 – 1,500 tons of compost annually which is sold commercially for about \$15/cubic yard. Abingdon and Hampton Roads have created the brand names Wolf Creek and Nutri-Green for their biosolid compost products. In all cases VDOT is a large purchaser of biosolid compost, which is used in roadway landscaping projects.

Alexandria

Match:

Alexandria convince the ASA treatment plant to undertake a similar program—it could even be a condition of contract renewal—provided that physical space is available for a composting pad. Because the City also collects leaves and yard debris as well as paper for recycling, all the raw materials are already available. The City’s treatment plant currently produces about 22,000 wet tons of EPA-rated “Excellent Quality” biosolids. These are sent to a contractor for direct land application at a cost to the city of \$40 per ton. Disposing of biosolids via composting would reduce or eliminate disposal fees, and should result in overall lower net disposal costs since sales of compost will bring in revenue.

References:

Case studies by E&A Environmental Consultants of Canton, MA, presented at 2000 Y2Kompost conference, Charlottesville VA. Found on: <http://www.p2pays.org/ref/11/10297.pdf>

3. Central Composting Facility (CCF) Organic Waste Treatment

Location:

Hamilton, Ontario

Department:

Public Works, Solid Waste Management Division

Start Date:

Facility completed in 2006

Budget and Staffing:

This building has 10 full time staff on site to maintain the equipment, provide security, and take care of administrative tasks. In addition, there are 8 full time “trash collectors” and a fleet of six trucks to collect the waste. The annual operating budget in 2—7 was \$1.8 million. The plant cost \$30 million to construct.

Description:

This state-of-the-art Central Composting Facility (CFF) has been applauded by the Solid Waste Association of North America (SWANA) as one of the most innovative organic waste treatment plants in the world. In addition, the CFF will help to implement the City’s aggressive target of creating an integrated waste management system that will reduce and divert landfill waste by as much as 65%.

The CFF represents a strong commitment to a sustainable solid waste policy which will significantly extend the life of the City's only active landfill and will create an income stream which will help offset the operation costs associated with the plans. To date, more than 150,000 single family households (80% of the city's residents) participate in this composting program. The center primarily processes organic materials and does not accept metals, plastics or glass. Those other materials are separated and disposed of at another recycling plant off site. This plant has been highly effective and can process up to 90,000 metric tons of organic waste per year.

Alexandria

Match:

The CCF takes up approximately 9 acres of land. If a similar facility were to be constructed in this area, an industrially zoned parcel of land away from residential land uses would need to be located. Alexandria could consider partnering with neighboring jurisdictions such as Arlington or Fairfax, not only to locate a site, but to create an economy of scale to make a program such as this economically feasible.

Point of

Contact:

City of Hamilton, Ontario
Waste Management Division
Joel McCormick
(905) 546-2424

References:

City's web site: <http://www.hamiltoncompost.ca>

WASTE REDUCTION

1. Trash Stickers or Pay as You Throw

Location:

Charlottesville, Virginia

Department:

Charlottesville Department of Public Works

Start Date:

1992

Budget and

Staffing:

No additional staff was required for the Charlottesville program. In 2001 Charlottesville spent \$1.2 million for domestic refuse collection.

Description:

Charlottesville Code of Ordinances, Ch.26 Article V states: "This council finds that reduction of the solid waste stream through imposition of volume based user fees is one effective means of addressing the growing problem and escalating costs of solid waste disposal."⁶⁰

⁶⁰ City of Charlottesville

In 1992, Charlottesville Public Service initiated the trash sticker program as a means to encourage residents to reduce the amount of household trash generated each week. Often called “Pay as You Throw” (PAYT), charging by volume for refuse collection is a practice that has been gaining currency in the US for several years. At least six other municipalities in Virginia have pay-as-you-throw programs, including Chesterfield, Hampton, Lynchburg, and Norfolk. Nationally, 7,095 municipalities offer PAYT, with the majority being in northern and western states.

Several approaches to billing are available for PAYT service. Some municipalities have issued bins of varying sizes or “service levels” to households, with larger bins carrying higher fees. Others distribute specially marked garbage bags which must be used for all curbside trash pickup, with households being charged per bag that is actually used. Some municipalities simply sell stickers or tags that must be affixed to each garbage bag for curbside pickup. Finally, some have mixed the bin and sticker approaches, selling stickers for various sizes of bag. This approach maximizes efficiency, achieving the desired volume charging while avoiding excess expense for bins and bags. In addition, stickers may be placed on any kind of bag, allowing residents to re-use grocery or other shopping bags instead of buying more trash bags. Fees for any approach must be set carefully to avoid giving residents a “volume discount” on trash collection.

Most communities switching to a PAYT system have not needed to hire any additional staff. Those that outsource curbside refuse collection simply add the appropriate language to their contract, while cities with public refuse hauling operations must update billing systems and ensure that crews are aware of the new rules. In general, billing should remain a function of the municipal government in order to retain control of enforcement. Local governments can place liens against property and/or disconnect other public services in order to collect back fees. Private trash haulers have fewer enforcement options and have no strict interest in reducing the volume of refuse per household.

Charlottesville has used the sticker and volume approach, and currently charges \$1.05 per 16-gallon bag or \$2.10 per 32-gallon bag. The City offered refuse collection through its public service department until 2007, but now outsources this function to BFI, Inc., a private trash hauler. The city has retained responsibility for billing and enforcement. Trash stickers are available through the treasurer’s office, by mail or internet order and through selected private businesses, usually convenience stores or gas stations. In its first five years Charlottesville’s PAYT system resulted in an annual reduction of about 1,500 tons of garbage from both residential and commercial customers, with more than half of the total resulting from

additional recycling, composting, and reduced trash generation by residents.⁶¹

Alexandria

Match:

In comparison to Charlottesville, Alexandria has a slightly greater population in a smaller geographic area, and is served by a mix of public and private refuse collections. One difference is that private trash haulers in Alexandria are not subject to a contract with the City but are hired directly by commercial businesses or residential community associations. The City already imposes conditions on private service providers, especially the recycling ordinance passed in 2006. Based on these conditions, Alexandria could likely adopt a PAYT system modeled on Charlottesville with little modification, though the City may need to pass an ordinance requiring private trash haulers to participate.

References:

Charlottesville website:

<http://www.charlottesville.org/Index.aspx?page=422>

The EPA offers a “How-To” for local governments wishing to initiate a PAYT system, located on the internet at

<http://www.epa.gov/epaoswer/non-hw/payt/tools/pubs.htm>.

Eco-Cycle.org http://www.ecocycle.org/zero/pay_throw.cfm

RECYCLING

1. Incentives for Residential Recycling

Location: Philadelphia, Pennsylvania

Department: Philadelphia Streets Department

Start Date: February 21, 2006

**Budget and
Staffing:**

No additional City staff required for Philadelphia program.

The pilot program serving 100,000 households has been provided to Philadelphia free of charge by RecycleBank, which proposes a contract of approximately \$3 million to expand the program to the entire city. The Philadelphia Controller estimates that the city could save as much as \$17 million in landfill fees if RecycleBank is extended.

⁶¹ “Trash: Pay As You Throw” by Daniel K Benjamin, PERC 1997 <http://www.perc.org/perc.php?id=424> Accessed April 28, 2007

Description: In the early 2000s, Philadelphia’s recycling rate stood at 7%. To improve this rate, the City first tried mandatory recycling with fines for nonparticipation. In general, the public did not like being fined for failure to recycle. Meanwhile a private company, RecycleBank, had successfully piloted a financial incentive program in select City neighborhoods. The City subsequently decided to contract with RecycleBank to expand the program to the entire city, covering at least 100,000 residents in its initial phase.

According to news sources, Philadelphia had issued as much as \$37,000 in fines during mandatory recycling, but achieved no increase (in fact, a minor reduction) in its recycling rate. The City expects to double its recycling rate under the incentive program, resulting in savings of up to \$2.4 million out of \$40 million in annual landfill fees.

Alexandria Match:

Recycling is currently mandatory in Alexandria. The City requires household recycling and offers a variety of programs for hazardous materials and yard waste, but does not offer direct incentives for recycling to households or businesses. An incentive program could increase the City’s recycling rate. In addition, because Alexandria operates a public trash pickup the City could realize financial benefits in the form of reduced landfill fees which could partially or fully offset the cost of the incentive program.

References: The Associated Press State & Local Wire, 2/12/2005, Recycle Now Philadelphia <http://www.recyclenowphiladelphia.org/home.asp>; Philadelphia Streets Dept <http://recyclingpays.phila.gov/>; RecycleBank <http://www.recyclebank.com/faq.cfm>

SUPPLEMENTAL SOLID WASTE PROGRAMS AND PRACTICES

1. Master Composter Program

Location: Mecklenburg County, North Carolina

Description: The first “Master Gardener” program was invented in 1972 by Seattle Cooperative Extension agent Dr. David Gibby. Gibby needed a way to meet overwhelming public demand for instruction in gardening practices, but could not add staff to answer phone calls. The solution was to train volunteer gardeners in exchange for a public service commitment to be fulfilled by working with interested residents or on public education programs. Today Master Gardener International reports that 45 US states, Washington, D.C., and four Canadian provinces offer Master Gardener programs.

In the year 2000, Mecklenburg County, North Carolina, implemented a Master Composter program modeled after the Master Gardener concept. The program was implemented using a grant of \$9,000 from the state, matched by county funds. The program trained 17 volunteers in its first session, graduates going on to assist with public outreach.

Alexandria does not currently provide training or City staff assistance for composting activities. A large part of the City's land area is in single-family or duplex houses on mature lots that produce large amounts of yard waste. The small cost of training and materials for a Master Composter program would likely yield immediate and large benefits in both reduced need for debris collection and increased reportable recycling rate.

Points of

Contact:

Mecklenburg County, Solid Waste - Waste Reduction
704-336-5359 ext. 5 or Laurette.Hall@MecklenburgCountyNC.gov

References:

Master Composters Piedmont Landscape and Naturescape Training
<http://www.charmeck.org/Departments/LUESA/Solid+Waste/PLANT+Program/master.htm>

2. Paint Exchange

Location:

Blacksburg and Montgomery County, Virginia, among others.

Description:

A paint exchange allows residents and businesses to share unneeded latex paint instead of throwing it away. There are two basic approaches to operating paint exchanges. Some municipalities, including Blacksburg and Montgomery County, offer pickups on select dates, usually concurrent with their household hazardous waste collections. Others, including Santa Monica and Lee County, Iowa, keep a staffed location open daily during 2-3 seasons of the year. All paint exchanges accept only household latex paint, not oil-based or spray paint. The latter are considered hazardous materials and must be disposed of accordingly.

Alexandria currently collects household hazardous materials on a weekly basis. The City's housing stock is mostly older construction, and affluent residents are often engaged in renovation work. A paint exchange, whether concurrent with household HAZMAT collections or as a standalone program, would likely be quite popular with residents and contractors working in the City. The City might also consider staffing a full- or part-time location with volunteers.

Points of

Contact:

Blacksburg, Virginia
(540) 961-1806
recycle@blacksburg.gov

Montgomery County, VA

Ms. Linda Crable
(540) 382-5793

References: National Paint and Coatings Association. Community Paint Exchange Guide. http://www.paint.org/con_info/exchange_guide.cfm

3. Recycling Club

Location: Blacksburg, Virginia

Description: Blacksburg's Solid Waste Coordinator coordinates parent volunteers who turn collect recyclables weekly from the children in their school's recycling club and transport them to a drop-off location.

Points of

Contact: Blacksburg, Virginia
(540) 961-1806
recycle@blacksburg.gov

References: http://www.blacksburg.gov/services/recycling/recycle_club.php

4. Construction and Demolition Debris (C&D) Recycling

Location: Richmond, Virginia

Description: Construction and Demolition Debris (C&D) are often composed of basic materials such as concrete, asphalt, steel, glass and wire that are individually excellent subjects for recycling. C&D recycling can take various forms. In some regions landfill fees exceed those charged by recycling facilities. Recycling may also be done by the construction contractor on-site.

A state-financed parking garage in Richmond, Virginia, used crushed concrete debris from buildings demolished during site preparation as leveling material for the new structure. In spite of the extra time and effort required, the state estimates a savings of nearly \$500,000 over land filling the debris and purchase of fresh material. Alexandria could realize financial savings and/or an increased recycling rate by requiring C&D debris recycling for public construction projects and educating private builders about available resources for C&D debris recycling.

Points of

Contact: Virginia Department of General Services (DGS)

References: Architecture Week, online:
http://www.architectureweek.com/2004/0811/building_1-2.html

Greener Buildings, online:
http://www.greenerbuildings.com/news_detail.cfm?NewsID=27506

5. Construction Material Reuse Ordinance

Location: Santa Monica

Description: Smaller-scale construction and renovation projects often throw away items that could be salvaged and reused in other projects. Similar to the Paint Exchange, items such as doors, windows, flooring, fixtures and hardware can be brought to an exchange or swap meet hosted by the city and traded or given away to other residents or businesses. In addition to reducing the volume of municipal solid waste and improving the city's recycling rate, diversion of these items from the waste stream can also be a popular program among residents and others who are able to use the items. Alexandria's mostly-older building stock is a prime environment for a municipal material reuse program.

The Construction Materials Recycling Association estimates there are slightly more than 3,100 concrete and asphalt recycling plants in the country, about 600 single-material or mixed-waste recycling facilities, and several dozen each of asphalt shingle and gypsum recyclers.

The U.S. Environmental Protection Agency (EPA) estimates that 136 million tons of construction and demolition waste was generated in 1996, the last year these figures were made available. Most of the waste came from demolition and renovation, while the rest came from new construction. Less than 30 percent of that waste was salvaged for recycling.

Santa Monica has diverted 60% of its waste from landfills for construction projects since implementation of its Construction Material Reuse Ordinance. This ordinance falls under the California Integrated Waste Management Act of 1989, which requires that each local jurisdiction in the state divert 50% of discarded materials (base year 1990) from landfills by December 31, 2000.

Chicago also recently adopted an ordinance requiring a certain percentage of construction and demolition waste to be recycled — 25 percent for projects that had a permit issued in 2007, and 50 percent if the permit is issued in 2008.

Points of

Contact: Marsha Jones Moutrie, Santa Monica City Attorney

References: [Santa Monica's Construction and Material Waste Recycling Ordinance](http://greenbuildings.santa-monica.org/whatsnew/waste.ordinance.html)
<http://greenbuildings.santa-monica.org/whatsnew/waste.ordinance.html>

Environmental Health Perspectives

<http://www.ehponline.org/members/2003/111-16/focus.html>

Masonry Magazine

<http://www.masonrymagazine.com/4-07/green.html>

USEFUL LINKS

- American Planning Association, Policy Guide on Solid and Hazardous Waste Management
<http://www.planning.org/policyguides/wastemgmt.htm>
- BioCycle Magazine
<http://www.biocycle.net/>
- Green Labeling: Global Guide for Marketers in the New Millennium, 2005 Edition
http://www.raymond.com/promo_raymond-library/greenlabel.html
- Master Composter Web site
<http://www.mastercomposter.com/>
- Paint Exchange Guidelines
http://www.paint.org/con_info/exchange_guide.cfm
- PowerScorecard: Electricity from Municipal Solid Waste
http://www.powerscorecard.org/tech_detail.cfm?resource_id=10
- SWANA - Solid Waste Association of North America
<http://www.swana.org/www/default.aspx>
- Waste Age Magazine
<http://wasteage.com/>
- The Waste Reduction Resource Center (WRRRC)
<http://wrrc.p2pays.org/>
- U.S. EPA, Municipal Solid Waste in the United States: 2005 Facts and Figures
<http://www.epa.gov/epaoswer/non-hw/muncpl/msw99.htm>
- U.S. EPA, Office of Solid Waste
<http://www.epa.gov/osw/>
- U.S. EPA, Resource Conservation Challenge: Reusing and Recycling Industrial Materials
<http://www.epa.gov/epaoswer/osw/consERVE/resources/bene-use.htm>

- Virginia Recycling Association
http://www.vrarecycles.org/board_index.htm
- WasteWise's Environmental Management Systems Web Site
<http://www.epa.gov/wastewise/wrr/ems.htm>
- WasteWise's Resource Management Web Site
<http://www.epa.gov/wastewise/wrr/rm.htm>
- World Bank, Urban Solid Waste Management
<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTURBANDEVELOPMENT/EXTUSWM/0,,menuPK:463847~pagePK:149018~piPK:149093~theSitePK:463841,00.html>

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Arlington Green Living Challenge. Arlington County, Virginia (2007). Available at:
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Environmental Sustainability Policy. City of Charlottesville. Accessed April 2007 from:
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Master Composters <http://www.mastercomposters.org/>

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Muto, Sheila. From Recycled Rubble Come Roads, Parking Lots, Savings. The Wall Street Journal. May 26, 2004 p.B1.

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Chenango, NY: <http://www.co.chenango.ny.us/DPW/latexpaintexchange.htm>

Helena, MT: <http://www.deq.mt.gov/Recycle/Helena-ED-07.htm>

Lee County, IA: <http://www.leecounty.org/Services/GRRWA/landfill/paintexchange.htm>

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<http://www.epa.gov/epaoswer/non-hw/payt/faq.htm>

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