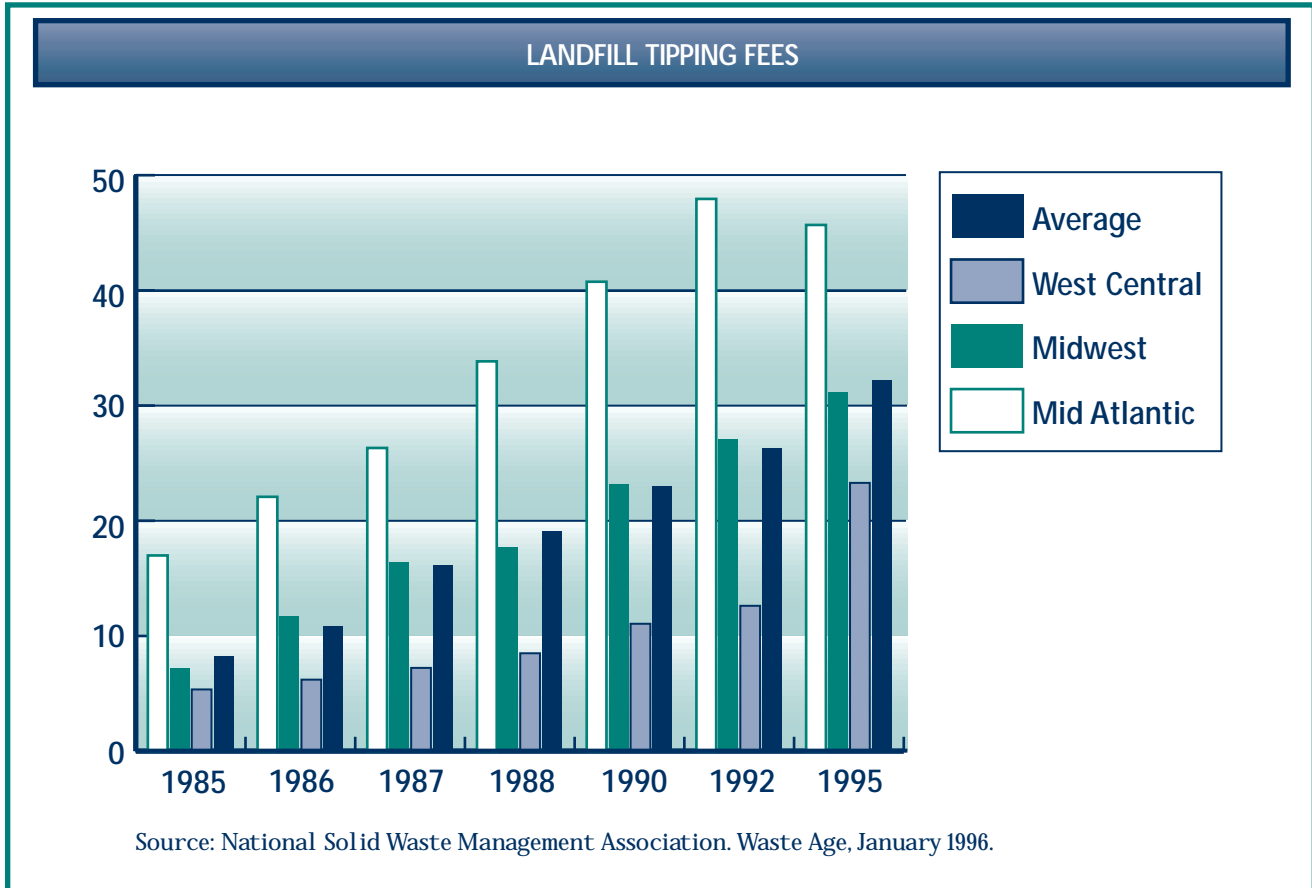




Smart Waste Reduction and Recycling Investments

■ BENEFITTING FROM SMART WASTE REDUCTION AND RECYCLING INVESTMENTS

Local governments usually pay for collecting and disposing of municipal solid waste (MSW). Over the last three decades, the volume of MSW has grown from 88 million tons in 1960 to 208 million tons in 1995, and local governments' waste disposal costs have risen steadily as well. From 1980 to 1992, local government expenditures for solid waste management more than tripled, raising from \$3.3 billion to \$10.7 billion. The increase has been driven in part by the escalation in nationwide average landfill tipping fees, which went up nearly fourfold in a decade. In some cases, the rise in tipping fees has been even more sudden and dramatic: when Portland, Oregon's landfill closed in 1988 and the city was forced to contract with a private regional landfill 150 miles away, its tipping fees grew from \$17.50 to \$75 per ton.¹



WASTE REDUCTION AND RECYCLING INVESTMENTS WITH POTENTIALLY HIGH RETURNS

SHORT-TERM

- Use crushed concrete for road base
- Recycle toner cartridges
- Buy retread tires for fleet vehicles
- Buy recycled plastic “lumber”
- Salvage and reuse building materials

LONG-TERM

- Use recycled paper
- Implement unit pricing for solid waste

Smart Waste Management Investments yield cost savings. Given these costs, cutting the amount of waste generated in the community and sent to landfills can yield immediate savings. By also implementing waste reduction practices in public facilities, local governments can reap additional savings. Recycling, one of the most widely used ways to divert materials from the waste stream, may provide further financial benefits through the sale of recyclable materials, as well as economic benefits through job creation. A study by the Massachusetts Department of Economic Development found that recycling industries have created 10,000 jobs and added \$588 million to the state’s economy.² Newark, New Jersey’s recycling program saved residents and local businesses \$15.4 million in disposal fees and generated almost \$167,000 from the sale of recycled materials over six years.³ Many cities and counties that buy recycled products to support local recycling markets have also realized savings through the lower prices of some recycled products. Finally, holding down waste disposal costs for local businesses can stimulate private investment in more productive economic activities.

Smart Waste Management Investments yield environmental benefits. Waste reduction and recycling yields environmental benefits to the community, as well. By prolonging the life of existing landfills, reductions in waste volumes can postpone or eliminate the need for new or expanded landfills. The environmental impact of existing landfills is alleviated, since less waste means less leachate that might contaminate ground water and less loose trash that can blow into surrounding neighborhoods. With fewer trucks needed to collect and transport waste, and with less trash burned in municipal incinerators, local air quality may also improve.

\$ SMART INVESTMENTS IN MUNICIPAL SOLID WASTE REDUCTION

THE EPA WASTEWISE PROGRAM

The goal of WasteWiSe, a program launched by EPA’s Office of Solid Waste and Emergency Response (OSWER) in 1994, is to cut the generation of municipal solid waste through voluntary waste reduction and recycling agreements. Under the current program, which targets the commercial sector, companies volunteer

to develop their own waste reduction and recycling plans, and provide EPA with annual progress reports, along with updated goals for the coming year. Goals must include three components: (1) implementation of three significant waste reduction or prevention steps, (2) establishment or improvement of a recycling program, and (3) increased manufacture or purchase of recycled products. Annual progress reports must include data on the amount of waste reduction, the quantity of recyclable items diverted from the company's waste stream, and examples of recycled material purchases.

EPA provides information and technical assistance to participating companies through the WasteWiSe Update newsletter, a help line, various workshops and "how-to" publications, and a "peer exchange" through which participants can share ideas and learn from one another's experience. Participants also receive public recognition through EPA newsletters and press releases, and are permitted to use the WasteWiSe logo in their promotional and advertising materials.

OPPORTUNITIES FOR LOCAL GOVERNMENT PARTICIPATION

During the first two years of the WasteWiSe program, more than 500 businesses and industries volunteered for the program, including many Fortune 1000 corporations. Late in 1997, EPA was finalizing a comprehensive plan to expand the program to local governments and community development groups. As drafted, the plan offers two parallel options for local governments:

- Under the first option, local governments can join the WasteWiSe program as Partners, by signing agreements with EPA to develop voluntary waste reduction and recycling goals and to report annually how they have progressed. Under this option, EPA may allow school districts to join the program as independent entities.
- Under the second option, local governments, along with community development and business assistance organizations, can join WasteWiSe as Allies, to assist EPA in providing information and outreach services to small and medium sized-businesses in their areas. Together with such local organizations as chambers of commerce, university extension services and small business development centers, EPA plans to support a series of interactive satellite broadcasts on solid waste reduction topics, to be publicized and aired locally around the country.



PROGRAM BENEFITS TO LOCAL GOVERNMENTS

WasteWiSe benefits local governments by fostering innovative public-private partnerships that in some instances yield direct economic gains. For example, Virco Manufacturing, a maker of school and office furniture, in partnership with the Conway School District in Arkansas, initiated a recycling program for corrugated cardboard. During its first five months in one school, Virco collected and sold 39,000 pounds of corrugated cardboard, returning \$2,000 in rev-

enue to the district. The following year, after the program was expanded to other schools, the district received \$3,800 from the collection and sale of 85,000 pounds of cardboard.⁴ There may also be significant potential for school districts to cut their costs for waste disposal. By instituting a recycling and garbage reduction program in its cafeterias alone, the Richmond School District in Contra Costa County, California saved \$30,000 in waste transportation and disposal fees.⁵

UNIT PRICING PROGRAMS

By the end of 1997, all but six states had some requirement for waste reduction or diversion from landfills. Unit pricing programs are one mechanism that can help local governments comply with those requirements. A 1994 survey of 80 cities with populations of 50,000 or more found that 35 percent paid for waste disposal services out of property tax revenues.⁶ In these communities, or where waste disposal costs are paid out of general revenues, residents may be unaware of the true cost of their waste disposal, and may have no incentive to reduce the quantities they generate. Unit pricing programs, also known as variable rate pricing or “pay-as-you-throw” programs, provide a direct economic incentive for waste reduction and recycling by charging households a disposal fee for each bag or container of waste they generate. Revenues from disposal fees offset the costs of disposal and recycling programs.

By 1996, more than 2,000 communities nationwide were operating unit pricing programs for solid waste, with the resulting MSW volume reductions averaging around 30 percent and ranging as high as 50 percent or more in some communities. Recent studies indicate that unit pricing can also produce increases of 30 to 70 percent in local recycling and composting rates. San Jose, California, the nation’s eleventh largest city, began a unit pricing and recycling program in 1993. From 1993 to 1994, the volume of landfilled residential waste decreased more than 20 percent, from 250,000 tons to 198,000 tons, while the volume of residential recyclable materials collected more than doubled, rising from less than 31,000 to nearly 76,000 tons. The amount of residential yard waste diverted from the city’s waste stream increased by nearly 50 percent, from 66,500 tons in 1993 to 96,800 in 1994.⁷

In general, the greatest waste reduction and recycling increase can be expected in communities that combine unit pricing with curbside recycling pickup and composting programs. One study has concluded that curbside recycling programs alone reduce waste volumes more than unit pricing programs alone. However, because recycling may initially increase capital and operating costs for solid waste disposal, it is often advisable to institute unit pricing programs concurrently in order to generate the needed revenue.

In designing unit pricing programs, local governments should consider several factors, including the size or type of container, the method of payment and the fee structure. Some programs charge a small base fee to cover the fixed costs of waste collection and transportation, combined with a per-container fee for disposal. Other programs charge a flat rate for each container of a given size or



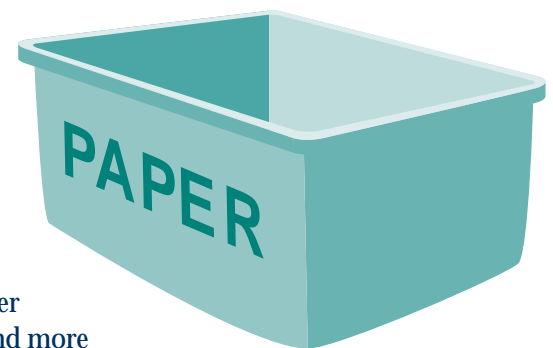
COST SAVINGS AND WASTE REDUCTION THROUGH UNIT PRICING

- **Dover, New Hampshire**
 - 64.5% decrease in residential waste volume.
 - MSW budget down from \$1.2 million to \$878,000.
- **South Kingstown, Rhode Island**
 - 71.4% decrease in residential waste volume.
 - Average annual household disposal cost down 43% from \$92 to \$52.
- **Falmouth, Maine**
 - 35% decrease in residential waste volume.
 - Waste collection savings of \$30,000.
 - Disposal fees savings of \$88,000.

weight. Either way, careful estimation of waste volumes and program costs can ensure that fees are sufficient to cover program costs. Many communities have not only managed to cover their waste disposal costs with unit pricing, but have also achieved significant cost savings over “conventional” solid waste management programs, as demonstrated by the following examples.⁸

- **Dover, New Hampshire.** In 1990, prior to implementation of its unit pricing and curbside recycling program, the City of Dover disposed of 11,000 tons of residential trash each year at a cost of \$1.2 million. By 1996, after five years of unit pricing, residential solid waste amounts had dropped to 3,900 tons — a 64.5 percent decrease — and the city’s waste disposal budget was down to \$878,000 for its 1997 trash disposal and recycling programs combined.
- **South Kingstown, Rhode Island.** South Kingstown’s unit pricing program, instituted in 1994 in combination with the opening of a free recycling center, reduced the city’s residential waste volume by 71.4 percent, from 7,608 tons in 1992 to 2,175 tons in 1995. Within the first year of the program, the average annual waste disposal cost per household for a family of four dropped from \$92 to \$52.
- **Falmouth, Maine.** Residential waste volumes in Falmouth decreased 35 percent and recycling rates increased from 12 to 21 percent of the waste stream following imposition of a unit pricing program in 1992. The 900 ton drop in waste generation reduced the cost of the town’s collection contract with a private waste hauler from \$146,000 to \$116,000, and, at the current tipping fee of \$98 per ton, is saving the town an additional \$88,000 per year in disposal fees.
- **Mendham Township, New Jersey.** Mendham Township followed up the initial waste reduction success of its recycling program with a switch to variable rates for solid waste disposal. The combination of these two programs allowed the town to cut back from two garbage collections each week to one and saved residents an average of \$200 annually. The town saved money, increased recycling volumes by 83 percent, and reduced garbage production by 55 percent, all with no increase in illegal dumping.

Because of the high degree of public involvement and residents’ cooperation needed to make them successful, most unit pricing programs also include extensive outreach and public education efforts. San Jose, for example, spent more than \$1.5 million on its education and outreach program, which included radio, television, and newspaper public service announcements, mailings to all residential households, and more than 250 community meetings. The city has been responsive to residents’ concerns, and random telephone surveys have indicated 80 to 90 percent approval of its unit pricing program. Equally high resident satisfaction has been reported in Seattle, where unit pricing increased recycling by 60 percent from 1980 to 1985. Eighty percent of the Seattle population favors the system.



SMART INVESTMENTS IN CONSTRUCTION AND DECONSTRUCTION WASTE MINIMIZATION

EPA estimates that construction and demolition (C&D) waste accounts for approximately 24 percent of all solid waste disposed in landfills nationwide. To encourage greater recycling and reuse, the agency's procurement guidelines, developed under the Resource Conservation and Recovery Act (RCRA), include recycled-content recommendations for a variety of construction products (see p. 4-13). Although C&D waste is usually sent to dedicated C&D landfills rather than MSW landfills, local governments can still realize significant cost savings from C&D waste minimization in public construction. Recycled C&D materials are often less expensive than virgin materials, and the recycling of demolition debris and unused construction materials can yield significant savings on transportation and disposal costs. Most successful C&D waste minimization strategies draw upon the solid waste management principles of *reduction, reuse, and recycling* to divert material from disposal in landfills. While these principles can be applied to private projects, the focus here is on their application to the public sector.

REDUCING C&D WASTE

For construction projects, waste reduction results from plans designed to minimize the amount of construction materials needed and from adopting on-site practices that generate less debris. The following measures can help achieve these objectives.

- **Use the pre-existing shell of a former building.** Metro, the three-county regional government of the Portland, Oregon metropolitan area, acquired the site of a former Sears department store for its new headquarters, it designed new offices within the shell of the pre-existing building. Using this approach, Metro saved approximately 80 percent of the building's structure from demolition and disposal, and saved \$4 million in costs of new materials and construction.⁹
- **Design new buildings to use materials efficiently.** Incorporating standard sizes in building design, or "optimum value engineering," can reduce waste of excess materials as well as material and labor costs. For example, using increments in the floor and wall layout that match the standard dimensions of building materials can minimize the need to cut materials to special sizes. In addition, using computer design software that integrates information on project layout and materials, builders can easily assess the effects of different design options on material requirements.
- **Prevent material loss and damage.** Storing materials in a secure, protected place on the job site prevents losses and damage from weather, accidents and vandalism.
- **Save on materials packaging.** Purchase materials whose packaging is minimal, reusable or recyclable. It will reduce the quantity of waste disposed in landfills.

REUSING C&D MATERIALS THROUGH DECONSTRUCTION

Many materials that enter the C&D waste stream can be reused, often on the same project site. These include wood flooring and framing, plumbing and lighting fixtures, doors, windows, insulation, molding, siding, wall boxes, cabinets and various scrap materials. These items can often be salvaged through deconstruction. As opposed to conventional demolition, deconstruction involves carefully dismantling a structure and removing materials for reuse. Because deconstruction is more time and labor intensive than demolition, it may complicate planning and scheduling and raise initial costs of a project. However, deconstruction not only reduces the costs of waste disposal and purchase of new materials, but can also yield substantial revenue from the resale of salvaged materials, often more than offsetting the additional labor costs.

- When two California groups, Beyond Waste and San Francisco Community Recyclers, teamed up to deconstruct a building at San Francisco's Presidio in 1996, they salvaged 66,000 board feet of lumber. At a total cost of \$53,000 for the one-month project, the \$43,660 in lumber resale income yielded a net deconstruction cost of only \$9,340 — nearly 45 percent less than the demolition bid of \$16,800.
- In 1997, assisted by the Youth Employment Partnership, Beyond Waste deconstructed a warehouse owned by the Port of Oakland, at a total cost of \$330,000. With \$280,000 in income from the resale of 450,000 board feet of salvaged lumber, the net deconstruction cost of \$50,000 was only one-third the demolition bid of \$150,000.

The optimal mix of deconstruction and demolition for a specific project and the potential economic benefits of material reuse depend on several factors, such as the value of recoverable items, the prevailing cost of disposal and the availability of local salvage markets. In some cases, contractors simply salvage select items before conventional demolition. In others, they dismantle entire structures to be sold and rebuilt elsewhere.

RECYCLING C&D DEBRIS

As is the case with recycling of municipal solid waste, recycling of C&D materials diverts them from the waste stream for reprocessing into new products. Recyclable materials salvaged during C&D projects include lumber, cardboard, stumps and brush, metal, drywall, glass, concrete, asphalt and composition roofing. Potential cost savings from C&D debris recycling depend on several local factors. Usually, planners need to compare recycling fees against landfill tipping fees, and consider requirements for source separation and the distance materials must be transported to reach recycling outlets.



PROMOTING C&D WASTE MINIMIZATION: LOCAL GOVERNMENT POLICIES AND OUTREACH TOOLS

Because C&D waste minimization depends largely on the economic advantages of recycling over conventional disposal, local governments may be able to promote salvage and recycling markets by enhancing these advantages. They can make conventional disposal more expensive, for example, by raising tipping fees at municipally-operated C&D waste landfills. By including waste minimization requirements in their bid specifications for public projects, local governments can also use their purchasing power to help develop local markets for recycled materials. Use of source separation dumpsters free of charge can be another incentive. However, even where economics favor C&D waste minimization, builders and contractors may be slow to change long-established waste management practices. Enacting ordinances requiring C&D waste minimization may overcome their reluctance, but will not always ensure that the most efficient and cost-effective practices are adopted. Local governments, therefore, have an important role to play in promoting C&D waste minimization. They can help by combining technical assistance with education and outreach in order to increase contractors' recycling expertise and awareness while overcoming their resistance to new or unfamiliar practices.

A variety of outreach tools have been successfully used to encourage builders and contractors to minimize and recycle their C&D wastes. Guides to local reuse and recycling businesses help contractors identify outlets for materials. Technical assistance such as information hotlines and recycling manuals and videos, together with salvage and reuse education workshops for project managers and construction workers, can improve contractors' expertise and speed adoption of C&D waste minimization practices. Motivational tools such as work site billboards that tally quantities of diverted waste remind crews of the importance of waste reduction and recycling. Billboards can also engage the public if properly placed.

CASE STUDIES: TURNING C&D WASTE MINIMIZATION POLICIES INTO PRACTICE

The five case studies presented below exemplify successful local government efforts to cut C&D waste in the public sector and promote it in the private sector.

● KING COUNTY, WASHINGTON

HIGHLIGHTS

- ▶ Contracts for public construction specify recycling/reuse of demolition debris.
- ▶ Free technical assistance to contractors developing waste management plans.
- ▶ 95% of debris from demolition at the new Regional Justice Center site salvaged or recycled, saving the County \$265,000 in waste disposal cost.



TOOLS TO PROMOTE C&D WASTE REDUCTION

- C&D waste reduction ordinances
- Economic incentives
- Contractor bid specifications
- Technical assistance
- Guides to area recyclers
- Training and outreach
- Motivational tools

King County, which includes the City of Seattle, uses a variety of policy and outreach tools to foster C&D waste minimization. Rather than mandate specific practices by ordinance, the county has chosen to encourage waste minimization through its contracts and bid specifications for selected public projects, such as the recent construction of its new justice center. The county’s Solid Waste Division further encourages waste minimization in both public and private projects by providing free technical assistance to contractors and project managers in developing on-site waste control plans. The division also offers outreach and education through case studies of successful work site programs and a guide to the area’s recyclers, as well as C&D waste recycling and contract specification booklets developed by the state’s Clean Washington Center.

These tools brought the county impressive cost savings on the recent construction of its new regional justice center. The demolition of 28 buildings to clear the site produced 37,523 tons of material. Ninety-five percent of it was salvaged or recycled, saving \$265,000 in waste disposal costs. Crushing 33,358 tons of concrete and asphalt debris and reusing it on site as fill material saved approximately \$159,000. Salvaging 750 tons of reusable timber and lumber saved about \$57,000, and recycling 918 tons of unsalvageable wood saved an additional \$49,000.¹⁰

● **METRO, PORTLAND, OREGON**

..... **HIGHLIGHTS**

- ▶ C&D waste makes up 26% of region’s solid waste stream.
- ▶ Executive Order 47 requires waste minimization on public construction projects.
- ▶ Technical assistance and a guide to local C&D salvaging and recycling businesses.
- ▶ \$4 million savings on reuse of existing building shell for new headquarters.

Metro is the regional government of the Portland, Oregon metropolitan area, with a population of 1.2 million. Metro estimates that C&D waste makes up approximately 26 percent of its municipal solid waste stream, even though local economic conditions appear to favor C&D waste minimization. Regional land-fill tipping fees are about \$75 per ton, while recycling fees for most C&D wastes are \$35 per ton or less. Nonetheless, only 49 percent of all C&D materials were diverted from the waste stream in 1995. According to Metro, diversion rates of more than 80 percent are possible.^{11,12}

In an effort to increase diversion rates, Metro issued Executive Order 47, mandating C&D waste reduction, salvaging and recycling at all of its facilities and on all its property. The order requires contractors bidding on public projects to include plans to salvage or recycle waste whenever it is cost-effective. Metro assists contractors in developing such plans by providing them with education and outreach material, including a list of publications on C&D waste recycling and a guide to area salvaging and recycling firms.

Metro’s waste minimization policy for public projects resulted in significant cost savings in the design and construction of its new headquarters in a former Sears department store. Willingness to reuse the existing building shell effectively “diverted” about 80 percent of the structure from demolition and disposal, and saved \$4 million in avoided costs of new materials and construction. Through additional salvaging and recycling on the project, Metro diverted 8,024 tons of materials (77 percent of the waste generated during remodeling) and saved an estimated \$35,000 (70 percent of the project’s original waste hauling and disposal budget). Contractors salvaged 159 tons of wood, carpet, doors, bathroom fixtures and shrubs, and recycled 725 tons of metal, wood, sheet rock and corrugated cardboard. Seven thousand tons of brick, concrete, sand and dirt were reused as fill material both on and off the site, and as capping material for a closed landfill.^{13,14,15}

● AUSTIN, TEXAS

HIGHLIGHTS

- ▶ Sustainable Building Guidelines establish “green” standards for municipal construction.
- ▶ City assisted demolition contractors by compiling a database of prospective salvage buyers.
- ▶ Housing units relocated for reuse as low-income housing, eliminating need for new construction.

Landfill tipping fees in the Austin area are low, less than \$20 per ton, and outlets for recycling C&D waste are limited. Nevertheless, the city is among the leaders in promoting C&D waste minimization. Through its Green Builder Program, an environmental rating system for private sector construction, the city sets criteria for C&D waste reduction. In 1994 the Austin City Council created the Sustainable Building Guidelines for construction and operation of municipal buildings. The guidelines require C&D waste reduction, reuse and recycling in all municipal projects.

Before adopting the Sustainable Building Guidelines, Austin tested various C&D waste reduction measures during demolition of a former Air Force base. Demolition involved removing airplane hangars, residential buildings and other structures. The project bid requests encouraged waste minimization and gave examples of possible practices, but stipulated that the city would not pay extra for reuse or recycling. To help hold the costs down, the city compiled a database of prospective buyers of salvaged materials and provided contractors with space at the job site to sell salvaged items. Several waste minimization measures were implemented successfully, including the following.

- Contractors stockpiled asphalt for recycling and reuse in new road construction and crushed concrete for use as fill material on the site.
- The city moved some residential buildings to new sites to be refurbished and used as low income housing. The moving and renovation costs were

comparable to the estimated cost of building new homes, thus conserving resources without extra expense.

- One contractor salvaged and resold cabinets, dishwashers, hot water heaters, vanities, doors and windows from demolished houses, and separated concrete, wood and metal debris from demolition waste for recycling. The contractor charged the government less for the demolition job because he incurred less cost.
- Contractors deconstructed airplane hangars piece by piece and sold them for reconstruction at other facilities.

● **LOS ANGELES, CALIFORNIA**

HIGHLIGHTS

- ▶ C&D waste comprises 15% of city's solid waste stream.
- ▶ State law requires 50% reduction in waste sent to landfills by the year 2000.
- ▶ \$14 million in savings from recycling materials for road base and asphalt.
- ▶ 1.6 million tons of debris diverted from disposal following the 1994 Northridge earthquake.
- ▶ Technical assistance and guide on C&D waste recycling and reuse.

Los Angeles has developed ambitious waste minimization practices to comply with a state law that requires towns and cities to reduce the amount of waste sent to landfills by 50 percent by the year 2000. The city's Bureau of Street Maintenance, for example, recycles old paving materials into crushed road base and new asphalt. This program has saved the city \$14 million in its first nine years. Following the 1994 Northridge earthquake, the Earthquake Demolition Recycling Program diverted approximately 1.6 million tons of debris from landfills.

C&D waste accounts for 15 percent of the city's solid waste stream. The Integrated Solid Waste Management Office is responsible for developing and implementing C&D waste reduction, reuse and recycling programs and policies, and providing technical assistance to the public and private sectors. The office offers a broad range of outreach and information resources, including audio tapes of a sustainable building workshop and a series of guides on C&D waste minimization. The guides provide information about recycling and reuse options for specific types of C&D waste in the Los Angeles area.

RUTLAND COUNTY, VERMONT

HIGHLIGHTS

- ▶ Private landfill charges \$90 per ton for C&D waste.
- ▶ County started a C&D recycling service to provide a less expensive alternative.
- ▶ District's recycling/reuse fees cover all facility costs
- ▶ Contractors save \$22-\$85 per ton on waste disposal costs.
- ▶ Illegal dumping has decreased by 1,000 tons annually.

Rutland County, encompassing 16 towns with a combined population of 50,000, has taken a unique approach to C&D waste minimization by opening its own recycling facility. The Rutland County Solid Waste District hauls waste to a local private landfill where tipping fees for C&D waste are \$90 per ton. As a result, the county has suffered from a considerable amount of illegal dumping by local contractors. In an effort to decrease illegal dumping by providing a less expensive alternative to the private landfill, the district has started its own grinding and recycling service for construction and demolition waste.

Providing the service at cost, either on-site or at its facility, the district charges \$20 per ton to grind clean wood for use as boiler fuel, compost and mulch; \$10 per cubic yard for concrete and asphalt that it crushes and sells to private contractors for road construction; and \$5 per cubic yard for metal that it resells for \$30 per cubic yard. Much of the remaining demolition debris is ground for \$68 per ton and sent to the private landfill for use as daily cover. Thus, contractors save a minimum of \$22 per ton by recycling mixed waste and they can save more by separating clean wood, concrete and asphalt. The district processes about 5,000 tons of material per year, half of all C&D waste generated in its service area, and estimates that illegal dumping has decreased by as much as 1,000 tons annually.

By designing a small-scale facility suitable for the limited quantity of waste it expected to process, the district was able to keep equipment costs low, purchasing a tub grinder, excavator, loader, detached trailer and mister (to limit dust) at a cost of \$206,000. The facility also uses a truck that the district already owned and requires labor equivalent to 1.5 full time positions. As a result, the fees charged for recycling are not only lower than prevailing disposal costs, but also cover the district's costs to provide the service. Consequently, local governments that require their contractors to recycle C&D waste from public projects at the district's facility can save on disposal costs and the county incurs no additional costs for district operations.

SMART INVESTMENTS IN PURCHASING RECYCLED PRODUCTS

Although local recycling programs are a common means to promote resource conservation and reduce the environmental impact of waste disposal, they often suffer from a lack of buyers for recycled materials. In an effort to improve the

viability of local recycling markets, hundreds of local governments have taken steps to specify recycled products in their purchasing contracts. With their considerable buying power, local governments are in a position to negotiate favorable pricing terms, and have found that many recycled products became less expensive as a result.

Recycling markets and local “buy recycled” efforts have also been stimulated by federal and state procurement regulations. The Resource Conservation and Recovery Act (RCRA) requires government agencies to develop “affirmative procurement” programs for the purchase of various recycled-content products designated by EPA. This requirement applies to any federal, state, or local government agency or contractor that receives federal funds and spends more than \$10,000 per year on one of the 24 designated recycled-content products.¹⁶ EPA’s Recovered Materials Advisory Notice lists representative recycled-material content ranges for each designated product, to assist purchasing agencies in developing contract specifications.



DESIGNATED RECYCLED-CONTENT PRODUCTS UNDER EPA’S COMPREHENSIVE PROCUREMENT GUIDELINE		
Paper and Paper Products Non-paper Office Products Office Recycling Containers Office Waste Receptacles Plastic Desktop Accessories Toner Cartridges Binders Plastic Trash Bags Transportation Products Traffic Cones Traffic Barricades	Vehicular Products Engine Coolants Re-refined Lubricating Oils Retread Tires Park and Recreation Products Playground Surfaces Running Tracks Landscaping Products Hydraulic Mulch Yard Trimmings Compost	Construction Products Structural Fiberboard Laminated Paperboard Carpet Floor Tiles Patio Blocks Building Insulation Products Cement and Concrete Containing Coal Fly Ash Ground Granulated Blast Furnace Slag

Source: U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. [Environmental Fact Sheet: EPA Issues Comprehensive Procurement Guidance](#). EPA530-F-95-010, April 1995.

At least 45 states, the District of Columbia, and more than 500 local governments also have laws, ordinances or administrative policies mandating the purchase of recycled-content products by government agencies or their contractors.¹⁷ The State of Washington, for example, requires local governments annually buying more than \$500,000 in supplies to purchase recycled products, periodically report on their progress, and appoint procurement officers as liaisons with the state.¹⁸ The City of Seattle has had a Buy Recycled Ordinance since 1992, requiring all city agencies and their vendors, contractors and consultants to purchase recycled products. The ordinance sets recycled-content standards for paper products, building insulation, lubricating oils, cement made with fly ash, latex paint, glass and plastic. It also lists specifications for retread tires and compost.¹⁹

RECYCLED OFFICE SUPPLIES

Recycled paper products are perhaps the most widely used and commonly available recycled office products. Most state and local government procurement policies include provisions for buying recycled paper, often specifying required percentages of recycled and/or post-consumer content. Office products made from recycled plastic, such as binders, desk accessories, wastebaskets and trash bags, are also increasingly available .


Some local governments have been reluctant to use recycled paper and other products due to a misperception that recycled materials are more expensive and lack quality. Many local governments that have switched to recycled products, however, have found that their fears about product quality were unfounded and have realized cost savings.

- By purchasing remanufactured toner cartridges for office copiers and printers, King County, Washington saved \$200,000 in 1996 alone.²⁰
- Under its Recycled Product Procurement Policy, 93 percent of King County's paper purchases in 1995-96, totaling nearly \$953,000, were recycled-content products, up from only eight percent prior to adoption of the policy in 1990.²¹ The County's policy specifies a 15 percent price preference for recycled paper, although it is normally available for less than a 10 percent price differential.²²
- The City of San Jose, California saves \$10,000 annually by returning toner cartridges to the supplier to be refilled and reused.
- The City of Cambridge, Massachusetts saves 75 percent by purchasing remanufactured toner cartridges through a state contract.²³

RECYCLED ROAD SURFACING AND INFRASTRUCTURE MAINTENANCE SUPPLIES

Local government public works departments spent more than \$26 billion on highways in 1992. Although cost breakdowns are not available, it is likely that a large portion of that expense was devoted to roadway resurfacing. Some local governments reduce costs for road maintenance and repair by using demolition wastes such as crushed concrete and recycled asphalt for road surfacing. Some public works departments have also found that the use of recycled glass or plastic for construction and infrastructure maintenance applications can further cut their costs, as seen in the examples below.

- King County, Washington saved \$75,000 in 1995-96 by using crushed concrete instead of virgin gravel for temporary road surfacing at the Cedar Hills landfill.²⁴
- The Houghton Landfill in Kirkland, Washington saved over \$6,500 in the summer of 1994 by using crushed concrete instead of virgin gravel as road surfacing material. At the same time, the Houghton Landfill also saved nearly \$3,600 by substituting recycled glass aggregate for pea gravel as bedding for drainage pipes.²⁵



SAVINGS FROM REMANUFACTURED TONER CARTRIDGES PURCHASES

- King County, Washington
 - 1996 savings = \$200,000
- San Jose, California
 - Annual savings = \$10,000
- Cambridge, Massachusetts
 - Savings = 75% of cost of new cartridges



SAVING ON RECYCLED MATERIALS IN PAVING AND ROAD SURFACING

- King County, Washington
 - 1995-96 Cedar Hill Landfill: \$75,000
- Kirkland, Washington
 - 1994 Houghton Landfill: \$6,500
- Los Angeles, California
 - 9 years of road & parking area improvements: \$14 million

- The City of Los Angeles saved \$14 million over nine years by crushing old asphalt for use as road base, and by using 15 percent recycled-content asphalt for all street and parking area improvements.²⁶
- By switching from conventional wooden boards to “lumber” made of recycled plastic for anchoring astroturf at the Kingdome stadium, King County saved 160 hours in maintenance labor and \$1,600 on the cost of replacement wood, for total savings of more than \$5,100 per year. The County also purchases recycled plastic lumber for stadium fence slats, signs and bleachers, and the Parks Department uses plastic lumber for park benches.²⁷
- King County’s Fleet Administration Division buys truck siding boards made of recycled plastic to replace wooden ones. The plastic boards are stronger and last longer, cutting replacement costs.²⁸
- King County’s Construction and Facilities Maintenance Department is testing Eco-glass paint that contains 30 percent ground recycled glass, as a sealer for cement block walls and swimming pools. The cost is comparable to latex paint, but the glass paint may offer superior water seepage prevention.²⁹

Still other cost savings may be available to local governments through purchases of alternative road and public building maintenance supplies, as illustrated by the following examples.

- At water line repairs, the Santa Monica Street Maintenance Division uses cold mix asphalt as temporary backfill, but excavates and replaces it with permanent hot mix asphalt once repairs are complete. The Division is testing an alternative fill material which can be left in place permanently and capped with hot mix asphalt, for potential annual savings of \$46,000 on excavation and disposal costs.³⁰
- By switching from disposable air filters to reusable ones in ventilation systems at county garages, Itasca County, Minnesota is saving \$4,700 and reducing waste generation by 53 cubic yards annually. This is a 97 percent savings over the costs of single-use filters. Installing partially reusable filters in the county courthouse saves an additional \$780, or 46 percent of filter costs, and reduces waste generation by nearly 26 cubic yards each year.³¹

RECYCLED VEHICLE PARTS AND LESS TOXIC MAINTENANCE SUPPLIES

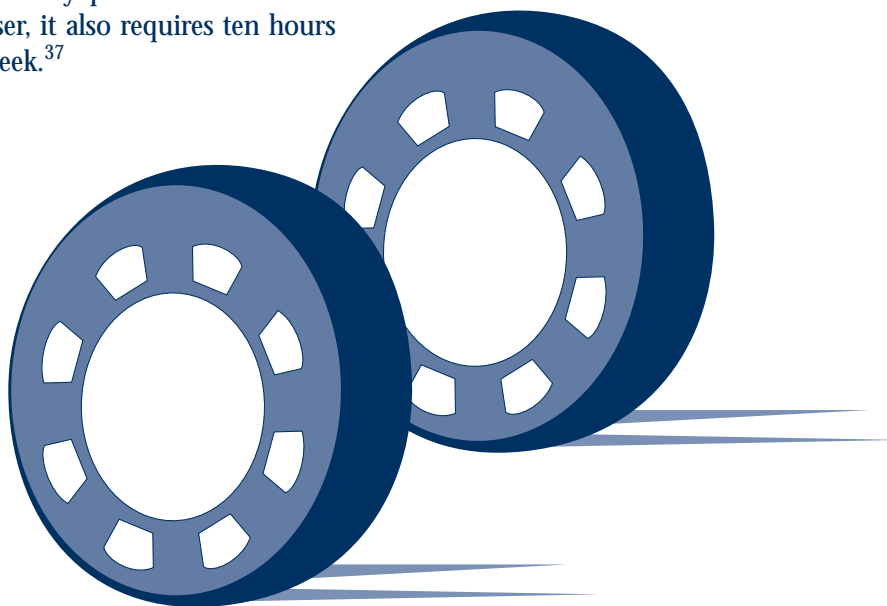
The large fleets of trucks and equipment, buses and passenger vehicles owned and operated by local governments provide opportunities for cost savings through the use of a variety of recycled maintenance supplies, including retread tires, re-refined engine oil, and recycled or remanufactured antifreeze and coolant. Retread tires perform as well as new tires and they cost much less. Prices of re-refined oil or remanufactured antifreeze do not yield great savings, but there can be a significant drop in transportation and disposal costs for used oil and antifreeze. Under so-called “closed loop” contracts, suppliers collect the used products for re-refining and re-processing. As the following examples illustrate, local governments have had favorable, and in some cases long-standing, experience with such products.



VEHICLE MAINTENANCE COST SAVINGS THROUGH THE USE OF:

- Retread tires
- Re-refined oil
- Reconditioned air filters
- Propylene glycol antifreeze
- Re-manufactured antifreeze
- High pressure spray washer

- The Town of Natick, Massachusetts purchases retread tires rather than new ones for its public works vehicle fleet, saving 43 to 57 percent or \$80 to \$140 per tire.³²
- King County, Washington, spent \$100,000 on retread tires in 1995-96, saving 62 to 69 percent (\$218 for heavy equipment tires, \$191 for light duty tires) over new tire costs. The county's public works fleet alone saved over \$30,000 on such purchases in 1995 and almost \$39,000 in 1996.³³
- Phoenix, Arizona's Sanitation Truck Tire Recap Program diverted 409 tires from the city's waste stream and resulted in total savings of over \$94,000 in disposal costs and tire purchases in 1995 alone.³⁴
- The City of Santa Monica's Fleet Management Division has used retread tires for more than twenty years. For the past several years, the Division has also been using re-refined oil and propylene glycol antifreeze. Although propylene glycol is not a recycled product, it is less toxic than the standard ethylene glycol antifreeze. It also saves on supply costs and maintenance time because it does not require the addition of a pH enhancer.³⁵
- By reconditioning air filters for multiple use in road graders and large trucks, Itasca County, Minnesota reduced the number of filters it purchases each year from 350 to 88. The county was able to cut filter replacement costs by \$7,300 annually, or 52 percent.³⁶
- By switching from a chemical degreaser to a high pressure spray washer using soap and water to clean engines and equipment, the Itasca County maintenance garage saves more than \$9,000 each year, or 99 percent of the cost of purchasing the chemical solvents. The soap and water system not only performs as well as the chemical degreaser, it also requires ten hours less labor each week.³⁷





GETTING STARTED

TIPS FOR MAKING \$SMART WASTE REDUCTION AND RECYCLING INVESTMENTS

Local governments can benefit fully from potential cost savings in their waste control and recycling programs through the development of a coordinated waste reduction and recycling plan that incorporates elements of the Smart Investments highlighted in this chapter. Important considerations in developing such a coordinated plan include:

- Unit pricing systems for waste reduction work best when combined with curbside recycling and yard waste composting programs. However, it is important to set fees for waste disposal high enough to cover any added costs of recycling and composting.
- To be most effective, C&D waste minimization programs should combine requirements for salvaging and recycling on public projects with education and outreach to contractors. Where possible, outreach materials should include guides to local outlets for salvaged and recycled materials.
- When initiating procedures for buying recycled products, pilot tests of such products may be necessary to overcome skepticism about their performance and resistance to change.



SOURCES OF ADDITIONAL INFORMATION

EPA WAVE PROGRAM

Smart Growth Network
 Urban and Economic Development Division
 Office of Policy, Planning and Evaluation
 U.S. Environmental Protection Agency (2127)
 401 M Street, SW
 Washington, DC 20460
 Phone: (202) 260-2750
 Fax: (202) 260-0174
 Internet Site: <http://smartgrowth.org>

EPA coordinates the Smart Growth Network, comprised of private sector, public sector and NGO partners. The network seeks to create and promote development practices that are economically, environmentally and socially beneficial. The network's Internet site includes information on deconstruction and construction waste management.

Triangle J Council of Governments
 P.O. Box 12276
 Research Triangle Park, NC 27709
 Contact: Judy Kincaid, Solid Waste Planning Director
 Phone: (919) 558-9343
 Fax: (919) 549-9390
 E-mail: jkincaid@nando.net

The Triangle J Council of Governments (TJCOG) is the regional planning council for the Wake, Durham, Orange, Chatham, Lee, and Johnston County region in North Carolina. TJCOG is working to promote C&D waste minimization in the triangle area. It has investigated state and local rules and regulations that created barriers to waste minimization and identified changes in public policy necessary to remove those barriers. TJCOG produces and distributes several resources, including a video for construction workers on C&D waste minimization, and the following guides:

- [Guide to Construction and Demolition Waste Recycling and Disposal in the Triangle](#)
- [Construction and Demolition Debris Reduction and Recycling: A Regional Approach](#)
- [WasteSpec: Model Specifications for Construction Waste Reduction, Reuse, and Recycling](#)

King County Solid Waste Division
 Department of Natural Resources
 400 Yesler Way, Room 600
 Seattle, WA 98104-2637
 Contact: Theresa Koppang
 Phone: (206) 296-8480
 Fax: (206) 296-0197

Metro Regional Environmental Management
 Department
 600 Northeast Grand Avenue
 Portland, OR 97232-2736
 Contact: Bryce Jacobson, Associate Planner
 Phone: (503) 797-1663
 Fax: (503) 797-1795

C&D WASTE MINIMIZATION *continued*

<p>City of Austin Planning, Environmental and Conservation Services Department 206 East 9th Street Austin, TX 78701 Contact: Laurence Doxsey Phone: (512) 499-3504 Fax: (512) 499-2859</p>	<p>City of Los Angeles Integrated Solid Waste Management Office Bureau of Sanitation 200 N. Main Street, Room 1450, City Hall East MS #944 Los Angeles, CA 90012 Contact: Kelly McArthur Ingalls Direct Phone: (213) 237-0143 General Phone: (213) 237-1444 Fax: (213) 847-3054 E-mail: ISWMO@loop.com</p>
<p>Rutland County Solid Waste District 2 Green Hills Lane Rutland, VT 05701 Contact: Michael Samson, District Manager Phone: (802) 775-7209</p>	

MUNICIPAL SOLID WASTE REDUCTION

<p>U.S. Environmental Protection Agency Office of Solid Waste WasteWiSe Helpline Phone: (800) EPA-WISE Contact: Joanne M. Oxley, Marketing & Communications Manager, WasteWiSe Program Phone: (703) 308-0199</p>	
<p>U.S. Environmental Protection Agency Office of Solid Waste and Emergency Response (OSWER) Pay-As-You-Throw Helpline Phone: (888) EPA-PAYT [toll-free] Contact: Janice Canterbury e-mail: canterbury.janice@epamail.epa.gov</p>	<p>Through its toll-free Pay-As-You-Throw Helpline, OSWER offers a tool kit for solid waste planners who are considering unit pricing programs. Many of the materials in the tool kit are also available through OSWER's Pay-As-You-Throw world-wide web site (URL: http://www.epa.gov/epaoswer/non-hw/payt/index.htm), including fact sheets, reports, and recent case studies of communities using unit pricing systems.</p>
<p>International City/County Management Association (ICMA) 777 North Capitol Street, NE, Suite 500 Washington, DC 20002-4201 Phone: (202) 289-4262 Fax: (202) 962-3500 Internet Site: http://www.icma.org</p>	<p>ICMA is a professional and educational association for more than 8,000 local government administrators worldwide. ICMA provides training programs, technical assistance, data services and publications to improve the quality of local government management and administration.</p>

BUYING RECYCLED

U.S. Environmental Protection Agency
 Office of Solid Waste and Emergency Response
 (OSWER)
 RCRA Hotline: (800) 424-9346 [TDD (800) 553-7672 for the hearing impaired]
 Internet site: URL:
<http://www.epa.gov/epaoswer/non-hw/procure.htm>

The hotline provides Comprehensive Procurement Guideline, as well as Buy-Recycled Series fact sheets on the recommended recycled content of different products. OSWER's Internet site, titled "Reduce, Reuse, Recycle... Through Procurement," is designed to facilitate implementation of the Comprehensive Procurement Guideline. The site lists manufacturers and suppliers of recycled-content products in the following categories :

- Construction,
- Landscaping,
- Park and recreation,
- Transportation,

The list also includes vehicular and non-paper office products containing recovered material.

Buy Recycled Campaign
 U.S. Conference of Mayors
 1620 Eye Street, NW
 Washington, DC 20006
 Phone: (202) 293-7330
 Northeast Maryland Waste Disposal Authority
 25 S. Charles Street, Suite 2105
 Baltimore Maryland 21201
 Phone: (410) 333-2730

The U.S. Conference of Mayors' Buy Recycled Campaign, in coordination with the Northeast Maryland Waste Disposal Authority, has developed the "Buy Recycled Training Manual" for local government procurement officers. Additional information on obtaining the manual, or on buying recycled products, can be obtained by calling either organization.

Recycling Data Management Corporation
 P.O. Box 577
 Ogdensburg, NY 13669
 Phone: (800) 267-0707
 Fax: (315) 471-3258

Recycling Data Management publishes The Official Recycled Products Guide, a national directory of more than 5,000 manufacturers and distributors of recycled products. Reprinted annually, the guide is also updated periodically throughout the year.

King County Recycled Product Procurement Program
 500 4th Avenue, Room 620
 Seattle, WA 98104
 Contact: Eric Nelson
 Phone: (206) 296-4234
 Fax: (206) 296-4211
 e-mail: eric.nelson@metrokc.gov

King County, Washington has developed sample procurement contract specifications, modeled on its Recycled Product Procurement Program, that can be obtained from its world-wide web site (<http://www.metrokc.gov/oppis/recyclea.html>). The site also includes copies of the county's fact sheets summarizing its experience with various recycled products, as well as annual reports for its Recycled Product Procurement Program.

BUYING RECYCLED *continued*

Alameda County Source Reduction and Recycling Board

Contact: Mark Cullors

Phone: (510) 614-1699 Alameda County, California's

Source Reduction and Recycling Board has sponsored the development of a buyers' manual on source reduction and recycled product procurement entitled "Resourceful Purchasing." This manual includes information on federal and state (California) purchasing requirements, recycled content standards, contracting procedures and model language for a recycled product procurement policy.

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