

2009

INFRASTRUCTURE FACT SHEET



In 2007, the U.S. produced 254 million tons of municipal solid waste. More than a third was recycled or recovered, representing a 7% increase since 2000. Per capita generation of waste has remained relatively constant over the last 20 years. Despite those successes, the increasing volume of electronic waste and lack of uniform regulations for disposal creates the potential for high levels of hazardous materials and heavy metals in the nation's landfills, posing a significant threat to public safety.

WATER AND ENVIRONMENT

FACTS
ABOUT

SOLID WASTE

RAISING THE GRADES

SOLUTIONS

THAT WILL WORK **NOW**

A = Exceptional
B = Good
C = Mediocre
D = Poor
F = Failing

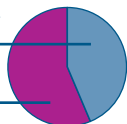
AMERICA'S
INFRASTRUCTURE
G.P.A.

D

ESTIMATED 5-YEAR FUNDING REQUIREMENTS FOR HAZARDOUS WASTE AND SOLID WASTE

Total investment needs
\$77 BILLION

Estimated spending
\$33.6 BILLION
Projected shortfall
\$43.4 BILLION



- ★ **IMPLEMENT** a holistic approach to waste management that reduces the volume of waste landfilled, increases the amount of materials recovered and recycled, and reduces the emissions of greenhouse gasses from landfills;
- ★ **ENCOURAGE** greater use of landfill gas to energy conversion to reduce greenhouse gas emissions and create new energy resources;
- ★ **OPPOSE** legislation that restricts the interstate movement of municipal solid wastes to new regional landfills that meet all federal requirements;
- ★ **PROMOTE** the use of alternative covers and the introduction of non-indigenous liquids and other operational changes to increase the effectiveness of solid-waste landfills;
- ★ **IMPLEMENT** source reduction policies that call for better design, packaging, and life span of commercial products;
- ★ **DEVELOP** national standards to promote proper, effective, and efficient collection and recycling of waste electronics.

CONDITIONS

According to the U.S. Environmental Protection Agency (EPA), municipal solid waste (MSW), commonly known as trash or garbage, consists of everyday items from households and businesses that are deposited in landfills. Some landfills, however, do accept such non-MSW as construction by-products, wastewater sludge, or other hazardous materials.

Per capita solid waste generation in 2007 was 4.62 pounds per person per day, a slight decline from 4.65 pounds in 2000.¹ While per capita waste production has been fairly constant, MSW continues to increase with population growth. In 2007, the U.S. produced 254 million tons of municipal solid waste of all types—an increase from 239 million tons in 2000,

according to the EPA. This included MSW that was generated by households, businesses, construction sites and other sources.¹

In 1986, there were 7,683 municipal solid waste landfills in the U.S. In October 1991, the EPA adopted stringent new federal regulations for landfill design and operation to reduce groundwater contamination from hazardous materials disposed of in landfills. By 1992, the number of U.S. landfills had dropped to 5,345. By 1995, the EPA landfill census recorded only 3,581 facilities. In 2007, the agency counted 1,754 landfills—a decline of 79% within two decades.¹ According to the EPA, the nation's disposal capacity has remained relatively constant because new landfills are much larger than in the past. In 2006, the National Solid Wastes Management

RAISING THE GRADES CASE STUDIES

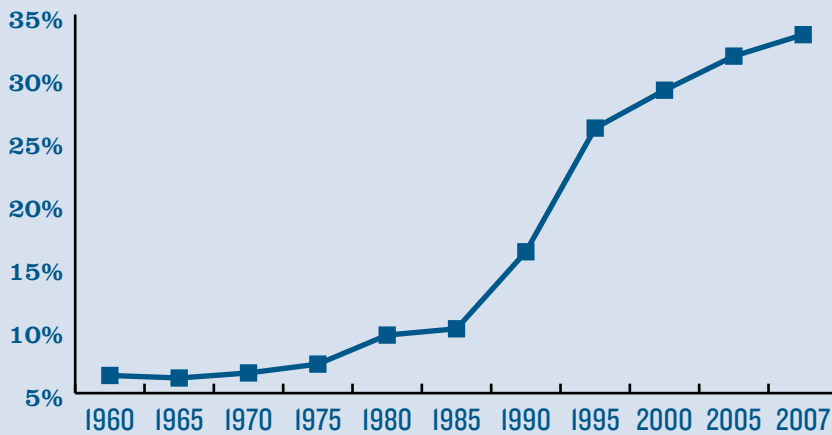
SAN FRANCISCO, CA ★ Food Scraps Diversion Program

San Francisco's food scrap diversion program—the first program of its kind in a large city—annually diverts more than 100,000 tons of primarily food scrap source-separated compostable material from the landfill for a variety of beneficial programs. The food scrap diversion program's commercial and agricultural uses include edible food redistribution, animal feed, on-site and centralized composting, conversion to energy, and grease to biodiesel.



Photo courtesy of Norcal Waste.

FIGURE 5.1 ★ Percent of Municipal Solid Waste that is Recycled: 1960–2007



SOURCE EPA Facts and Figures about Municipal Solid Waste, 2008

Association estimated that states have disposal capacity for another 20 years.²

Of the 254 million tons of solid waste generated in 2007, 85 million tons, or 33%, were recycled or composted compared to 30.1% in 2000; 32 million tons, or 13%, were burned in waste-to-energy (WTE) plants; and 137 million tons, or 54%, went into landfills compared to 55.3% in 2000.¹

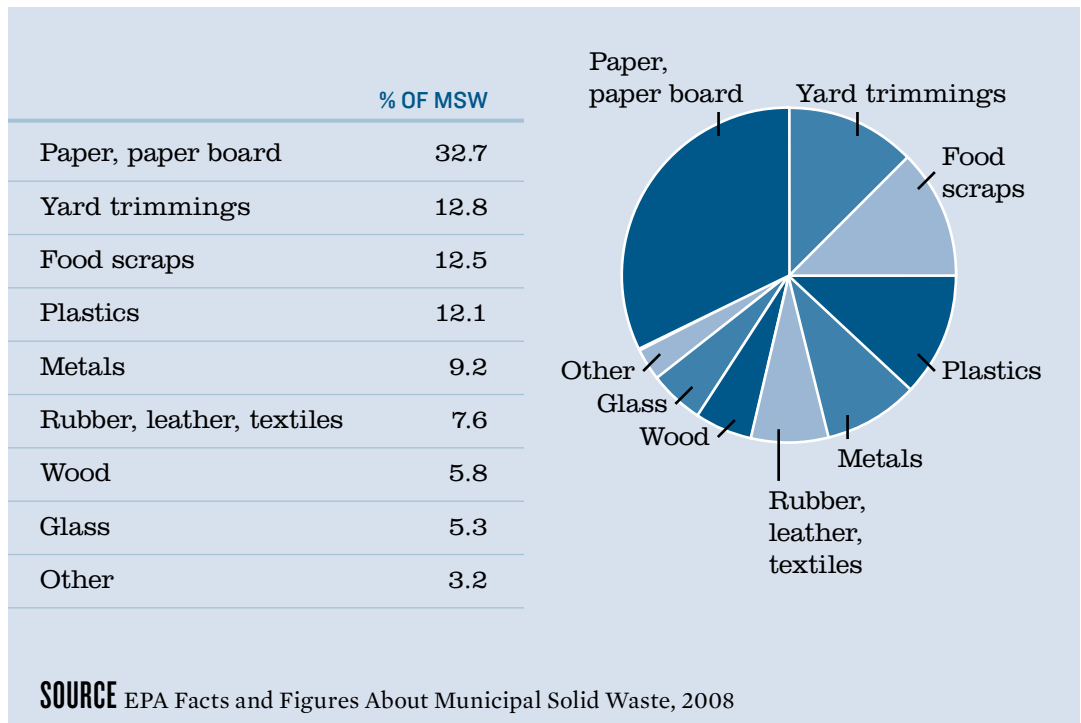
While the improvement in recycling rates is encouraging news, such issues as the improper disposal of electronic equipment and the emission of greenhouse gasses from landfills pose continued challenges.

The EPA estimates that in 2005 waste electrical and electronic equipment (WEEE) amounted to approximately two

million tons, most of which was discarded in landfills. Only between 345,000 and 379,000 tons were recycled.³ End-of-life electronics may contain such materials as lead that are hazardous to the environment when not handled and disposed of properly. No national standard on the recycling of WEEE exists, and uncoordinated state regulations can discourage consumers from recycling.⁴

In 2006, 23% of human-related methane gas emissions came from MSW landfills, making landfills the second largest producer of methane.⁵ The methane gas emitted from landfills can be captured and transformed into usable energy. Despite this opportunity, at the end of 2007 only 457 landfill gas (LFG) energy projects

FIGURE 5.2 ★ Components of Municipal Solid Waste
(254 million tons generated in 2007)



were operational. These LFG programs produce approximately 11 billion kilowatt hours of electricity per year and deliver 236 million cubic feet per day of gas to direct-use applications. The EPA estimates that more than 500 additional sites are good candidates for energy conversion projects, but high start-up costs inhibit expansion of this process.⁵

RESILIENCE

Although landfills are dependent on energy and road infrastructure, as a sys-

tem, solid waste disposal facilities remain resilient. However, the impacts of such landfill failures as air and groundwater pollution on surrounding neighborhoods are apparent but not well quantified, and the time required for restoration is often lengthy and costly. Additionally, landfills can play an important role during recovery operations, but without adequate disposal options cleanup and recovery efforts may be hindered.

Future investments must consider new technologies and behavioral changes focused on energy conversion, recycling, waste reduction, and increased efficiency.

ORANGE COUNTY, FL ★ Orange County Landfill

The Orange County Landfill, the third largest landfill in Florida, initiated design activities for a landfill gas-to-energy project in 1998. The electricity generated from the plant powers an estimated 13,000 homes and reduces methane emissions by nearly 31,000 tons per year at full capacity. Orange County stands to make \$400,000 per year for rights to the landfill gas.⁵

Photos courtesy of Debra R. Reinhart, Ph.D., P.E., BCEE, F.ASCE.



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CONCLUSION

Innovative technologies and recycling efforts have been successful in improving the safety, sustainability, and efficiency of the nation's waste disposal systems. The lack of long term strategies to deal with increased amounts of electronic waste and under-use of waste to energy practices, however, indicates the need for continued research and development of new policies and management practices. ★

SOURCES

- 1 U.S. Environmental Protection Agency, *Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2006*, November 2008.
- 2 National Solid Wastes Management Association, *What is a Solid Waste Landfill*, November 2006. <http://wastec.isproductions.net/webmodules/webarticles/anmviewer.asp?a=1127>
- 3 U.S. Environmental Protection Agency, *Statistics on the Management of Used and End-of-Life Electronics*. www.epa.gov/epawaste/conserve/materials/ecycling/manage.htm
- 4 Government Accountability Office, *Electronic Waste: EPA Needs to Better Control Harmful U.S. Exports through Stronger Enforcement and More Comprehensive Regulation*, August, 2008.
- 5 U.S. Environmental Protection Agency, *Landfill Methane Outreach Program, Basic Information*. www.epa.gov/outreach/lmop/overview.htm#methane

DETROIT, MI ★ Greater Detroit Resource Recovery Facility

Detroit's Resource Recovery Plant began operating in July 1989 and is currently one of the largest waste-to-energy facilities in the country in terms of capacity—the facility is permitted to process 4,000 tons of municipal solid waste per day. Everyday waste is processed into refuse-derived fuel (RDF), which is burned in stoker-fired boilers to yield steam for heating, cooling, and electricity. Approximately 3,300 tons of municipal solid waste is processed each day, yielding 3,100 tons of RDF. The facility produces 720,000 pounds of steam per hour, which is used to generate up to 68 megawatts of electricity. The resulting energy products are then sold to Detroit Edison Corporation.

Between July 1, 1989, and June 30, 1999, the facility processed 7,572,000 tons of municipal solid waste—enough waste to fill the interior of the Detroit Tigers' baseball stadium approximately 40 times. *Photos courtesy of the Greater Detroit Resource Recovery Authority.*

