

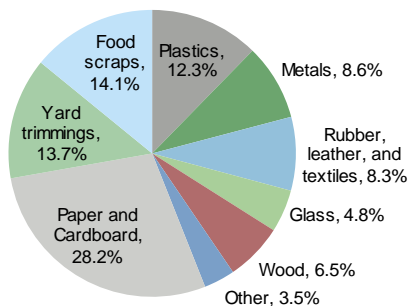


# Municipal Solid Waste

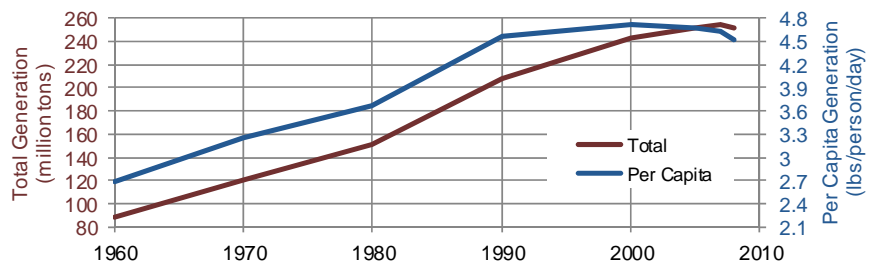
# factsheets

Municipal Solid Waste (MSW), commonly called “trash” or “garbage”, includes wastes such as durable goods, e.g., tires, furniture; nondurable goods, e.g., newspapers, plastic plates/cups; containers and packaging, e.g., milk cartons, plastic wrap; and other wastes, e.g., yard waste, food. This category of waste generally refers to common household waste, as well as office and retail wastes, but excludes industrial, hazardous, and construction wastes. The handling and disposal of MSW is a growing concern as the volume of waste generated in the U.S. continues to increase.

U.S. MSW Composition, 2009<sup>1</sup>



U.S. Annual MSW Generation<sup>1</sup>



## Generation Statistics<sup>1</sup>

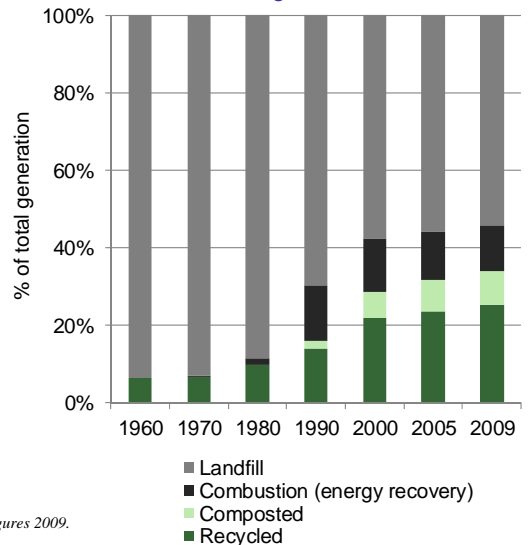
- Total annual MSW generation in the U.S. has increased by 60% since 1980, to the current level of about 250 million tons per year.
- Packaging and containers were 29.5% of MSW generation in 2009, followed by nondurable goods (including papers and plastics which last under 3 years) at 22.0%, with most of the remainder split between durable goods, yard trimmings, and food scraps.
- Between 1960 and 1990, per capita MSW generation in the U.S. increased 68%, including an increase of more than 20% in the 1980s, but per capita generation has been relatively constant for the past 15 years.
- At the 2009 per capita rate of 4.34 lbs/person/day the average American generates their own weight (180 lbs) in MSW every 41 days.<sup>2</sup> For comparison, MSW generation rates (in lbs/person/day) are 3.1 in Sweden, 3.5 in Germany, and 3.4 in the UK.<sup>3</sup>
- The generation of MSW per dollar of private consumption in the U.S. is approximately 62 lbs per thousand dollars. Comparable generation rates (in lbs/thousand dollars) are 75 in Sweden, 88 in Germany, and 67 in the UK.<sup>4</sup>

## Management Methods

### Landfill

- In 2009, 54.3% of MSW generated in the U.S. was disposed of in 1,908 landfills.<sup>1</sup>
- While the total number of landfills in the U.S. has been declining steadily, total capacity has increased. The 2010 combined capacity of the two largest landfill corporations in the U.S. was 9.3 billion tons.<sup>5</sup>
- Disposal (tipping) fees for landfills in the U.S. currently average \$42 per ton with a high of \$96 per ton in Vermont.<sup>6</sup>
- Environmental implications of landfill disposal include the loss of land area resources, potential leaching of hazardous materials to ground water (proper design limits this possibility), and emissions of methane (CH<sub>4</sub>, a greenhouse gas) to the atmosphere.
- Landfills were the third largest source of U.S. anthropogenic CH<sub>4</sub> emissions in 2009, accounting for 117.5 million metric tons CO<sub>2</sub>-equivalent emissions, about 2% of total GHG emissions. Half of landfill-produced CH<sub>4</sub> is recovered and combusted into CO<sub>2</sub> through flaring or electricity generation.<sup>7</sup>

MSW Management in the U.S.<sup>1</sup>



<sup>1</sup> U.S. Environmental Protection Agency (2010) *Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures 2009*.

<sup>2</sup> Center for Disease Control (2009) *FastStats – Body Measurements*.

<sup>3</sup> Organisation for Economic Co-operation and Development (2010) *Factbook 2010: Economic, Environmental, And Social Statistics*.

<sup>4</sup> Organization for Economic Co-operation and Development (2008) *OECD Key Environmental Indicators 2008*.

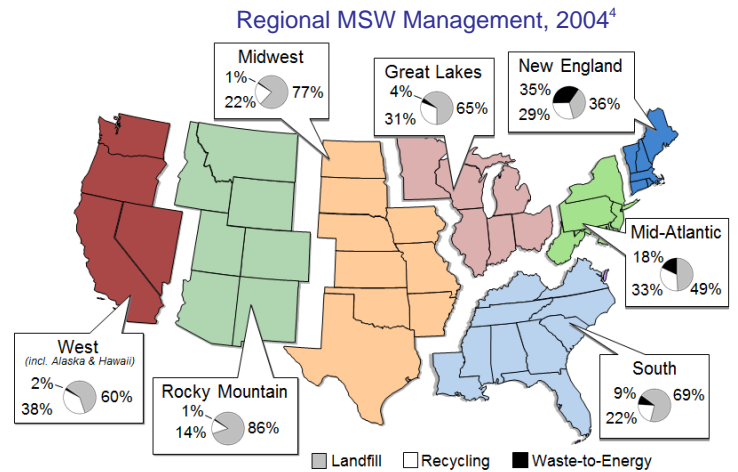
<sup>5</sup> U.S. Securities and Exchange Commission (2011) *Annual 10-K Filings*.

<sup>6</sup> Biocycle and the Earth Engineering Center of Columbia University (2008) *The State of Garbage in America*.

<sup>7</sup> U.S. Environmental Protection Agency (2011) *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2009*.

## Combustion

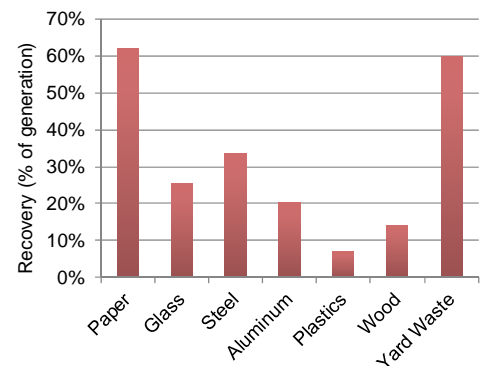
- In 2009, 11.9% of MSW generated in the U.S. was disposed of through waste incineration with energy recovery.<sup>1</sup>
- Combustion reduces waste to ash by about 75% (by weight) for disposal in a landfill.<sup>1</sup>
- Biogenic MSW (e.g. paper, food, yard trimmings) converted into useable energy provided 169 trillion BTU in 2008 – less than 0.2% of total U.S. demand.<sup>8</sup>
- In 2006, 103 waste-to-energy facilities were in operation in the U.S. with average disposal fees of \$64.88 per ton.<sup>6</sup>
- The incineration of MSW generates a variety of pollutants (such as CO<sub>2</sub>, heavy metals, dioxins and particulates) that contribute to environmental and human health impacts such as climate change, smog, acidification, asthma, and heart and nervous system damage.



## Recycling and Composting<sup>1</sup>

- In 2009, 33.8% of MSW generated in the U.S. was recovered for recycling or composting, diverting 82 million tons of material from landfills and incinerators – more than double the amount diverted in 1990.
- Recovered composting materials represent 25% of all recovered materials.
- Curbside recycling programs currently serve 71% of people in the U.S., and about half of these programs are single-stream (i.e. materials such as glass and paper are separated at the recycling plant).<sup>1</sup> The number of curbside programs in the U.S. has increased more than threefold since 1990.<sup>9</sup>
- Over 81% of corrugated boxes are recovered for recycling; other commonly recycled products include newspapers (88%), major appliances (67%), office papers (74%), and aluminum beverage cans (51%).<sup>1</sup>
- Some common products with poor recycling rates include: carpet (8%), plastic bags (9%), and small appliances (7%).<sup>1</sup>

**Recovery of Materials in MSW, 2009<sup>1</sup>**



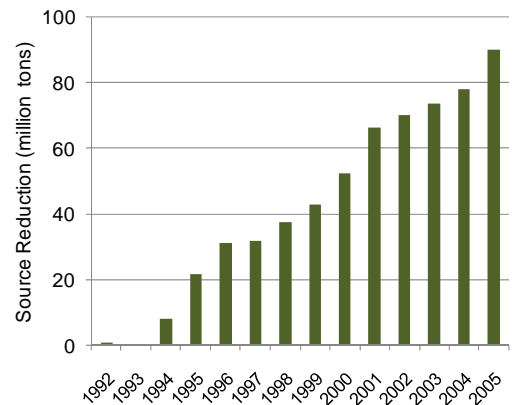
## Opportunities for Improvement

### Source Reduction

Source reduction activities reduce the amount of wastes before they enter the MSW management system. Source reduction activities for consumers include:

- Minimize the volume of packaging material required to deliver products by selecting products packaged efficiently or buying in bulk.
- Identify opportunities to reuse products and packaging in the home or community rather than disposing or recycling them.
- Encourage companies to implement source reduction programs and purchase products with post-consumer recycled content.
- Reduce consumption of disposable goods and purchase products from reuse centers.
- Reduce food waste (27% of edible food is wasted at the consumer level) through efficient meal planning and composting of scraps.<sup>10</sup>

**U.S. Source Reduction<sup>3</sup>**  
(using 1990 baseline)



### Encourage Supportive Public Policy

- Many municipalities have implemented programs, e.g., reuse centers, food rescue; and incentives, e.g., Pay-As-You-Throw programs designed to limit the volume of waste collection per household.
- Implementation of curbside recycling and composting programs where they are currently unavailable can help reduce the burden of waste disposal.
- Many states do not restrict landfill disposal of some potentially hazardous items, e.g., oil, batteries, scrap tires and electronics.<sup>6</sup> Many of these products and materials are hard to recycle and have limited management options.
- 11 states (CA, CT, DE, HI, IA, ME, MA, MI, NY, OR, and VT) have deposit laws that encourage the return of empty containers for refunds.<sup>1</sup>

<sup>8</sup> U.S. Department of Energy Energy Information Administration (2009) *Renewable Energy Trends in Consumption and Electricity 2007*.

<sup>9</sup> Biocycle and the Earth Engineering Center of Columbia University (2006) *The State of Garbage*.

<sup>10</sup> Heller, M.C. and G.A. Keoleian (2000) *Life Cycle-Based Sustainability Indicators for Assessment of the U.S. Food System* (CSS00-04).

