

TRASH FACTS

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America has made great strides in dealing with municipal solid waste (MSW, trash, garbage) in the last 10-15 years. Major accomplishments include:

- Attainment of EPA's national recycling goal of 25%
- Development of stringent regulations for landfills and municipal solid waste combustors
- Significant reduction in the weight of packaging and products
- Increased

MSW Generation		
Year	Population (millions)	MSW (millions of tons)
1980	227	152
1990	250	205
1995	263	214
1999	273	231
2000	282	232

removal of hazardous materials from the waste stream

Nationally, a more balanced mix of waste management methods has been achieved, with recycling at 30%, landfilling at 55%, and waste combustion at 15% of MSW.

However, trash management remains a difficult issue at the municipal or county level. Many economic and public policy challenges remain for localities in achieving an appropriate mix of waste management options.

About the Author

Dr. J. Winston Porter is president of the Waste Policy Center, which deals with a wide range of environmental management issues. Dr. Porter was an EPA assistant administrator from 1985 to 1989, serving as national manager for the Superfund and RCRA programs. In 1988, he set a national recycling goal of 25%, which was reached in 1995.

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What's in our trash?

Municipal solid waste is a complex mixture of discarded items, with paper and yard wastes providing the largest fractions. Trash content can be described by basic materials (glass, metals, paper, plastic, etc.) or by types of used products (appliances, containers, newspapers, etc.).

MSW By Product in 2001

	Millions of Tons	% by Weight
Containers & Packaging		
Corrugated boxes	29.0	13.5%
Glass	10.9	4.8
Misc. paper	9.4	4.4
Plastics	11.2	4.9
Wood	8.2	3.3
Steel	2.6	1.3
Aluminum	2.0	0.9
Subtotal	73.5	33.1
Non-durable Goods		
Newspapers	12.2	6.1
Misc. non-durables	11.7	5.1
Misc. printed matter	10.3	4.4
Office paper	7.4	3.4
Clothing and shoes	6.7	2.7
3rd Class mail	5.4	2.4
Paper tissue and towels	3.3	1.5
Disposable diapers	3.4	1.4
Subtotal	60.4	27.0
Durable Goods		
Misc. durables	14.9	6.5
Furniture, furnishings, rugs	10.8	4.4
Tires & batteries	6.6	2.9
Appliances	4.7	1.6
Subtotal	37.6	15.4
Yard Wastes	28.0	12.0
Food Wastes	26.2	11.0
Other Wastes	3.5	1.5
TOTALS	229.2	100.0

MSW by Material in 2001

	Millions of Tons	% by Weight
Paper & paperboard	81.9	35.7%
Yard Wastes	28.0	12.2
Food Wastes	26.2	11.4
Plastics	25.4	11.1
Glass	12.6	5.5
Ferrous Metals	13.5	5.9
Wood	13.2	5.7
Textiles	9.8	4.3
Rubber & Leather	6.5	2.8
Aluminum	3.2	1.4
Other Wastes	8.9	3.9
Totals	229.2	100.0%

How is trash managed?

The nation's trash is managed through landfilling, combustion (usually to make electrical energy), and recycling (including composting). The EPA refers to the complementary use of these methods, along with source reduction, as Integrated Waste Management (IWM), which promotes customized local programs.

Nationally, recycling has become a much more important component of trash management.

Waste-to-Energy Combustion

Trash can also be managed in waste-to-energy (WTE) plants, which burn refuse at high temperatures to reduce its volume by about 90 percent. Some

100 of these plants are in use in the U.S., with over 75 percent of the capacity in the states above.

The electricity generated by WTE facilities meets the needs of about 2.4 million homes, replacing the energy equivalent of almost 30 million barrels of crude oil per year.

Trash combustors are primarily regulated under the Clean Air Act (CAA) and RCRA. The CAA requires WTE plants to obtain permits whose provisions depend on plant size and other factors.

Federal and state regulators, under the CAA, set emissions standards for SO₂, HCl, NO, CO, particulates, cadmium, lead, mercury, and dioxins/furans.

A major RCRA requirement involves determining if combustor ash meets the definition of a hazardous waste. If so, it must be managed as such, which is rare.

	1990	1999	2000	2001	2002
Landfilling	68.3	56.2	57.0	55.6	55.5
Combustion	15.5	16.7	14.5	14.7	14.7
Recycling	16.2	28.4	29.2	29.7	29.8
Totals	100.0	100.0	100.0	100.0	100.0

Source reduction

Source reduction involves reduction in the quantity or toxicity of materials during the manufacturing process, or through product reuse. It can also include, for example, minimizing food spoilage or product damage through effective packaging.

While wastes are increasing somewhat due to

population growth and our information society, considerable source reduction is also occurring.

	1980	2002
2-liter PET bottle	65	47
Aluminum can	19	13
Glass soda bottle	255	165
Steel (tin) soup can	48	35
Half-pint milk carton	14	9

Landfills

Approximately 2000 landfills operate in the U.S. About two-thirds are owned by public entities, with the remaining one-third belonging to private companies. These landfills vary greatly in size and capacity.

- About 20% receive less than 25 tons of waste per day.
- Some 17% receive more than 500 tons daily.
- Private sites contain about 2/3 of the remaining capacity.

Modern landfills are designed to minimize potential hazards to public health and the environment. Both existing and new landfills must meet RCRA "Subtitle D" requirements. (RCRA is the Resources Conservation and Recovery Act.)

States can seek approval from EPA to enforce these requirements, which include the following:

Landfill Requirements

- Restrictions on locations of landfills
- Operating criteria such as exclusion of hazardous wastes, methane gas controls, and surface water requirements
- Design criteria which, in effect, require liners and leachate collection systems for most new landfills
- Groundwater monitoring and corrective action when indicated
- Closure and post-closure care requirements
- Financial assurance provisions

Also, for large landfills, EPA has issued rules for non-methane organics emissions under the Clean Air Act.

Recycling

MSW recycling is now a mainstream waste management tool with over 9,000 curbside programs, almost 4,000 composting facilities, and many thousands

Recycling as a Percentage of Waste Streams

Corrugated boxes	70%
Newspapers	62
Steel cans	59
Yard wastes	56
Office paper	54
Aluminum cans	47

of drop-off and buy-back centers, material recovery facilities, and scrap dealers.

It is helpful to view recycling from at least two standpoints. The first deals with the percentage of a specific waste which is recycled, as estimated to the left for 2002.

The second concerns the relative contribution of specific items to the overall recycling rate. This is shown (to the right) for the estimated 68 million tons of recycling in 2002 from residential and commercial sources.

Recycling as a Percentage of MSW

	Residential	Commercial	Total
Corrugated boxes	0.1%	8.8%	8.9%
Yard wastes	6.5	0.5	7.0
Newspapers	2.8	0.5	3.3
Other paper	1.4	0.7	2.1
Office paper	0.1	1.6	1.7
Steel cans & appl.	0.8	0.7	1.5
Glass containers	0.8	0.2	1.0
Wood packaging	0.0	0.6	0.6
Textiles	0.3	0.2	0.5
Plastics packaging	0.5	0.0	0.5
Rubber and leather	0.1	0.4	0.5
Aluminum cans	0.2	0.1	0.3
Food wastes	0.2	0.1	0.3
Other wastes	0.4	1.2	1.6
Totals	14.2%	15.6%	29.8%

State Recycling Goals

Goal	Date	Goal	Date
Alaska	25%	Missouri	40 1998
Arkansas	40	Montana	25 1996
California	50	Nebraska	50 2002
Colorado	50	Nevada	25
Conn.	50	N.H.	40 2000
Delaware	50	N.J.	65 2000
DC	45	N.M.	50 2000
Florida	30	New York	50 1997
Georgia	25	N.C.	40 2001
Hawaii	50	N.D.	40 2000
Ohio	50	Ohio	50 2005
Idaho	25	Penna.	35 2003
Illinois	50	R.I.	70
Indiana	50	S.C.	35 2005
Iowa	50	S. Dakota	50 2001
Kentucky	30	Tennessee	25 2003
Louisiana	25	Texas	40 1994
Maine	55	Vermont	50 2005
Maryland	40	Virginia	25
Mass.	70	Washington	50 1995
Michigan	25	W. Virginia	50 2010
Minn.	50	Wyoming	35 2005
Miss.	25		1996

U.S. Conference of Mayors Recycling Index

The CMRI allows “apples to apples” comparisons of recycling rates. Divide the weight of all items recovered to make new products by all the MSW produced in your area. Use only MSW as defined below.

$$\text{CMRI} = \frac{\text{Amount Recycled}}{\text{MSW Produced}} \times 100$$

Municipal Solid Wastes (MSW) Special Wastes(SW)

<i>Paper:</i>	Newspapers	Asphalt
	Corrugated	Auto scrap
	Office paper	C & D debris
	Mixed paper	Ferrous scrap
<i>Metal:</i>	Aluminum cans	Non-ferrous scrap
	Steel cans	Stumps
	Appliances	Used Oil
<i>Glass:</i>	Containers	
	Other Plastics	
<i>Textiles, Batteries, Tires, Yard Wastes, Food Wastes and Other Trash</i>		