

## Municipal Solid Waste

Municipal solid waste (MSW) (also called trash) consists of everyday items such as product packaging, yard trimmings, furniture, clothing, bottles and cans, food, newspapers, appliances, electronics and batteries. Sources of MSW include residential waste, as well as waste from commercial and institutional locations, such as restaurants, grocery stores, other businesses, schools, hospitals and industrial facilities. Industrial facility waste includes waste from sources such as offices, cafeterias and packaging, but not process waste. The Environmental Protection Agency's (EPA) definition of MSW does not include industrial process waste, hazardous waste, or construction and demolition (C&D) waste. Once generated, MSW must be collected and managed. Common management methods include recycling, composting, combustion with energy recovery and landfilling. Many wastes that are landfilled represent a loss of materials that could be reused, recycled or converted to energy to displace the use of virgin materials.

Before the 1970s, MSW management generally consisted of depositing wastes in open dumps, accompanied by open burning to reduce waste volumes. Often industrial hazardous wastes were co-disposed with municipal garbage and refuse in open dumps or landfills. Historically, environmental problems associated with these older landfills have included ground water contamination, emissions of toxic fumes and greenhouse gases, land contamination and increases in pest and disease vector populations, such as rodents, flies and mosquitos. Landfills are now subject to federal or state requirements to minimize these environmental impacts.

This indicator shows trends in the national generation and management of MSW, as well as trends in waste generation intensity from 1960 to 2018. MSW generation and management totals are estimated over time using a materials flow methodology that relies on production data (by weight) for materials and products that eventually enter the waste stream. These data are collected from industry associations, businesses and government agencies. Exhibit 2 compares MSW trends with the official U.S. population and real (inflation-adjusted) GDP. These data are indexed such that 1960 equals one, which allows all variables to be plotted on the same scale.

As a society consumes more materials, it demands more resources like water, energy, minerals and land and generates more pollutants and waste. According to EPA's National Recycling Strategy, "a circular economy, as defined in the Save Our Seas 2.0 Act, refers to an economy that uses a systems-focused approach and involves industrial processes and economic activities that are restorative or regenerative by design, enable resources used in such processes and activities to maintain their highest value for as long as possible, and aim for the elimination of waste through the superior design of materials, products and systems (including business models). It is a change to the model in which resources are mined, made into products, and then become waste. A circular economy reduces material use, redesigns materials to be less resource-intensive, and recaptures "waste" as a resource to manufacture new materials and products." (EPA, 2022)

"Circularity is embraced within the sustainable materials management (SMM) approach that the United States federal government has pursued since 2009. A circular economy approach under the SMM umbrella demonstrates continuity in EPA's emphasis on reducing life-cycle impacts of materials, including climate impacts; reducing the use of harmful materials, and decoupling materials use from economic growth. The National Recycling Strategy recognizes the need to implement a circular economy approach for all – reducing the creation of waste with local communities in mind and implementing materials management strategies that are inclusive of communities with environmental justice concerns." (EPA 2022)

### What the Data Show

The total quantity of MSW generated in the U.S. grew steadily from 88 million tons (MT) in 1960 to a peak of 292 MT in 2018 (Exhibit 1). Of the MSW generated in 1960, 6 percent was recycled and 94 percent was landfilled or disposed of using other methods (including open burning) (Exhibit 1). In 2018, 24 percent of MSW was recycled, 9 percent was composted, 12 percent was combusted with energy recovery, 50 percent was landfilled or disposed of using other methods, and 6 percent was food waste managed by other methods (Exhibit 1). The last several decades have seen steady growth in recycling and composting, while the total amounts landfilled and combusted with energy recovery have remained fairly steady since 1990. Disposal practices have also been influenced by the development of large waste-to-energy facilities, particularly during the 1980s. Starting with the 2018 data, EPA revised its food

measurement methodology to more fully capture flows of excess food and food waste. The resulting new “other food management” category accounted for 17.7 MT of MSW managed in 2018, explaining most of the increase since 2017 seen in Exhibit 1.

Overall, from 1960 to 2018, total MSW generation in the U.S. increased by 232 percent. During this time, the U.S. population increased by 81 percent and the size of the U.S. economy, as measured by real GDP, grew by 473 percent. MSW generation per capita increased by 71 percent from 1960 to 1990 (from 2.7 to 4.6 pounds per person per day) but has leveled off since then. The higher rate in 2018 reflects the change in food waste measurement methodology. MSW generation per dollar GDP has decreased fairly steadily over the last five decades, with a 42 percent decrease from 1960 to 2018 (Exhibit 2).

## Limitations

- The data in this indicator are derived from economic statistics on materials generation and estimates of the lifecycle of goods, rather than from direct facility-based measurements of disposed wastes. However, the four management methods shown in Exhibit 1 are rigorously defined and consistent from year to year, allowing for reliable long-term trend analyses.
- Data for food waste managed by methods other than composting, combustion with energy recovery, and landfilling were included for the first time for 2018 and accounted for 17.7 million tons (6.1%) of waste managed in 2018, causing an apparent increase in municipal solid waste that reflects a change in the measurement methodology.
- The data presented on landfills represent the amount of MSW left after accounting for recycling, composting, other food management, and combustion with energy recovery. These data do not indicate the capacity or volume of landfills or the amount of land used for managing MSW. Also, land used for recycling facilities and waste transfer stations is not included in this indicator. Data to describe the amount of land used or total capacity of landfills are not available nationally.
- The data also do not indicate the status or effectiveness of landfill management or the extent to which contamination of nearby lands does or does not occur.
- In Exhibit 2, MSW intensity can only reflect national-scale materials use intensity to a limited degree. Because of international trade, materials extracted or produced in one country may end up being managed as waste in another. This indicator covers waste managed in the U.S., regardless of country of origin.

## Data Sources

Exhibits 1 and 2 are derived from estimates developed for EPA’s Advancing Sustainable Materials Management: 2018 Fact Sheet (U.S. EPA, 2020a, U.S. EPA, 2020b). Additionally, Exhibit 2 incorporates GDP data obtained from the U.S. Bureau of Economic Analysis (BEA, 2021) and population data from the U.S. Census Bureau (2000, 2004, 2011, 2019).

## References

BEA (U.S. Bureau of Economic Analysis). 2021. Current-dollar and “real” gross domestic product (GDP). <https://www.bea.gov/data/gdp/gross-domestic-product#gdp>.

U.S. Census Bureau. 2019. Annual estimates of the resident population for the United States, regions, states, and Puerto Rico: April 1, 2010 to July 1, 2019 (NST-EST2019-01). Released December 2019. <https://www.census.gov/data/tables/time-series/demo/popest/2010s-national-total.html>

U.S. Census Bureau. 2011. Intercensal estimates of the resident population by sex and age for the United States: April 1, 2000 to July 1, 2010 (US-EST00INT-01). Released September 2011. <https://www.census.gov/data/tables/time-series/demo/popest/intercensal-2000-2010-national.html>.

U.S. Census Bureau. 2004. Intercensal estimates of the United States resident population by age and sex: 1990 to 2000 (US-EST90INT). <https://www.census.gov/data/datasets/time-series/demo/popest/intercensal-1990-2000-national.html>.

U.S. Census Bureau. 2000. Historical national population estimates: July 1, 1900 to July 1, 1999. Released April 2000. <https://www2.census.gov/programs-surveys/popest/tables/1900-1980/national/totals/popclockest.txt>.

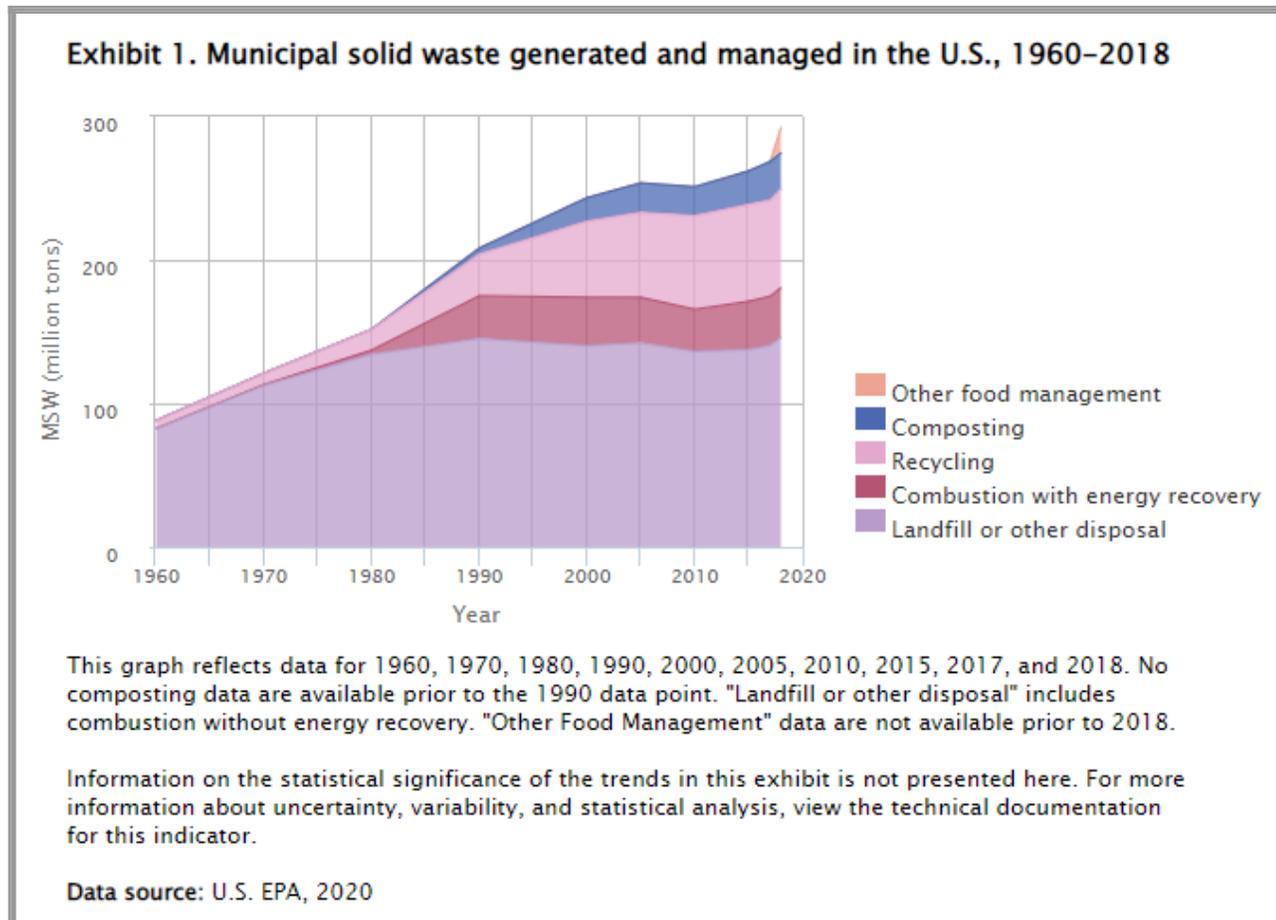
U.S. EPA (U.S. Environmental Protection Agency). 2022. Strategies on Building a Circular Economy for All. January 2022. <https://www.epa.gov/recyclingstrategy/strategies-building-circular-economy-all#strategy>

U.S. EPA (U.S. Environmental Protection Agency). 2020a. Advancing Sustainable Materials Management: 2018 Fact Sheet. December 2020.

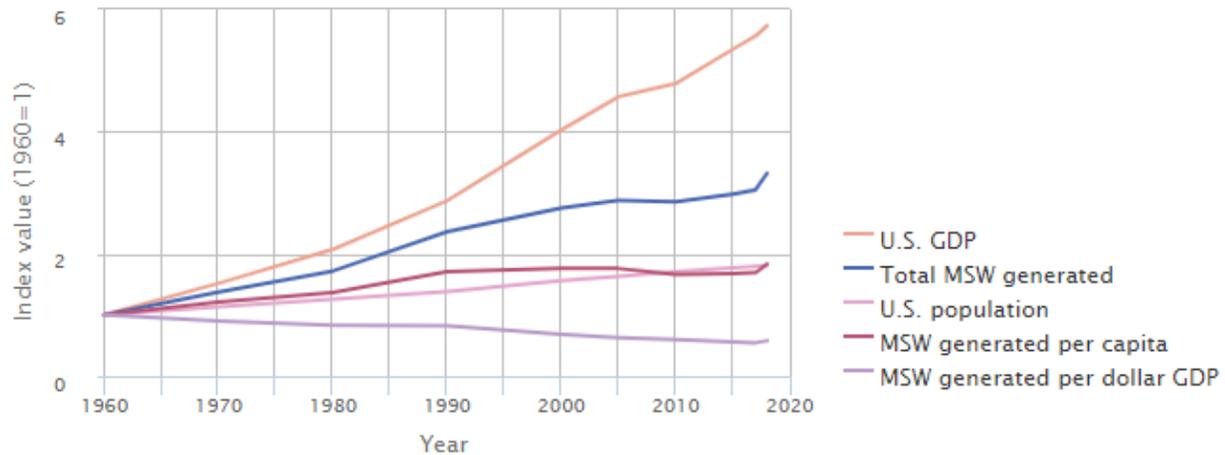
[https://www.epa.gov/sites/production/files/2021-01/documents/2018\\_ff\\_fact\\_sheet\\_dec\\_2020\\_fnl\\_508.pdf](https://www.epa.gov/sites/production/files/2021-01/documents/2018_ff_fact_sheet_dec_2020_fnl_508.pdf) (PDF) (25 pp, 4.8MB).

U.S. EPA. 2020b. Advancing Sustainable Materials Management: 2018 Tables and Figures. December 2020.

[https://www.epa.gov/sites/production/files/2021-01/documents/2018\\_tables\\_and\\_figures\\_dec\\_2020\\_fnl\\_508.pdf](https://www.epa.gov/sites/production/files/2021-01/documents/2018_tables_and_figures_dec_2020_fnl_508.pdf) (PDF) (84 pp, 8MB)



## Exhibit 2. Intensity of U.S. municipal solid waste generation, 1960–2018



This graph reflects data for 1960, 1970, 1980, 1990, 2000, 2005, 2010, 2015, 2017, and 2018. GDP is real (inflation-adjusted) GDP.

Information on the statistical significance of the trends in this exhibit is not presented here. For more information about uncertainty, variability, and statistical analysis, view the technical documentation for this indicator.

**Data source:** BEA, 2021; U.S. Census Bureau, 2000, 2004, 2011, 2019; U.S. EPA, 2020