Advancing Sustainable Materials Management: Facts and Figures 2013

Assessing Trends in Materials Generation, Recycling and Disposal

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Webinar Outline

- Introduction
- MSW Generation and Recovery
- Commodity Specific Generation and Recovery
- MSW and Greenhouse Gases
- MSW Economic Analysis
- Construction and Demolition Debris

Advancing Sustainable Materials Management: Facts and Figures 2013

- EPA has collected data for more than 30 years
- Facts and Figures Fact Sheet is issued every year
- Full Report is issued every other year
- For details go to:

  http://www.epa.gov/osw/nonhaz/municipal/msw99.htm

New in this Year's Report

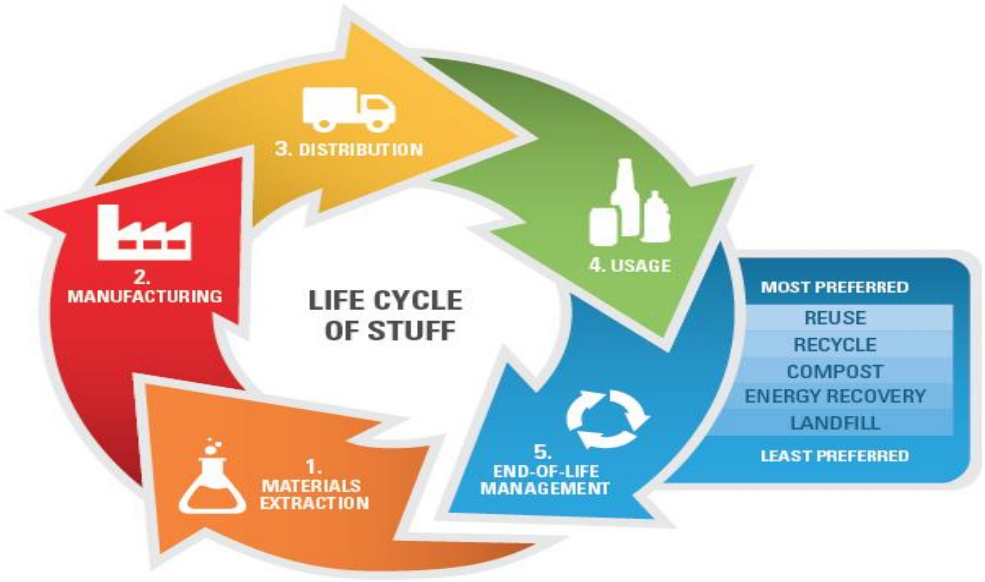
- New report title emphasizes the importance of Sustainable Materials Management (SMM)

- New name also reflects expansion of report to include:
  - New information on historical landfill tipping fees
  - Construction and demolition debris generation
  - Source reduction

Key Report Findings

- In 2013, the recycling rate (including composting) was 34.3%
- Food waste composting was 5.0% in 2013, up from 4.8% in 2012
- Electronics recycling was 40.4% in 2013, up from 30.6% in 2012

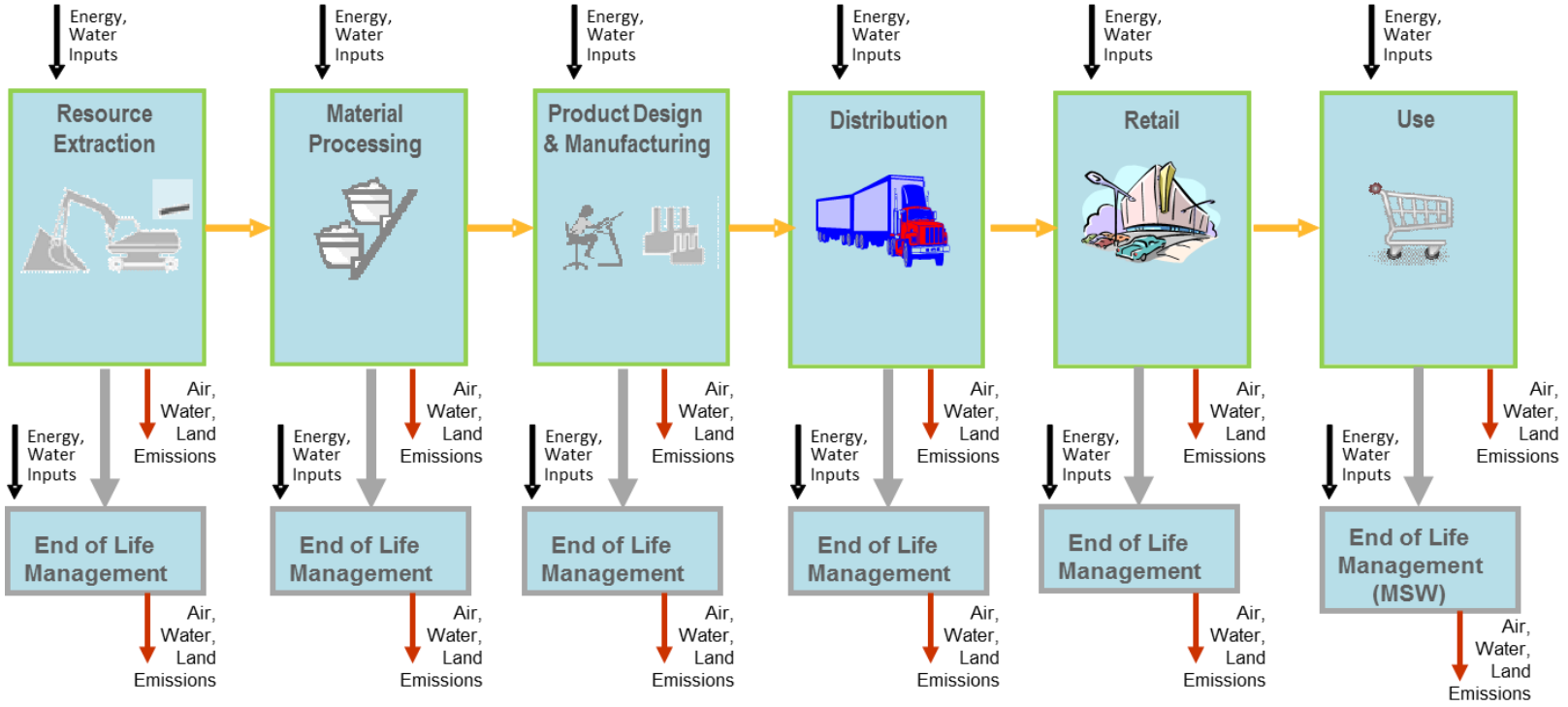
What is Sustainable Materials Management?



"An approach to serving human needs by using/reusing resources productively and sustainably throughout their life cycles, generally minimizing the amount of materials involved and all associated environmental impacts."

Sustainable Material Management: The Road Ahead, EPA, 2009

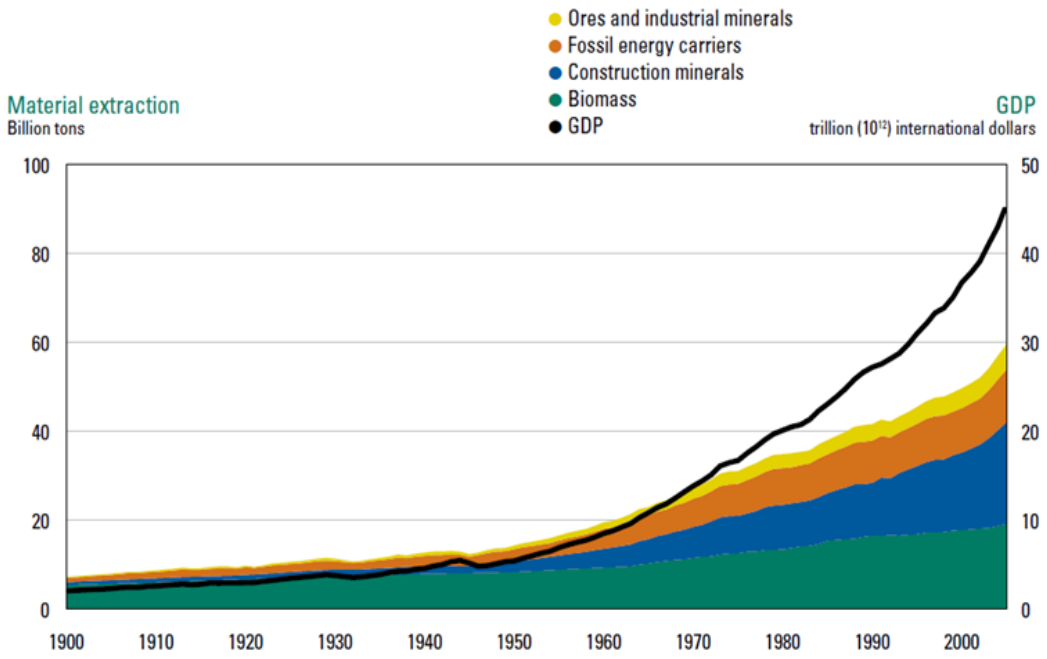
What is SMM: Material/Product Life Cycle



Hidden material flows (i.e., wastes) account for up to75% of the total materials moved, but are not accounted for in the gross domestic product.

Why SMM: Present Material Use-GDP Decoupling Insufficient

Figure 2. Global material extraction in billion tons, 1900–2005



Source: Krausmann *et al.*, 2009

Why SMM?

- U.S. Recycling and reuse industry:
  - Consists of 56,000 establishments that employ >1.1 million people
  - Generates an annual payroll of nearly $37 billion
  - Generates a gross over $236 billion in annual revenues
    (U.S. Recycling Economic Information Study 2001)
- Southeast Recycling Development Council (SERDC) research:
  - In Tennessee, local governments pay $42 million annually to bury commodities with a raw value of $180 million.
  - Alabamians pay $25 million to bury $193 million worth of materials.
  - The Georgia Department of Community Affairs determined that their state pays $100 million to bury $300 million.
  - The SE region of the US could have 21,500 more private sector jobs if those states just recycled 10% more material.

What is EPA doing?

- G7 Efforts specific to SMM
- Measurement and Analysis

What is EPA doing?

- Convening
- Procurement
- Regulatory Action

Food Loss Reduction and Recovery in the U.S.

- Roughly one third of the food produced in the world for human consumption every year — approximately 1.3 billion tonnes — gets lost or wasted. (UNEP 2011)
- 40% of U.S. food goes to waste costing Americans approximately $165 billion annually.
- Getting food to our table accounts for 10% of U.S. energy consumption, uses 50% of U.S. land, and 80% of fresh water consumed in the U.S.
- Uneaten food ends up in landfills where organic matter accounts for 16% of methane emissions.
- If we recovered only 15% of the wasted food we could feed 25 million Americans. (Natural Resources Defense Council 2012)

Food Loss Reduction and Recovery in the U.S.

- EPA's Food Recovery Challenge
  - Partnering with organizations and businesses to prevent and reduce wasted food.
  - Over 700 participants (grocery stores, restaurants, universities, schools, hospitality and venues) conduct audits of their food management practices and identify steps in their process to reduce wasted food through source reduction, donation, or composting and/or anaerobic digestion.
  - Nearly 2 million tons of food recovered providing a GHG benefit of 1.4 million tons of CO2E = annual emissions from 290 thousand passenger cars.

- EPA collaborating with U.S. Department of Agriculture
  - U.S. Food Waste Challenge
  - Sustainable Development Goals

Electronics

- For every million cell phones recycled, we can recover: 35,274 pounds of copper, 772 pounds of sliver, 75 pounds of gold, and 33 pounds of palladium.
  (U.S. Geological Survey, U.S. Department of Interior, 2006)

- The total wholesale sales of smartphones, tablets, TVs and other gadgets in the U.S. was $207 billion in 2013.
  (Consumer Electronics Association)

Electronics

- USG National Strategy for Electronics Stewardship: *"Moving Sustainable Electronics Forward: An Update to the National Strategy for Electronics Stewardship"* (2014).

- (EPEAT) Electronic Product Environmental Assessment Tool - global environmental rating system that helps purchasers identify greener electronics.

Electronics

- EPA's SMM Electronics Challenge
  - Participants contributed 22% of the total used electronics collected in the U.S. in 2012 (baseline year of Challenge).

- Champion Award winners included Best Buy Co., Inc., Dell Inc., and Sprint

- In 2013, Challenge participants increased their collection totals by over 7.6%. The increase of over 15,000 metric tons to certified recyclers is equal to:
  - Taking 8,500 passenger vehicles off the road for one year;

  Or
  - Saving enough energy to power more than 3,700 U.S. homes for one year.

Questions for the Webinar Audience

- What role do you see yourself and your organization playing in SMM and the circular economy?

- What can EPA do to decrease waste generation and increase reuse and recycling in the U.S.?

Questions for the Webinar Audience

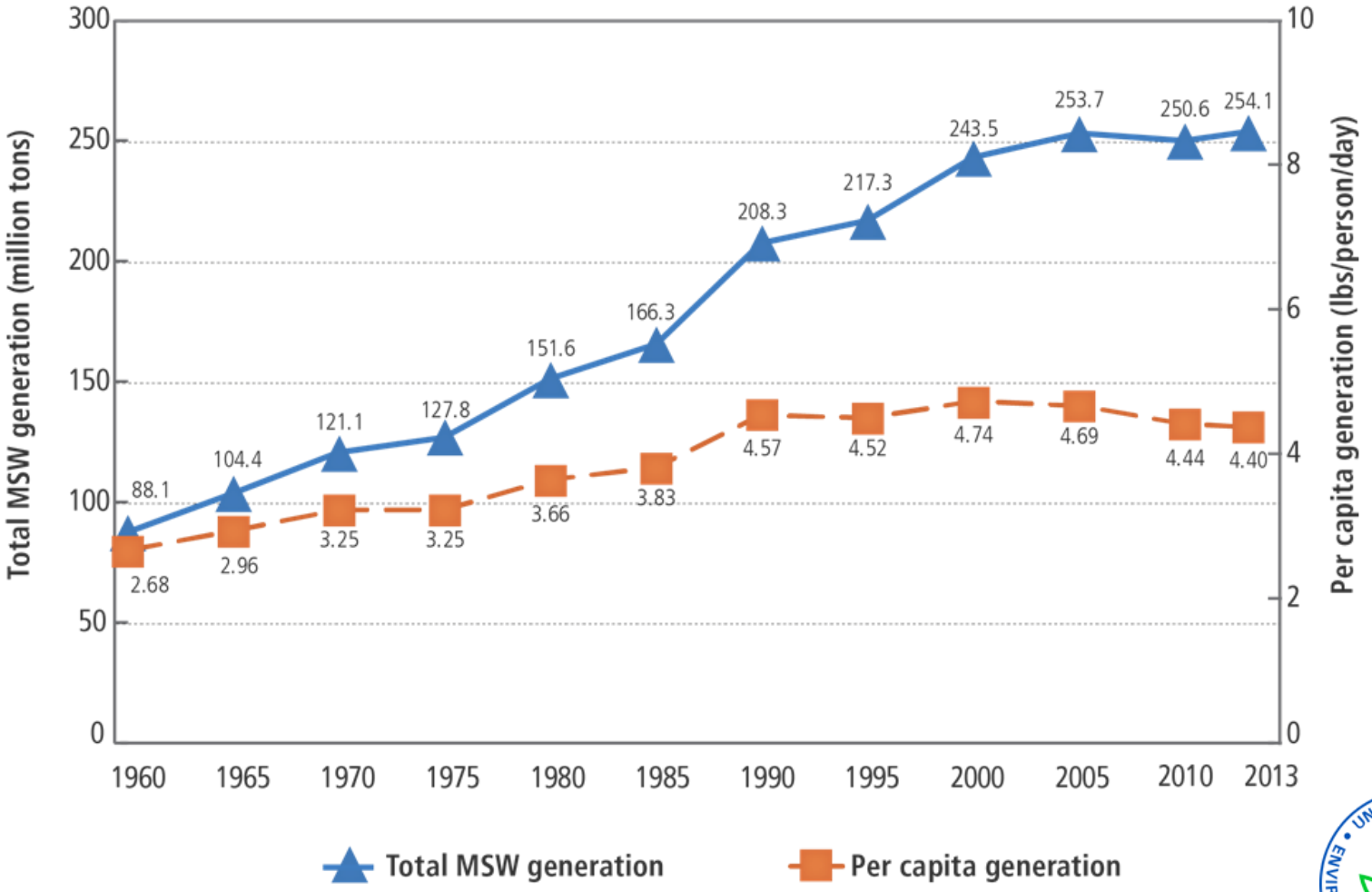
- What can EPA do to assist in the adoption and implementation of SMM and circular economy approaches and practices?

- What obstacles or incentives are needed to operationalize SMM?

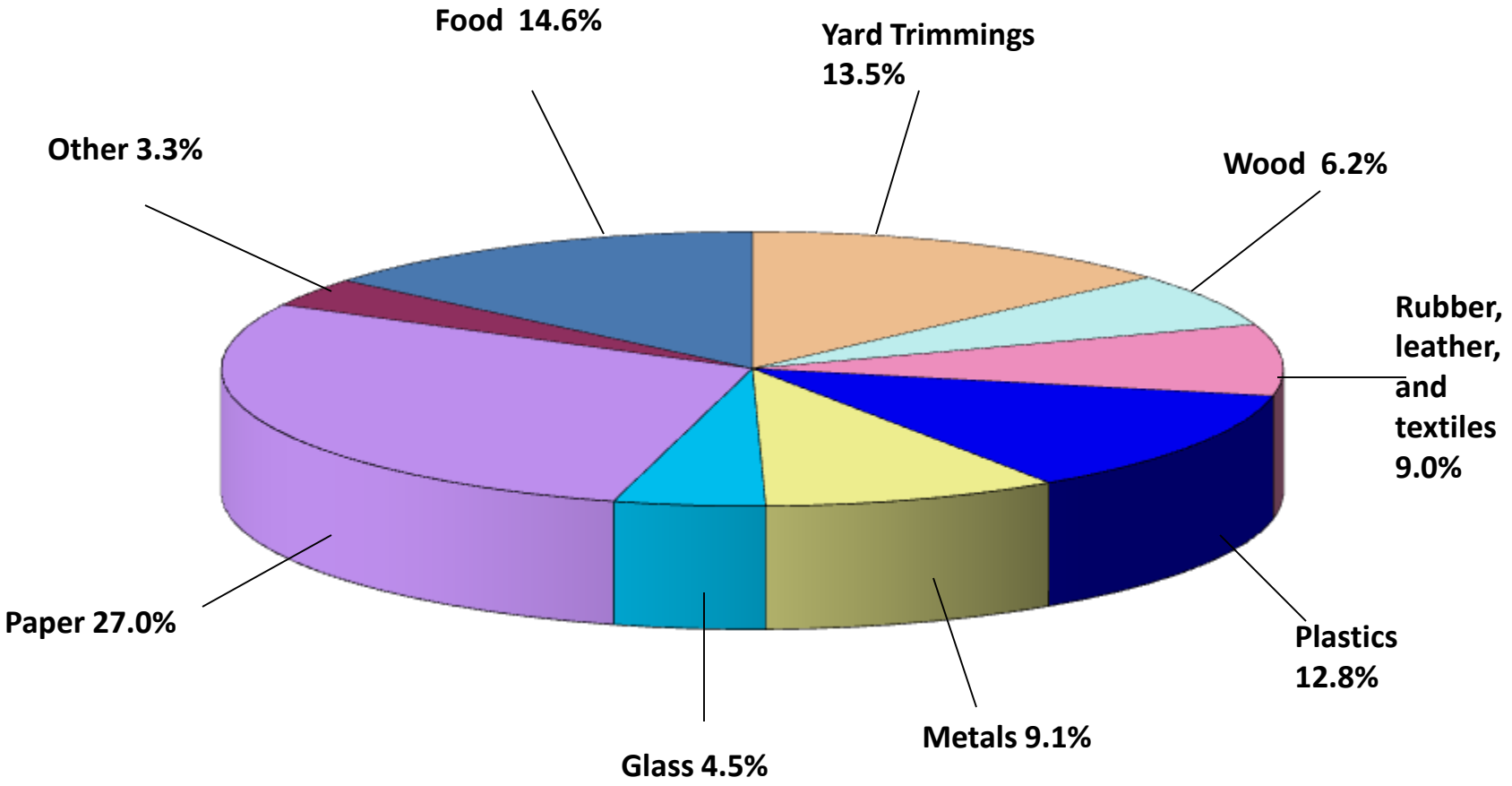
MSW Facts and Figures in the U.S. Key Generation Data

- A high of 254.1 million tons of MSW was generated in 2013, up from 251.0 million tons in 2012.
- 4.40 pounds/person/day generated in 2013, up from 4.38 pounds/person/day in 2012.

MSW Generation Rates, 1960 to 2013



Municipal Solid Waste Generation in 2013
254 Million Tons (before recycling)

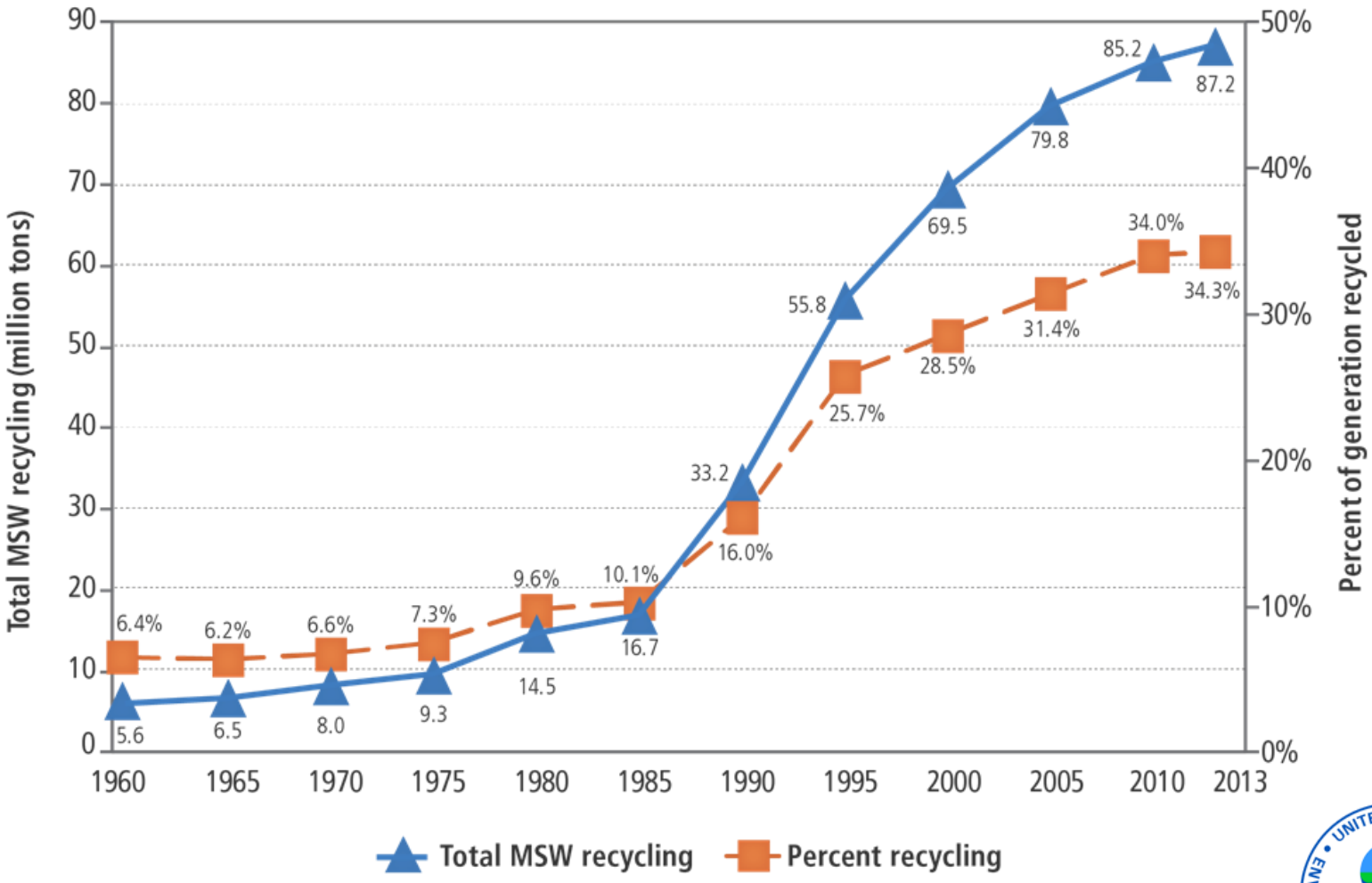


EPA 2013 Facts and Figures

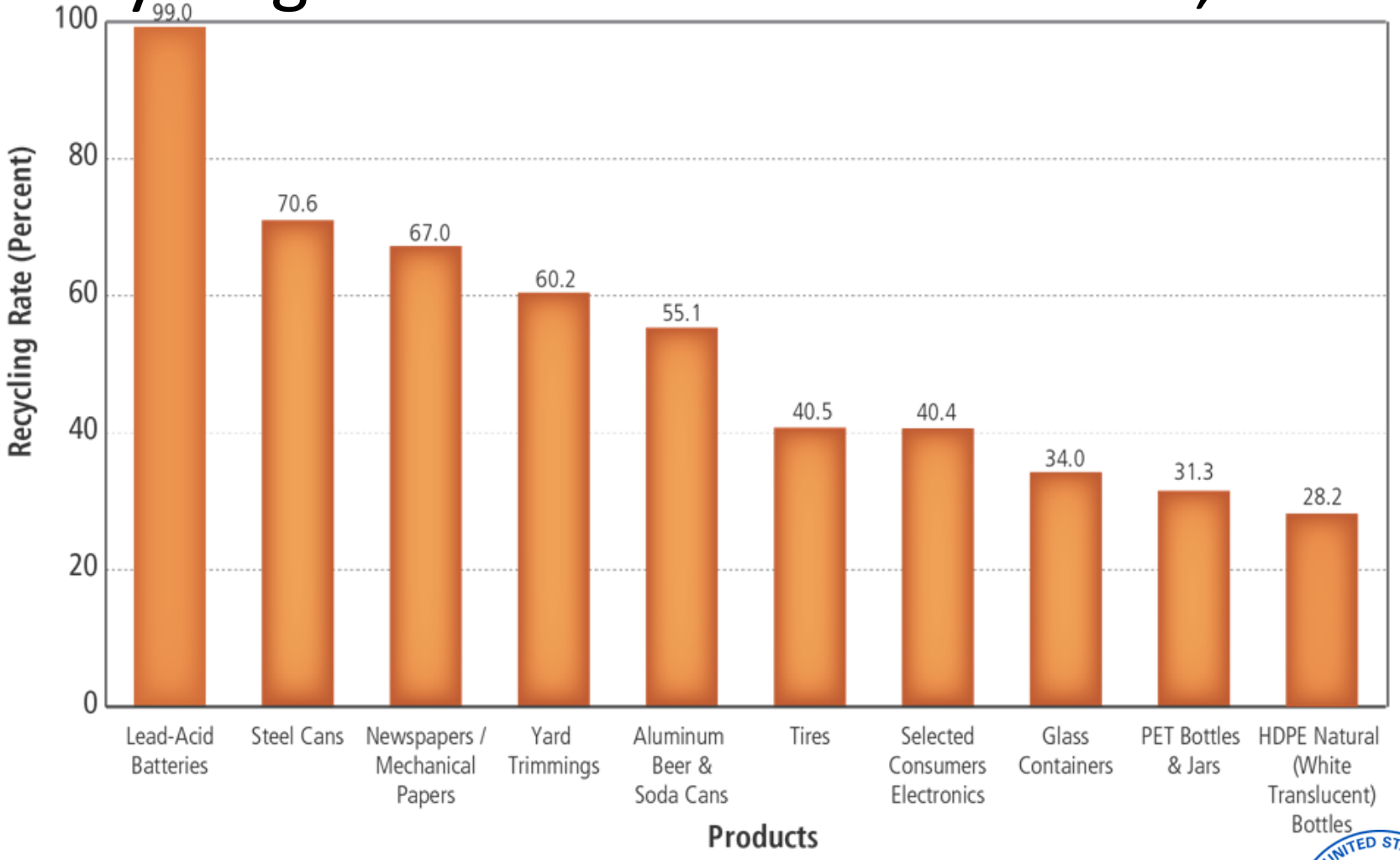
MSW Facts and Figures in the U.S. Key Recycling Data

- 34.3% recycled (including composting) in 2013, down from 34.5% in 2012.
- A high of 87.2 million tons of MSW was recycled in 2013, up from 86.6 million tons in 2012.
  - Recycling (not including composting) was 64.7 million tons in 2013, down from 65.2 million tons in 2012.
  - Composting was 22.4 million tons in 2013-an all-time high, and up from 21.3 million tons in 2012.

MSW Recycling Rates, 1960 to 2013



Recycling Rates of Selected Products, 2013



Commodity Recycling Trends

	1970	1980	1990	2000	2013
Paper and paperboard	15%	21%	28%	43%	63%
Glass	1%	5%	20%	23%	27%
Metals	4%	8%	24%	35%	34%
Plastics	Neg.	<1%	2%	6%	9%
Yard trimmings	Neg.	Neg.	12%	52%	60%
Rubber tires	13%	6%	12%	26%	41%
Lead-acid batteries	76%	70%	97%	93%	99%

EPA 2013 Facts and Figures

Neg. = less than 5,000 tons or 0.05 percent.

MSW Facts and Figures in the U.S. Key Data, cont.

- 12.9% of MSW was combusted with energy recovery in 2013, up from 12.8% in 2012.
- 52.8% of MSW was landfilled in 2013, up from 52.7% in 2012.

How is Waste Managed in 2013?

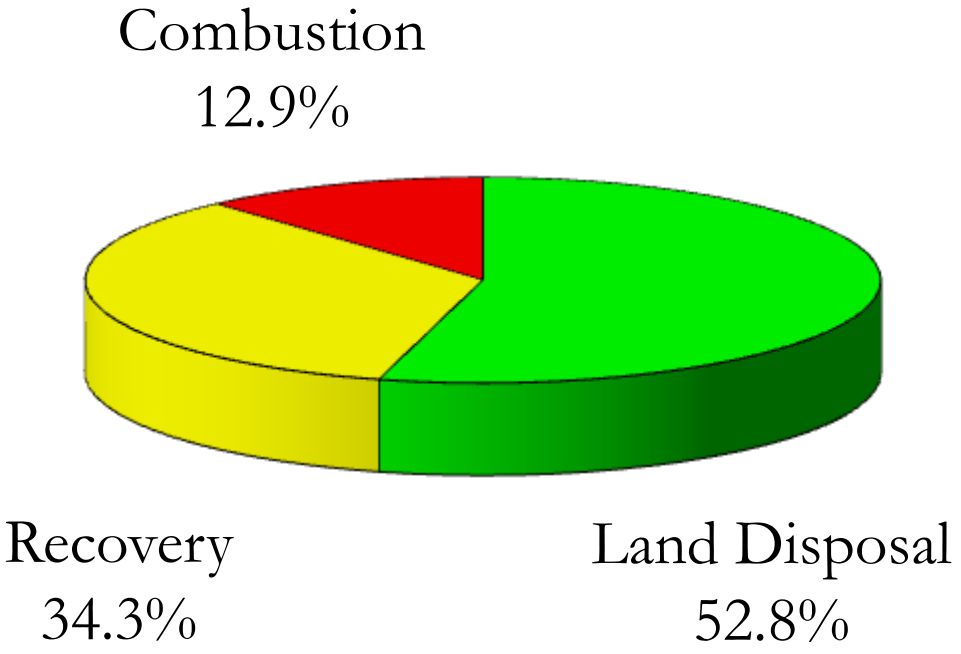
- **Recovery** (Recycling and Composting)

  34.3%
- **Land Disposal**

  52.8%
- **Combustion**

  12.9%

MSW Management in the U.S.

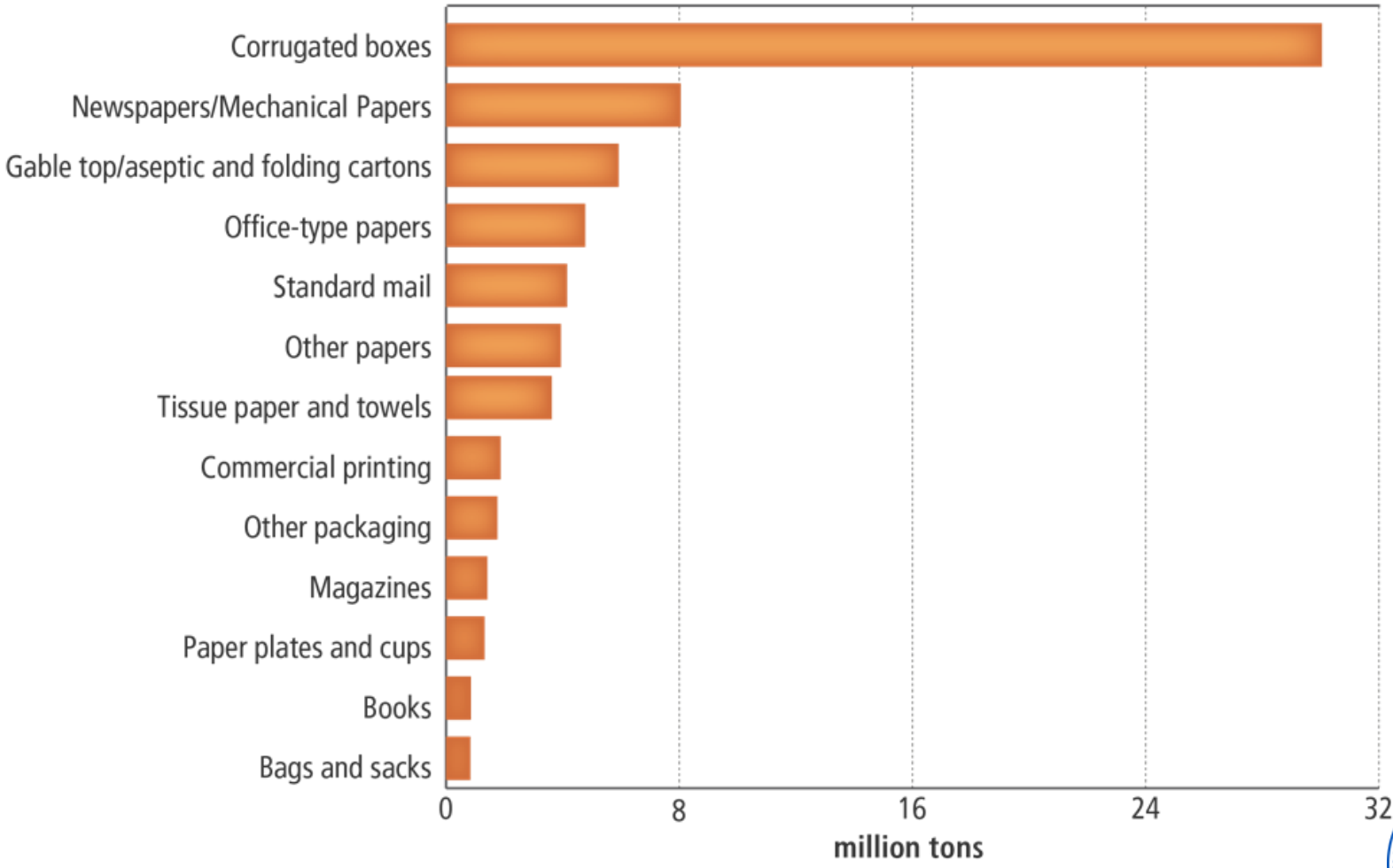


EPA 2013 Facts and Figures

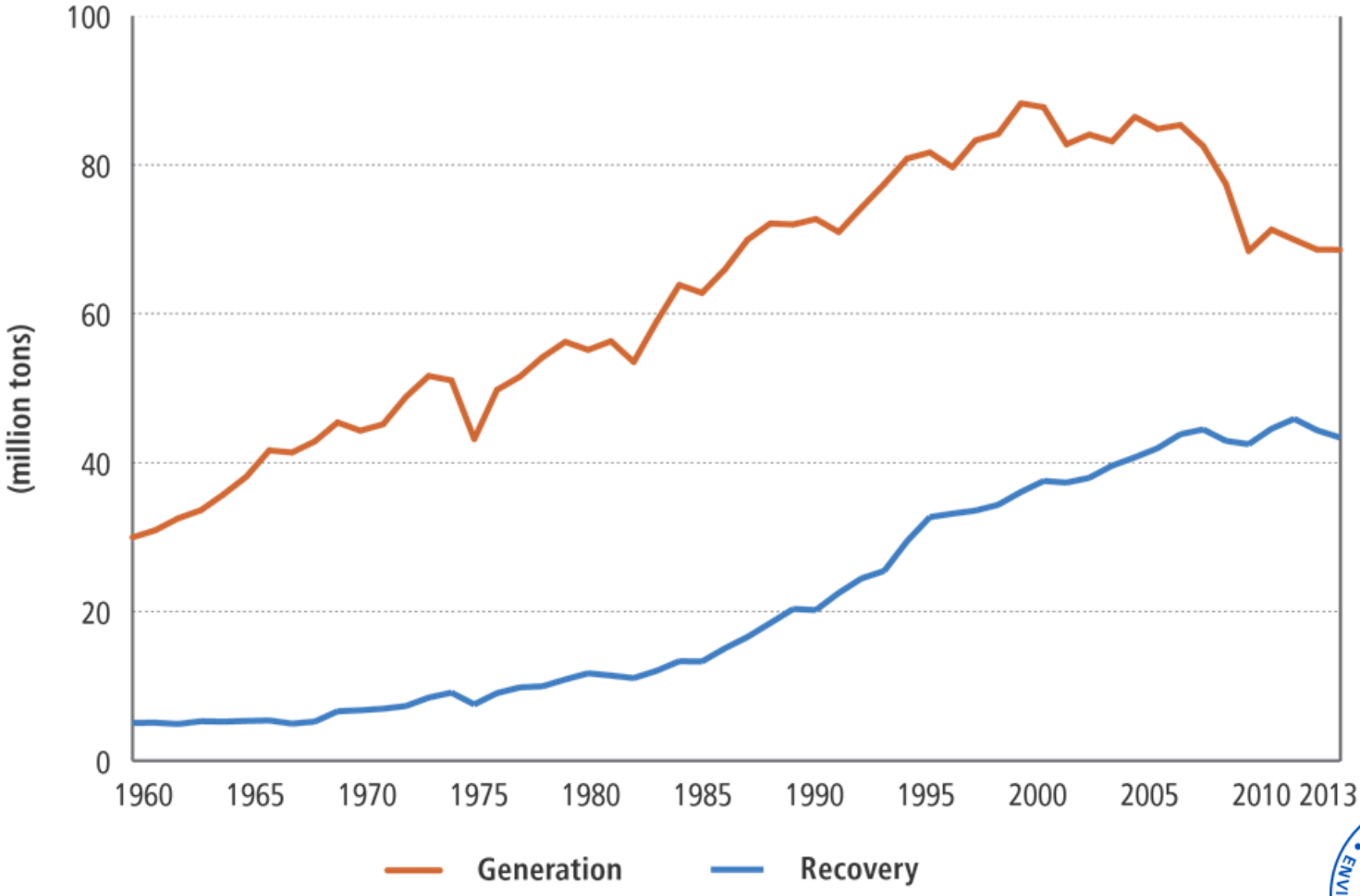
Paper and Paperboard

- Paper and paperboard generation was 68.60 million tons, down from 68.62 million tons in 2012.
- Paper and paperboard recycling was 63.3%, down from 64.6% in 2012.
- Newspapers/mechanical papers were recycled at 67.0%, down from 70.0% in 2012.
- Corrugated boxes were recycled at 88.5%, down from 90.9% in 2012.
- Other paper nondurable goods (books, magazines, office paper, standard mail, paper plates, etc.) were recycled at 41.3%, down from 43.2% in 2012.

Paper and Paperboard Products Generated in MSW, 2013



Paper and Paperboard Generation and Recovery, 1960 to 2013

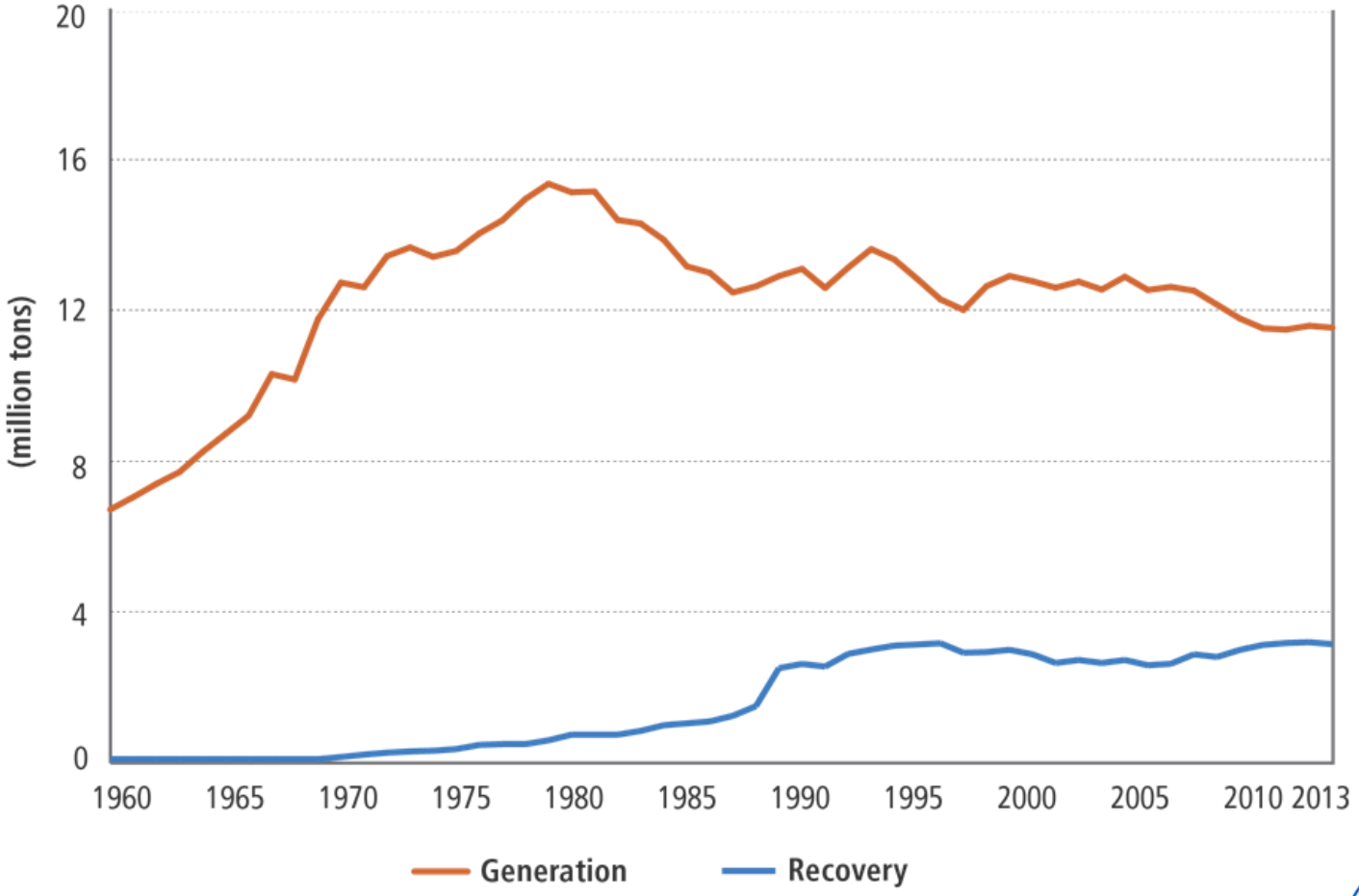


Glass

- 11.54 million tons of glass was generated in 2013, down from 11.59 million tons in 2012.

- 27.3 percent of glass was recovered for recycling in 2013, down from 27.7 percent in 2012.

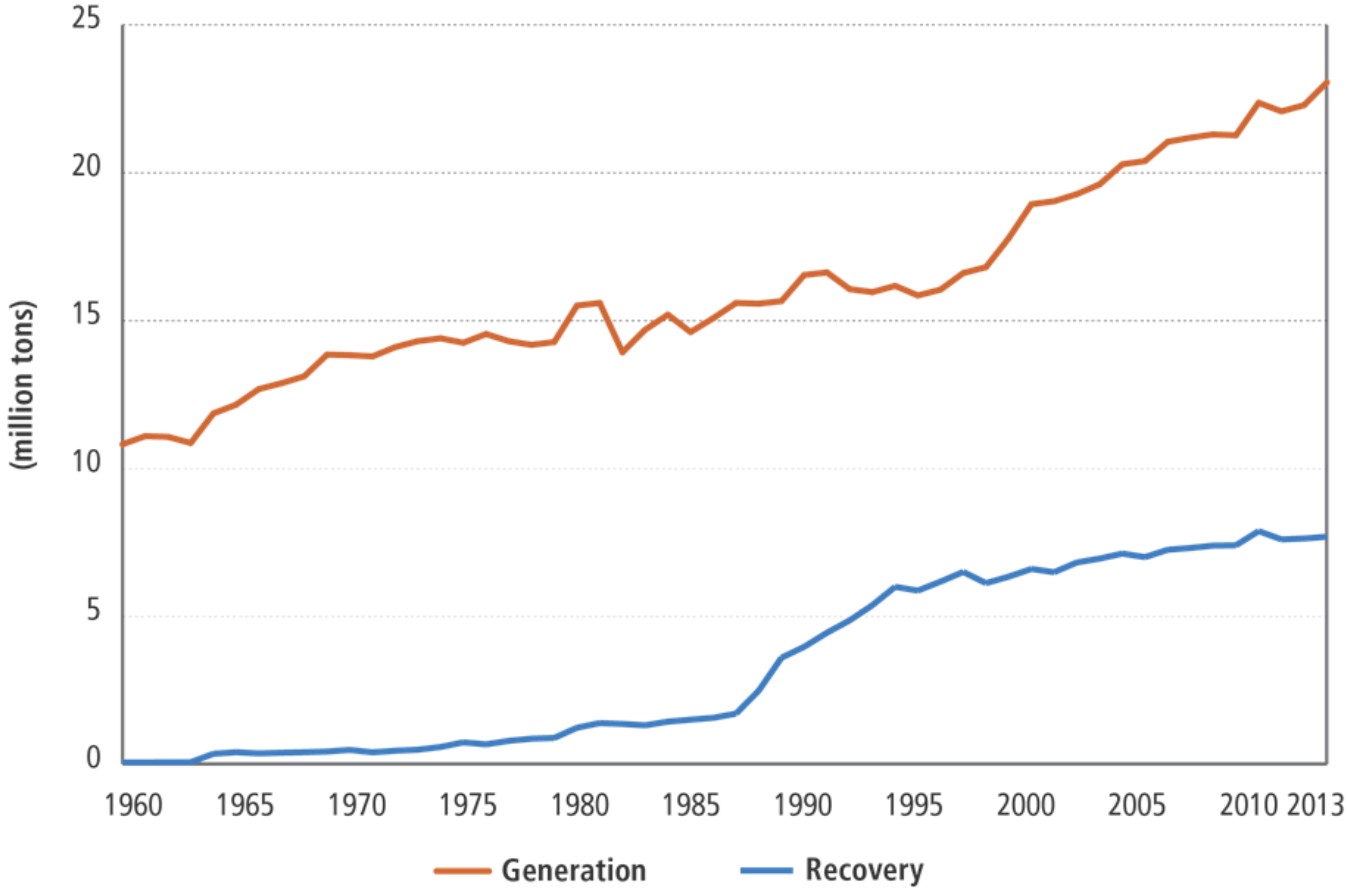
Glass Generation and Recovery, 1960 to 2013



Metals

- 23.1 million tons of metals were generated in 2013, up from 22.3 million tons in 2012.
- 34.1% of metals were recycled in 2013, down from 34.2% in 2012.
- Steel can recycling rate was 70.6% in 2013, down from 70.8% in 2012.
- Aluminum beer and soda can recycling rate was 55.1% in 2013, up from 54.6% in 2012.

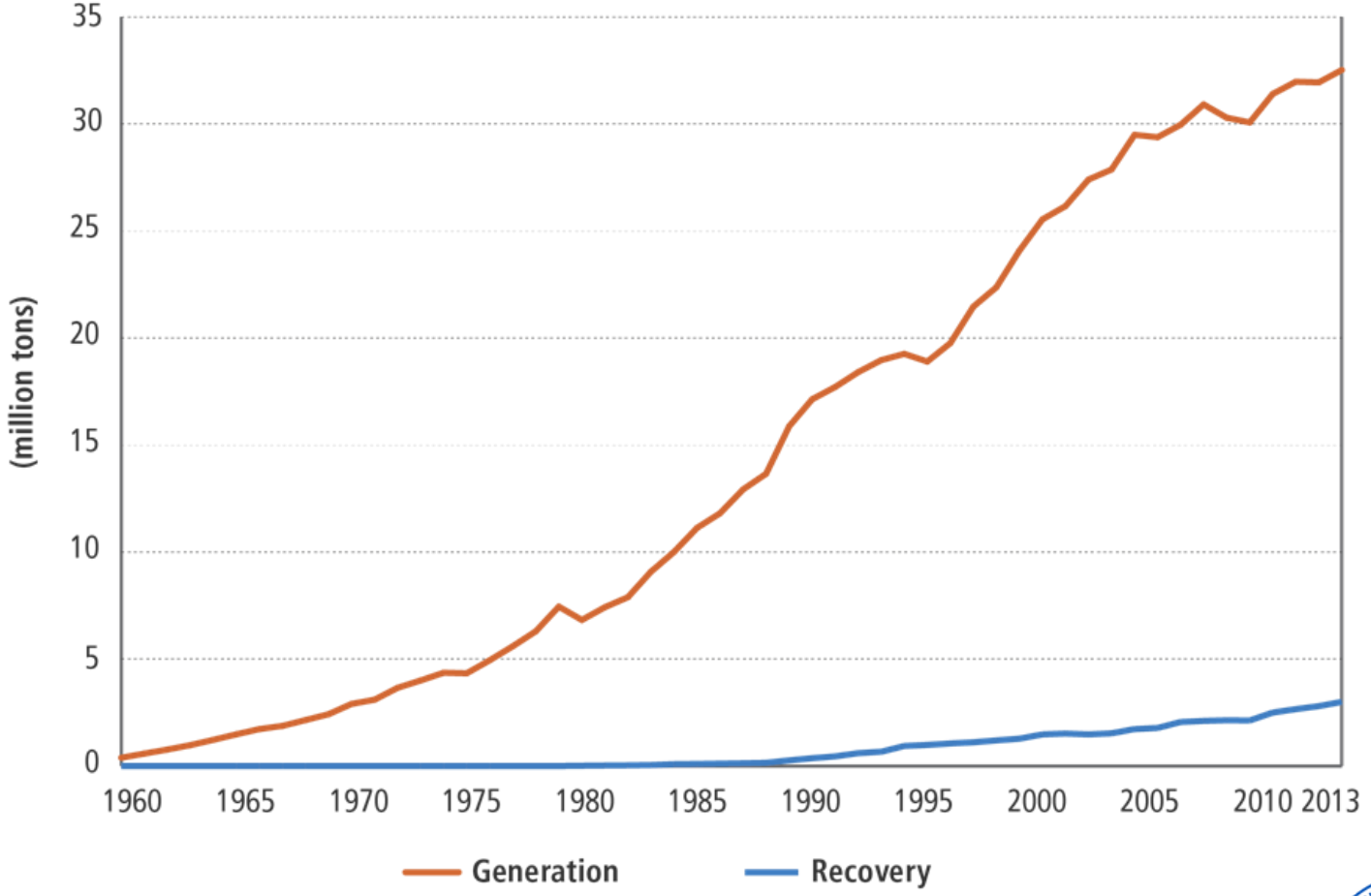
Metals Generation and Recovery, 1960 to 2013



Plastics

- 32.5 million tons of plastics were generated in 2013, up from 31.9 million tons in 2012.
- Recycling rate for plastics was 9.2% in 2013, up from 8.8% in 2012.
- Recycling rate for PET bottles and jars was 31.3% in 2013, up from 30.8% in 2012.
- Recycling rate for HDPE Natural (white translucent) bottles was 28.2% in 2013, the same as the recycling rate in 2012.

Plastics Generation and Recovery, 1960 to 2013



Electronics

- An estimated 3.14 million tons of selected consumer electronics was generated in 2013, down from 3.27 in 2012.

- The recovery rate for selected consumer electronics was 40.4% in 2013, up from 30.6% in 2012.

Food

- Generation of food was estimated to be 37.1 million tons in 2013, up from 36.4 million tons in 2012.
- Total composting equals 1.8 million tons, up from 1.7 million tons of food and other organic materials composted in 2012, for a **recovery rate of 5.0%, up from 4.8% in 2012.**
- 21.1% of MSW discarded is food.

Yard Trimmings

Generation

- An estimated 34.2 million tons of yard trimmings were generated in 2013, up from 34.0 million tons in 2012.

Recovery

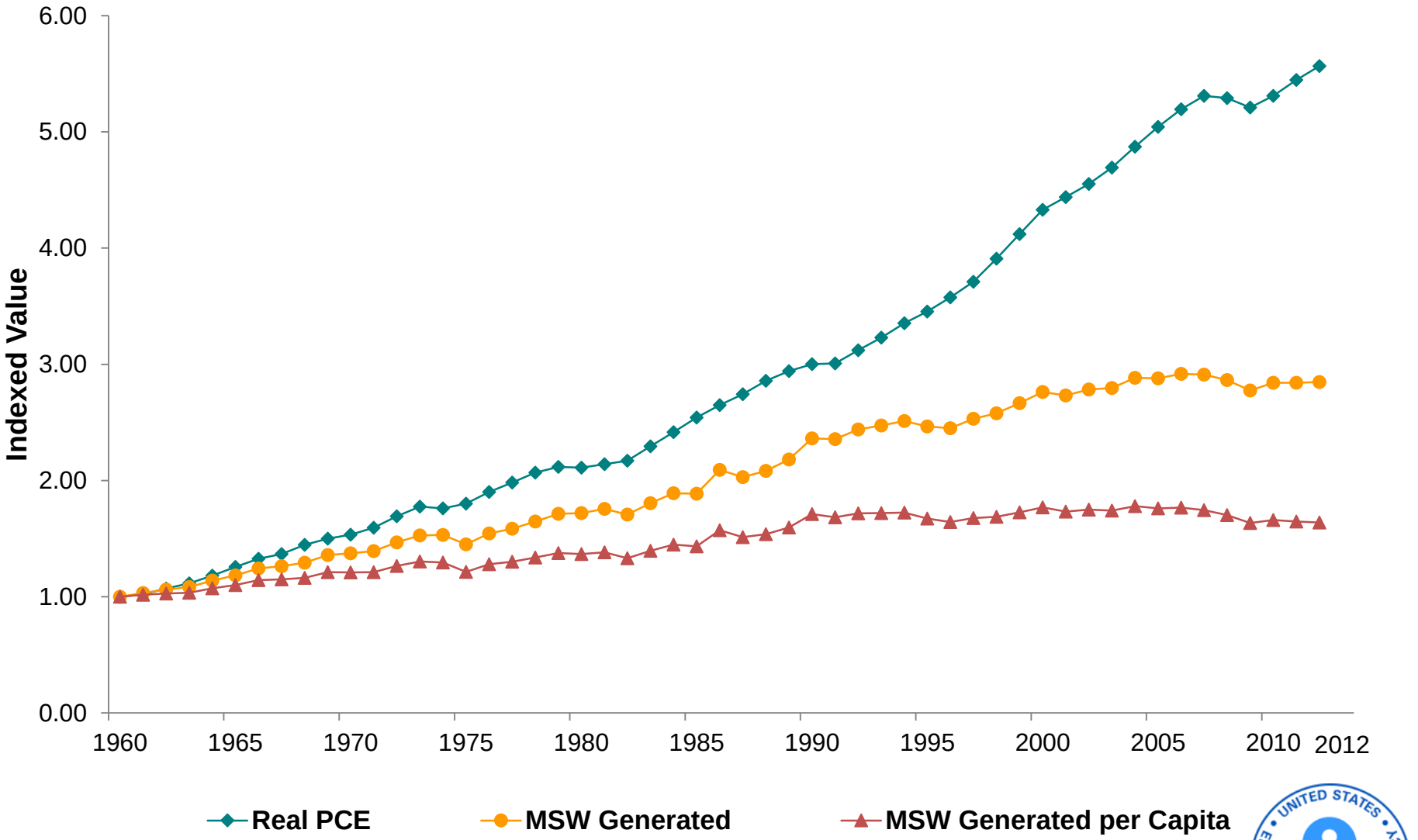
- An estimated 20.6 million tons of yard trimmings removed for composting or mulching in 2013, up from 19.6 in 2012.

- In 2013 **60.2% of yard trimmings were composted, up from 57.7% in 2012.**

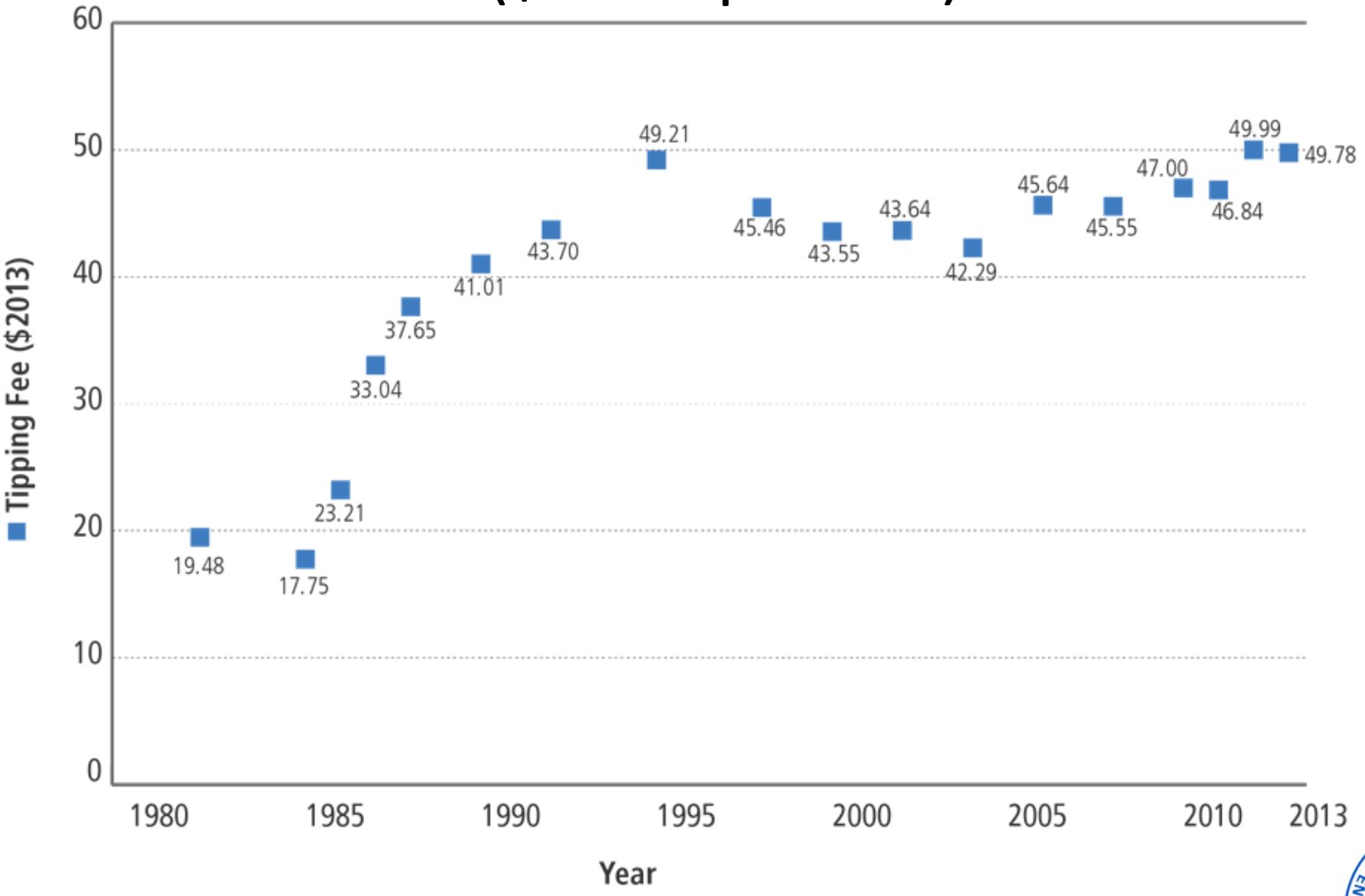
Greenhouse Gas (GHG) Emissions

- Approximately 42 percent of U.S. GHG emissions are associated with materials management.
- These GHG emissions can be reduced through materials recovery.
- In 2013, the 87 million tons of MSW recycled and composted provided an annual reduction of 186 million tons of carbon dioxide equivalent emissions, comparable to the annual emissions from over 39 million passenger cars.

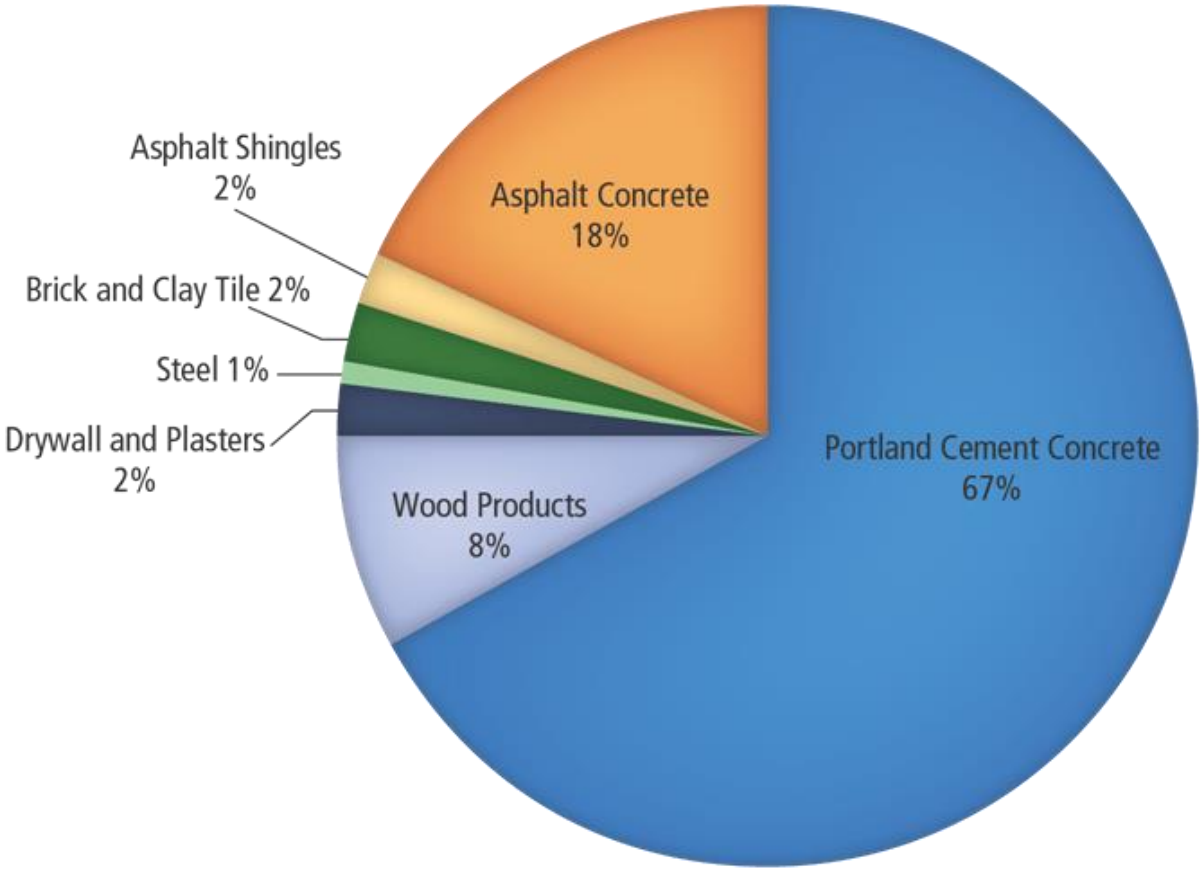
Indexed MSW Generated and Real PCE over Time (1960-2012)



National Landfill Tipping Fees, 1982-2013 ($2013 per ton)



C&D Generation Composition by Material, 2013 (530 Million Tons Before Recycling)

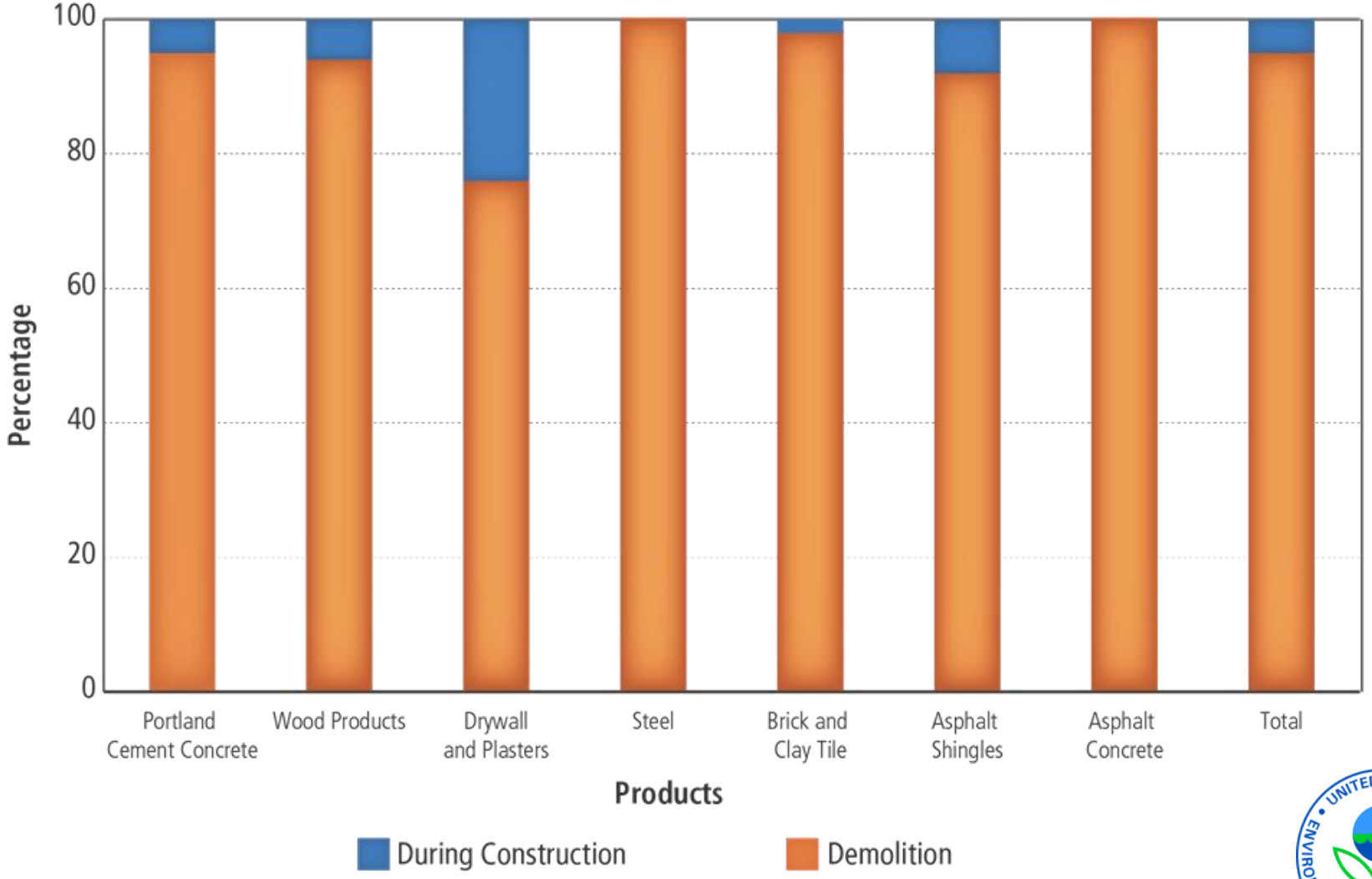


C&D Debris Generation by Material and Activity (Million Tons)

	Waste During Construction	Demolition Debris	Total C&D Debris
	2013	2013	2013
Portland Cement Concrete	17.5	335.4	352.9
Wood Products	2.5	37.7	40.2
Drywall and Plasters	3.1	9.9	13.1
Steel[1]	0	4.3	4.3
Brick and Clay Tile	0.3	11.8	12.1
Asphalt Shingles	1.0	11.5	12.6
Asphalt Concrete	0	95.1	95.1
Total	**24.4**	**505.9**	**530.3**

[1] Steel consumption in buildings also includes steel consumed for the construction of roads and bridges. Data were not available to allocate steel consumption across different sources.

Contribution of C&D Phases to Total 2013 C&D Debris Generation



C&D Debris Generation by Source (Million Tons)

	Buildings	Roads and Bridges	Other
	2013	2013	2013
Portland Cement Concrete	79.9	148.4	124.5
Wood Products	40.2		
Drywall and Plasters	13.1		
Steel[1]	4.3		
Brick and Clay Tile	12.1		
Asphalt Shingles	12.6		
Asphalt Concrete		95.1	
Total	**162.2**	**243.5**	**124.5**

[1] Steel consumption in buildings also includes steel consumed for the construction of roads and bridges. Data were not available to allocate steel consumption across different sources.

For more information

Please see:

http://www.epa.gov/wastes/nonhaz/municipal/msw99.htm