

SOLID WASTE GREENHOUSE GAS FACTS AND FIGURES (May 4, 2011)

Greenhouse Gas Emissions in T_gCO₂E:

Landfill:	Methane (CH ₄) generated: MSW	266.3 ¹
	Methane generated: industrial	15.6 ¹
	Methane converted into energy:	(72.0) ¹
	Methane destroyed by flaring:	(79.4) ¹
	Methane destroyed by oxidation:	(13.1) ¹
	Total methane released:	117.5 ¹
Composting:	Methane:	1.7 ¹
	Nitrous oxide (N ₂ O):	1.8 ¹
	Total:	3.5 ¹
MSW Combustion:	Waste-to-energy: Nitrous oxide:	0.4 ¹
	Carbon dioxide (CO ₂):	12.3 ¹
	Total:	12.7 ¹
Trucks/process energy (includes recycling):		2.9 ²
Total Emissions:		136.6 ¹

- 2.059 percent of U.S. greenhouse gas emissions
- Landfills stored 12.6 T_gCO₂E of carbon in 2009¹. (see carbon sequestration – below)

Greenhouse Gas Reduction Activities:

Landfills reduced their total methane emissions by more than one half through conversion of methane to energy and destruction by flaring and oxidation¹. Without these techniques, landfill gas methane emissions would have been 266.3 T_gCO₂E instead of 117.5 T_gCO₂E.

- 551 operational landfill gas-to-energy projects in the United States generated 1697 MW (megawatts) and 309 million standard cubic feet per day (mmscfd). This is enough energy to directly power 1,001,972 homes and heat 729,280, respectively.³
- According to the Nobel Prize-winning Intergovernmental Panel on Climate Change (IPCC) landfill gas recovery directly reduces greenhouse gas emissions⁴.

Landfills are the third highest producer of anthropogenic methane in the United States. Natural gas recovery and enteric fermentation, which are digestive gases produced by ruminant animals such as cows, have produced more methane every year in this decade¹.

Waste-to-energy facilities produce 17 billion kilowatt hours of energy, enough to power 2.5 million homes and to avoid the production of an equivalent amount of electricity from conventional coal or oil-fired power plants.⁵

Recycling and composting: recycling reduced greenhouse gas emissions by 182.2 T_gCO₂E, or 2.5%, in 2005⁶. Uncovered compost piles, however, create volatile organic compounds.

Recycling and composting: 82.1 million tons of municipal solid waste were recycled or composted in 2009 (61.3 million tons recycled and 20.8 million tons composted)⁷.

Alternative fuel trucks: trucks using compressed or liquefied natural gas or hybrid engines increase fuel efficiency. More than 4000 natural gas-fueled refuse and recycling trucks were in use in 2010⁸.

Carbon sequestration (storage):

Recycling paper increases carbon storage in trees by easing the pressure on forests¹.

Landfills store carbon due to incomplete degradation of organic materials such as wood products and yard waste¹. According to the IPCC, 50 percent of the “organic” fraction in a landfill – paper, food and yard waste – does not degrade because lignin is “recalcitrant” and the cellulosic portion degrades slowly⁴. Landfills stored 12.6 T_gCO₂E in 2009¹.

Progress over the years:

Between 1974 and 1997, increased recycling, composting, waste-to-energy and landfill gas reduction caused greenhouse gas emissions from solid waste management facilities to drop by 78 percent even as waste generation increased by 70 percent. Without these improvements, these emissions would have been 600 percent higher⁹.

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Sources:

1. “Inventory of Greenhouse Gas Emissions and Sinks: 1990 – 2009”, USEPA, April 15, 2011 <http://www.epa.gov/climatechange/emissions/usinventoryreport.html>
2. “Municipal Solid Waste Industry Reduces Greenhouse Gases through Technical Innovation and Operational Improvements”, NSWMA, 2005 <http://www.nswma.org>.
3. U.S. EPA, Landfill Methane Outreach Program, <http://www.epa.gov/lmop/>, dated as of April 12, 2011, pulled April 28, 2011 <http://www.epa.gov/lmop/documents/pdfs/LMOPGreenPower.pdf> <http://epa.gov/climatechange/wycd/waste/downloads/fullreport.pdf>
4. “IPCC Fourth Assessment Report: Working Group III Report: Mitigation of Climate Change: Chapter Ten Waste Management”, Intergovernmental Panel on Climate Change, 2007 <http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter10.pdf>
5. Energy Recovery Council <http://www.wte.org>.
6. “Solid Waste Management and Greenhouse Gases: A Lifecycle Assessment of Emissions and Sinks”, USEPA, September 2006
7. “Municipal Solid Waste In the United States: 2009 Facts and Figures”, U.S. EPA, 2011, <http://www.epa.gov/epawaste/nonhaz/municipal/msw99.htm>
8. Green Truck Summit, 2011
9. “The Impact of Municipal Solid Waste Management on Greenhouse Gas Emissions in the United States”, Weitz, *etal*, Air and Waste Management Association, 2002 <http://www.wte.org/docs/Thorneloe.pdf>

* T_gCO₂E refers to Teragrams of Carbon Dioxide Equivalent. A teragram is 10¹² grams.