

7 WASTE MANAGEMENT AND RECYCLING

WASTE MANAGEMENT AND RECYCLING INDICATORS
Table 7. Waste Management and Recycling Indicators for Carnegie Mellon, FY 2004

Report Section	Indicator	Reason	FY 2004	Units
7.1.1	Amount of solid waste disposed of annually (non-hazardous)		2,906	lbs
7.1.2	<i>Annual quantity of demolition/construction waste landfilled</i>	<i>Indicates total amount of demolition and construction wastes sent to landfills</i>	<i>FWD</i>	<i>tons</i>
7.1.2	<i>Annual quantity of demolition/construction waste recycled/reused</i>	<i>Indicates total amount of demolition and construction wastes diverted from landfills and recycled or reused</i>	<i>FWD</i>	<i>tons</i>
7.2.1	Amount of hazardous chemical wastes disposed annually		17,161	lbs
7.2.2	Annual quantity of computer monitors that are recycled for toxicity reasons	Indicates amount of computers that are recycled because they contain hazardous waste	57,800	lbs
7.2.2	<i>Annual quantity of computers that are recycled voluntarily</i>	<i>Indicates amount of computers diverted from the waste stream and recycled</i>	<i>FWD</i>	<i>lbs</i>
7.2	Amount of solvents disposed annually	A representative item for tracking purposes.	11,200	lbs
7.2	Amount of mercury items disposed annually	A representative item for tracking purposes.	453	lbs
7.2	Amount of oil paint disposed annually	A representative item for tracking purposes.	875	lbs
7.2	Amount of compressor oil disposed annually	A representative item for tracking purposes.	1,600	lbs
7.3	Amount of biological waste disposed annually		8,888	lbs
7.4	Amount of radioactive waste disposed annually		235	gallons (over 5 years)
7.5.1	Percent of total non-hazardous waste stream recycled	Indicates amount recycled on campus	23	% by weight
7.5.2	Amount of organic waste composted	Indicates amount of lawn waste, food waste, etc. that is diverted from landfills	69.28	tons
7.5.3	<i>Amount of non-hazardous waste reused</i>	<i>Indicates amount of materials that are reused by organizations outside of Carnegie Mellon</i>	<i>FWD</i>	

WASTE MANAGEMENT INDICATORS RATIONALE

The amount of waste generated by an institution and how it is disposed is one of the easier groups of indicators to measure. This is in part due to the fact that waste disposal is a purchased service and therefore one with a managed accounting system.

7.1 Non-hazardous Solid Waste

7.1.1 Standard Solid Waste

Standard solid waste includes normal garbage from University garbage cans as well as food wastes. Solid waste is removed from the University by a contracted waste management company. The quantity of solid waste removed annually is an indicator that can track impacts from reduction and recycling programs on campus.

7.1.2 Construction and Demolition Wastes

As discussed in Chapter 6, construction and demolition wastes are currently handled by the contractor who does the construction and demolition. However, these wastes comprise a large portion of the landfilled waste stream. In 1996 the U.S. Environmental Protection Agency estimated 136 million tons of construction wastes were sent to landfills in the United States⁶⁰. As a forward-leaning indicator, measuring the quantity of construction and demolition wastes removed from the University and landfilled and the quantity of wastes recycled will permit further study of solutions to minimize the waste stream. This may require adding a waste management clause to a general contractor contract requiring that the contractors report waste quantities removed. In the past, Carnegie Mellon has achieved high levels of construction waste management on the New House project,⁶¹ diverting 75% of all construction waste from landfills by recycling or reuse. Also, “Agents of Change,” a local recycling firm, removes a truck load of wood (estimated at several tons) each year after teardown of booths constructed for Spring Carnival.⁶²

⁶⁰ U.S. Environmental Protection Agency, “About C&D.” <http://www.epa.gov/epaoswer/non-hw/debris/about.htm>. Accessed 19 January 2005.

⁶¹ New House Residence Hall, Carnegie Mellon University, LEED Project #0246, http://www.usgbc.org/Docs/Certified_Projects/Cert_Reg85.pdf. Accessed 18 January 2005.

⁶² Pers. Comm., Barb Kviz, Environmental Coordinator. 19 January 2005.

7.2 Hazardous Wastes

Hazardous wastes are generated on campus in various, including teaching, research, and facility maintenance activities.⁶³ Hazardous wastes include wastes that are corrosive, ignitable, reactive, toxic, or that are listed by the USEPA.⁶⁴

7.2.1 Chemical Wastes

Chemical wastes are collected biweekly from a variety of pick up locations on campus.⁶⁵ Changes in the total quantity of hazardous chemical wastes over time indicates the effect of waste minimization on campus. Because hazardous wastes can include cleaning supplies, or one-time shipments such as PCB-contaminated transformer oil, this indicator can identify areas of improvement such as purchasing of non-hazardous cleaning supplies.

Because there are a large variety of chemical wastes discarded by Carnegie Mellon, several representative types of waste are identified as tracking indicators. These include oil based paint, solvents, and items which contain mercury. This does not include other wastes such as lab packs, PCB contaminated oils, and photo fixers. The total amount of chemical hazardous waste disposed of each year may indicate a change in practices to reduce hazardous waste.

7.2.2 Computers

Cathode Ray Tube (CRT) computer monitors contain heavy metals⁶⁶ including leachable lead. To date, computer monitors are not required by regulation to be recycled. However, studies using the Toxicity Characteristic Leaching Procedure (TCLP) have shown the quantities of leachable lead available in the monitors is higher than minimum toxicity characteristic level for hazardous waste⁶⁷ (lead is hazardous waste at leachable levels higher than 5.0 mg/L⁶⁸) and therefore should be considered and disposed of as hazardous waste. Carnegie Mellon recycles all computer monitors. Currently most computer components are either discarded or reused. The

⁶³ Carnegie Mellon Environmental Health and Safety, "Hazardous Waste." http://www.cmu.edu/ehs/Waste_and_Recycling_Programs/hazardouswaste.htm. Accessed 22 December 2004.

⁶⁴ See 40CFR261, accessible from <http://www.gpoaccess.gov/ecfr/>.

⁶⁵ Carnegie Mellon Environmental Health and Safety, "Hazardous Waste Pickup Schedule." <http://www.cmu.edu/ehs/pdf/HazWastePickup.pdf>. 22 December 2004.

⁶⁶ Purdue University, "Hazardous Waste Management: Computer Monitor Recycling." <http://www.adpc.purdue.edu/PhysFac/rem/hmm/wstmin.htm#Computer%20Monitor%20Recycling>. Accessed 16 January 2005.

⁶⁷ Pers. Comm., Mark Banister, Chemical Safety Specialist, 19 January 2005.

⁶⁸ See 40CFR261.24, <http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=40&PART=261&SECTION=24&TYPE=TEXT>

total number of pounds of computer waste that is disposed of will indicate efforts to minimize disposal through reuse or recycling.

7.3 Biological Wastes

Biological wastes are generated from many different research venues as well as from Health Services. It is picked up weekly and sent for disposal. Currently, there is not a precise tracking system in place to track the quantities of waste disposed. This system is in development, and until it is completed the values presented for this indicator are estimated quantities. Biological wastes are disposed of on a per box basis where each box holds a volume of 4.3-cubic feet. Because some wastes are heavier than others and some boxes are filled more fully with waste than others, the weight of biological wastes disposed is an estimate based on a range of box weight, material density, and volume of materials in the box.

7.4 Radioactive Wastes

Radioactive materials are generated on-campus from a variety of research venues. Waste minimization is emphasized during training, and the majority of radioactive materials used are short-lived and allowed to decay until non-radioactive and disposed of as normal garbage. The amount of radioactive waste that is disposed as normal garbage and as radioactive waste indicates the effects of waste minimization and source reduction.⁶⁹ These wastes are collected in a 55-gallon drum which may contain solid wastes or liquid wastes, and materials of varying levels of radioactivity. Because the radioactivity of the wastes inside the drum may vary widely the amount of radioactive waste disposed is presented in gallons, calculated from the number of drums filled.

It should be noted that smoke detectors that contain radioactive wastes are returned to the manufacturer for recycling. However, non-radioactive smoke detectors are not recycled.

7.5 Non-Landfill Disposal

7.5.1 Recycled Materials

In 1990 Carnegie Mellon adopted a Recycling policy stating that “Carnegie Mellon University is committed to recycling the materials it uses and to minimizing non-hazardous waste. It is the responsibility of every member of the campus community to support these

⁶⁹ Personal Communication, Celia Rajkovich, 22 December 2004.

efforts”⁷⁰ To this end each department has a recycling liaison who works with Facilities Management to ensure proper recycling practices are maintained.

Carnegie Mellon University currently recycles a number of items, including paper, cardboard, and beverage containers. The University participates in the College and University Recycling Council/U.S. Environmental Protection Agencies recycling competition Recyclemania⁷¹ and strives to achieve the Pennsylvania Department of Environmental Protection goal to recycle 35% of Pennsylvania’s waste stream by weight⁷² The annual quantity of non-hazardous materials recycled indicates how well we are accomplishing this.

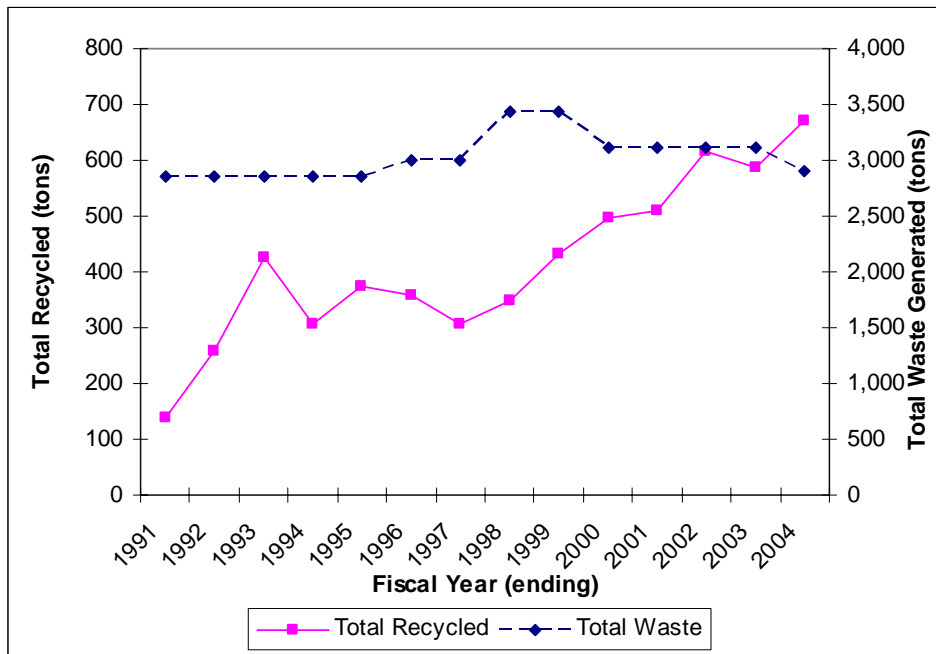


Figure 7-1. Non-Hazardous Solid Waste Disposal by and Recycling Carnegie Mellon, 1991 - 2004

7.5.2 Composted Materials

Currently Carnegie Mellon composts only lawn wastes. There have been discussions about the feasibility of implementing food waste composting⁷³ but the program is still under development. The amount of materials composted at Carnegie Mellon University indicates a diversion of the waste stream from landfills to reusable compost.

⁷⁰ Carnegie Mellon University Recycling Policy. <http://www.cmu.edu/policies/documents/Recycle.html> Accessed 20 December 2004.

⁷¹ Recyclemania. <http://www.recyclemaniacs.org/>. Accessed 20 December 2004.

⁷² PA Department of Environmental Protection, “The Future of Recycling in Pennsylvania.” Draft, July 2004. p. 3. http://www.dep.state.pa.us/dep/deputate/airwaste/wm/RECYCLE/document/RECYCLING_PLAN7-8-04.pdf. Accessed 19 January 2005.

⁷³ Carnegie Mellon Green Practices, “Food Composting in Pittsburgh.” http://www.cmu.edu/greenpractices/community_connections/composting.html. Accessed 20 December 2004.

7.5.3 *Reused Materials*

One of the waste reduction efforts itemized in the Recycling policy is source reduction, which includes reuse/resale of surplus furniture. Currently reuse or donation for reuse of materials is a widely dispersed activity and does not have one person for contact. The amount of reused materials at Carnegie Mellon University is a forward leaning indicator intended to collect information on the quantity of materials diverted from the waste stream. This includes any material that could have been thrown away but instead was reused or donated. The easiest way to collect this information is to concentrate on a few departments. Housing generally donates worn bedroom sets, abandoned bicycles on campus are collected and donated to local bicycle advocacy groups by Facilities Management, and computers are erased and donated by Computing Services. Also, as mentioned in Section 7.1.2, wood from Carnival construction is reused internally from year to year and when exhausted removed for recycling. By tracking these departments until a more defined tracking system is developed the amount of nonhazardous materials diverted from the waste stream can be monitored.

