

Facts and Figures on E-Waste and Recycling

This is a summary of available statistics that quantify the problems of electronic waste and e-waste recycling efforts. Each item includes its source and link to the original documents (where available), to make it easy for reporters to confirm data back to the original source.

We assembled these statistics primarily for media and for legislators and advocates of e-waste policies. This list will be updated periodically as new statistics are released.

Contents	
Topic	Page
How much e-waste is being discarded – trashed or recycled?	2
How much e-waste gets stockpiled or stored?	3
Sales of electronics – how much is being sold	4
Computers	
Televisions	
Cell Phones	
All consumer electronics	
Digital TV Conversion statistics	6
Resource recovery from electronics recycling	6
Resources used in electronics (energy, water, etc)	6

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How Much E-waste is Being Discarded?

Whether trashed or recycled, what are we getting rid of each year in the US? (See next section for what we stockpile.)

Products	Total disposed** (million of units)	Trashed (million of units)	Recycled (million of units)	Recycling Rate (by weight)
Televisions	26.9	20.6	6.3	18%
Computer Products*	205.5	157.3	48.2	18%
Cell Phones	140.3	126.3	14	10%

*Computer products include CPUs, monitors, notebooks, keyboards, mice, and "hard copy peripherals", which are printers, copiers, multi's and faxes.
 **These totals don't include products that are no longer used, but stored.

Source: EPA ¹

41.1 million desktops & laptops

The EPA (in report summarized above) estimates that 29.9 million desktops and 12 million laptops were discarded in 2007. That's over 112,000 computers discarded per day!

31.9 million computer monitors

The EPA report (above) estimates that 31.9 computer monitors were discarded in 2007 – both flat panel and CRTs.

400 million units of e-waste

In a 2006 report, the International Association of Electronics Recyclers projects that with the current growth and obsolescence rates of the various categories of consumer electronics, (a broader list than the EPA used above, including DVDs, VCRs, mainframes) somewhere in the neighborhood of 3 billion units will be scrapped during the rest of this decade, or an average of about **400 million units a year**.²

Over 3 million tons of e-waste disposed in 2008 in USA

In 2008, we generated **3.16 million tons of e-waste in the U.S.** Of this amount, only 430,000 tons or 13.6 % was recycled, according to the EPA. The rest was trashed – in landfills or incinerators. (The total generated increased from 3.01 million tons of e-waste generated in 2007, but the recovery rate stayed at 13.6%.³

Selected consumer electronics include products such as TVs, VCRs, DVD players, video cameras, stereo systems, telephones, and

¹ "Electronic Waste Management in the United States, Approach 1" Table 3.1 EPA530-R-08-009 US Environmental Protection Agency, July 2008. <http://www.epa.gov/osw/conservation/materials/recycling/docs/app-1.pdf>

² International Association of Electronics Recyclers Industry Report, 2006. Available at <http://www.iaer.org/communications/indreport.htm>

³ "Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2008." United States Environmental Protection Agency, Office of Solid Waste (EPA-530-F-009-021, November 2009). Data is from Characterization Data Tables 12 – 14, beginning on page 14: <http://www.epa.gov/epawaste/nonhaz/municipal/pubs/msw2008data.pdf>

⁴ IBID

E-Waste Facts and Figures

20 to 50 million metric tons of e-waste disposed worldwide each year	computer equipment.” ⁴ Note: EPA’s 2009 data is expected in November or December 2010. “Some 20 to 50 million metric tonnes of e-waste are generated worldwide every year, comprising more than 5% of all municipal solid waste. When the millions of computers purchased around the world every year (183 million in 2004) become obsolete they leave behind lead, cadmium, mercury and other hazardous wastes. In the US alone, some 14 to 20 million PCs are thrown out every year. In the EU the volume of e-waste is expected to increase by 3 to 5 per cent a year. Developing countries are expected to triple their output of e-waste by 2010.” ⁵
E-waste is still the fastest growing municipal waste stream in the US	The category of “selected consumer electronic products” grew by almost 5% from 2007 to 2008, from 2.84 million tons to 3.01 million tons to 3.16 million tons. ⁶ While it’s not a large part of the waste stream, e-waste shows a higher growth rate than any other category of municipal waste in the EPA’s report. Overall, between 2007 and 2008, total volumes of municipal waste DECREASED, while e-waste volumes continue to increase.
Only 13.6% of disposed e-waste was recycled in 2007 and 2008	Only 13.6% of the consumer electronic products generated into the municipal waste stream (meaning, that people tossed out) were “recovered” for recycling in 2008. This compares to the overall recovery rate of all categories of municipal waste was 33.2% in 2008. A total of 430,000 tons of electronics were recovered in 2008. ⁷

How Much Electronic Waste Gets Stored or Stockpiled?

68% of consumers stockpile	“ 68 percent of consumers stockpile used or unwanted computer equipment in their homes.” ⁸
235 million units in storage as of 2007, including 99 million TVs	The EPA estimates the following quantities of electronics were in storage by 2007 (not including cell phones) Televisions: 99.1 million Desktop computers: 65.7 million Desktop monitors: 42.4 million Notebook computers: 2.1 million Hard copy peripherals: 25.2 million (printers, copiers, faxes, multi’s) TOTAL: 234.6 million units in storage ⁹

⁵ Press Release, “Basel Conference Addresses Electronic Wastes Challenge.” November 27, 2006, United Nations Environment Programme (UNEP). Available at:

<http://www.unep.org/Documents/Multilingual/Default.asp?DocumentID=485&ArticleID=5431&l=en>

⁶ “Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2008.” United States Environmental Protection Agency, Office of Solid Waste, November 2009. Data is from Characterization Data Tables 12 – 14. Report: <http://www.epa.gov/epawaste/nonhaz/municipal/pubs/msw2008data.pdf>

⁷ Ibid. Table 13. Note: See page 33 of report for definitions of generation and recovery.

⁸ HP Fact Sheet, Earth Day 2005.

http://www.hp.com/hpinfo/newsroom/press_kits/environment/earthday-fs.pdf

⁹ “Electronic Waste Management in the United States, Approach 1” Table 3.1 EPA530-R-08-009 US Environmental Protection Agency, July 2008, Table 3.4 on page 25. <http://www.epa.gov/osw/conservation/materials/recycling/docs/app-1.pdf>

Sales in Electronics - How Much Electronics Are Being Sold

Note: Many statistics on sales are expressed in terms of "units shipped" from the manufacturers into their various sales channels.

Consumer Electronics

- 500 million units in 2008 in US According to the Consumer Electronics Association (CEA), consumers were expected to purchase **500 million units** of consumer electronics in the US in 2008. US households spend about **\$1407 per year** on hardware.¹⁰
- Spending: \$1380 per household on consumer electronics last year. The average U.S. household spent \$1,380 on consumer electronics (CE) products in the past 12 months, an increase of \$151 from last year, according to a new study released in May 2010 by the Consumer Electronics Association (CEA).¹¹
- \$165 billion in consumer electronics products projected for 2010 According to the Consumer Electronics Association, US consumers will purchase \$165 billion in consumer electronics in 2010, a slight increase over 2009 sales.¹² [See TV sales numbers below.]

Computer Sales

- 305 million computers sold in 2009 worldwide. The US bought 96 million of them. According to Gartner, Inc, manufacturers shipped 305.8 million computers in 2009. 55% of these were mobile PCs (notebooks, netbooks, tablets).¹³ Ninety six million of these were to the U.S.¹⁴
- Computer sales projections: 366 million worldwide in 2010, up 20% over 2009. 70% of those will be mobile PCs. "Worldwide PC shipments are projected to total 366.1 million units in 2010, a 19.7 percent increase from 305.8 million units shipped in 2009, according to the latest preliminary forecast by Gartner, Inc. Worldwide PC spending is forecast to reach \$245 billion in 2010, up 12.2 percent from 2009."¹⁵

Television Sales

- 3.3 Million TVs bought for the superbowl in 2009. US consumers bought 3.3 million HD TVs for Super Bowl 2010, up from 2.6 million in 2009.¹⁶
- 2.6 Million HD TVs bought for Super Bowl 2009. Americans bought 3.9 million TVs for the 2008 Super Bowl, according to the National Retail Federation.¹⁷ That's up more than

¹⁰ Consumer Electronics Association, Presentation by Parker Brugge to E-Scrap Conference, Sept 17, 2008.

¹¹ Consumer Electronics Association Press Release, May 6, 2010.

http://www.ce.org/Press/CurrentNews/press_release_detail.asp?id=11900

¹² Consumer electronics Association Press Release, January 7, 2010.

http://www.ce.org/Press/CurrentNews/press_release_detail.asp?id=11861

¹³ "Gartner Says Worldwide PC Shipments to Grow 20 Percent in 2010," March 4, 2010.

<http://www.gartner.com/it/page.jsp?id=1313513>

¹⁴ "Gartner Says Worldwide PC Shipments in Fourth Quarter of 2009 Posted Strongest Growth Rate in Seven Years," January 13, 2010, <http://www.gartner.com/it/page.jsp?id=1279215>

¹⁵ "Gartner Says Worldwide PC Shipments to Grow 20 Percent in 2010," March 4, 2010.

<http://www.gartner.com/it/page.jsp?id=1313513>

¹⁶ "Super Bowl is spurring a blitz of TV sales for retailers," Indianapolis Star, quoting Consumer Electronics Association, Feb 4, 2010.

<http://www.tmcnet.com/usubmit/2010/02/04/4606159.htm>

¹⁷ Press Release from National Retail Federation: "As Super Bowl Sales Near \$10 Billion, Retailers Plan Big Promotions, According to RAMA," January 213, 2008. Available at: http://www.nrf.com/modules.php?name=News&op=viewlive&sp_id=461

E-Waste Facts and Figures

	50% from the 2.5 million we bought for the 2007 superbowl. We bought 1.7 in 2006.
34.5 million digital TVs in 2009 26.8 million digital TVs in 2008	The Consumer Electronics Association (CEA) predicts that in 2009, we will buy 34.5 million digital TVs in the US, up from 26.8 sold in 2008. They predict that 29.8 million of these will be HD TVs. ¹⁸
Manufacturers earned over \$25 BILLION selling digital TVs in 2007.	“According to new CEA sales projections, manufacturers will post 11 percent revenue growth, to over \$25 billion, from sales of digital televisions in 2007. CEA also forecasts 13 percent revenue and 17 percent unit sales growth for digital television in 2008.” ¹⁹
211 million TVs sold worldwide in 2009	Market research firm DisplaySearch said 211 million TVs were sold worldwide in 2009. ²⁰ This was 2% higher than 2008, despite expectations that sales would decrease due to economic conditions.
North America accounts for 83% of the 50"+ TV market	We are buying BIG TVs. While the average TV size in North America is 29.5 inches, North America accounted for 83% of the 50"+ market and 52% of the 40"+ market ²¹
3D TV sales	“DisplaySearch forecasts 3.4 million 3D TVs to be shipped in 2010, with the market expected to reach 42.9 million in 2014. Based on this forecast, 3D TV market penetration is expected to grow from a 5% share of total flat panel TVs in 2010 to 37% in 2014.” Just over 2 million of these will be to North America. ²²
Cell Phone Sales	
1.211 billion cell phones sold worldwide in 2009	According to Gartner, Inc, 1.21 billion mobile phones were sold in 2009, a slight decrease over 2008. Of those, 172.4 million were smartphones. ²³
4 BILLION cell phone users worldwide	“By the end of 2008, an important milestone in the ICT [information and communications technologies] development race was achieved: over 4 billion mobile cellular subscriptions worldwide...” ²⁴

¹⁸ Press Release from Consumer Electronics Association, Jan 30, 2009.

http://www.ce.org/Press/CurrentNews/press_release_detail.asp?id=11679

¹⁹ IBID

²⁰ DisplaySearch press release: “Global LCD TV Shipments Reached 146M Units in 2009, Faster Growth Than 2008,” Feb 22, 2010, http://www.displaysearch.com/cps/rde/xchg/displaysearch/hs.xml/100222_gobal_lcd_tv_shipments_reached_146m_units_in_2009_faster_growth_than_2008.asp

²¹ DisplaySearch press release, November 27, 2006; “DisplaySearch Report Indicates Samsung Takes the Top Position in Global TV Units and Revenues,” <http://www.displaysearch.com/press?id=1014>

²² DisplaySearch press release, July 28, 2010, “3D TV Shipments Expected to Reach 3.4M in 2010 and 42.9M in 2014,” http://www.displaysearch.com/cps/rde/xchg/displaysearch/hs.xml/100728_3d_tv_shipments_expected_to_reach_3_4_m_in_2010_and_42_9_m_in_2014.asp

²³ “Gartner Says Worldwide Mobile Phone Sales to End Users Grew 8 Per Cent in Fourth Quarter 2009,” Gartner, Inc. , Feb 23, 2010, <http://www.gartner.com/it/page.jsp?id=1306513>

²⁴ “Measuring the Information Society.” A report from the International Telecommunication Union, 2009, Page 3. http://www.itu.int/ITU-D/ict/publications/idi/2009/material/IDI2009_w5.pdf

E-Waste Facts and Figures

Smart Phones – 174 million sold worldwide in 2009

According to IDC, 174.2 million smart phones were sold in 2009 worldwide, up 15.1% from the 151.4 million units in 2008. Smartphones accounted for 15.4% of all mobile phones shipped in 2009, up slightly from 12.7% in 2008.²⁵

Digital TV Conversion Statistics

Are we experiencing an E-Waste Tsunami?

We believe a large numbers of TVs are being disposed of in conjunction with the digital conversion (now and in the future). Consumers have a lot of TVs in storage (not used, ready for disposal). Now that we have passed the digital conversion deadline, any expectations of someday reusing or donating these analog TVs will disappear, since few people will want analog TVs. Here are some statistics.

26.9 million televisions disposed in 2007

The EPA estimates that in 2007, we got rid of 26.9 million TVs – either by trashing or recycling them.²⁶ That’s equivalent to 910,600 tons.

99 million TVs stockpiled

The EPA estimates that by the end of 2007, there were over 99 million TVs stockpiled or stored in the US.²⁷

Over 35% of US households are affected by digital transition

According to the federal Government Accountability Office, 15% of households rely solely on over the air TV signal – the signal that will be unavailable if you don’t have a digital TV or converter box. Another 21% of households have at least one TV that receives over the air signal.²⁸ With about 110 million households in the US, that means that approximately 40 million TVs may be affected.

How many TVs will be discarded?

There is no good data available for this question. We estimate tens of millions, but have no exact number.

Resource Recovery from Recycling Electronics

Gold recovery from e-waste recycling

“One metric ton (t) of electronic scrap from personal computers (PC’s) contains more gold than that recovered from 17 t of gold ore. In 1998, the amount of gold recovered from electronic scrap

²⁵ “Worldwide Converged Mobile Device Market Grows 39.0% Year Over Year in Fourth Quarter, Says IDC,” Feb 4, 2010;

<http://www.idc.com/getdoc.jsp?sessionId=&containerId=prUS22196610&sessionId=BB21CD29B9FB122C65B341DA0E4D9B96>

²⁶ “Electronic Waste Management in the United States, Approach 1” Table 3.1 EPA530-R-08-009 US Environmental Protection Agency, July 2008. <http://www.epa.gov/osw/conserves/materials/ecycling/docs/app-1.pdf>

²⁷ IBID. Page 25.

²⁸ Digital Television Transition. Testimony before the House Subcommittee on Telecommunications and the Internet, June 10, 2008. Mark Goldstein, Government Accountability Office (GAO). P11

<http://www.gao.gov/new.items/d08881t.pdf>

in the United States was equivalent to that recovered from more than 2 million metric tons (Mt) of gold ore and waste.²⁹

Resources Used in Electronics Manufacturing

To manufacture one computer and monitor, it takes 530 pounds of fossil fuels, 48 pounds of chemicals, and 1.5 tons of water.

“Finally, the production of electric and electronic devices is a very resource-intensive activity. The environmental burden due to the production of electrical and electronic products (“ecological baggage”) exceeds by far the one due to the production of other household materials. A UN study found that the manufacturing of a computer and its screen takes at least 240 kg (530 pounds) of fossil fuels, 22 kg (48 pounds) of chemicals and 1.5 tonnes of water - more than the weight of a rhinoceros or a car (Kuehr and Williams, 2003).”³⁰

81% of a desktop computer’s energy use is in MAKING the computer, not using it

Energy Use

When you add up the energy usage during the whole lifecycle of a computer with a 17 inch monitor, you find most is used during manufacturing, not using the computer:

“In contrast with many home appliances, life cycle energy use of a computer is dominated by production (81%) as opposed to operation (19%).”³¹

A ton of used cell phones (6000 phones) yields \$15,000 in precious metals.

Precious metals in cell phones

“A ton of used mobile phones, for example – or approximately 6,000 handsets (a tiny fraction of today’s 1 billion annual production) -- contains about 3.5 kilograms of silver, 340 grams of gold, 140 grams of palladium, and 130 kg of copper, according to StEP. The average mobile phone battery contains another 3.5 grams of copper. Combined value: over US \$15,000 at today’s prices.”³²

Recycling metals from e-waste uses a fraction of the energy needed to mine new metals

Recycling aluminum uses saves 90% of energy of mining new aluminum

“Recovering 10 kilograms of aluminum via recycling, for example, uses no more than 10% of the energy required for primary production, preventing the creation of 13 kilograms of bauxite residue, 20 kilograms of CO₂, and 0.11 kilograms of sulphur

²⁹ USGS Fact Sheet FS-060-01 July 2001. <http://pubs.usgs.gov/fs/fs060-01/>

³⁰ “E-waste, the hidden side of IT equipment’s manufacturing and use,” Environment Alert Bulletin, United Nations Environment Programme, January 2005. Available at: http://www.grid.unep.ch/product/publication/download/ew_ewaste.en.pdf
Quote references a compilation called, “Computers and the Environment. Understanding and managing their impact.” Eric Williams and Ruediger Kuehr, Editors, United Nations University, October 2003.

³¹ Energy intensity of computer manufacturing: hybrid assessment combining process and economic input-output methods, Eric Williams United Nations University, *Environmental Science & Technology* 38(22), 6166 - 6174 (2004).

³² United Nations University (2009, September 17). Set World Standards For Electronics Recycling, Reuse To Curb E-waste Exports To Developing Countries, Experts Urge. *ScienceDaily*. Retrieved September 21, 2009, from <http://www.sciencedaily.com/releases/2009/09/090915140919.htm>

³³ IBID

E-Waste Facts and Figures

dioxide emissions, and causes many other emissions and impacts.”³³

Jobs and Reuse

Reuse Creates More Jobs

Compared to disposal, computer reuse creates 296 more jobs per for every 10,000 tons of material disposed each year.³⁴

Sources for information and statistics on the electronics industry

[Gartner](#) - A market research firm specializing in the IT industry.

[IDC](#) – A market research firm specializing in IT and consumer electronics.

[Displaysearch](#) – A market research firm specializing in TVs and other display technology.

³⁴ Institute For Local Self Reliance, “Recycling Means Business,” 1997.
<http://www.ilsr.org/recycling/recyclingmeansbusiness.html>