

Facts and Figures on E-Waste and Recycling

This is a summary of available statistics that help us to 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 and researchers 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 content gets updated regularly as new statistics are released. If you have come across statistics we should add to this, please send them to us at info@etakeback.org.

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 are we buying?	4
Computers	
Televisions	
Cell Phones	
All consumer electronics	
Digital TV Conversion statistics	5
Resource recovery from electronics recycling	6
Resources used in electronics (energy, water, etc)	6

How Much E-waste Do We Generate?

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

E-Waste by the Ton in 2010 – Was it Trashed or Recycled (According to the EPA)				
Products	Total disposed**	Trashed	Recycled	Recycling Rate
	tons	tons	tons	%
Computers	423,000	255,000	168,000	40%
Monitors	595,000	401,000	194,000	33%
Hard copy devices	290,000	193,000	97,000	33%
Keyboards and Mice	67,800	61,400	6,460	10%
Televisions	1,040	864,000	181,000	17%
Mobile devices	19,500	17,200	2,240	11%
TV peripherals*	Not included	Not included	Not included	Not included
Total (in tons)	2,440,000	1,790,000	649,000	27%

E-Waste by the UNIT in 2010 – Was it Trashed or Recycled (Same report as above, but reported in UNITS, not by TONS)				
Products	Total disposed**	Trashed	Recycled	Recycling Rate
	Units	Units	Units	%
Computers	51,900,000	31,300,000	20,600,000	40%
Monitors	35,800,000	24,100,000	11,700,000	33%
Hard copy devices	33,600,000	22,400,000	11,200,000	33%
Keyboards and Mice	82,200,000	74,400,000	7,830,000	10%
Televisions	28,500,000	23,600,000	4,940,000	17%
Mobile devices	152,000,000	135,000,000	17,400,000	11%
TV peripherals*	Not included	Not included	Not included	Not included
Total (in units_	384,000,000	310,000,000	73,700,000	19%

What's included here?
 Computer products include CPUs, desktops and portables.
 Hard copy devices are printers, digital copiers, scanners, multi-functions and faxes.
 Mobile devices are cell phones, personal digital assistants (PDAs), smartphones, and pagers
 *Study did not include a large category of e-waste: TV peripherals, such as VCRs, DVD players, DVRs, cable/satellite receivers, converter boxes, game consoles.

***"Disposed" means going into trash or recycling. These totals don't include products that are no longer used, but which are still stored in homes and offices.

Source: EPA ¹

¹ "Electronics Waste Management in the United States Through 2009," U.S. EPA, May 2011, EPA 530-R-11-002
<http://www.epa.gov/wastes/conservation/materials/recycling/docs/fullbaselinereport2011.pdf>

How much e-waste do we generate? Continued

In 2010, we (U.S.) got rid of:
2.4 million TONS of e-waste²
384 million UNITS of e-waste
152 million mobile devices

Over 3 million tons of e-waste discarded in 2009

Discarded Electronics
Worldwide:
20 to 50 million metric tons of e-waste disposed worldwide each year

E-waste is still the fastest growing municipal waste stream in the US

The EPA's most recent e-waste report (summarized in the table on the previous page) shows that we got rid of 2.4 million TONS of e-waste in 2010. (That's the latest year for which they have data.)

That means we got rid of (trashed or recycled) **142,000 computers and over 416,000 mobile devices EVERY DAY!!**

In 2009, we generated **3.19 million tons of e-waste in the U.S.** Of this amount, only 600,000 tons or 17.7 % was recycled, according to the EPA (up from 13.6 in 2008). The rest was trashed – in landfills or incinerators.

Selected consumer electronics include products such as TVs, VCRs, DVD players, video cameras, stereo systems, telephones, and computer equipment.³

Note: This is larger than the number for 2010 shown above. See note 2 below, for explanation of how EPA has changed its methodology for counting this.

"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."⁴

The category of "selected consumer electronic products" grew by almost 5% from 2007 to 2008, from 2.84 million tons from 3.01 million tons to 3.16 million tons.⁵ 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.

² Those of you keeping score may notice that this number of 2.4 million tons of e-waste generated for 2010 is actually LOWER than the number (3.19 million tons) the EPA had previously published for 2009 (and that we had used on this Facts and Figures document). Is the e-waste volume going down? Definitely not. But the 3.19 million number came from the EPA's annual "Municipal Solid Waste in the United States: 2009 Facts and Figures" which when published in December 2010 had used that figure. When the EPA published this new report in 2011 (in footnote 1), they used a different (smaller) scope of products than they had been using for their annual Municipal Solid Waste reports (which also included VCRs, DVD players, video cameras, stereo systems, telephones). Rather than simply explaining that the volumes used in the two different reports don't match up because they use a larger scope or products in the Municipal Solid Waste reports than in the E-waste reports, the EPA inexplicably chose to just go back and revise their prior year numbers for these Municipal Solid Waste Reports to the smaller scope of products, basically "losing" data previously collected and skewing the picture of what's really happening. We hope the EPA will reverse this approach, and simply report all data they have, since there are very few sources of data on e-waste quantities for the U.S.

³ "Municipal Solid Waste in the United States: 2009 Facts and Figures," US EPA, December 2010.
<http://www.epa.gov/epawaste/nonhaz/municipal/pubs/msw2009rpt.pdf>

⁴ 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>

⁵ "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>

Sales in Electronics - How Much Electronics Are We Buying?

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

	US Sales			Global Sales			
	What we bought in 2010	What we bought in 2011	What we will buy in 2012	What we bought in 2010	What we bought in 2011	What we will buy in 2012	Future Year Projections
Computers							
Computers: Desktop Laptop, but not tablet	71.7 million total	68.7 million Gartner Quarterlies	23.5 million laptops only CEA	350.9 million Gartner	352.8 million Gartner	404 million Gartner	
Tablets (incl e-readers)		54.8 million projection Gartner	36.4 million CEA	19.5 million Gartner	72.7 million Displaysearch	103.4 million Gartner	383.2 million by 2017 Displaysearch
- iPads			81 million				
Servers							
Printers							
Printers, Multi's, Digital copiers	27,918,009 IDC						
Televisions							
All Televisions	34.1 million EPA			247 million Displaysearch	248 million Displaysearch	254 million Displaysearch	
LCD TVs				195 million Displaysearch	206 million Displaysearch		
Cell Phones							
All cell phones	235.6 million EPA			1.211 billion Gartner	1.59 billion Gartner		
Smart Phones	65 million Gartner	95 million Gartner	108.8 million CEA	304.7 million IDC	491.4 million IDC		Over one billion by 2015 IDC
iPhones			190 million	47 million iSuppli	93 million iSuppli		

Sources for E-Waste Statistics

CEA: Consumer Electronics Association, www.ce.org

Gartner market research firm: <http://www.gartner.com>

IDC market research firm: <http://www.idc.com>

iSupply market research firm: www.isupply.com

Displaysearch, market research firm: www.displaysearch.com

EPA: US Environmental Protection Agency www.epa.gov

Sales in Electronics - How Much Electronics Are Being Sold - Continued

Consumer Electronics Generally

Spending: \$1179 per household on consumer electronics per year.

The average U.S. **household spent \$1,179** on consumer electronics (CE) products a year, according to a study released in May 2011, by the Consumer Electronics Association (CEA). The average household reports owning **24 discrete CE products**.⁶

We will buy 1.6 billion electronics in 2011

Globally, we will buy 1.6 billion consumer electronics in 2011, up from 1.56 billion in 2010, according to market research firm iSupply.⁷

Television Sales

5.1 Million TVs will be bought for the 2012 Superbowl.

A survey by the National Retail Federation, we will buy 5.1 million new TVs to watch the 2012 Superbowl. This is up from 4.6 million in 2011 and 3.6 million in 2010⁸ and 2.6 million in 2009.⁹

How Long Do Products Last?

TVs: 5 – 7 years
PCs: 3 – 4 years

New York Times: "In another bright spot for TV makers, consumers seem willing to upgrade their sets more frequently than they did in the tube era, when it was not uncommon for them to use the same sets for a decade or more.... Analysts and TV makers now assume a five-to-seven-year replacement cycle for televisions."¹⁰

Digital TV Conversion Statistics

Are we experiencing an E-Waste Tsunami?

We believe a large numbers of TVs have been and continue to be disposed of in conjunction with the 2009 digital conversion, as well as the huge increase in HDTV programming available now. 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.¹¹ That's equivalent to 910,600 tons.

⁶ Consumer Electronics Association Press Release, May 23, 2011.

http://www.ce.org/Press/CurrentNews/press_release_detail.asp?id=12100

⁷ iSupply Press Release, Jan 25, 2011, [http://www.isuppli.com/Home-and-Consumer-](http://www.isuppli.com/Home-and-Consumer-Electronics/News/Pages/Consumer-Electronics-Market-Boosted-by-Connected-Home-Products-in-2011.aspx)

[Electronics/News/Pages/Consumer-Electronics-Market-Boosted-by-Connected-Home-Products-in-2011.aspx](http://www.isuppli.com/Home-and-Consumer-Electronics/News/Pages/Consumer-Electronics-Market-Boosted-by-Connected-Home-Products-in-2011.aspx)

⁸ "Super Bowl XLVI Set to Break Spending Records," Business News Daily, February 3, 2012,

<http://www.businessnewsdaily.com/1986-super-bowl-spending.html>

⁹ "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>

¹⁰ "A Bonanza in TV Sales Fades Away," New York Times, Jan 5, 2011.

http://www.nytimes.com/2011/01/06/technology/06sets.html?_r=1&ref=technology

¹¹ "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>

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.¹²

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.¹³ 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

Recycling 1 million cell phones can recover:

- 50 lbs of gold
- 550 lbs of silver
- 20 lbs of palladium
- 20,000 lbs of copper

According to the EPA, "Experts estimate that recycling 1 million cell phones can recover about 24 kg (50 lb) of gold, 250 kg (550 lb) of silver, 9 kg (20 lb) of palladium, and more than 9,000 kg (20,000 lb) of copper."¹⁴

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 in the United States was equivalent to that recovered from more than 2 million metric tons (Mt) of gold ore and waste."¹⁵

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)."¹⁶

¹² IBID. Page 25.

¹³ 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>

¹⁴ EPA Website: <http://www.step-initiative.org/news.php?id=0000000163> Accessed February 9, 2012

¹⁵ USGS Fact Sheet FS-060-01 July 2001. <http://pubs.usgs.gov/fs/fs060-01/>

¹⁶ "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

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%)."¹⁷

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."¹⁸

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 dioxide emissions, and causes many other emissions and impacts."¹⁹

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.²⁰

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.

¹⁷ 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).

¹⁸ 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>

¹⁹ IBID

²⁰ Institute For Local Self Reliance, "Recycling Means Business," 1997.

<http://www.ilsr.org/recycling/recyclingmeansbusiness.html>