Facts and Figures on E-Waste and Recycling

This is a summary of available statistics that help is 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 (at) etakeback dot org.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much e-waste is being discarded – trashed or recycled?</td>
<td>2</td>
</tr>
<tr>
<td>How much e-waste gets stockpiled or stored?</td>
<td>3</td>
</tr>
<tr>
<td>Sales of electronics – how much are we buying?</td>
<td>4</td>
</tr>
<tr>
<td>Resource recovery from electronics recycling</td>
<td>6</td>
</tr>
<tr>
<td>Resources used in electronics (energy, water, etc)</td>
<td>7</td>
</tr>
</tbody>
</table>
## 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)

<table>
<thead>
<tr>
<th>Products</th>
<th>Total disposed**</th>
<th>Trashed</th>
<th>Recycled</th>
<th>Recycling Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>tons</td>
<td>tons</td>
<td>tons</td>
<td>%</td>
</tr>
<tr>
<td>Computers</td>
<td>423,000</td>
<td>255,000</td>
<td>168,000</td>
<td>40%</td>
</tr>
<tr>
<td>Monitors</td>
<td>595,000</td>
<td>401,000</td>
<td>194,000</td>
<td>33%</td>
</tr>
<tr>
<td>Hard copy devices</td>
<td>290,000</td>
<td>193,000</td>
<td>97,000</td>
<td>33%</td>
</tr>
<tr>
<td>Keyboards and Mice</td>
<td>67,800</td>
<td>61,400</td>
<td>6,460</td>
<td>10%</td>
</tr>
<tr>
<td>Televisions</td>
<td>1,040</td>
<td>864,000</td>
<td>181,000</td>
<td>17%</td>
</tr>
<tr>
<td>Mobile devices</td>
<td>19,500</td>
<td>17,200</td>
<td>2,240</td>
<td>11%</td>
</tr>
<tr>
<td>TV peripherals*</td>
<td>Not included</td>
<td>Not included</td>
<td>Not included</td>
<td>Not included</td>
</tr>
<tr>
<td><strong>Total (in tons)</strong></td>
<td><strong>2,440,000</strong></td>
<td><strong>1,790,000</strong></td>
<td><strong>649,000</strong></td>
<td><strong>27%</strong></td>
</tr>
</tbody>
</table>

### E-Waste by the UNIT in 2010 – Was it Trashed or Recycled

(Same report as above, but reported in UNITs, not by TONS)

<table>
<thead>
<tr>
<th>Products</th>
<th>Total disposed**</th>
<th>Trashed</th>
<th>Recycled</th>
<th>Recycling Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Units</td>
<td>Units</td>
<td>Units</td>
<td>%</td>
</tr>
<tr>
<td>Computers</td>
<td>51,900,000</td>
<td>31,300,000</td>
<td>20,600,000</td>
<td>40%</td>
</tr>
<tr>
<td>Monitors</td>
<td>35,800,000</td>
<td>24,100,000</td>
<td>11,700,000</td>
<td>33%</td>
</tr>
<tr>
<td>Hard copy devices</td>
<td>33,600,000</td>
<td>22,400,000</td>
<td>11,200,000</td>
<td>33%</td>
</tr>
<tr>
<td>Keyboards and Mice</td>
<td>82,200,000</td>
<td>74,400,000</td>
<td>7,830,000</td>
<td>10%</td>
</tr>
<tr>
<td>Televisions</td>
<td>28,500,000</td>
<td>23,600,000</td>
<td>4,940,000</td>
<td>17%</td>
</tr>
<tr>
<td>Mobile devices</td>
<td>152,000,000</td>
<td>135,000,000</td>
<td>17,400,000</td>
<td>11%</td>
</tr>
<tr>
<td>TV peripherals*</td>
<td>Not included</td>
<td>Not included</td>
<td>Not included</td>
<td>Not included</td>
</tr>
<tr>
<td><strong>Total (in units_</strong></td>
<td><strong>384,000,000</strong></td>
<td><strong>310,000,000</strong></td>
<td><strong>73,700,000</strong></td>
<td><strong>19%</strong></td>
</tr>
</tbody>
</table>

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

---

How much e-waste do we generate? Continued

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

The EPA’s most recent e-waste report (summarized in the table on the previous page) shows that we got rid of (we trashed or recycled) 142,000 computers and over 416,000 mobile devices EVERY DAY!!

In the US, we generated
3.27 million tons of e-waste in 2012
3.14 million tons of e-waste in 2013

According to the EPA
In 2013, we generated 3.14 million tons of e-waste in the U.S. Of this amount, only 1 million tons or 40% was recycled. The rest was trashed – in landfills or incinerators. ²

Also see Figure 1, on the next page, including our comments about this data.

E-waste Worldwide:
20 to 50 million metric tons of electronic waste disposed worldwide each year

“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.” ³

In 2014, we generated 41 metric tons of e-waste, although that includes a broader category of electrical equipment than we consider in the U.S. to be e-waste.

“The global quantity of e-waste in 2014 is comprised of:
1.0 Mt lamps,
3.0 Mt of Small IT,
6.3 Mt of screens and monitors,
7.0 Mt of temperature exchange equipment (cooling and freezing equipment),
11.8 Mt large equipment, and
12.8 Mt of small equipment.

41.9 Total
The amount of e-waste is expected to grow to 49.8 Mt in 2018, with an annual growth rate of 4 to 5 per cent.” ⁴

iPad 5 release drives consumers to give up their old but working tablets

Release of iPad 5 greatest surge of tablet trade ins

“Consumers are trading in their iPads and other tablets at an "unprecedented rate" to buy the newest offerings from Apple, Google and Microsoft, according to SellCell, an electronics trade-in website.”

Still over 100 million CRTs in U.S. homes

The Consumer Electronics Association’s (CEA) April 2014 survey of U.S. households. Analysis of the results suggests there are approximately 77 million CRT TVs still in U.S. households and approximately 30 million CRT monitors.

Figure 1: EPA data from “Advancing Sustainable Materials Management, Facts and Figures 2013,” published in June 2015. These EPA numbers are for “selected consumer electronics” which include products such as TVs, VCRs, DVD players, video cameras, stereo systems, telephones, and computer equipment.

Note: The above data comes from an annual estimate by the EPA, whose most recent data (as of summer 2015) is for 2013. This shows that we generated 3,140,000 tons of e-waste, in 2013 and recycled 40%, up from 30% in 2012. **We doubt that recycling rates actually increased this much in one year.** Even the EPA seems to doubt it, stating,

“It is unclear whether the large increase in the electronics recycling rate from 2012 to 2013 is due to an actual increase in recycling or the result of improved and expanded data.” [Source is this report, page 69].

We are also suspicious of data showing that the volume of e-waste being generated is decreasing. Certainly the weight of what we are buying is decreasing, as many products get thinner and lighter. But with the huge increase in volumes of products we are buying and retiring, we’d be surprised if these numbers (of e-waste generated, meaning e-waste ready to be trashed or recycled) are going down already. But we don’t doubt that e-waste recycling volumes are increasing, primarily as the result of many state laws requiring e-waste recycling, as well as some of the manufacturers’ voluntary programs.

But we include this source because we don’t have other good sources of data for e-waste generation volumes in the U.S.
### Sales in Electronics - How Much Electronics Are We Buying?

Note: Statistics on sales are expressed in terms of “units shipped” from the manufacturers into their various sales channels, unless otherwise noted.

<table>
<thead>
<tr>
<th></th>
<th>US Sales</th>
<th></th>
<th></th>
<th>Global Sales</th>
<th></th>
<th></th>
<th>Future Year Projection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What we bought in 2013</td>
<td>What we bought in 2014</td>
<td>What we bought in 2015</td>
<td>Projected Sales for 2016</td>
<td>What we bought in 2013</td>
<td>What we bought in 2014</td>
<td>What we bought in 2015</td>
</tr>
<tr>
<td><strong>Computers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer PCs: Desktop Laptop, ultramobiles, but not tablets</td>
<td>61.1 million Gartner reports</td>
<td>64.2 million Gartner qtr reports</td>
<td>62.8 million Gartner qtrly reports</td>
<td>316 million Gartner</td>
<td>313.8 million Gartner</td>
<td>306.3 million Gartner</td>
<td>317 million in 2016 Gartner</td>
</tr>
<tr>
<td>Tablets incl e-readers</td>
<td>77.4 million CEA</td>
<td>89.3 million CEA</td>
<td>60 million in 2016 CEA</td>
<td>206.8 million Gartner</td>
<td>229.6 million IDC</td>
<td>236.7 million Gartner</td>
<td>257.9 million Gartner</td>
</tr>
<tr>
<td><strong>Servers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Televisions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Televisions</td>
<td>36.6 million TVs iSuppli</td>
<td>39 million LCD TVs CEA</td>
<td>39 million LCD TVs CEA</td>
<td>27 million in 2016 CEA</td>
<td>253.1 million by 2015 iSuppli</td>
<td>2015: 141 million iSuppli</td>
<td></td>
</tr>
<tr>
<td>“Smart” TVs (connected)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Streaming set top devices</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell Phones</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All cell phones</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smart Phones</td>
<td>138 million phones CEA</td>
<td>152 million phones CEA</td>
<td>173 million in 2016 CEA</td>
<td>183 million in 2016 CEA</td>
<td>284.4 million IDC</td>
<td>1.3 billion IDC</td>
<td>1.8 billion by 2017 Display-search</td>
</tr>
<tr>
<td>iPhones</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Game Consoles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3D printers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>496,475 in 2016 Gartner</td>
</tr>
<tr>
<td>Wearables (fitness trackers, watches)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALL CE Sales</td>
<td>Over $215.8 billion CEA</td>
<td>$223.2 billion CEA</td>
<td>$287 billion in 2016 CEA</td>
<td>2.35 billion PCs, Tablets, Mobile phones Gartner</td>
<td>IT spending will be $3.8 trillion in 2014 Gartner est</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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: $1312 per household on consumer electronics per year.

In 2012, the average U.S. household spent $1,312 on consumer electronics (CE) products a year, according to a study, by the Consumer Electronics Association (CEA).  
 5 The average household reports owning 24 discrete CE products.  

In the U.S. we spent over $206 billion on electronics in 2012.

According to the Consumer Electronics Association (CEA) sales of smartphones and tablet computers are expected to drive annual consumer electronics sales to over $206 billion in 2012 — the first time above the $200 billion mark."  

APPLE DEVICES

As of Q1 2013, Apple has sold over 796 million iDevices (iPod, iPhone, iPad).  

If you stacked these iDevices into one column, it would reach over 4200 MILES high, well into outer space. If you then laid that iDevice snake on its side, it would reach from Vancouver to Bogota, Colombia. Or Oslo to Mumbai.

Television Sales

Over 7.5 Million TVs will be bought for the 2013 Superbowl.

A survey by the National Retail Federation says we bought over 7.5 million new TVs for the 2013 Superbowl.  
9 This is up from 5.1 million new TVs to watch the 2012 Superbowl, 4.6 million in 2011, 3.6 million in 2010  
10 and 2.6 million in 2009.  

Almost all US households have at least 1 TV

98% of US households have at least one TV, according to a 2013 study by CEA.  
12

---

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.”¹³

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, including the increase in HDTV programming now available. Consumers still 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 want analog, tube 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.¹⁴ 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.¹⁵

Over 35% of US households were affected by digital transition  
According to the federal Government Accountability Office, 15% of households rely solely on the air TV signal – the signal that is now 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.¹⁶ With about 110 million households in the US, that means that approximately 40 million TVs were 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

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.”¹⁷

---

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

¹⁴ “Electronic Waste Management in the United States, Approach 1”  
Table 3.1 EPA530-R-08-009 US Environmental Protection Agency, July 2008.  

¹⁵ IBID. Page 25.

¹⁶ Digital Television Transition. Testimony before the House Subcommittee on Telecommunications and the Internet, June 10, 2008.  
Mark Goldstein, Government Accountability Office (GAO). P11  

¹⁷ EPA Website:  
Accessed February 9, 2012
- 20,000 lbs of copper

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.”

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).”

Energy Use

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

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%).”

Our gadgets used at home consumed 169 terawatt hours of electricity in 2013.

A study by the Consumer Electronics Association (CEA) showed that the 3.8 billion consumers electronics used at home consumed 169 terawatt hours in 2013. This is a full 12% of residential energy used. That total is equal to the output of more than 50 large polluting power plants, costing consumers about $20 billion annually.

---

21 http://www.ce.org/CorporateSite/files/e4/e4d65f2d-bbd3-49f5-b3d6-8634268aa055.pdf
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.”23

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

Recycling aluminum uses saves 90% of energy needed to mine 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.”24

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.25


24 Ibid