

## 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 \(at\) etakeback dot org](mailto:info@etakeback.org).

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## 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.)

<b>E-Waste by the Ton in 2010 – Was it Trashed or Recycled</b> (According to the EPA)				
<b>Products</b>	<b>Total disposed**</b>	<b>Trashed</b>	<b>Recycled</b>	<b>Recycling Rate</b>
	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
<b>Total (in tons)</b>	<b>2,440,000</b>	<b>1,790,000</b>	<b>649,000</b>	<b>27%</b>

<b>E-Waste by the UNIT in 2010 – Was it Trashed or Recycled</b> (Same report as above, but reported in UNITS, not by TONS)				
<b>Products</b>	<b>Total disposed**</b>	<b>Trashed</b>	<b>Recycled</b>	<b>Recycling Rate</b>
	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
<b>Total (in units_</b>	<b>384,000,000</b>	<b>310,000,000</b>	<b>73,700,000</b>	<b>19%</b>

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 <sup>1</sup>

<sup>1</sup> "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:  
384 million UNITS of e-waste  
152 million mobile devices

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

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

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.

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

Still over 100 million CRTs in U.S.  
homes

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!!**

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. <sup>2</sup>

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

“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.” <sup>3</sup>

“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.

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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.” <sup>4</sup>

### **Release of iPad 5 greated 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.”

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.

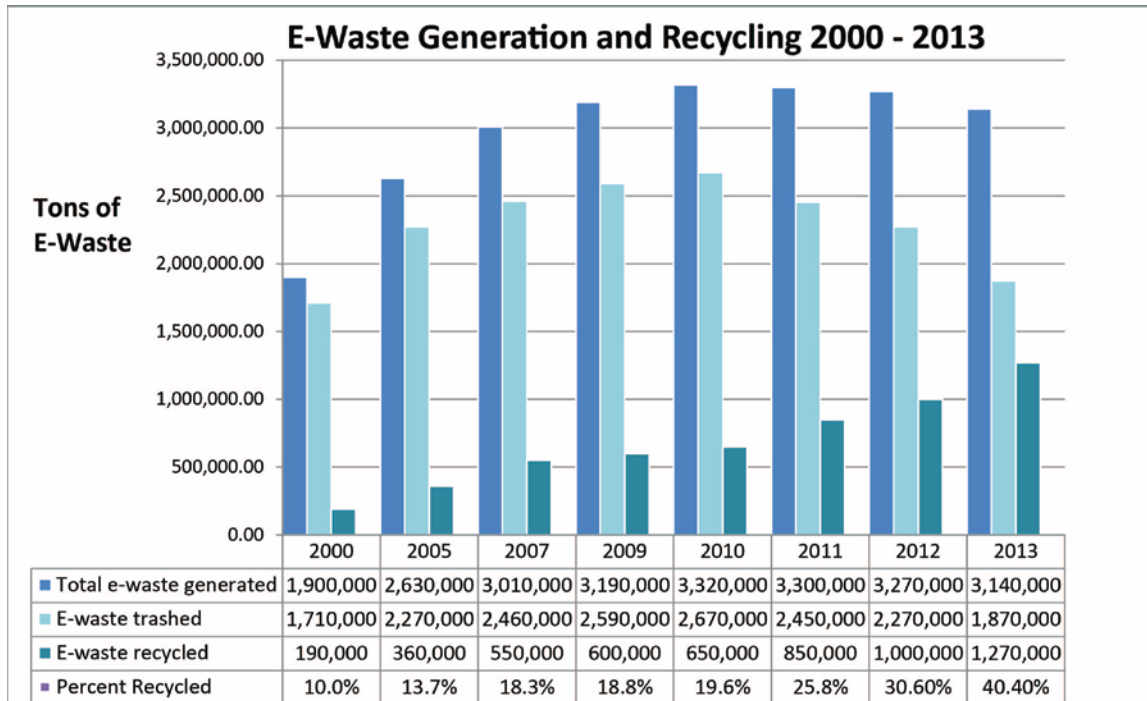
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<sup>2</sup> [“Advancing Sustainable Materials Management. Facts and Figures 2013,”](#) published in June 2015.

<sup>3</sup> 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>

<sup>4</sup> Baldé, C.P., Wang, F., Kuehr, R., Huisman, J. (2015), “The global e-waste monitor – 2014,” United Nations University, IAS – SCYCLE, Bonn, Germany; <http://i.unu.edu/media/unu.edu/news/52624/UNU-1stGlobal-E-Waste-Monitor-2014-small.pdf> Page 22-24



**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.

	US Sales				Global Sales			
	What we bought in 2013	What we bought in 2014	What we bought in 2015	Projected Sales for 2016	What we bought in 2013	What we bought in 2014	What we bought in 2015	Future Year Projection
<b>Computers</b>								
Computer PCs: Desktop Laptop, ultramobiles, but not tablets	61.1 million <a href="#">Gartner</a> reports	64.2 million <a href="#">Gartner</a> qtr reports	62.8 million <a href="#">Gartner</a> qtrly reports		316 million <a href="#">Gartner</a>	<a href="#">313.8 million</a> Gartner	<a href="#">306.3 million</a> Gartner	<a href="#">317 million</a> in 2016 Gartner
Tablets incl e-readers	<a href="#">77.4 million</a> CEA	<a href="#">89.3 million</a> CEA		60 million In 2016 <a href="#">CEA</a>	<a href="#">206.8 million</a> Gartner	<a href="#">229.6 million</a> IDC	<a href="#">236.7 million</a> Gartner	<a href="#">257.9 million</a> Gartner
Servers								
<b>Televisions</b>								
All Televisions	<a href="#">36.6 million</a> TVs iSuppli	<a href="#">39 million</a> <a href="#">LCD TVs</a> CEA	<a href="#">39 million</a> <a href="#">LCD TVs</a> CEA					<a href="#">253.1 million</a> by 2015 <a href="#">iSuppli</a>
“Smart” TVs (connected)				27 million in 2016 <a href="#">CEA</a>				2015: 141 million <a href="#">iSuppli</a>
Streaming set top devices					4 million <a href="#">iSuppli</a>			9.6 million in 2015 <a href="#">iSuppli</a>
<b>Cell Phones</b>								
All cell phones					<a href="#">1.8 billion</a> Gartner	<a href="#">1.8 billion</a> Gartner	<a href="#">1.9 billion</a> Gartner	<a href="#">2 billion</a> in 2016 Gartner
Smart Phones	<a href="#">138 million phones</a> CEA	<a href="#">152 million phones</a> CEA	173 million in 2016 <a href="#">CEA</a>	183 million in 2016 <a href="#">CEA</a>	<a href="#">284.4 million</a> IDC	<a href="#">1.3 billion</a> IDC		<a href="#">1.8 billion</a> by 2017 Display-search
iPhones					<a href="#">125 million</a> CNET	<a href="#">150.2 million</a> CNET	231 million <a href="#">Statista</a>	
Other								
<b>Game Consoles</b>		<a href="#">5.7 billion consoles</a> CEA						
<b>3D printers</b>				179,000 <a href="#">CEA</a>				<a href="#">496,475</a> in 2016 Gartner
<b>Wearables</b> (fitness trackers, watches)				38.4 million <a href="#">CEA</a>				
<b>ALL CE Sales</b>								
	Over <a href="#">\$215.8 billion</a> <a href="#">CEA</a>	<a href="#">\$223.2 billion</a> CEA		\$287 billion in 2016 <a href="#">CEA</a>	2.35 billion PCs, Tablets, Mobile phones <a href="#">Gartner</a>	IT spending will be <a href="#">\$3.8 trillion in 2014</a> Gartner est		

## Sources for E-Waste Statistics

CEA: Consumer Electronics Association, [www.cea.org](http://www.cea.org)  
Gartner market research firm: <http://www.gartner.com>  
IDC market research firm: <http://www.idc.com>

iSupply market research firm: [www.isupply.com](http://www.isupply.com)  
Displaysearch, market research firm:  
[www.displaysearch.com](http://www.displaysearch.com)  
EPA: US Environmental Protection Agency [www.epa.gov](http://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).<sup>5</sup> The average household reports owning **24 discrete CE products**.<sup>6</sup>

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.”<sup>7</sup>

### APPLE DEVICES

As of Q1 2013, Apple has sold over 796 million iDevices (iPod, iPhone, iPad).<sup>8</sup>

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.<sup>9</sup> This is up from 5.1 million new TVs to watch the 2012 Superbowl, 4.6 million in 2011, 3.6 million in 2010<sup>10</sup> and 2.6 million in 2009.<sup>11</sup>

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.<sup>12</sup>

<sup>5</sup> Consumer electronics Association Press Release April 22, 2013: <http://www.cea.org/News/News-Releases/Press-Releases/2013-Press-Releases/Mobile-Devices-Lead-Electronics-Purchases,-Finds-C.aspx>

<sup>6</sup> Consumer Electronics Association Press Release, May 23, 2011.  
[http://www.cea.org/Press/CurrentNews/press\\_release\\_detail.asp?id=12100](http://www.cea.org/Press/CurrentNews/press_release_detail.asp?id=12100)

<sup>7</sup> Consumer Electronics Association Press Release, July 24, 2012, “CE Industry Yearly Revenues Expected to Surpass \$200B for First Time,” [http://www.cea.org/News/News-Releases/Press-Releases/2012-Press-Releases/CE-Industry-Yearly-Revenues-Expected-to-Surpass-\\$2.aspx](http://www.cea.org/News/News-Releases/Press-Releases/2012-Press-Releases/CE-Industry-Yearly-Revenues-Expected-to-Surpass-$2.aspx)

<sup>8</sup> “iPhone, iPad sales up, Macs fall as Apple sees record sales,” MacWorld Jan 23, 2013.  
<http://www.macworld.com/article/2026112/iphone-ipad-sales-up-macs-fall-as-apple-sees-record-sales.html>

<sup>9</sup> “TV Demand Up 39% Among Super Bowl Fans: Survey.” This Week in Consumer Electronics, Jan 29, 2013:  
<http://www.twice.com/articletype/news/tv-demand-39-among-super-bowl-fans-survey/104848>

<sup>10</sup> “Super Bowl XLVI Set to Break Spending Records,” Business News Daily, February 3, 2012,  
<http://www.businessnewsdaily.com/1986-super-bowl-spending.html>

<sup>11</sup> “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>

<sup>12</sup> Consumer Electronics Association Press Release, April 22, 2013, “Mobile Devices Lead Electronics Purchases, Finds CEA’s Annual Ownership Study,” <http://www.cea.org/News/News-Releases/Press-Releases/2013-Press-Releases/Mobile-Devices-Lead-Electronics-Purchases,-Finds-C.aspx>

## 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.”<sup>13</sup>

## 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.<sup>14</sup> 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.<sup>15</sup>

Over 35% of US households were 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 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.<sup>16</sup> 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.”<sup>17</sup>

<sup>13</sup> “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](http://www.nytimes.com/2011/01/06/technology/06sets.html?_r=1&ref=technology)

<sup>14</sup> “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>

<sup>15</sup> IBID. Page 25.

<sup>16</sup> 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>

<sup>17</sup> EPA Website: <http://www.step-initiative.org/news.php?id=0000000163> 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.<sup>18</sup>

## 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).”<sup>19</sup>

### 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%).”<sup>20</sup>

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.<sup>21</sup> That total is equal to the output of more than 50 large polluting power plants, costing consumers about \$20 billion annually.<sup>22</sup>

<sup>18</sup> USGS Fact Sheet FS-060-01 July 2001. <http://pubs.usgs.gov/fs/fs060-01/>

<sup>19</sup> “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](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.

<sup>20</sup> 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).

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

<sup>22</sup> Noah Horowitz, Senior Scientist for NRDC, “Has Consumer Electronics Energy Use Finally Peaked?” June 26, 2014: [http://switchboard.nrdc.org/blogs/nhorowitz/has\\_consumer\\_electronics\\_energ.html](http://switchboard.nrdc.org/blogs/nhorowitz/has_consumer_electronics_energ.html)



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.”<sup>23</sup>

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 CO<sub>2</sub>, and 0.11 kilograms of sulphur dioxide emissions, and causes many other emissions and impacts.”<sup>24</sup>

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.<sup>25</sup>

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<sup>23</sup> 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>

<sup>24</sup> IBID

<sup>25</sup> Institute For Local Self Reliance, “Recycling Means Business,” 1997. <http://www.ilsr.org/recycling/recyclingmeansbusiness.html>