



Thousands of monitors piled up in Guiyu, China, where a large amount of e-waste from the U.S. is sent.

Photo © Basel Action Network, 2008.

# How Exporting Toxic Electronic Waste from U.S. Causes Harm Here and Abroad

## An Issue Briefing Book



Electronics  
**TakeBack**  
Coalition

TAKE IT BACK. MAKE IT GREEN.  
RECYCLE RESPONSIBLY

# How Exporting Toxic Electronic Waste from U.S. Causes Harm Here and Abroad

This report explains the impact of global e-waste dumping, why our laws don't stop this practice, and how Congress can solve the problem and create jobs in the U.S.

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# Exported U.S. E-Waste is Poisoning Communities

Recyclers estimate that 50 to 80% of the e-waste that is collected by U.S. recyclers is not really recycled, but is exported to developing countries around the globe.

## E-Waste Dumping in Asia

E-waste is handled in ways that is causing grave harm in most of these developing countries. Typically, products are broken apart under unsafe conditions – bashed open or melted down in backyard operations. The workers are attempting to remove the valuable metals, which they can sell into the metals market. <sup>1</sup>

They also burn the plastics, which emit deadly dioxin. They heat the circuit boards to melt the lead solder, breathing in lead fumes. They use acids to remove gold from the chips on the circuit boards. In the Guiyu region of China, they toss the leaded glass from dismantled CRT monitors and TVs into nearby drainage ditches. By handling e-waste in these crude ways, they are exposing themselves to significant quantities of toxic chemicals and are severely polluting their environment.

Workers in these areas are showing the health impacts of these unsafe practices. Medical studies conducted in China's Guiyu region – where a large volume of e-waste is processed - found that **more than 80% of the children have lead poisoning, the water is unsafe to drink, and the workers have extraordinarily high levels of toxic fire retardants and their toxic by-products in their bodies.** <sup>2</sup>



*Woman in Guiyu, China, about to smash a monitor, to remove the copper yoke at the end of the funnel. The glass is laden with lead, but the biggest hazard from this is the inhalation of highly toxic phosphor dust coating inside. December 2001. Copyright: Basel Action Network.*



*Copyright: Basel Action Network*

## E-Waste Dumping in Africa: Myth of "Reuse"



*Photo copyright Basel Action Network, 2005.*

*Electronic waste dumped in residential area just outside of Alaba market in Lagos, Nigeria. E-waste is routinely burned here.*

Much of the e-waste currently sent to Africa is done under the guise of "reuse." In theory, we send them our old electronic products to "bridge the digital divide." In fact, much of what recyclers send labeled "for reuse" are not actually working or fixable products. In fact, we are using Africa as a dumping ground for our electronic waste.

### **Non-working, non-repairable trash**

A 2005 film and report by the Basel Action Network show that as much as 75% of the electronics in containers sent for reuse to Lagos, Nigeria from the U.S. and Europe cannot be resold or refurbished because they are non-working, non-repairable trash.<sup>3</sup> With no real electronics recycling infrastructure, "recyclers" in Lagos end up recovering the valuable metals by burning these toxics-laden products in open fires very close to residential areas, emitting deadly dioxin and furans.

Lagos, Nigeria has a vibrant reuse market and a skilled workforce for refurbishing used electronics. But they should be receiving only tested, fully functional products, and not completely obsolete, non-working, or untested equipment.

The same problem in Ghana has been documented in the January [2008 issue](#) of National Geographic<sup>4</sup> and by Consumers International, in a 2008 report and film<sup>5</sup>. A June 23, 2009 PBS [Frontline segment](#) on global e-waste dumping called Ghana the e-waste capitol of Africa, and found that "50% of the computers shipped to Ghana labeled as "donations" are, in fact, broken beyond repair."<sup>6</sup>

# Exported U.S. E-Waste is a National Security Problem

Computer chips from our e-waste exported to China are sold back to Pentagon as military grade

**"We are having field failures regularly within our weapon systems—and in almost every weapon system."**

A Naval Air Systems Command manager  
*Business Week* 10/2/08

**BusinessWeek**

**"The proliferation of counterfeit parts is not limited to occasional, isolated incidents, but is increasingly present at every level of the supply chain."**

U.S. Department of Commerce Survey,  
November 2009



In 2008, *Business Week* documented a lesser known consequence of exporting e-waste to China: computer chips from old, consumer grade PCs – sent to China for “recycling” – are actually being sold back to the U.S. as fake “military grade” chips.<sup>7</sup> These chips have been found in military equipment, including the flight computer of an F15 fighter, raising concerns about national security equipment failure and accidents, and raising alarm within the military supply chain.

Workers in China pluck the chips off of circuit boards, and refinish and repaint them with markings claiming that the chips are new when they can be more than 10 years old. They pass them off as special military grade products when they are really just consumer-grade, coming from the old computers we exported to China. They are then sold into the supply chain, and are very difficult to detect as being fraudulent.

The article quoted a Naval Air Systems manager who believes that **“as many as 15% of all the spare and replacement microchips the Pentagon buys are counterfeit.** As a result, he says, ‘we are having field failures regularly within our weapon systems—and in almost every weapon system.’”

Fake chips are also being found in military network routers, which raises serious concerns about espionage and security compromises of the military agencies’ networks. Four hundred fake routers have been seized so far, according to *Business Week*.

These concerns prompted the Department of Commerce to conduct an assessment of the problem, which resulted in a November 2009 report: **“Defense Industrial Base Assessment: Counterfeit Electronics.”**<sup>8</sup> This assessment found the problem to be widespread within the defense industry and growing:

“The proliferation of counterfeit parts is not limited to occasional, isolated incidents, but is **increasingly present at every level of the supply chain.** Nor are incidents of counterfeit components restricted to one class of suppliers, specific discrete electronic component or microcircuit product lines, or older “legacy” components.” (Page 164)

For the five industry sectors surveyed, the number of counterfeit incidents for all electronic part types climbed dramatically from 3,868 cases in 2005 to 9,356 cases in 2008. (Page 169-170)

# Exported U.S. e-waste comes back to harm us here

## Lead from exported e-waste is found in toxic children's jewelry imported from China

### Professor Finds High Lead in Children's Jewelry

A 2007 study by Chemistry Professor Jeffrey Weidenhamer, of Ashland University in Ohio, found that inexpensive imported children's jewelry sold at local dollar stores not only showed very high lead concentrations, but that the chemical "footprint" of the lead in some of the jewelry suggests that the lead came from the leaded solder recovered from electronic waste processing. In the past year, over a million children's toys and jewelry have been recalled in the U.S. because of high levels of lead in the paint.<sup>9</sup> But this study was the first time that high lead levels in children's jewelry have been linked to our old e-waste.



*Circuit board being cooked to melt solder in Taizhou, China 2007. China illegally imports electronic waste from the US and other developed countries, where it is processed in backyard operations like this one. Photo © 2007 Stuart Isett/www.isett.com*

### Lead Solder Melted From Circuit Boards

Circuit boards removed from electronic products sent to China for disassembly are heated in woks or over open flames in primitive backyard recycling operations. The melted solder is removed, dumped into a bucket and later sold to local metals companies.

### Metals Company Sells E-Waste Solder To Jewelry Companies

A July 2007 *Wall Street Journal* article documented the connection between the metal processing to the jewelry making companies in the Yiwu area of China. "Liu Mouye, owner of the Yiwu Yiming Alloy Factory here, says the lead alloy she sells to jewelry makers around Yiwu -- an important hub for low-priced Chinese exports -- is made in part from so-called e-waste that arrives by ship in southern China from the U.S. and other developed countries."<sup>10</sup>

## THE WALL STREET JOURNAL

July 12, 2007

### Lead Toxins Take a Global Round Trip

#### 'E-Waste' From Computers Discarded in West Turns Up In China's Exported Trinkets

...For lead, the trip to China from the U.S. typically goes something like this: U.S. consumers and businesses send their old electronics to recycling firms -- often by way of innocuous recycling drives. Some of those firms then sell the electronics to dealers in the U.S., who sell them to dealers in China. Chinese companies buy the e-waste and strip lead and other re-sellable materials from it -- often discarding harmful materials along the way, adding to local pollution. Those firms then sell the recovered lead to alloy makers like Ms. Liu, who provide it to Chinese manufacturers. The lead makes its way -- sometimes at toxic levels -- into trinkets sold to consumers in the U.S....[Full story](#)

## How Does This Happen?

I took my old computer to a community recycling event. How did it end up in China?



Is it really possible that the television or computer that you dutifully hauled down to your town's Earth Day electronics recycling event may actually be sent to China, where it could poison people and the environment?

And that lead from your product may come back in jewelry that your child buys at the local dollar store?

Or that a chip from your old computer could end up in an F-15 jet fighter or aircraft carrier?

The answer is, yes – in fact, it's quite likely. As much as 80% of the electronic waste collected by "recyclers" in the U.S. is exported to developing countries, like China, India, Vietnam, Ghana, and Nigeria. For example, Cathode Ray Tube (CRT) monitors or TVs contain 4-8 lbs of lead, as well as toxic phosphors. A recycler could either PAY money to take apart the monitor and then manage the CRT glass responsibly or he could SELL the whole monitor for a few dollars to a waste trade broker who will export it. Most recyclers opt to export.

### Exporting Whole Units More Profitable Than Recycling in U.S.

It boils down to simple economics. Recyclers in the U.S. can make more money by selling many electronic products to exporting waste traders than by processing them here. Traders send the e-waste to developing countries where workers earn extremely low wages (often a few dollars per day) and where health and safety and environmental laws, enforcement, infrastructure and citizens' rights are very weak. Simply stated, we are handling our e-waste problem by exporting it to poor countries around the globe because it is profitable to do so.

Meanwhile, legitimate recyclers in the U.S. -- companies that have invested in operations that safely manage electronic waste without harmful exposures -- are finding it increasingly difficult to compete with the exporters who continually underbid them.

### Exporting Recycling Jobs

By exporting e-waste – either for low-road "processing" or even for refurbishment – to developing countries, we are losing out on a significant number of jobs. Responsible e-waste disassembly and refurbishment can both be done here in the U.S., providing badly needed green collar jobs here.

## Case study of a typical e-waste exporter

### 1. Electronics “recycler” solicits charities to collect e-waste as fundraisers

EarthCycle, a “recycler” based in Tulsa, OK, solicits charities across the country to hold e-waste collection events as fundraisers, offering \$5000 to charities who collect 100,000 lbs of e-waste. The charity does all the outreach, and EarthCycle handles the e-waste.

From EarthCycle Website:

You can run your own event to benefit any organization. Please contact us to hold a Computer and Electronics Recycling Event Fundraiser. Each event earns you and the organization sponsor \$5,000 each for each 100,000 lbs.

Recycling benefits everyone and everyone wins when you recycle your old computers and electronics with EarthCycle(R), LLC.

### 2. Humane Society holds Pittsburgh e-waste collection events with EarthCycle

Three Humane Society chapters in the Pittsburgh area partnered with EarthCycle and sponsored several free e-waste collection events as fundraisers in March and April 2009. Thousands of residents brought their old TVs and other electronics to the collection sites for recycling. Consumers were charged \$15 for TVs, but other products were free to recycle.

### 3. Recycler Tells Public He Won't Export

Amid concerns about possible exporting, the recycler assured the public that products collected would be processed locally and responsibly. According to the *Pittsburgh Post-Gazette*:

“Jeff Nixon, chief executive officer of EarthCycle, said the electronic waste collected will mostly be processed in the company's warehouse in Homewood. ‘Much of the waste we work with is stuff that we can repair and then resell because it's still usable. The rest of it will be broken down and reprocessed by local recycling companies,’ said Mr. Nixon. “

**GOT ELECTRONICS?**  
**THE HUMANE SOCIETY OF WASHINGTON COUNTY**  
**PRE-EARTH DAY-GREEN EVENT**

DONATE YOUR OLD ELECTRONICS  
SAVE MOTHER EARTH AND ANIMAL'S LIVES

MARCH 18<sup>TH</sup> THROUGH MARCH 22, 2009

**DROP-OFF LOCATIONS:**

CROWN CENTER MALL	10 - 5 EACH DAY
SOUTHSHORE COMPLEX	10 - 5 EACH DAY
TRACTOR SUPPLY - Route 198	10 - 5 EACH DAY

Drop-off the following items - No Drop-off fees:

Personal computers	Monitors 15" or less	Mouse
Personal printers	Modems	Keyboards
Personal scanners	Webcams	Power supplies
Personal speakers	External hard drives	External floppy drives
Personal digital cameras	Cell phones	MP3 players
Personal digital recorders	Personal digital assistants	Personal digital organizers
Personal digital cameras	Personal digital recorders	Personal digital organizers
Personal digital cameras	Personal digital recorders	Personal digital organizers

Information: [www.earthcycle.com](http://www.earthcycle.com) or 412-519-4841



### 4. E-waste is collected and loaded into shipping containers

E-waste collected at the events was unloaded into a Pittsburgh warehouse, then reloaded into ocean-going shipping containers. Photo at left shows CRT monitors loaded from EarthCycle's Monroeville warehouse into shipping containers. Seven containers were seen being loaded.

### 5. E-waste is exported to Hong Kong and South Africa

Despite the recycler's public claims about local processing, the e-waste was shipped to developing nations. Of the seven containers seen being loaded, six went to Hong Kong, and one went to South Africa. Three of the Hong Kong containers (which were ultimately destined for Vietnam) were sent back when the Basel Action Network notified authorities there of the contents. (The import violates China's laws.) This recycler regularly advertises on online export sales sites that he has e-waste for sale for export.

### 6. Did this exporter break any U.S. law?

The only U.S. law this company may have broken is the CRT rule, which applies to exports of CRTs. (The EPA has now filed [a compliance order](#).) But in exporting other e-waste, this exporter did not break any U.S. laws, because we have no such laws.

# GAO Report Finds U.S. Laws Don't Stop E-Waste Export



## GAO: "Exports flow virtually unrestricted"

Currently, there are few U.S. laws or regulations to stop the recyclers who export toxic e-waste. An August 2008 report by the Government Accountability Office (GAO), the independent investigative agency for Congress, concluded that, "US exports of potentially harmful used electronics flow virtually unrestricted."<sup>11</sup> The report found that the only category of e-waste with any regulations regarding exporting - cathode ray tubes (CRTs) - are not enforced by the EPA, and are therefore routinely ignored.

## Exemptions removed e-waste from "hazardous waste" and export controls

This was not always the case. The Resource Conservation and Recovery Act (RCRA) established the concept of "Cradle to Grave" management of our hazardous wastes. It says that hazardous waste should not be exported to other countries unless they have specifically agreed to accept it, and establishes a clear notice and consent procedure to obtain that permission.

However, while many of the materials in e-waste were once considered "hazardous waste" under RCRA, the EPA has created so many exemptions that very little e-waste is now covered by RCRA's notice and consent procedures. Over the years, the EPA has weakened the rules, both by removing many of these materials from the definition of "hazardous" and by creating loopholes for materials being exported for alleged "recycling" or "reuse." Waste brokers export containers full of mostly non-working equipment, labeling them as destined for reuse, to get past port inspections in countries which otherwise would not accept the non-working e-waste. There is no requirement in the U.S. that items exported for "reuse" are actually tested or working.

## The Solution:

# Legislation to Stop the Export of Toxic E-Waste to Developing Countries

The global marketplace encourages the export of toxic e-waste to developing nations, where it causes great harm. But we could easily solve this problem if Congress were to pass legislation to ban the export of toxic e-waste to developing nations. (All of Europe has already banned such exports, as have many other countries.)

### Elements of legislation needed to solve the problem:

1. Toxic electronic waste may not be exported to developing nations (countries not in the OECD or EU/Liechtenstein).
2. Exports of tested and fully functional equipment and parts being sold into legitimate reuse markets may be exported, but untested or non-working equipment and parts may not be exported.
3. Exempt from export ban: products under manufacturer warranty sent for repair; and CRT glass that is fully cleaned, being sent to a glass-to-glass recycling facility as a legal feedstock.
4. Exports of hazardous e-waste are still allowed to developed nations; there are many destinations for processing e-waste in developed countries (Canada, Western Europe), where health and safety laws are much stronger, and where the backyard processing doesn't happen.
5. Exporters must be licensed by the EPA. Only licensed companies would be eligible to generate paperwork acceptable at the port for export.



*Photo copyright Basel Action Network, 2005. Boy hired to haul electronic scrap from Alaba market in Lagos, Nigeria to this nearby informal dump sitting on a swamp. Imported scrap televisions and computers that could not be repaired get deposited and burned.*

## Global E-Waste Dumping in the News



### PBS Frontline

#### Ghana: Digital Dumping Ground

June 23, 2009

Link to view segment:

<http://www.pbs.org/frontlineworld/stories/ghana804/>



" *60 Minutes* is going to take you to one of the most toxic places on Earth - a place government officials and gangsters don't want you to see. It's a town in China where you can't breathe the air or drink the water, a town where the blood of the children is laced with lead..."

### CBS 60 Minutes

#### Electronic Wasteland

November 6, 2008

Link to view segment:

<http://www.cbsnews.com/video/watch/?id=4586903n>



"Lax rules and weak enforcement allow scrap companies to profit by sending junked computers, printers, and TVs overseas."

### Business Week

#### E-Waste: The Dirty Secret of Recycling Electronics

October 15, 2008

[Link to story](#)



"As the sun heats the humid air, pillars of black smoke begin to rise above the vast Agbogboshie Market... Soon the muddy track is flanked by piles of old TVs, gutted computer cases, and smashed monitors heaped ten feet (three meters) high. Beyond lies a field of fine ash speckled with glints of amber and green—the sharp broken bits of circuit boards. "

### National Geographic

#### High Tech Trash: *Will Your Discarded TV End Up In A Ditch in Ghana?*

December 19, 2007

[Link to story](#)

[Link to photo gallery](#)

For more media coverage:

[http://www.electronicstakeback.com/media/press\\_coverage\\_main.htm](http://www.electronicstakeback.com/media/press_coverage_main.htm)

For more information: [www.electronicstakeback.com](http://www.electronicstakeback.com)

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February 20, 2010

## Footnotes

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- <sup>1</sup> "Exporting Harm: The High Tech Trashing of Asia," Basel Action Network, 2002. <http://www.ban.org/E-waste/technotrashfinalcomp.pdf>
- <sup>2</sup> X.Z. Yu<sup>a</sup>, Y. Gao<sup>a</sup>, S.C. Wu, H.B. Zhang, K.C. Cheung and M.H. Wong. "Distribution of polycyclic aromatic hydrocarbons in soils at Guiyu area of China, affected by recycling of electronic waste using primitive technologies." *Chemosphere*, Volume 65, Issue 9, November 2006, Pages 1500-1509
- <sup>3</sup> Digital Dump: Exporting Reuse and Abuse to Africa. Basel Action Network, 2005. <http://www.ban.org/BANreports/10-24-05/documents/TheDigitalDump.pdf>
- <sup>4</sup> Chris Carroll, "High Tech Trash," National Geographic, January 2008. <http://ngm.nationalgeographic.com/2008/01/high-tech-trash/carroll-text>
- <sup>5</sup> "E-waste: West Africa continues to drown in the rich world's obsolete electronics," Consumers International, April 2008. <http://www.consumersinternational.org/Templates/Internal.asp?NodeID=97534&int1stParentNodeID=89651&int2ndParentNodeID=89692>
- <sup>6</sup> "Ghana: Digital Dumping Ground,," PBS Frontline Stories from a Small Planet, June 23, 2009 Link on website: <http://www.pbs.org/frontlineworld/stories/ghana804/>
- <sup>7</sup> Brian Grow, Chi-Chu Tschang, Cliff Edwards and Brian Burnsed, "Dangerous Fakes," Business Week, October 2, 2008. [http://www.businessweek.com/magazine/content/08\\_41/b4103034193886.htm?chan=top+news\\_top+news+index+-+temp\\_top+story](http://www.businessweek.com/magazine/content/08_41/b4103034193886.htm?chan=top+news_top+news+index+-+temp_top+story)
- <sup>8</sup> "Defense Industrial Base Assessment: Counterfeit Electronics," Bureau of Industry and Security, Office of Technology Evaluation, U.S. Department of Commerce, November 2009 [http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/defmarketresearchrpts/final\\_counterfeit\\_electronics\\_report.pdf](http://www.bis.doc.gov/defenseindustrialbaseprograms/osies/defmarketresearchrpts/final_counterfeit_electronics_report.pdf)
- <sup>9</sup> "Still Not Safe." A report from Consumers Union, May 15, 2008. <http://www.consumersunion.org/pdf/StillNotSafe.pdf>
- <sup>10</sup> Gordon Fairclough, "E-Waste' From Computers Discarded in West Turns Up In China 's Exported Trinkets," *Wall Street Journal*, July 12, 2007.
- <sup>11</sup> Electronic Waste: EPA Needs to Better Control Harmful U.S. Exports through Stronger Enforcement and More Comprehensive Regulation, Government Accountability Office, GAO-08-1044, August 2008. <http://www.gao.gov/new.items/d081044.pdf>