



From the Toxipedia website in original form. Last updated by Toxipedia in 2011.

Author Maria M. Williams.

Electronic Waste (E-Waste)

Overview

The below, addressed to American consumers, is borrowed from Toxipedia's friends at the Basel Action Network.

"There is an ugly underbelly of economic globalization that few wish to talk about. Under the guise of simply utilizing the "competitive advantage" of cheap labor markets in poorer areas of the world, a disproportionate burden of toxic waste, dangerous products, and polluting technologies are currently being exported from rich industrialized countries to poorer developing countries. In effect, rather than being helped to leap-frog over dirty development cycles directly toward clean production methods, developing countries are instead being asked to perpetuate some of the world's most toxic industries and products and are even asked to become the global dumping ground for much of the world's toxic wastes.

California and most other states allow the export of hazardous waste. If you've tossed out batteries, cameras, lightbulbs, or anything electric that contains toxic chemicals, likely it's now somewhere in the developing world.

The problems begin when the parts of those electronics begin to decompose. The Silicon Valley Toxics Coalition reports that just one computer can contain hundreds of chemicals, including lead, mercury, cadmium, brominated flame retardants, and polyvinyl chloride (PVC). Many of these chemicals are known to cause cancer, respiratory illness, and reproductive problems. They are especially dangerous because of their ability to travel long distances through air and water and to accumulate in our bodies and the environment."

The Facts About E-Waste

Recycling vs Disposal of E-Waste in the United States (source: Environmental Protection Agency, Statistics on the Management of Used and End-of-Life Electronics, 2007)

- Of the 2.25 million tons of TVs, cell phones and computer products ready for end-of-life (EOL) management, 18% (414,000 tons) was collected for recycling and 82% (1.84 million tons) was disposed of, primarily in landfills.
- From 1999 through 2005, recycling rate was relatively constant at about 15%. During these years, the amount of electronics recycled increased but the percentage did not because the amount of electronics sent for end of life management increased each year as well.
- For 2006-2007, the recycling rate increased to 18%, possibly because several states have started mandatory collection and recycling programs for electronics.

Summary of Worldwide Generation of E-waste (source: United Nations Environment Program, 2006)

"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."

Summary of the Export of E-Waste from Developed to Developing Nations (source: Greenpeace: Where Does E-Waste End Up?)

"E-waste is routinely exported by developed countries to developing ones, often in violation of the international law. Inspections of 18 European seaports in 2005 found as much as 47 percent of waste destined for export, including e-waste, was illegal. In the UK alone, at least 23,000 metric tonnes of undeclared or 'grey' market electronic waste was illegally shipped in 2003 to the Far East, India, Africa and China. In the US, it is estimated that 50-80 percent of the waste collected for recycling is being exported in this way. This practice is legal because the US has not ratified the Basel Convention.

Mainland China tried to prevent this trade by banning the import of e-waste in 2000. However, we have discovered that the laws are not working; e-waste is still arriving in Guiya of Guangdong Province, the main centre of e-waste scrapping in China.

We have also found a growing e-waste trade problem in India. 25,000 workers are employed at scrap yards in Delhi alone, where 10-20000 tonnes of e-waste is handled each year, 25 percent of this being computers. Other e-waste scrap yards have been found in Meerut, Ferozabad, Chennai, Bangalore and Mumbai."

Summary of Computer Processing Methods in Developing Nations (source: United Nations Environment Programme: The Great E-Waste Recycling Circus)

"In many countries entire communities, including children, earn their livelihoods by scavenging metals, glass and plastic from old computers. To extract the small quantity of gold, capacitors are melted down over a charcoal fire. The plastic on the electrical cords is burnt in barrels to expose the copper wires. All in all each computer yields about US \$6 worth of material (Basel Action Network). Not very much when you consider that burning the plastic sends dioxin and other toxic gases into the air. And the large volume of worthless parts are dumped nearby, allowing the remaining heavy metals to contaminate the area."

Health and Environmental Effects of E-Waste Processing in Developing Nations (source: Basel Action Network, et al:Exporting Harm report)

"The E-waste recycling and disposal operations found in China, India, and Pakistan are extremely polluting and likely to be very damaging to human health. Examples include open burning of plastic waste, exposure to toxic solders, river dumping of acids, and widespread general dumping."
For a table summarizing potential occupational and environmental health effects of operations in Guiyu, China, see page 28 of the report. Details are discussed in the report text.

Resources

Featured Articles

- Time to realize the global E-Waste Crisis: Basel Action Network shocked the world with photos from China. By Jim Puckett, Recycling Magazine No.07/2007.
- The Underbelly of Globalization: Our Toxic Wastes Exported to Developing Countries. By Thomas Kostigen (author of *You Are Here*), CSRwire.

Scientific Articles

- E-Waste Recycling Heavily Contaminates a Chinese City with Chlorinated, Brominated and Mixed Halogenated Dioxins - Yu et al 2008
- Heavy Metals Concentrations of Surface Dust from e-Waste Recycling and Its Human Health Implications in Southeast China - Environmental Science & Technology - 4 March 2008
- Spatial Distribution of Polybrominated Diphenyl Ethers and Polychlorinated Dibenzop-dioxins and Dibenzofurans in Soil and Combusted Residue at Guiyu, an Electronic Waste Recycling Site in Southeast China - Environmental Science & Technology - 14 March 2007 (*Abstract only*)
- Trace metal contamination of sediments in an e-waste processing village in China- Elsevier - 12 May 2006
- Distribution of polycyclic aromatic hydrocarbons in soils at Guiyu area of China, affected by recycling of electronic waste using primitive technologies - Elsevier - 1 April 2006
- Relevance of BFRs and thermal conditions on the formation pathways of brominated and brominated-chlorinated dibenzodioxins and dibenzofurans - Elsevier (*Abstract only*)

Reports

- Adverse Effects of the Illicit Movement and Dumping of Toxic and Dangerous Products and Wastes on the Enjoyment of Human Rights - Special Rapporteur on Toxic Waste for the United Nations Commission on Human Rights, 19 January 2001; Addendum to Same
- The Digital Dump: Exporting Re-use and Abuse to Africa. 2005 photo-documentary report by Basel Action Network.
- Exporting Harm: The High Tech Trashing of Asia. This 2002 report was a partnership between Silicon Valley Toxics Coalition, Basel Action Network (BAN), Toxics Link (India) and SCOPE (Pakistan).
- Electronics Take Back Coalition: Facts and Figures on E Waste and Recycling.
- Greenpeace Briefing: Toxic Tech: The Dangerous Chemicals in Electronic Products.
- U.S. Government Accountability Office (GAO) report: Electronic Waste: EPA Needs to Better Control Harmful U.S. Exports through Stronger Enforcement and More Comprehensive Regulation (August 2008).

Nonprofit Organizations Addressing Global E-Waste Trade

- Basel Action Network (Seattle, USA) - also offers separate e-Stewards website.
- Electronics TakeBack Coalition (coalition of U.S. nonprofit organizations)
- Silicon Valley Toxics Coalition (California, USA)
- Toxics Link (India)
- Greenpeace International: Greener Electronics Campaign

Regulations

- Text of the Basel Convention banning the export of hazardous products to developing nations.
- Wikipedia has an overview of e-waste regulations in Europe, Canada, the U.S., Australia, and Asia.

For additional resources, please see the Basel Action Network's Library.