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# India's Toxic Landfills: A Dumping Ground for the World's Electronic Waste

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# India's Toxic Landfills: A Dumping Ground for the World's Electronic Waste

*by Nisha Thakker**

## Introduction

From New Delhi in the north, to Calcutta in the south, a repetitive striking image is found in India's metropolises. One reporter writes of a "hostile zone" in Calcutta where "high brick walls block the views of activities going on within."[1] What hides behind those walls, however, tells a chilling tale of what happens to the discarded electronics of developed countries. These electronic waste ("e-waste") scrap yards have become common in India. Within these landfills children "as young as eight-years-old tear apart electronic components with bare hands, while vats of acid lying just a few feet away bubble like giant black cauldrons, spewing out strange-smelling fumes."[2] Another report tells of a teenager cutting into a car battery with a torch – wearing no mask or protective clothing.[3] Workers in these scrap yards expose themselves to hazardous materials seven days a week, for twelve to fourteen hours a day.[4]

These are common stories of individuals ranging from eight-years-old to the elderly, all dismantling e-waste dumped in India by developed countries. India's less stringent environmental standards allow for frequent, unregulated e-waste dumping within its borders.[5] Moreover, dumping e-waste in India and other developing countries allows all parties involved to make money. In the United States, it costs approximately twenty U.S. dollars to recycle an old computer. However, when waste brokers sell that same computer for export, they make about five U.S. dollars a piece, while the recycling in India costs just four dollars.[6]

*The world is currently in an e-waste crisis…*

## What is E-Waste?

E-waste can be defined as "a collective name for discarded electronic devices that enter the waste stream."[7] E-waste includes refrigerators, cellular phones, personal stereos, air conditioners, computers, and consumer electronics.[8] Over one thousand different "substances and chemicals, many of which are toxic and are likely to create serious problems for the environment and human health if not handled properly," can be found in e-waste.[9]

The world is currently in an e-waste crisis, with technology rapidly advancing and older models becoming obsolete faster than they can be dealt with. In New Delhi alone, about 25,000 workers are employed in scrap yards, "where 10,000 to 20,000 tons of e-waste are handled every year."[10] It was estimated that in 2005, one personal computer was discarded for "every new one put on the market."[11]

### How Much E-Waste is There?

India and other developing nations are easy targets for e-waste dumping by developed countries due to the fact that "generous import policies on second-hand computers, aimed at helping charities and schools, is being abused."[12] Under the guise of donating used electronics, especially computers, developed countries are able to discard e-waste far more cheaply than disposing of it within their own borders. Toxics Link, a New Delhi based organization dedicated to environmental justice and a toxic-free environment, estimates that 20,000 kilograms of e-waste finds its way through India's borders every day.[13] In the United States, an estimated 40,000 computers are discarded every year, and it is believed that another 300 million to 700 million units are being stored in houses and businesses waiting to be dumped.[14] Furthermore, experts estimate than "more than 500 million computers will become obsolete in the [United States] alone between the years 1997 and 2007."[15] Worldwide, twenty to fifty million tons of e-waste are generated annually.[16]

It has been estimated that e-waste is increasing by three to five percent per year.[17] In 2002, the Basel Action Network ("BAN") released a report stating that over five percent of municipal solid waste was comprised of electronic waste.[18] According to BAN, the U.S. government does not know how much e-waste is exported every year; however, estimates based on other studies conclude that 10.2 million computer units were sent to Asia in 2002 alone.[19] Toxic Links discovered that 70 percent of electronic waste present in recycling facilities located in New Delhi, India, has been exported or left by developed countries.[20]

### Where Does E-Waste Come From?

BAN notes that electronic waste in the United States is generated by three major sectors: "individuals and small business; large businesses, institutions, and governments; [and] original equipment manufacturers."[21] Much of the electronics that households and small businesses discard is not broken, but simply obsolete or outdated.[22] With constantly advancing technology and upgrades, computer owners are now buying new computers and disposing of their old ones about every two years.[23]

Employee computers at large institutions are upgraded on a regular basis. For example, in 2002, Microsoft had approximate-

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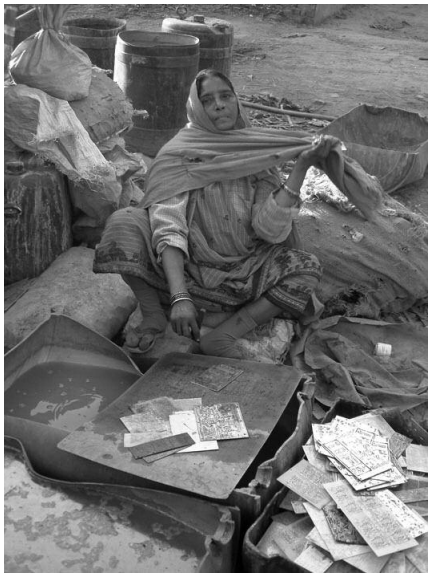
ly 50,000 employees worldwide[24] with all employees having at least one computer of their own. According to a Microsoft spokesman, the company replaces each computer every three years.[25] U.S. law forbids large users from disposing of their computers in landfills (unlike individuals and small business) and therefore, "this e-waste goes to the re-use/recycling/export market."[26] Finally, equipment manufacturers also contribute to the e-waste problem in the United States because, when products do not "meet quality standards, [they] must be disposed of."[27]

However, it is important to note that the Indian Supreme Court, in compliance with the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, prohibits the exportation of hazardous waste into India.[28] Thus, the e-waste coming into India enters under a deceptive guise or illegally.[29]



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A woman in India recovers metals from circuit boards using an acid bath process.

## How Toxic is E-Waste?

E-waste includes over one thousand different substances, and this article would not be complete without discussing these hazards and the serious health risks that they present.[30] Scrap yard workers are exposed to these toxins on a daily basis through their unprotected dismantling of e-waste in an effort to extract gold, platinum, and copper. Without proper recycling, 315 million computers will release 550 million kilograms of lead, 900,000 kilograms of cadmium, and 180,000 kilograms of mercury into the environment.[31] Other chemicals released include barium, toners, phosphor and additives, and beryllium.[32] Each of these toxic substances is found in different parts of computers and other electronics.

Lead can be found in "glass panels and gaskets in computer monitors" as well as being used as the "solder in printed circuit boards."[33] Lead causes damage to humans' nervous, blood, and reproductive systems.[34] In children, lead has been found to impede brain development, causing what one doctor terms "brain drain."[35] Lead has no biological function and should not be present in the human body; however, a person living in areas surrounded by e-waste will have about eight to ten micrograms of lead per deciliter.[36] In children, a measurement of anything close to ten micrograms of lead per deciliter can lower the IQ.[37]

Cadmium compounds accumulate in the human body, causing potentially irreversible effects on human health, especially the kidneys.[38] Cadmium is generally found in "SMD chip resistors, infra-red detectors, and semiconductor chips."[39] Additionally, it is estimated that nearly one-fourth of the world's yearly consumption of mercury is by electronic equipment.[40] Mercury can cause damage to the brain and kidneys, as well as a developing fetus.[41]

Functioning as a radiation protector, barium is used in the front panels of computers.[42] While long-term effects of exposure to barium are not documented, studies have found that short-term effects of barium exposure include "brain swelling, muscle weakness, damage to the heart, liver, and spleen."[43]

Plastic printer cartridges containing toner are one of the most common forms of e-waste.[44] Carbon black is the main ingredient of the black toner.[45] Entering the human body through inhalation, carbon black causes respiratory irritation if a person is subjected to prolonged exposure.[46] The International Agency for Research on Cancer classifies carbon black as a possible carcinogen.[47]

Phosphor "is applied as a coat on the interior of the [cathode ray tube faceplate]" and it "affects the display resolution and luminance of the images that is seen in the monitor."[48] Contained within the phosphor coating on cathode ray tubes are heavy metals such as cadmium, zinc, and vanadium.[49] While the hazards of phosphor used for this purpose are not reported, the U.S. Navy issued a directive regarding this coating: "NEVER touch a CRT's phosphor coating: it is extremely toxic. If you break a CRT, clean up the glass fragments very carefully. If you touch the phosphor, seek medical attention *immediately*."[50]

Beryllium is found on motherboards and finger clips in computers, used to "strengthen the tensile strength of connectors and tinyplugs while maintaining electrical conductivity."[51] Beryllium is classified as a human carcinogen since exposure to it can cause lung cancer. Workers can develop beryllicosis, a disease that primarily affects the lungs, if they are constantly exposed to beryllium, even in small amounts.[52] Beryllium exposure also causes a type of skin disease, such as the inability to heal property and the development of wart-like bumps.[53]

*The e-waste coming into India enters under a deceptive guise or illegally.*

## Why Risk It?

People collecting e-waste boil, crush, or burn electronic parts to extract valuable materials like gold, platinum, and copper that can then be resold.[54] Each component that is retrieved has its own value and market.[55] The monetary value for each of these materials hardly seems worth the health risks the workers endure everyday; however, most of these workers have no other steady-paying jobs and must find some way to support their families.

In a 2002 study, Toxics Link followed the money trail for each component of a broken down computer and monitor, finding that the majority of the profit is taken by the trader,

not the worker collecting the e-waste.[56] When a local trader buys a single computer with monitor for US $10 to $15, he can then earn up to US $50 in profit by selling the disassembled parts.[57] For example, a trader can buy a circuit board for thirteen cents per kilogram, and then resell it for ten cents per kilogram after the metals, such as lead, copper alloy, and gold, are recovered.[58] A profit is made when acid battery manufactures buy the recovered lead for US $2.17 per kilogram.[59] The copper recovered fetches US $1.74 per kilogram from copper wire manufacturers.[60]

In order to retrieve all of these valuable materials, workers subject themselves daily to hazardous conditions as fumes are released into the environment and absorbed into their bodies by the melting of computer parts. Long-term health risks have not been documented for e-waste workers, but the effects of these toxic chemicals are clear. One worker in New Delhi said that the pay in e-waste work is good "compared to what he could make doing other kinds of labor" – he earns around 3,000 rupees, or US $66, a month, "working six days a week in eight-hour shifts."[61] That kind of repeated exposure will most certainly lead to health problems. In some areas, doctors have noticed an increase in lung ailments in laborers, attributed to "the burning wires."[62] A study by the Chittaranjan National Cancer Institute found that people in New Delhi are nearly "twice as likely to suffer from lung ailments as those in the countryside."[63] Though traffic pollution is the primary cause, "doctors say the smelting electronic parts at factories on the city's edges should not be discounted."[64]

*People collecting e-waste boil, crush, or burn electronic parts to extract valuable materials.*

Without stricter regulations and enforcement, hundreds of thousands of India's poor will be forced to endure these conditions – conditions that would not be tolerated in the United States or other developed countries.

## E-Waste Management: International Conventions and Regulations

The Basel Convention is a major international agreement that addresses the need to regulate e-waste. Adopted in response to the "public outcry against the indiscriminate dumping of hazardous wastes in developing countries by developed-world industries," India ratified the treaty in 1992.[65] However, the Convention is helpless to restrict the import of waste from nations that have not ratified the Convention, such as the United States.[66] States that have ratified the Basel Convention need to endure complex government-level processes before they can export non-working computers.[67] The goal of these regulations is to ensure proper disposal in the importing countries; however, even countries that have ratified this Convention often ignore these procedures.[68]

Currently, under U.S. domestic law it is legal to export potentially hazardous e-waste from the United States. In fact, the U.S. Resource Conservation and Recovery Act ("RCRA") appears to encourage the export of hazardous e-waste by exempting it from export controls of any kind."[69] According to the BAN report, RCRA "has exempted more and more toxic wastes simply because they are claimed to be destined for recycling operations."[70]

The Rotterdam Convention on the Prior Informed Consent ("PIC") Procedure for Certain Hazardous Chemicals and Pesticides in International Trade entered into force on February 24, 2004.[71] The procedures of the Convention require exporters to obtain the prior informed consent of importers before proceeding with the transaction, providing an international method to monitor and control the trade of hazardous materials.[72] While the accession of the Rotterdam Convention by India has occurred, the United States has failed to ratify the treaty.[73]

The EU has enacted two model regulations in the disposal and reuse of e-waste. Each member state of the European Community must implement both the Directive on Waste Electrical and Electronic Equipment ("WEEE") and the Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment ("RoHS") into their national laws.[74] The priorities of WEEE are to prevent the creation of e-waste and also to encourage companies and individuals to reuse or recycle e-waste to reduce disposal.[75] The RoHS directive complements the WEEE Directive and restricts the use of certain hazardous materials in new equipment in order to protect human health.[76] Beginning July 1, 2006, manufactures are not permitted to use lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, or polybrominated diphenyl ethers in creating their new electronic equipment.[77]

Conversely, the United States has failed to create a domestic law regulating e-waste. However, California, Maryland, Maine, and Washington [state] have created their own set of laws. For example, the California Electronics Waste Recycling Act was signed into law in 2003, and then amended in September of 2004.[78] The Act establishes a program to safely dispose of video display products, like televisions and computer monitors.[79] As of January 1, 2005, California consumers began paying a fee at purchase when buying video displays, the money is then funneled into a special account from which qualified recyclers and collectors are paid to cover their costs.[80]

Similarly, the Maryland Department of the Environment requires the registration of certain computer manufacturers.[81] Manufacturers that sell an average of more than one thousand computers annually are required to pay a $5,000 fee, or reduce the payment by creating a free recycling program for consumers.[82] Likewise, municipalities in Maine have until July 20, 2006 to ensure that discarded televisions and computer monitors generated by households are recycled, or the manufacturers will be required

to pick up the tab.[83] The latest e-waste legislation has been enacted by Washington State on March 8, 2006,[84] Requiring manufactures to carry the cost of collection, transportation, and recycling of old computers, monitors, and televisions, the statute also prohibits exporting e-waste to developing countries.[85]

On March 3, 2005, U.S. Senators Ron Wyden (D-OR) and Jim Talent (R-MO) introduced a bill that would incentivize the safe disposal of outdated electronics.[86] Included in the proposed bill is a directive authorizing the U.S. Environmental Protection Agency to recommend a national program based a cost-benefit analysis of various e-waste recycling programs. However, the proposed legislation lacks a complete ban on the export of hazardous waste to developing nations.

*The United States has failed to create a domestic law regulating e-waste.*

### Indian Domestic Laws and E-waste

Currently, e-waste is not defined in Indian domestic environmental law.[87] In 2003, India amended the Hazardous Waste (Management and Handling) Rules of 1989.[88] The rules advise that "waste generated from the electronic industry is considered as hazardous waste."[89] That means that once e-waste *becomes* hazardous waste, it is covered under the hazardous waste rules; however, the hazardous waste contained in the electronics must first be taken out for it to be considered "hazardous waste."[90] Though this law is in place and has been amended as recently as 2003, there is no specific legislation for the handling of e-waste in India.[91]

Additionally, the Supreme Court in India set up India's Supreme Court Monitoring Committee on Hazardous Wastes ("Committee") in November 2003.[92] The goal of the Committee is to pursue "certain serious and chronic situations relating to the management of hazardous wastes."[93] The Committee recently returned hazardous wastes that were wrongly imported into India in accordance with Basel Convention.[94] Zinc from Bangladesh and a container full of garbage from Ireland were part of the returned waste.[95]

### The Future of E-waste in India

In New Delhi, the Indian government has plans for three potential waste dumps.[96] The sites would be used for "scientific disposal of hazardous household waste and e-waste generated from processing of electronic goods."[97] The Energy Resources Institute ("TERI") estimates that fifteen to twenty acres of land will be needed to develop a scientific landfill site, at a cost of about 310 million Indian rupees, to deal with the over 45,000 tons of e-waste in New Delhi.[98] TERI further estimates that overhead expenses will cost around 30 million Indian rupees annually.[99]

Additionally, the United Nations Environment Programme started a two-year project in India in September 2005 called "Environment and E-waste India."[100] The project's goals are to reduce the environmental and health impacts "due to improper e-waste recycling in India."[101] The project also provides support in implementing national policies as well as improving income opportunities, "particularly of poor communities, by changing the working conditions and job security in informal e-waste recycling sectors."[102] This project should, hopefully, rid India of the "backyard scrap yards" and allow Indian to run a more environmentally sound e-waste recycling program.

## Conclusion

With the rate of electronic obsolescence increasing each year, it is imperative for the international community to take a stronger stand against dumping toxic e-waste into developing countries. Dismantling e-waste is a relatively new phenomenon, resulting in individuals dangerously exposing themselves to toxic substances. Without proper controls and regulations from India and the international community, India's population will face a certain environmental and public health crisis.

Uninformed imports of hazardous waste material into developing countries should be banned. These countries do not have the resources to deal with the massive quantities of e-waste coming into their territories. It is not a morally or legally sound practice to allow those that have not benefited from electronic products bear the burden of dealing with the dangers of their unregulated disposal.

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