



Review on E-waste Crisis and E- Waste Management for Betterment of Socio-Environmental Habitat

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ABSTRACT

Electronic equipment and gadgets is the fastest growing waste stream in many countries. This is creating a serious and hazardous impact on the mankind and environment. Rapid technological change, low initial costs and even planned obsolescence have resulted in a fast growing e-waste crisis around the globe. Electronic waste (WEEE) now makes up five percent of all municipal solid waste worldwide, nearly the same amount as all plastic packaging, but it is much more hazardous. In this Paper we have stated the facts and statistics of e- waste across the Globe. We have also described the harmful effects of e- waste along with the preventive measures it also includes the way through which we can recycle and dispose the e- waste and turn it into a profitable business. This paper is all about the E-Waste in an aim to create GREEN EARTH.

Keywords: waste, disposal of e-waste, e-waste crisis, WEEE, Management

I. Introduction:

Electronic equipment and gadgets is the fastest growing waste stream in many countries. For many, electronics are part of modern life - cell phones, laptops, TVs and a growing number of gadgets. Every year we buy new, updated equipment to support our needs -there are upwards of 300 million computers and one billion cell phones produced every year. All of these electronics become obsolete or unwanted, often within 2-3 years of purchase. This global mountain of waste is expected to continue growing 8% per year, indefinitely (BCC Research). E-waste describes electronic equipment that has reached its end of life in the hands of its current user. Between 20 and 50 million tons of e-waste world-wide are generated each year. On average, people discard computers every two to four years.

The EPA estimated that 29.9 million desktops and 12 million laptops were discarded in 2007, totaling over 112,000 computers discarded each day. Overall, a total of 157 million computer products — including CPUs, monitors, notebooks, keyboards, mice, printers, faxes, and copiers — were discarded, with only 18% recycled. Approximately 126 million cell phones were also discarded in 2007, with only 10% recycled. E-wastes are considered dangerous, as certain components of some electronic products contain materials that are hazardous, depending on their condition and density. The hazardous content of these materials pose a threat to human health and environment. Discarded computers, televisions, VCRs, stereos, copiers, fax machines, electric lamps, cell phones, audio equipment and batteries if improperly disposed can leach lead and other substances into soil and groundwater.

II.E- Waste

E-waste, as it's popularly known, includes the broad spectrum of electronic appliances, products, components, and accessories that - due to malfunction, exhaustion (batteries, light bulbs and fluorescent tubes), or obsolescence have been discarded. E-waste, is the by-product of the technologi-

cal revolution. When disposed off in a landfill, it becomes a conglomeration of plastic and steel casings, circuit boards, glass tubes, wires, resistors, capacitors, fluorescent tubes, and other assorted parts and materials. It is both valuable as a source of secondary raw material, and toxic if treated and discarded improperly. In the simplest of terms, Electronic Waste – e-waste for short – or Waste Electrical and Electronic Equipment (“WEEE”), includes all types of electronic equipments/ products which have become obsolete or have been discarded due to:

- Advancement in technology
- Changes in fashion, style, status or perception
- nearing the end of their useful life

III Categories of E- Waste- Based on the electronic item:

Computers and its accessories: Computer waste is the most significant of all e-waste due to the quantity as well as rate at which it is generated. There are several reasons to discard the computers. It can be the newer technologies hitting the market, or it may be because some viruses or spy wares have ruined them, if not these then the other reason would be for sure that, it's too slow in functioning, so why not seek for a better one. Keyboards or Mouse or even Cathode tubes which are the units of computer that are often discarded individually.

Televisions: after computer T.V. sets are second most e-waste generated. This is because of two reasons that is T.V sets were either not working properly or they wanted a bigger one.



Cell Phones: The cell phones are more of a need nowadays than a trend. But on the other side it is that no one is interested in older models and wants to have the most recent one in their hands.

Electronic Articles: it includes Simpler and smaller parts of complex electronic articles like air conditioners, coolers and even numerous fluorescent tubes, DVD player, speakers also discarded and replaced by new one.

Electronic component- Solder in printed circuit boards, Chip resistors and semiconductors,

Relays and switches, Cabling and computer housing if disposed in open land also release the Lead, Mercury and other hazardous constituent.



Based on their reasons of being a waste

Type 1 - Those electrical articles which are working but are turned into a waste because of the fact that newer technologies have invaded the market and more and more people find themselves inclined to these newer technologies and because of their affinity to this newer technologies they discard their existing articles.

Type 2 - E wastes that are actually wastes. By this we mean those articles that do not possess any function anymore that is the true wastes. The total amount of e waste should be equivalent to the waste generated under type 2 but the growing concern is because of the type 1 wastes which are growing in volume.

Type 3 - Often it's seen that not a whole electrical article is a waste but a still a certain part of it is not functioning for ex. In a television just the cathode rays are not working but the remaining parts are working. But many people chose the other way and replace the whole article. So the whole article becomes a waste and is discarded.

IV. Disposal Risks

- Up to 85% of discarded electronics were disposed of in landfills E-waste is the fastest growing municipal waste stream.
- Electronic items considered to contain hazardous materials include:
 - o CRT televisions and computer monitors
 - o LCD desktop monitors and laptops with LCD displays
 - o LCD televisions
 - o Plasma televisions
 - o Portable DVD players with LCD screens
- Flat panel monitors and notebooks contain small amounts of mercury and CRT monitors can contain up to seven pounds of lead.
- Incineration of electronic waste releases heavy metals such as lead, cadmium, and mercury into the ashes and air.
- Leaked mercury can accumulate in fish, which is a major route of exposure for humans to high levels of mercury. The extreme amounts of lead found in electronics can cause damage to the nervous systems, blood, and kidneys when humans are exposed.
- In developing countries, recycling is done by hand in scrap yards, often by children. Electronic waste recycling sites in developing countries lack the controls designed to
- Protect workers and the environment that are found in developed countries.

V. Hazardous effects of E-waste:

Toxins generated from the open burning of Plastic shells,

PCB boards and other non-ferrous materials contained in e-waste pollute the air, water and ground and are a growing concern and for health authorities in and around the regions where such practices take place. In fact, due to the presence of PVC and brominated flame retardants in wires, the emissions contain high levels of both brominated and chlorinated dioxins and furans – two of the most deadly persistent organic pollutants (POPs). Even high traces of cancer causing polycyclic aromatic hydrocarbons (PAHs) are found in the emissions and the ash of E-waste.

Much of the work to remove chips from circuit boards is done for the ultimate purpose of removing precious metals. This is most often done by a very primitive process using acid baths, which are normally a mixture of 25% pure nitric acid and 75% pure hydrochloric acid. The studded PCBs are dipped into the acid mixture until the PVC is separated from the chips, after which this acid is irresponsibly drained out into the nearest drain or river. Water samples tested in and around the areas where such activities are carried out have been found to have dangerously high levels of toxins for human contact, let alone human consumption.

Lead-laden monitor glass, which qualifies as a hazardous waste as per the Basel Convention, is regularly dumped on land or pushed into rivers, after the copper laden yoke of the CRT monitor is extracted. This copper laden yoke is then sold to scrap metal dealers, but only at a very heavy price to the environment.

VI. Recovery and reuse

This technique could eliminate waste disposal costs, reduce raw material costs and provide income from a salable waste. Waste can be recovered on-site, or at an off-site recovery facility, or through inter industry exchange. A number of physical and chemical techniques are available to reclaim a waste material such as reverse osmosis, electrolysis, condensation, electrolytic recovery, filtration, centrifugation etc. For example, a printed-circuit board manufacturer can use electrolytic recovery to reclaim metals from copper and tin-lead plating bath.

However recycling of hazardous products has little environmental benefit if it simply moves the hazards into secondary products that eventually have to be disposed of. Unless the goal is to redesign the product to use nonhazardous materials, such recycling is a false solution.

VII. The E-Waste Recycling Life-Cycle

Though individual countries might have their own domestic laws governing specific aspects of e-waste management, the overall mode of execution of an e-waste recycling model in developed countries in current times includes the following three broad stages – collection of Advance Recycling Fee at the point-of-sale of EEE components, disposal of WEEE at dedicated collection points at their end of life and the final recycling/ safe disposal of e-waste by recyclers. This activity flow can be pictorially captured as follows:

VIII. E-waste management: key challenges in India

While the overall challenges regarding management of e-waste in India are the same faced by other developing economies, the vast geographical diversity and economic disparities between regions often make e-waste management challenges unique in India. A few of the key challenges faced are:

1. Rapidly increasing e-waste volumes, both domestically as well as generated through imports. Imports are often disguised as second-hand computer donations towards bridging the digital divide, or as metal scrap
2. Limited accuracy in the estimates of the quantity of e-waste generated and recycled
3. Low level awareness among consumers about the hazards of incorrect e-waste disposal

4. Widespread e-waste recycling in the informal sector using rudimentary techniques such as acid leaching and open air burning resulting in severe environmental damage
5. E-waste workers have little or no knowledge of toxins in e-waste and are exposed to serious health hazards, etc.

IX. Conclusion

Global mountain of WEEE (E- Waste) waste imposing a serious problem on mankind as well as environment. Before it takes shapes of disaster it is better to have a preventive measure. We have explained how the e-waste imposes adverse effect on environment and on human, and also the

reclining method .by observing the facts related to it ,There exists an urgent need for a detailed assessment of the current and future scenario including quantification, characteristics, existing disposal practices, environmental impacts etc. Institutional infrastructures, including e-waste collection, transportation, treatment, storage, recovery and disposal, need to be established, at national and/or regional levels for the environmentally sound management of e-wastes. Establishment of e-waste collection, exchange and recycling centers should be encouraged in partnership with private entrepreneurs and manufacturers.

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