

E-WASTE MANAGEMENT

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ABSTRACT

Electronic and Electrical Waste (e-waste) is the term used for all those electrical and electronic items whose life term is nearing the end. These items, which are so detrimental in nature, are either over used or disposed off in an unhealthy manner causing damage to the human health. They contain hazardous metals which can erase not only the major life systems on this earth but also the whole of the earth. This paper tries to discuss the causes and effects of the e-waste and also show the possible solutions through which we may overcome further damage.

Key words: hazardous, land filling, incinerators, obsolescence

INTRODUCTION:

With the changing life style, there is an increased demand for e-items like air conditioners, refrigerators, cell phones, lap-tops, disks, LEDs, LCDs, ATMs and so on. With the rise in the use of electrical and electronic goods, many markets have come forward to cater the needs of consumers by offering them the brand new items. Both, the developed and developing nations, are mongering after the latest, i.e. technologically advanced, goods. Little thought is given to the used products. All the discarded, electrical and electronic, devices, destined for reuse, recycling or resale, contain lead, cadmium, brominated flame retardants and beryllium. Each used piece of electronic item, containing such hazardous contents, when not properly disposed or recycled would pose a serious threat to human health and environment. These discarded, defective and obsolete pieces, which are dumped by the buyer, are considered as e-waste.

Rapid changes in technology (LAP TOPS, MP3/4 and Software), “falling prices and planned obsolescence” of electronic goods have resulted in expansion of surplus e-waste around the globe. Due to the increased appetite (for monetary benefits) of firms and various industries, many products are designed with limited life span, thereby generating long term sales volume. With an increase in the greed for new technology display by the wealthy and the business class, the processors designed become outdated very quickly, thereby generating a need in the minds of the consumers to salvage the old and buy the new. Thereby, we are filling the whole earth with huge amounts of e-garbage.

According to the report, [1], U.S. produces about 3 million tons of e-waste and according to [1] China produces 2.3 million and the production of e-waste by the Indian nation is also likely to rise [2]. Little awareness is there among the people or the nations (third World) at large, over the judicious use of electrical and electronic devices. Most of the people either don't know or tend to forget that e-waste, if not properly disposed or recycled or even left open in environment for long, could prove disastrous as illustrated in the Table below[3].

Source of e-wastes	Constituent	Health effects
Solder in printed circuit boards, glass panels and gaskets in computer monitors	Lead (Pb)	Damage to central and peripheral nervous systems, blood systems and kidney damage. Affects brain development of children.
Chip resistors and semiconductors	Cadmium (Cd)	Toxic irreversible effects on human health. Accumulates in kidney and liver. Causes neural damage. Teratogenic.
Relays and switches, printed circuit boards	Mercury (Hg)	Chronic damage to the brain. Respiratory and skin disorders due to bioaccumulation in fishes.
Corrosion protection of untreated and galvanized steel plates, decorator or hardner for steel housings	Hexavalent chromium (Cr) VI	Asthmatic bronchitis. DNA damage.
Cabling and computer housing	Plastics including PVC	Burning produces dioxin. It causes Reproductive and developmental problems; Immune system damage; Interfere with regulatory hormones

Plastic housing of electronic equipments and circuit boards.	Brominated flame retardants (BFR)	Disrupts endocrine system functions
Front panel of CRTs	Barium (Ba)	Short term exposure causes: Muscle weakness; Damage to heart, liver and spleen.
Motherboard	Beryllium (Be)	Carcinogenic (lung cancer) Inhalation of fumes and dust. Causes chronic beryllium disease or berylliosis. Skin diseases such as warts.

The EU and its member states have listed out a few Hazardous Electronic Wastes under a system- European Council Directive- via European Waste Catalogue. However, the list is broadly defined and thereby, leaving doubts for the waste operators. Dumping of e-waste is giving rise to large amount of landfills. Incinerators, too, of late, have raised doubts as to the risks which follow (health wise). 70% of the discarded e-waste comes from United States and most of the waste that is to be recycled is not done at all. Critics of the electronic trade have pointed out that most of the developed nations, due to concern over the landfills in their regions, export the e-waste to the developing nations. These nations, like China, India and parts of Africa, have become the dumping yards for surplus items as well as technology waste like the bad cathode rays. Denial of the used electronics by the developing nations may in turn deny them of the sustainable employment and items at affordable prices and hence are accepted. At the Basel Convention (which has not been ratified by the United States), many nations came forward to control and reduce trans-boundary movements of surplus and hazardous waste materials. This is done in order to regulate waste management and promote sound management of waste. The European Union, which is likely to double its usage of e-waste, has come forward with an idea of Extended Producer Responsibility. In this it has proposed the manufacturers to take back the electronic item when it is discarded and has made it mandatory to list out the deadline for phasing out of the toxin substances in the items.

Denying the use of electronic products is not the solution. Instead a judicious use of them is the need of the hour. This can be done at various levels:

- 1) At the level of manufacturers
- 2) At the level of Govt. policies
- 3) At the level of NGOs
- 4) At the level of Citizen

At the production level the industries can reduce the quantity of hazardous materials by reviewing the material purchase procedures and the inventory tracking system. Corrective measures could be taken while using input materials and it should be in such a way that they avoid the loss through spills or leakages [4]. Thereby, overcome the wastage at the time of production process level itself. For this a training program could be held for the technicians who are handling production process so that they follow the correct methods while handling and operating the equipment. Sometimes a less hazardous material may be replaced by a hazardous one (while keeping in the mind the replaced material's efficiency quotient). Use of bio-degradable plastics could sometimes be a good choice. Modifying the existing equipment is another procedure for reducing waste management. In that way simple changes in the old material can reduce the use of new raw materials. Separation of hazardous from non-hazardous waste is another method. While treating the waste materials, segregation helps in retaining the useful metal value and destroying only the hazardous one's.

At the Government level regulatory agencies should be set up. Government ought to enforce stringent laws and administrative procedures [5]. There should be a demand for regulation at the production process level and government should take initiatives for advocating better reuse of e-waste materials. Heavy fines and penalties should be levied for any sort of deviation and check should be kept on uncontrolled dumping of used electronic gadgets. Unnecessary purchase of equipments like computers, projectors, fax machines, etc. by the government organizations should be cut down. Government can call for the support of NGO organizations and take the help of institutions, like the schools and colleges, in conducting campaigns on the reduction of e-waste.

At the citizen level care should be taken while purchasing electronic items. One should keep in mind the contents that go into the making of the items and also whether they have been certified by regulatory authorities or not. Everyone should make one's own self aware of the stipulated time that the e-items may be used and care should be taken while disposing the gadgets. From the smallest to the biggest, none of the electronic or electrical items should be allowed to lie open in the

environment and thrown into the dustbins. They should be disposed of very carefully, like by donating the items to schools, or low income group families. But before that one should check whether the electronic items are in a position to be reused or not. It is the collective responsibility of the people of all nations to transform this world into a beautiful place to live in. Let us all join our hands to erase the e-waste and say “I like this place and could willingly waste my time in it “[6].

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