

E-WASTE: EFFECTS AND MANAGEMENT IN INDIA

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ABSTRACT

Nowadays Technology is changing just as fast as you blink your eye, and we are adopting new technology very fast. Firstly we use Floppy disk, they become trash when compact disks(CDs) came to existence and then CDs become trash when Universal Serial Bus (USB) came to existence all these things just became e-Waste. During recent year's accelerated global rise in waste of Electric and Electronic Equipment (WEEE) and its indiscriminate disposal is becoming a foremost concern for human health and ecosystem services and with the rise in concerns for e-Waste generation and processing by a variety of regulatory instrument.

KEYWORDS

E-Waste, Waste of Electric and Electronic Equipment (WEEE), Human health and environment, Management, Information and Communication Technology (ICT).

INTRODUCTION

In past few decades, there is an increasing acknowledgement of our impact on the environment due to our lifestyle, we are getting addicted to new technology and leaving behind the old ones and now they are becoming e-Waste and it is now becoming very big headaches for us. However, their partial recyclability, due to their material composition along with the unavoidable restrictions in landfills has led to the development of retrieval techniques for their recycling and re-use, highlighting the significance of e-Waste recycling, not only from a waste management aspect.

E-Waste management is often misinterpreted as related to old computers or IT equipment in general, while the synonymous term Waste of Electric and Electronic Equipment (WEEE) is also used in the international literature.

E-Waste categories pursuant to the European directive 2002/96/EC

Category	Label
Large household appliances	Large HA
Small household appliance	Small HA
IT and telecommunication equipment	ICT
Consumer Equipment	CE
Lighting Equipment	Lighting
Electrical and electronic tools	E & E tools
Toys, leisure and sports equipment	Toys
Medical devices	Medical devices
Monitoring and control instruments	M&C
Automatic dispensers	Dispensers

REVIEW OF LITERATURE

Kurian Joseph (2007) in the paper highlighted the associated issues and strategies to address this emerging problem, in the light of initiatives in India. The paper presents a waste management system with shared responsibility for the collection and recycling of electronic wastes amongst the manufacturers / assemblers, importers, recyclers, regulatory bodies and the consumers.

G. Gaidajis, K. Angelakoglou and D. Aktsoglou (2010) in their research summarized that e-waste separation from the rest of solid waste and their recycling for the recovery of valuable raw materials and basic metals is essential. The management system has to be rationally designed so that the environmental benefits from the collection, transportation, management and the financial benefits from the recovery are not set-off by the required resources and energy consumptions for the system operation.

Sivakumaran Sivaramanan (2013) in the study suggested that waste electrical and electronic equipment (WEEE) is becoming major threat to the whole world. Its toxic emissions mixed with virgin soil and air and causing harmful effects to the entire biota either directly or indirectly. Direct impacts include release of acids, toxic compounds including heavy metals, carcinogenic chemicals and indirect effects such as bio magnification of heavy metals. Many private firms are involved in collecting, dismantling, separation and exporting e-wastes for recyclers. However, strict regulations are currently being followed as on approval of such firms such as e-steward certification by Basel action network in US, they also involved in public awareness programs; this review is based on collected information from various journal articles, websites including the technical note by Greenpeace international. Further, it analyzes the current progress on e-waste management worldwide.

Mahesh C. Vats and Santosh K. Singh (2014) in their research revealed that the presence of toxic and hazardous substances in e-wasted equipments attracted the attention of the waste managing agencies in the country because these substances endanger the human health, environment, wherever present in uncontrolled conditions. The existence and implementation of Environmentally Sound Management is partial and progressing very slowly due to obvious reasons. The formal recyclers have commissioned comprehensive e-waste treatment facilities; but inadequate in proportion to the e-waste generation in the country since the informal recyclers are treating 95% of the e-waste generated with hazardous practices. The formal e-waste collection from all sources is ambiguous. E-waste contains a good amount of valuable recyclable materials also and has potential to become lucrative business in the country.

OBJECTIVES OF THE STUDY

- To study the causes of e-Waste generation.
- To understand its effects on social, economic and biological environment.
- To find ways to manage and mitigate it.
- Indian Scenario of e-Waste management.

RESEARCH METHODOLOGY

The present studies based on secondary data and is descriptive in nature. The secondary data has been collected through various resources such as books, research journals, articles, reports of central pollution control board, parliament questions and reports of E-Waste in India: Research unit (LARRDIS).

ROOT CAUSE AND SOURCES OF E-WASTE

Almost every used electronic items are considered as e-Waste as discarded cell phones, cameras, CD players, TVs, radios, drillers, fax machines, printers, toners, ink cartridges, batteries, washing machines, digital calculators and clocks, CRT monitors, electric solders, computer mother boards, key board, fan, air-conditioners, iron, heater grinder, industrial and household electronic equipments, military and laboratory electronic equipment's etc.

IMPACT OF E-WASTE ON ENVIORNMENT AND HUMAN HEALTH

When we talk about e-waste it is mostly constitutes of plastic and other harmful chemicals. So there are chances of accidents like cuts and burns during the dismantling, shredding, acid baths and incineration process in addition, exposure to following chemicals have many long-term effects. Phthalates such as **DEHP** in this monomer form effects the development of testis, Butylbenzyl phthalate (BBP) and dibutyl phthalates in pregnancy reduces ano-genetal index in male child (distance between anus and genitals) (Swan et al. 2005). Polychlorinated biphenyls (PCBs) is absorbable via skin and inhaled or ingested causing neurotoxicity, liver damage, tumors, immune suppression and behavioral changes and reproductive disorders, abnormal sperms (Allsopp et al. 1999, Allsopp et al. 2001a).

Roughly there are 80,000 people working for recycling sector, some villages such as *Seelampur* has scrap markets where piles of e-Wastes are separated for recycling. They separate copper from wires after burning them. Acid treatment is given to isolate metals; corrosive acids also released from used batteries of cell phones and computers, according to scientists of Greenpeace recycling of a computer in India cost just 2\$ while it is 20\$ in US (Keekeesocan uploaded on 2012), not only cheap labor but also the profit from recovered metals of circuit boards such as copper gives earning of 3 to 5 \$ per day workers are spending on dismantling e-Waste rather considering their own health. However, currently

they are building an e-Waste recycling plant in Bengaluru which was estimated as having the capacity to handle 60,000 tons of e-wastes annually.

CURRENT DISPOSAL METHODS OF E-WASTE

Landfills- Landfills of e-waste are described as toxic time bomb. They may release to the environment after several years by natural means and there is a possibility of leaching wastes such as batteries releases acids and heavy metal mercury, nickel and cadmium etc. These may reach the land water and reached animals and humans and mixed with other fresh water sources such as rivers and streams.

- *Acid Baths-* It is a method in which sulfuric acid is use to dissolve the lead and in the extraction of gold and silver.
- *Incineration-* It also includes pyrolysis; substances generated during incineration are likely to be more toxic than its ordinary form, pyrolysis heating the substance in absence of oxygen, here burning does not occur but the substances are converted to fumes, oils and charcoal.
- *Reuse-* This is a good way to increase a product's lifespan. Many old products are exported to developing countries. Although the benefits of reusing electronics in this way are clear the practice is causing serious problems because the old products are dumped after a short period of use in areas that are unlikely to have hazardous waste facilities.
- *Recycle-* Although Recycling can be a good way to reuse the raw materials in a product; the hazardous chemicals in e-Waste mean that electronics can harm workers in the recycling yards, as well as their neighboring communities and the environment.

INDIAN SCENARIO FOR E-WASTE MANAGEMENT

In India, Ministry of Environment and Forests (MoEF) is responsible for environmental legislation and its control. The main bodies active in e-Waste management in India are CPCB, SPCBs, Gtz and industry associations such as MAIT.

The organizations are working under the guidance of MoEF. Central pollution Control Board (CPCB) had set up a task force in 2007 to analyze the different aspects of e-Waste covered in various environmental legislations in India and had drafted guidelines for environmentally sound management of e-Waste.

In the beginning of 2008, the CPCB released guidelines for environmentally sound management of e-waste, which apply to all those whose who handle e-waste. These guidelines are first policy framework dealing specifically with prevention, management, treatment, recycling and disposal of e-waste in India.

EXISTING REGULATIONS

- **Ministry of Environment and Forests' E-Waste management and handling rule 2011 (notified on 12th May 2011 and effective from 01st May 2012)** - The E-waste (management and handling) Rules, 2011 by MoEF was notified with a primary objective to channelize the e-waste generated in the country for environmentally sound recycling. For implementation of the provisions of the rules, a guidance document was framed to help producers, consumers, collection centers, dismantlers, recyclers and regulatory agencies for effective compliance.
- **Guidelines on Implementation of E-waste rules 2011 issued by Central Pollution Control Board Delhi** Ministry of environment and forest government of India central pollution control Board.
- **Department of Telecommunication notification date 25th June 2012**, to the manufacturers of mobile phone/telephone instrument to follow e-Waste management and handling rule notified by ministry of environment and forests on 12th May 2011 while manufacturing/distributing phones as per TRAI (Telephone regulatory authority of India) recommendation.
- **Environment/Climate change-2012 (Jan to Dec 2012) Human Rights documentation** India social Institute, Lodhi Road, New Delhi, India as a collection of previously published news and views from the print as well as the electronic media, whose reference marked at the end of each news items. Department of documentation and Library (DDL) of the India social Institute, New Delhi.
- **E-Waste in India: Research unit (LARRDIS), Rajya Sabha Secretariat, New Delhi June 2011:** This publication is the next in the series of 'Occasional Paper' being brought out by the Rajya Sabha secretariat on topical issues from time to time for the benefit of members of parliament.
- **Ministry of Environment and Forests (MoEF), government of India implementation of National Clean Energy fund project on remediation of hazardous waste contaminated sites in the country:** The project has been envisaged for remediation of 12 priority contaminated sites across the country and has been designed to provide a detailed site investigated, design of appropriate engineering solution for remediation and also to implement actual remediation of those contaminated sites.

CONCLUSION

There are some necessary evils that we must face when we move forward. When new technology comes we adopt it and left behind the old, it is necessary to do it. But we must take consideration that it may affect our future if not disposed of

properly, so there is need to be aware and spread awareness and to be aware as these simple looking electronic wastes may cause many huge problems.

There is a clear need to have a proper information system through standardized mechanisms. Eco-designs can have a positive impact in reducing the rate of WEEE generation, facilitating the management of e-waste and recovery of material, achieving cost reductions.

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