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MANAGEMENT OF ELECTRONIC WASTE (E - WASTE) IN INDIA:

A NEW ENVIRONMENTAL CHALLENGE

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Abstract

According to the CPCB (Central Pollution Control Board, India) Guidelines, 2008, E-waste is defined as ‘Waste generated from used electronic devices and household appliances which are not fit for their originally intended use and are destined for recovery, recycling and disposal’. Considering the importance of e-waste which is a new environmental challenge, the main objective of the study is to examine the management of e-waste in Indian context.

Currently, India faces a problem of continuous rise in the amount of e-waste generated due to the change in lifestyle of the people which now depends more on electrical and electronic equipments. In majority of the cases, the bulk of e-waste remains unattended in households and public offices. A major amount of e-waste is managed through informal sector which has an adverse effect on the environment. As a consequence, the risk of damage to human health and natural environment increases since no precaution is taken while performing the recycling work.

In conclusion, it may be stated that lack of awareness among the people about e-waste possesses a new environmental challenge in managing e-waste in India. Therefore, the awareness of the people about managing e-waste need to be increased and the rules presently available should be properly implemented in order to manage the rising quantum of e-waste in future.

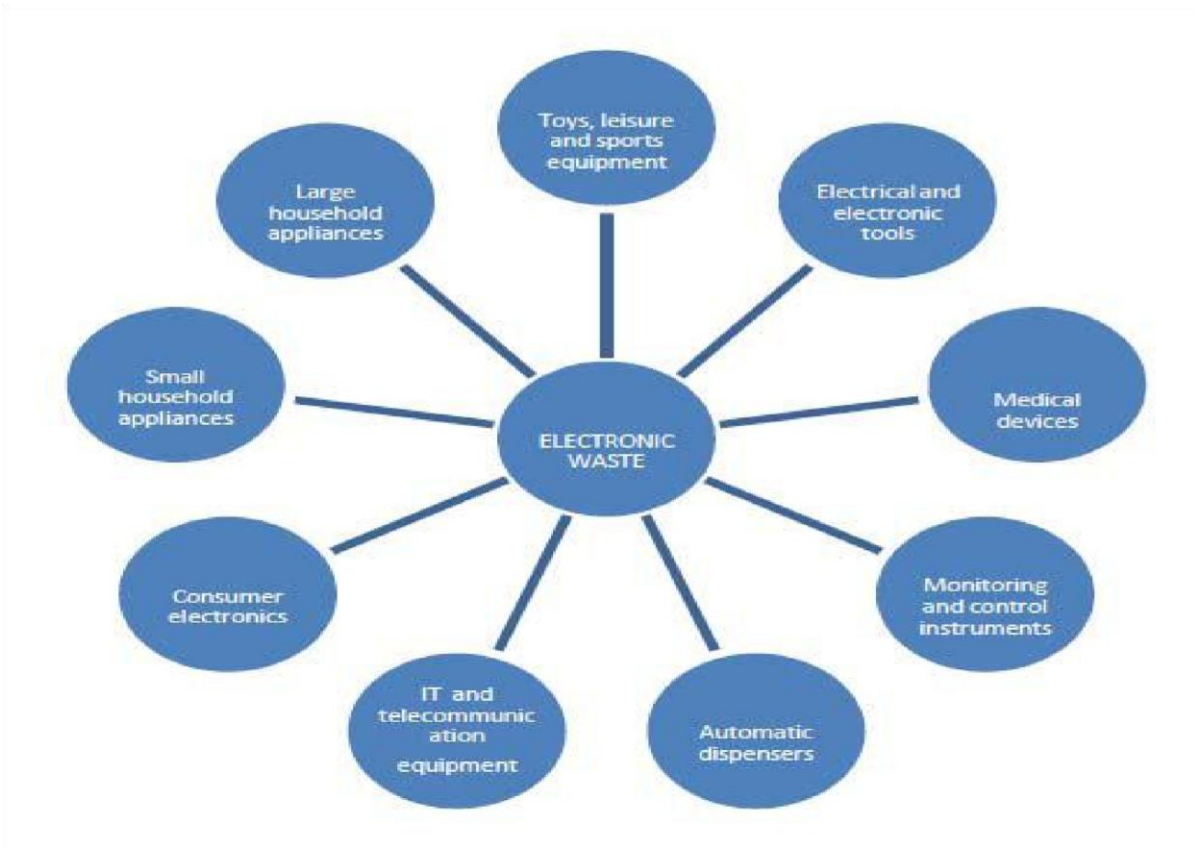
Key Words: *E-Waste, Waste Element, Electrical & Electronic Equipments, Hazardous Wastes.*

1. INTRODUCTION

According to the CPCB (Central Pollution Control Board, India) Guidelines, 2008, e-waste is defined as ‘Waste generated from used electronic devices and household appliances which are not fit for their originally intended use and are destined for recovery, recycling and disposal’. E-waste includes all hardware and accessories, including networking equipment, monitors, Central Processing Units (CPUs), Printed Circuit Boards (PCBs), wires, printers, ink cartridges, etc. Apart from it, e-waste encompasses a wide range of electrical and electronic devices.

Thus, e-waste consists of all waste from electrical and electronic equipments which have reached their end- of-life period or are not in useful condition and it should be either recycle or dispose. Accordingly, e-waste is divided into different categories according to Environment Protection Act, 1986 which is shown in the following figure:

Figure – 1: Different Categories of E-Waste



2. OBJECTIVE OF THE STUDY

Considering the importance of e-waste which is a new environmental challenge, the main objective of the study is to examine the management of e-waste in Indian context.

3. QUANTUM, EFFECT AND SOURCES OF E-WASTE IN INDIA

- Around 1,050 tonnes of electronic scrap is being produced by manufacturers and assemblers in a single calendar year.

- In a single month, there is a reported case of import of 30 MT of e- waste at Ahmedabad port.
- The minimum number of computers procured by an average scale scrap dealer is 20-25 per month.
- The approximate number of scrap dealers specializing in electronics, in and around Delhi, is more than 40. This figure also includes large scale dealers who handle thousands of PCs per month.
- Nearly 1.38 million personal computers become obsolete every year.
- The IT and IT enable services are expanding at a faster rate in and around the national capital regions like: Delhi, Gurgaon, and Noida.
- The total WEEE generation in India has been estimated to be 1, 46,180 tonnes per year based on selected EEE tracer items. Almost 50% of the PCs sold in India are products from the secondary market and are re-assembled on old components. The remaining market share is covered by multinational manufacturers (30%) and Indian (22%) brands.
- Presently, Mumbai tops the list of major cities with e-waste.
- The city of Bangalore may be generating 10,000 to 15,000 tonnes of e-waste every month, according to industry sources. Accordingly, the Karnataka State Pollution Control Board (KSPCB) has put it at 10,000 tonnes a month. Metal components and some of the outer casings are resold, while the rest of the computers are dumped haphazardly.

The effect of e-waste and its sources are presented in the following table:

Table – 1: Effect and Sources of E-Waste in India

Waste Element	Effect on Human Being	Sources of E-waste
Lead	Central and peripheral nervous system, Blood system, kidney and reproduction system	Glass panel, Gasket in computer monitors, solder in PCB and other component
Cadmium	Kidney	SMD chip registers, infra red detectors and semiconductor chips
Mercury	Brain, Kidney, Foetus	Electrical and electronic equipment thermostats, sensors, relays, switches, medical equipment, lamps, mobile phone, batteries, flat panel display
Barium	Brain swelling, muscle weaknesses, damage to heart, liver and spleen	Used in computer in front panel of a CRT
Beryllium	Lung cancer, skin diseases	Motherboard, finger clips
Toners	Respiratory treat irritation	Plastic printer cartridge
Hexavalent chromium	Damage to DNA	Untreated steel plant

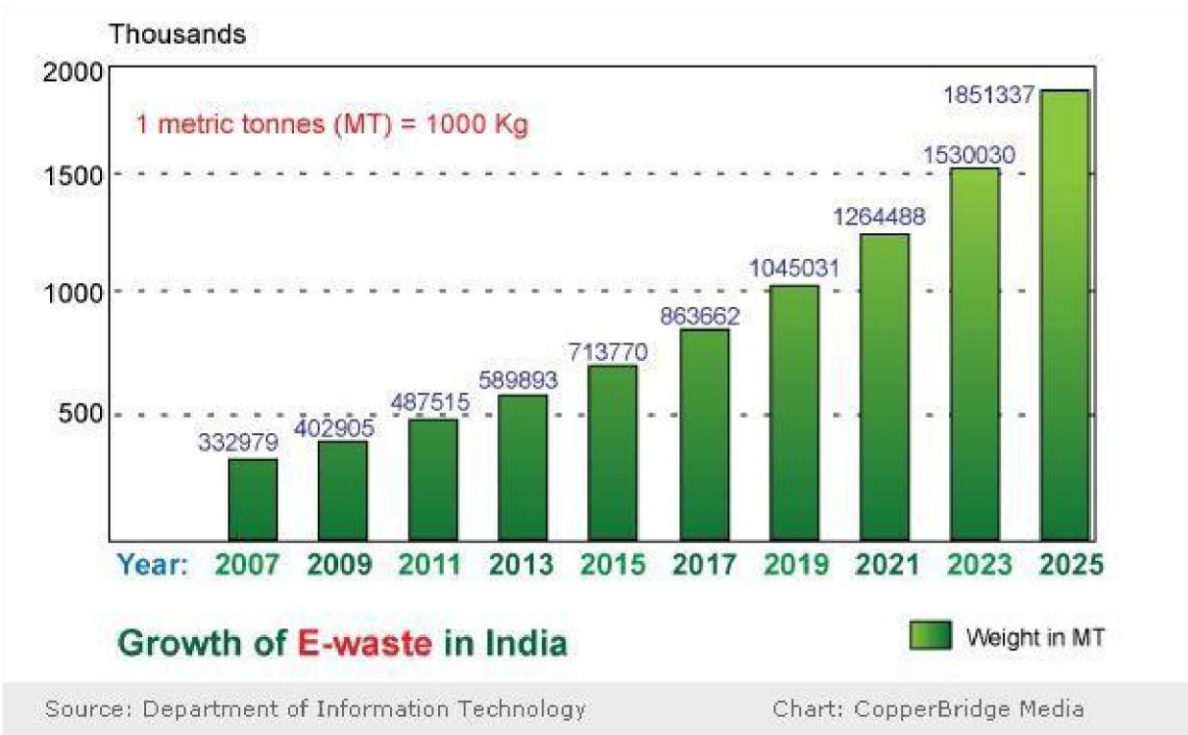
3. GROWTH OF E-WASTE IN INDIA

In India, the electronic market is growing at a very fast rate. Due to fast development in communication sector, a large range of mobiles and communication equipments are available and it is growing rapidly. The computer and peripheral industry is also growing at very fast rate. All these developments lead to the increase in e-waste generation in India.

Sixty five cities contribute to 60% of the total e-waste generated in India. Seventy five percent of the total ewaste is generated by the top ten states in India which includes Maharashtra, Tamil Nadu, Andhra Pradesh, Utter Pradesh, West Bengal, Delhi, Karnataka, Gujarat, Madhya Pradesh, and Punjab. Thus, the main reason for the increase in the amount of e-waste generation is mainly due to the increase in demand of various products like PC, TV, and telephones during the last 5

to 10 years. The Dept of Information Technology project the future estimate of e-waste as shown in Figure-2.

Figure - 2: Future Estimate of E-Waste in India



According to the report of the UNEP, by the year 2020, the amount of e-waste from old computers would grow by up to 500% from 2007 levels in India, while countries like South Africa and China will register a 200 to 400% rise in computer related waste. Due to significant growth in mobile phone sector in India, the amount of e-waste generated from discarded phone will grow by 18 times from 2007 levels, whereas in China it is estimated to witness a 7 time rise in e-waste from mobile phones. The magnitude of e-waste in different states of India is shown in Table - 2.

Table - 2: WEE Generating Top Ten States in India

States	WEE (Tonnes)
Maharashtra	20270.59
Tamil Nadu	13486.24
Andhra Pradesh	12780.33
Utter Pradesh	10381.11
West Bengal	10059.36
Delhi	9729.15
Karnataka	9118.74
Gujarat	8994.33
Madhya Pradesh	7800.62
Punjab	6958.46

Source: Country level WEEE assessment study by the International Resource Group Systems South Asia Pvt. Ltd (IRGSSA), (m/s IRG Systems South Asia Pvt. Ltd.), 2005.

4. MANAGEMENT OF E-WASTE IN INDIA

- In India, it has been observed that in majority of the cases, electronic items are stored unattended because of lack of knowledge about their management. As a result, these wastes are mixed with household wastes which are finally disposed of at landfills. This calls for the implementation of appropriate management for managing e-waste. Presently, the management practices that are available in India have severe impact on health and environment.
- Since composition of e-waste consists of hazardous items, the main approach to treat e-waste is to reduce the concentration of hazardous chemicals and elements through recycle and recovery process. To treat e-waste, recycling, re-use and recovery are done in India. The process of recycle and recovery includes the unit operations like dismantling, segregation of ferrous metal, non-ferrous metal and plastic by shredder process, refurbishment and reuse, recycling / recovery of valuable materials and treatment/disposal of dangerous materials and waste.

- The materials of potential hazard are disposed of in landfill sites or sometimes incinerated. CFCs are treated thermally, while PCB and Mercury is often recycled or disposed off in underground landfill sites. However, the environmental risks from land filling of e-waste cannot be neglected because the conditions in a landfill site are different from a native soil. Although, the risks cannot be quantified and traced back to e-waste, land filling does not appear to be an environmentally sound treatment method for substances which are volatile and not biologically degradable.
- The advantage of incineration of e-waste is the reduction of waste volume and utilization of the energy content of combustible materials. On the contrary, the disadvantage of incineration are the emission to air of substances escaping flue gas cleaning and large amount of residues from gas cleaning and combustion (Guidelines for Environmentally Sound Management of E-waste, 2008).
- The assessment of e-waste recycling sector in India indicates that e-waste trade starts from formal dismantling sector and moves to informal recycling sector (Guidelines for Environmentally Sound Management of E-waste, 2008). The whole e-waste treatment is being carried out in an unregulated environment where there is no control on emissions.

5. LEGISLATION FOR MANAGEMENT OF E-WASTE IN INDIA

In view of the ill-effects of hazardous wastes on environment and health, there is an urgent need for a greater level of policy initiatives for managing e-waste in India. In this respect, some of the policy level initiatives regarding e-waste in India are stated as follows:

- ✓ **The Hazardous Wastes (Management and Handling) Amendment Rules, 2003:**

As per Schedule 3, e-waste is defined as “Waste Electrical and Electronic Equipment including all components, sub-assemblies and their fractions except batteries falling under these rules”. Under this Rules, e-waste is only briefly included with no detail description.

- ✓ **Guidelines for Environmentally Sound Management of E-Waste, 2008:**

It was a Government of India initiative and was approved by the Ministry of Environment and Forest and Central Pollution Control Board. According to these guidelines, e-waste is

classified according to its various components and compositions and mainly emphasizes on the management and treatment practices of e-waste.

✓ **The E-Waste (Management and Handling) Rules, 2011:**

This rule is a recent initiative in India which is meant solely for addressing the issues related to e-waste. According to this rules, 'electrical and electronic equipment' are equipment which depends on electric currents or electro-magnetic fields and 'e-waste' means waste electrical and electronic equipment, whole or in part or rejects from their manufacturing and repair process which are intended to be discarded. These rules are applicable to every producer, consumer or bulk consumer involved in manufacturing, sale purchase and processing of electrical and electronic equipment, collection centers, dismantlers and recyclers of e-waste.

6. CONCLUDING REMARKS

Currently, India faces a problem of continuous rise in the amount of e-waste generated due to the change in lifestyle of the people which now depends more on electrical and electronic equipments. In majority of the cases, the bulk of e-waste remains unattended in households and public offices. Some people even discard ewaste with regular municipal solid waste which is extremely a harmful practice. A major amount of e-waste is managed through informal sector which has an adverse effect on the environment and very small amount of ewaste are managed by the formal sector. Unfortunately, there is no large scale organized sector to do the recycling work and it is performed only by unorganized sector. As a consequence, the risk of damage to human health and natural environment increases since no precaution is taken while performing the recycling work. Moreover, due to lack of awareness among people about e-waste, measures like ERP and take back policy is very difficult.

To conclude, it may be stated that lack of awareness among the people about e-waste possesses a new environmental challenge in managing e-waste in India. Therefore, the awareness of the people about managing e-waste need to be increased and the rules presently available should be properly implemented in order to manage the rising quantum of e-waste in future.

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