ELECTRONIC WASTE MANAGEMENT IN INDIA- ISSUES AND CHALLENGES

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Abstract

Disposal of e-waste is an emerging global environmental and public health issue. Managing solid waste was already a challenging task for India, now it has become even more complicated with the invasion of e-waste. E-waste consists of all waste from electronic and electrical appliances which have reached their end- of- life period or are no longer fit for their original intended use and are destined for recovery, recycling or disposal. This article discusses about the associated issues and impact of this emerging problem. It also throws light on the initiatives taken in India to tackle this situation.

Keywords: disposal, environmental issue, solid waste, recycling

Introduction

The electronic industry is the world's largest and fastest growing manufacturing industry (Radha,2002; DIT, 2003) The information and communication technology (ICT) industry has transformed life of one and all in the last two decades. This has led to the boom in the electronic manufacturing industries in terms of both, volume and applications .Such as extensive usage of electronic and electrical equipments has created a new but very hazardous stream of waste, called **"electronic-waste"**, or simply known as **e-waste**.

Due to the presence of poisonous chemicals and toxic substances in the electronic gadgets, disposal of e-waste has led to many environmental and health problems. Every year, lakhs of old computers, mobile phones, television sets and radio equipment are discarded, most of which either end up in landfills or unauthorized recycling yards.

Objectives of the Study

➢ To assess the risk of e-waste recycling by unorganized sector
➢ To identify various stakeholders in the e-waste value-chain
➢ To suggest eco-friendly recycling/disposal options for e-waste

E -Waste Generation in India

The computers, televisions, servers, music systems, mobile phones, refrigerators, air-conditioners, medical equipments and their respective assemblies are the major contributors of e-waste in the country.There are different assumed life spans of computers and mobile phones.

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The average life span of computers is three to five years and in case of mobile phones, it is only two to three years. Due to innovative products and offers, the life cycles of products are shrinking. Attractive market offers push customer to buy new product . The customers, who like to replace their computer and mobile as they see a new product with improved and innovative features, known as early adopter of technology, contribute to more e-waste generation. http://e- Apart from these India also receives large amount of e waste from developed countries. The country has been one of the main destinations of used EEE (Electric and Electronic Equipment) and WEEE (Waste Electric and Electronic Equipment) from OECD countries with an estimated 50 K tonnes of WEEE imported every year.

There are a number of stakeholders involved in the process of generation of E-waste. IT Industries, Public and private sector, government departments, corporate and business establishments, educational institutes and individual institutes all contribute to the generation of tonnes of wastes. The per capita e-waste generation in India is about 1 Kg per annum. The present population of the country is around 1250 billion. With this figure total e-waste accounts to 12,50000 tonnes per annum. However, the per capita e-waste generation in EU is 14 to 15 times to India [**Rajya Sabha, 2010**.]. In India e-waste is increasing at the rate of 10% per annum (**Ravi Agarwal, 2010)** Table 1 E-waste Generation [Consumer Voice,2009].

Sr.No.	States	E-waste Generated in MTA	Metropolitan Cities and others	E-waste Generated in MTA
1	Maharashtra	20270.59	Mumbai	11017.1
2	Tamil Nadu	13486.24	Delhi	9729.15
3	Andhra	12780.33	Bengaluru	4648.4
4	Uttar Pradesh	10381.11	Chennai	4132.2
5	West Bengal	10059.36	Kolkata	4025.3
6	Delhi	9729.15	Ahmadabad	3287.5
7	Karnataka	9118.74	Hyderabad	2833.5
8	Gujarat	8994.33	Pune	2584.2
9	Madhya	7800.62	Surat	1836.5
10	Punjab	6958.46	Nagpur	1768.9

Table : E-waste Generation [Consumer Voice,2009].

Problems with E-Waste in India

There is no doubt that environment, human and animal health all are affected by e waste.. E-waste is much more dangerous than many other municipal wastes because electronic

gadgets contain thousands of components made of deadly chemicals and metals like lead, cadmium, chromium, mercury, polyvinyl chlorides (PVC), brominates flame retardants and beryllium. Long term exposure to these substances damages the nervous systems, kidney and bones, and the reproductive and endocrine systems, and some of them are carcinogenic and neurotoxic.

Disposal of e-waste to landfills and incinerators causes irreversible environmental damage by polluting water and soil, and contaminating air. When e-waste is sent to a landfill, these dangerous substances can leak from decomposing waste and seep into the ground, contaminating the soil, groundwater, and possibly entering the food chain through vegetation. By coming into contact with these toxins, humans can develop many health problems including those to respiratory ailments, reproductive, developmental, and nervous system problems.

The electronic and electric waste in India is dismantled and sorted manually to parts such as printed wiring boards, cathode ray tubes (CRT), cables, plastics, metals. It is a livelihood for unorganized recyclers and due to lack of awareness, they are risk their healths and the environment as well. No modern machinery or personal protective equipment is used for the extraction of different materials. All the work is done by bare hands and only with the help of hammers and screwdrivers.
Children and women are routinely involved in the operations. Working in poorly-ventilated enclosed areas without masks and technical expertise results in exposure to dangerous and slow-poisoning chemicals.
A UNEP (United Nations Environment Programme) study states that 50 million tonnes (mt) of e-waste is generated a year globally, and India accounts for nearly 2.7 mt. There are 10 States that contribute to 70 per cent of the total e-waste generated in the country, while 65 cities generate more than 60 per cent of the total e-waste in India. Among the 10 largest e-waste generating States, Maharashtra ranks first followed by Tamil Nadu, Andhra Pradesh, Uttar Pradesh, West Bengal, Delhi, Karnataka, Gujarat, Madhya Pradesh and Punjab.

Among the top ten cities generating e-waste, Mumbai ranks first followed by Delhi, Bengaluru, Chennai, Kolkata, Ahmedabad, Hyderabad, Pune, Surat and Nagpur.In these states the various sectors like manufacturing, industrial, commercial, institutional, household, research and development are the major contributors for e-waste generation.

E-Waste Management in India

Effective e-waste management in India today needs a responsibility model in which all three primary stakeholders—the producer, the generator (households and bulk

consumers), and the local regulatory body (municipality)—share the responsibility of e-waste management .

Such a model could be centred on the concept of a Producer Responsibility Organisation (PRO), an entity which could include various e-waste producers (manufacturers and importers) and civic and civil bodies. The producers bear a part of the financial responsibility to establish and operate the PROs, by contributing to a producer responsibility fund. PROs could then employ systems to monitor real-time information on the flow of materials, which may also reduce costs. E-waste collection and recycling through this approach ensures crucial linkages for assuring the viability of recycling facilities. Households could be incentivized to bring the e-waste to a mobile van or any other dedicated collection centres. Forward looking producers in developed countries have employed entities such as proposed PROs, for e-waste management, in lieu of each producer establishing its own separate system.

For such innovative models to thrive and scale, the Government needs to play a crucial role in providing the required support, and policy enablement to make projects financially attractive to developers.

According to the new guidelines issued by CPCB in 2007, e-waste is included in schedules 1, 2, and 3 of the "Hazardous Waste (Management and Handling) Rules 2003" and Municipal Solid Waste Management Rule, 2000 each manufacturer of a computer, music system, mobile phone, or any other electronic gadget will be "personally" responsible for the final safe disposal of the product when it becomes a piece of e-waste.

There are many bodies that have come forward and taken the initiative in this regard. Plug-in to eCycling, e-Parisaraa, Earth Sense Recycle Private Limited ,Trishyiraya Recycling India Pvt. Ltd (TPL) are some of them to name a few.

Conclusion

There exists an urgent requirement for a detailed assessment of the environmental and health impacts of e-waste and their proper disposal practices. Institutional infrastructures, including e-waste collection, transportation, treatment, storage, recovery and disposal, need to be established, at national and/or regional levels for the sound management of e-wastes. Establishment of e-waste collection, exchange and recycling centers should be encouraged in partnership with private entrepreneurs and manufacturers.

Modern facilities with environmentally sound technologies and processes for recycling needs to be established. Policy level interventions should include development of e-waste

regulation, control of import and export of e-wastes and facilitation in development of infrastructure.

A sound program providing incentives for producers to design products that contain lesser hazardous components, and are easier to dismantle, reuse, and recycle may definitely help in cutting down the total quantity of e-wastes generated. Some form of incentives also needs to design to encourage consumers to return electronic devices for collection and reuse/recycling.

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