E-waste Management in India: Problems and Issues

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Abstract

Electronic waste or E-waste includes discarded electronic and electrical equipment. Developing countries, including India, are facing challenges related to the growing volume of E-waste which are either generated internally or imported from other countries. The existing E-waste management practices in India are reasonably poor and cause risk to both human health and the environment. The policy related to E-waste management exists in India, but implementation of these policies again is the big challenge, but still these are not being implemented in an appropriate way. This paper contributes to the problems and issues related to E-waste in India, which includes six major issues, i.e. growing volume of E-waste, Resource Depletion, Health and Environment Hazard, Less Effective Policies, Transboundary Movements of E-waste, Recycling Technologies.

Key Words

E-Waste, Hazardous waste, Risk, E-Waste Management.

Citation: Srivastava, R. (2015). E-waste Management in India: Problems and Issues. *Ganpat University Journal of Applied Research In Social Sciences & Humanities, 3 (2) & 4 (1),* 61-66.

Introduction

Waste refers to anything that is no longer privately valued by its owner or has reached its end-of-life (Porter, 2002). 'Electronic Waste', or E-waste, is therefore an end-of life electronic product that has ceased to be of any value for its owner. Such products include IT and telecommunications equipment such as computers, televisions, cell phones, and PDAs, as well as large and small home appliances including refrigerators, air conditioners, washing machines, and toasters. In the Waste Electrical and Electronic Equipment (WEEE) Directive, the European Union formally categorizes such E-waste into the 10 categories shown below:

- Large household appliances,Small household appliances
- IT and telecommunication equipments
- Consumer equipment
- Lighting equipment
- Electrical and electronic tools
- Toys, leisure and sports equipment
- Medical devices (with the exception of all implanted and infected Products)
- Monitoring and control instruments
- Automatic dispensers

Source: WEE Categories (The European Parliament and the Council of the European Union, 2003)

Major Issues Related to E-waste in India

Old appliances which have reached their end-of-life may not be very useful to their owners; however they still need to be disposed properly. Managing E-waste encompasses not just the disposal or recycling, but also the pre-disposal logistics involved in collecting and transporting the waste. It also includes strategies for reducing the total waste generated, in line with the 4R principle - 'Reduce, Recover, Reuse and Recycle'.

There are six major issues related to problem of E-waste in India, which are needed to be focused seriously. These six issues are discussed below.

The Growing Volume of E-waste: The electronics industry is the world's largest and fastest growing industry and is recognized as one of the engines of economic development in India (Kumar et al., 2012). The new electrical and electronic equipments have infiltrated all aspects of our daily life, providing us more comfort, health and security (Priyadharshini and Meenambal, 2011). India is one of the fastest growing economies in the world. In the recent years the growth of information and communication technology (ICT) sector is unprecedented in India. This has fueled the consumption of electrical and

electronic equipment (EEE) both from the institutional users and households. With the advent of this higher rate of consumption, shortened product lives, and rapid advancement of technology E-waste has emerged as a fastest growing waste stream.

According to Widmer et al. (2005), though waste generation is estimated to be less than 1kg E-waste per capita, due to the high population of the country, the absolute quantities of E-waste generated is very huge in India and China. From a study of MAITGTZ (2009), it is estimated that the total amount of E-waste generated in India is 382,979 metric tons. This amount only accounts for computers, TV and mobile phones. Considering other discarded electrical and electronic equipment under E-waste, this number is very conservative. In India, more than 60% of its E-waste is generated from 65 major cities. The top 10 cities that generate e-Waste are Mumbai, Delhi, Bangalore, Chennai, Kolkata, Ahmedabad, Hyderabad, Pune, Surat and Nagpur (Chatterjee, 2007).

Resource Depletion: Waste is regarded as a resource which should and could be reclaimed (Lindhqvist, 2000). Though disparate in their composition, electronic and electrical products contain valuable metals such as gold and silver as well as hundreds of other materials. However, these can be broadly categorized as plastic, ferrous metal, non ferrous metals, precious metals and glass. Apart from recycling E-waste, reducing E-waste should also be a priority because the manufacture of these products is extremely resource intensive. A study showed that the manufacturer of one desktop computer required 240 kilograms of fossil fuels, 22 kilograms of chemicals and at least 1,500 liters of water (Williams, 2003).

Health and Environment Hazard: Electronic waste contains many hazardous substances such as antimony, arsenic, cadmium, chromium, cobalt, lead, mercury, selenium, beryllium, and brominated flame retardants (BFRs). As a result, there are risks to human health associated with placing such products into landfills or incinerators where these hazardous elements can enter the air and water streams.
These substances do not only affect the environment, but also the health of people if not properly treated at the end of life (Eol). In India E-waste is mainly handled by people in the informal sector. Informal sector uses crude techniques such as burning of cables and acid bath to recover precious metals. Effluents from these techniques pollute environment and cause harm to the health of the people.

Contact with these toxic elements in humans can have health problems such as breathing difficulties, respiratory irritation, coughing, choking, pneumonitis, tremors, Neuropsychiatry problems, convulsions, comas and even death (Halluite et al., 2005). In

a study conducted by Steiner (2004) in Delhi it was assessed that open burning of PWB and cables release dioxins and furans and chronic exposure to them could lead to a higher-than-average risk of cancer in people in the vicinity of fire sites.

Less Effective Policies: Initially, there was no separate law on E-waste management in India. Electronic waste is interpreted under Hazardous Waste rules and the present recycling facilities are licensed under these rules. In May, 2011 a document with Guidelines for Environmentally Sound Management of E-waste was released by Ministry of Environment and Forests (MOEF) and Central Pollution Control Board (CPCB).
While India is a signatory of the Basel Convention it has not ratified the Ban Amendment which prohibits the shipment of E-waste among other hazardous substances from developed to developing countries. As per the Supreme Court directive of 1997 prohibits the import of hazardous waste into India (Agarwal et al., 2003). However, there is ambiguity in the policy because the Customs Tariff Act does not provide any provisions for old computers, whether working or waste. Furthermore, second hand imports of computer equipment are allowed in certain cases, such as charitable donations to educational institutes, but after getting required clearances from the government. It is felt that under the guise of such imports, scrapped computers are imported for recycling.

Transboundary Movements of E-waste: NGOs (BAN and SVTC, 2002) found the alarming volume of E-wastes being shipped from one country to another, mainly from developed countries to developing countries. This is not only considered illegal in many countries – exporting as well as importing; it goes against the principal of environmental justice. This transboundary movement is particularly dangerous because the recipient countries often do not recycle and dispose the waste in an environmentally sound manner, which is not compatible with the standards set in the country of export.
Besides being generated in the country, E-waste from developed countries lands in India as second hand goods and mixed metal scrap for recycling (Toxics Link, 2004). The main reasons for imports to India are its low labor cost and less stringent environmental laws (Ragupathy, 2006). Imports have been regarded as one of the major sources of PC scrap in India (IRGSSA, 2004). Though India is a signatory to the Basel Convention on the control of transboundary movements of hazardous wastes and their disposal under which E-waste is also a component, it fails to stop the illegal imports to India.

Recycling Technologies: Electronic waste recycling in India has been very labor intensive, often involving all the members of a family. The advantage of the high manual involvement is that the waste is sorted in much finer categories, facilitating greater reuse as well as better material recovery. For example printer motors are used in the

manufacture of toys; ICs and other electronic components are manually plucked from discarded PWBs and resold as second hand components; plastics are sorted by hand into various grades and colors before reprocessing into secondary raw materials.
The EMPA pilot study in 2004 it was found that while some recycling processes are hazard free, others release high levels of emissions into the environment and are extremely dangerous for human health. Especially dangerous are acid bath recovery operations and cable burning, both of which have large negative externalities. Increasing the dangers is the fact that this entire recycling activity takes place in the unorganized sector, with little possibility of control or monitoring.

In India, E-waste is mainly handled by people in the informal sector. Informal sector entities are those which are not registered with the government and have small operations that might not comply with environmental standards depending upon the type of operation such as collection and recovery of metals. There are a few authorized recyclers who conduct dismantling, recovery and recycling processes with environmental consciousness. There are few authorized recyclers and the number is increasing day by day. It is interesting to see the amount of E-waste being handled by formal and informal sector in India. It is estimated that the total share of informal sector recycling of E-waste in India is around 95% (MAIT-GTZ, 2009).

The E-waste trade value chain starts from both institutional and domestic consumers, then to collectors, transporters, bulk scrap dealers, Dismantlers, resale and refurbishing of usage, and recovery of metals and disposal of non-value items (IRGSSA, 2004).

Conclusion

The electronics industry is the world's largest and fastest growing industry and is recognized as one of the engines of economic development in India. The last decade has seen tremendous growth in the field of information technology all over the world, especially in developing countries like India. This growth, combined with rapidly increasing product obsolescence and consumer choices, has brought in a new kind of waste–electronic waste or E-waste. This ever-increasing waste has very complex characteristics and requires an equally complex set of efficient technology and processes to deal with it.

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