

E-Waste Analysis and Management

¹Dr. Soni Rastogi, ²Vani Goel

¹Associate Professor, Department of Chemistry, Sri Aurobindo College, Delhi University, Delhi, India

²DStudent, Bachelors of Architectural Studies (with specialization in Urbanism), Carleton University, Ontario, Canada
Email - ¹drrastogisoni@gmail.com, ²vanigoel18@gmail.com

Abstract:

“When we poison our environment, we poison our bodies, because our bodies are this environment, taken in as food, water and air. Environmental pollution becomes internal pollution.” - Udo Erasmus

Electronic waste, or e-waste, is an emerging problem given the volume of e-waste being generated and the content of toxic and hazardous materials in them. *The Basel Convention* has identified e-waste as hazardous, and developed a framework for controls on trans-boundary movement of such waste. This paper highlights the hazards of e-waste problem and analysis of e-waste management for the Indian context.

Keywords: E-waste, Environment, Electrical and Electronic Equipment, Health, Eco-friendly, Disposal.

1. INTRODUCTION:

Electronic waste or *e-waste* can be any outdated or obsolete appliance or electronic device found in offices, homes and pants pockets. Televisions, microwaves, computers and cell phones are all common examples of e-waste. *WEEE* is the common acronym used for this waste referring to the waste from electrical and electronics equipment. It is the fastest growing stream of waste type with increase in industrialization and urbanization. In this technology-driven age, the amount of e-waste is growing because the useful lifespan for devices and products is getting shorter and shorter. Consumer demand for “the next best” thing is increasing and companies are answering that demand by updating and improving devices and equipment quicker than before, resulting a very big amount of e-waste. This obsolescence of product and rapid technological advances poses a new environmental challenge of escalating e-waste. Electronics and electrical equipment are an indispensable part of the modern societies which leads to its mass production. The total weight of the global *EEE* (Electrical and Electronic Equipment) consumption increases annually by 2.5 million metric tonnes on an average. 51.8 million metric tonnes of e-waste was generated globally in 2018, with an average of 7.3 kg per capita. This is because of growing urbanization, industrialization and higher levels of disposal incomes. This rapid increase is said to shoot up even more, with 74.7 million metric tonnes of projected e-waste global generation by 2030. Out of the 51.8 million metric tonnes of e-waste generated in 2018, 20% was documented, collected and recycled. The remaining 80% was not recycled.

2. SOURCES OF E-WASTE :

In India, e-waste is found in two types of sectors: formal and informal. Some major sources of e-waste generation from the formal sector include importers, manufacturers, retailers, consumers, traders and scrap dealers. The informal sources of e-waste generation include dismantlers of the discarded materials found, smelters and recyclers.

3. IMPACTS OF E-WASTES:

As a consequence of its rapid growth, e-waste acts as a threat to human health and the environment due to the presence of toxic and hazardous constituents in it such as mercury, brominated flame retardants (BFR), and chlorofluorocarbons (CFCs), and lead, cadmium, etc.. On an average, 50 tonnes of mercury and 71,000 tonnes BFR plastics are found globally in undocumented streams of e-waste every year. The adverse impacts on human health and the environment arise due to unsuitable process of recycling and disposal that are currently in practice in India. These practices can have serious consequences for those in close proximity with the burn or recycled waste. Improper and careless management of e-waste also plays a part in global warming because of the non-recycled e-wastes cannot substitute “primary raw materials” thereby cannot reduce greenhouse gas emissions produced from the raw materials that are extracted and refined.

Landfilling of e-wastes leads to lead seeping into the ground water which is harmful for the soil. Cathode Ray Tubes (CRT) present in electrical equipment if crushed and burned, can emit toxic fumes into to air.

4. INVENTORY AND DISPOSAL OF E-WASTE:

In India, major amount of e-waste produced is from the urban areas in comparison to the rural. This is because of more use of electrical equipment such as computers, mobile phones, televisions etc. in the urban areas and their increasing role in today’s modern society.

Disposal of e-waste in an environmentally friendly manner is an issue faced globally. When computer chips are melted, they produce acids and sludge which if disposed improperly on the ground can lead to acidification of the soil. Open burning of e-waste such as plastics to obtain or recover copper and other metals is another dangerous form of disposal. The toxics that the fire produces in this process negatively impact the environment and the “broader global air currents” releasing toxic by-products and harmful gases in the air.

At present, the e-waste generated in the Indian scenario is treated in both formal and informal sectors with a ratio of 5 to 95 [Figure 1]. The formal recycling defines registered recyclers every year in the country who have to follow the guidelines and adhere to the rule of 2016, amended 2018 [E-waste (Management) Rule] as per the government. The informal recyclers however might not follow the guidelines issued by the *Central Pollution Control Board (CPCB)* and use dangerous methods of disposal such as open burning. The workers in this informal system is dominated by the urban poor who have low literacy rates and less awareness about the potential hazards of improper management and recycling of e-waste. Due to the lack of awareness, these informal recyclers are not only risking their health but the environment as well. Most of these informal recycling enterprises exploit the low labour costs due to high unemployment rates and the child labour laws.

Recycling E-waste in the Indian Scenario



Figure 1: Recycling of E-waste in the Indian Scenario

5. E-WASTE MANAGEMENT STRATEGIES:

For the Indian context, electronic waste is mostly stored unattended either because of lack of proper management, or lack of awareness. There are a few practices and policies in operation currently in the country to reduce the implications of e-waste. *The Basel Ban*, an amendment to the Basel Convention which is an international treaty goes a step further by prohibiting the export of e-waste from developed to industrializing countries. It implies that the export of this waste which can be hazardous requires specific permissions of the *Ministry of Environment and Forests*. India implemented an initiative in 2011, amended 2016 and 2018 addressing the issues related to the e-waste management. *The E-Waste (Management) Rules, 2016* defines responsibilities of producers, collection centers, consumers, dismantlers and recyclers when managing e-waste.

This policy level initiative is in the right direction towards the fighting the issue of e-waste disposal. However, implementation of these strategies is still lacking. Thus, management of these waste streams is a major challenge faced by the country. Lack of public awareness regarding not only the disposal of these electrical equipment's and goods, but also its potential ill-effects further enhance the problem. Best way to deal with this issue is the reduce the volume of the e-waste generated and rely on re-use and repair. Easily recoverable and recyclable materials that are less toxic need to be promoted. Recovering metals, plastics and glass reduces the amount of e-waste produced and also conserve the energy, keeping the environment toxic material free. Keeping in mind the 3R's for sustainability, reduce, reuse and recycle are the potential solutions to this challenge.

6. CONCLUSION:

E-waste generation is rapidly increasing globally, and in India as well, as dependence on electrical equipment increases in regular everyday life. However, management of its disposal is still unorganized which leads to many ill-effects on the environment and public health both. Lack of awareness is another reason as to why this particular stream of waste is mismanaged. People don't pay attention to the waste once they have discarded it and have a “out of sight, out of mind” attitude towards disposal strategies of household waste. They fail to realize the relationship between the cause of production of this waste and its negative impacts. Eco-friendly approaches need to be taken to tackle this issue, and the first and foremost step needs to be to educate the population and spread awareness about it. Proper

implementation of policies needs to be simultaneously be put in place to address the ever-growing pile of e-waste in India.

REFERENCES:

1. Joseph K. (2007). Electronic Waste Management in India-Issues and Strategies. *Centre for Environmental Studies, Anna University, Chennai*.
2. Borthakur A. and Singh p. (2012). Electronic Waste in India: Problems and Policies. *International Journal of Environmental Sciences*, Vol. 3(1).
3. Vats M. and Singh, S. (2014). Status of E-Waste in India – A Review. *International Journal of Innovative Research in Science, Engineering and Technology*, Vol. 3(10).
4. Agarwal R. (1998). India: The World's Final Dumpyard. *Basel Action News*, Vol.1
5. Devi B.S., Shobha S.V., Kamble R.K. (2004). E-Waste: The Hidden harm of Technological Revolution. *Journal IAEM*, Vol. 31, pp. 196-205.
6. Sergio J. and Tohru M. (2005) Waste management of electric and electronic equipment: comparative analysis of end-of-life strategies. *J. Mater. Cycles Waste Manag*, Vol. 7, pp. 24–32.
7. Ramesh S. and Joseph K. (2006). Electronic waste generation and management in an Indian city. *Journal of Indian Association for Environmental Management*, Vol. 33 (2), pp. 100-105