

A REVIEW AND PROPOSED AMENDMENTS OF VARIOUS RESPONSIBILITIES MENTIONED IN INDIAN GOVERNMENT POLICIES OF E-WASTE MANAGEMENT

***Manju Dabas Kadyan, Jyoti Dabass**

*Department of ECE, Rattan Institute of Technology & Management, Palwal
Department of ECE, YMCA University of Science & Technology, Faridabad

DOI: 10.5281/zenodo.55860

Keywords: E-Waste, risk, awareness, management, responsibilities.

ABSTRACT

People of this 21st century always tempt to change their electronic goods with their newer model within less than 6 months span and this is all thanks to new trendy gadgets coming into the market every month. Its okay, you are purchasing a new one but what about the old ones. Throwing them into the dustbin is not the proper idea of disposing them. It is leading to the growing piles of e-waste which creates problems mainly for the ecology and directly or indirectly for the living beings around there through air, water and soil pollution. Thus it becomes mandatory to control this hazardous situation so that it will not convert into uncontrollable. Thus, for avoiding this kind of scenario, Government of India has laid down various rules, regulations and policies. Through this paper, we will throw light on them and include some amendments for more effectiveness of them.

INTRODUCTION

Fifty years back, Gordan Moore forecasted the future of electronics backed with the relevant prediction of trend of exponential hike in number of transistors per square inch on integrated circuits. With benefits of better efficiency, reduced cost and robust computing, global Market of Electrical and Electronic devices acclaimed great heights. On flip side, Electronic devices do not meet the expectations as such in terms of lifespan.



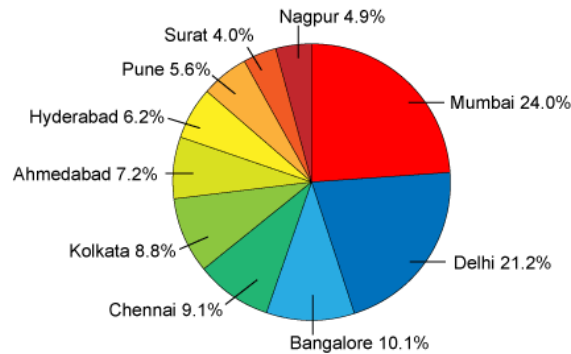
Fig. 1. Piles of Electronic Waste

Therefore the foremost challenge for waste management officials is e-waste disposal. In short E-waste are expired electronic or electrical devices such as television set, washing machines and stereo systems. Processed reusable items comprising Copper, Silver, Gold etc. adds up in e-waste category. Based on data gathered from 184 countries on E-waste in partnership of United Nations Organizations, governments and non governments and science Organizations-generation of E-waste will enhance threefold in the years to come. Last year



International Journal Of Engineering Sciences & Management Research

production of 54 million tons of E-waste was reported. China holds first position in this. To justify this fact ,in 2012,China produced about 12.2 million tons of over aged E-products.



City-wise E-waste Generation in India (Tonnes/year)

WITH ALL FLIP FLOPS, IS IT CORRECT TO CALL E-WASTE A HAZARD?

E-Waste is a name given for product of electronics which are obsolete or reaching towards life end. This comprises products such as copiers, printers, scanners, monitors, cellular phones, fax machines, TVs, medical apparatus and electronic components. Adulteration of E-waste in landfill poses a serious threat of cancer and brain disorders to human beings and suffocates the environment. In developed countries like US, Management of E-waste is done in un-regulated environment like in Prisons. E-waste is not harmful if managed properly. Obsolete cell phone batteries can be utilized to make a new one. To implement this in reality Company of India like ATTERO works on ruined devices to give them a form of valuable material. For information of other E-stewards or recyclers, Electronic Take Back Coalition is a useful source of information. To curb E-waste government too made few federal laws but they could not succeed. Reason is lack of information to masses about E-waste processing. For common people EPA made a statement that if we recycle one million laptops then we save electricity equivalent of electricity used by 3,657US homes in a year. It is feasible only when people are aware and curious enough to dump its flop side back to history by following safe and environmental friendly recycling and reusable techniques of E-waste. Also, the various adverse effects of e-waste constituents are listed below. These are only those which are known but there are still many which still are present and yet to be discovered.

Source of e-wastes	Constituent	Health effects
Solder in printed circuit boards, glass panels and gaskets in computer monitors	Lead (PB)	<ul style="list-style-type: none"> • Damage to central and peripheral nervous systems, blood systems and kidney damage. • Affects brain development of children.
Chip resistors and semiconductors	Cadmium (CD)	<ul style="list-style-type: none"> • Toxic irreversible effects on human health. • Accumulates in kidney and liver. • Causes neural damage. • Teratogenic.
Relays and switches, printed circuit boards	Mercury (Hg)	<ul style="list-style-type: none"> • Chronic damage to the brain. • Respiratory and skin disorders due to bioaccumulation in fishes.
Corrosion protection of untreated and galvanized steel plates, decorator or hardner for steel housings	Hexavalent chromium (Cr) VI	<ul style="list-style-type: none"> • Asthmatic bronchitis. • DNA damage.



Cabling and computer housing	Plastics including PVC	Burning produces dioxin. It causes <ul style="list-style-type: none"> • Reproductive and developmental problems; • Immune system damage; • Interfere with regulatory hormones
Plastic housing of electronic equipments and circuit boards.	Brominated flame retardants (BFR)	<ul style="list-style-type: none"> • Disrupts endocrine system functions
Front panel of CRTs	Barium (Ba)	Short term exposure causes: <ul style="list-style-type: none"> • Muscle weakness; • Damage to heart, liver and spleen.
Motherboard	Beryllium (Be)	<ul style="list-style-type: none"> • Carcinogenic (lung cancer) • Inhalation of fumes and dust. Causes chronic beryllium disease or beryllicosis. • Skin diseases such as warts.

Fig 3. Adverse effects of e-waste components on health

MANAGEMENT OPTIONS GIVEN BY INDIAN GOVERNMENT

Considering the severity of the problem, it is imperative that certain management options be adopted to handle the bulk e-wastes. Following are some of the management options suggested for the government, industries and the public.

STRUCTURE OF THE PROPOSED E-WASTE LEGISLATIONS

Title E-waste (Management & Handling) Rules to be published under the Environment Protection Act

Objective To put in place an effective mechanism to regulate the generation, collection, storage, transportation, import, export, environmentally sound recycling, treatment and disposal of e-waste. This includes refurbishment, collection system and producer's responsibility, thereby reducing the wastes destined for final disposal.

Essence The producer of electrical and electronic equipment is responsible for the entire life cycle of its own branded product and in particular the environmentally sound end-of-life management and facilitating collection and take back.

Responsibility of each element in the e-waste value chain

- Producers
- Dealers
- Collection agencies/ collection Centres
- Dismantlers
- Recyclers
- Consumer and bulk consumers

Procedure for authorisation of producers, collection agencies, dismantlers, recyclers and enforcement agencies

Procedure for registration/renewal of registration of recyclers

Regulations for import of e-waste

Liability of producers, collection agencies, transporters, dismantlers and recyclers

Information & tracking

Elimination of hazardous substances used in e-equipment

Setting up of designated authority to ensure transparency, audit and inspect facilities, examine authorisation/registration, etc.

From all these, we have only discuss the responsibilities which are given below:-

RESPONSIBILITIES OF THE GOVERNMENT

(i) To set up various regulatory agencies in each and every district of all states which are responsible for co-ordinating and consolidating the regulatory functions of the various government authorities regarding hazardous e-wastes.

(ii) To timely review and update existing laws concerning e-waste disposal and also give a comprehensive law that provides e-waste regulation and management and proper disposal of hazardous wastes, empowerment of the concerning agency to control, supervise and regulate the relevant activities of government departments.

Under this law, the agency concerned should be given the duty to

- Collect basic information on the materials from manufacturers, processors and importers and to maintain an inventory of these materials. The information should also include toxicity and potential harmful effects.
- Identify potentially harmful substances and testify them for their adverse health and environmental effects.
- Control risks from manufacture, processing, distribution, use and disposal of electronic wastes.
- Encourage beneficial reuse of 'e-waste' and encouraging business activities that use waste".
- Set up programs for promoting recycling among citizens and businesses.
- Give education about reuse/recycling options to the e-waste generators

(iii) To encourage more and more research into the development and standard of hazardous waste management, environmental monitoring and the regulation of hazardous waste-disposal.

(iv) To enforce strict rules and regulations against dumping e-waste in the country by outsiders in which stringent penalties, paltry fines and custodial sentences must be imposed on these outsiders / foreign nationals.

(v) To enforce strict regulations and levied heavy fines on those industries, which do not practice waste prevention and recovery in their production facilities.

(vi) To encourage and support more and more NGOs and other organizations to involve actively in solving the nation's e-waste problems.

(viii) To phased out uncontrolled dumping method for disposal of hazardous waste.

(viii) To explore opportunities to encourage manufacturers and retailers to provide their own recycling services.

RESPONSIBILITIES OF THE PRODUCER OF ELECTRICAL AND ELECTRONIC EQUIPMENTS

(i) To collect e-waste generated during the manufacturing of electrical and electronics equipments and also channelizing it for recycling or disposal.

(ii) To collect e-waste generated from the "end of life" of their products and thus abiding the principle of "Extended Producer Responsibility" given by the government of India and also to ensure that such e-wastes are channelized to registered recycler or dismantler.

(iii) To set up collection centres or take back systems either individually or collectively.

(iv) To finance and organize a system to meet the costs involve in the environmentally sound management of e-waste generated from the "end of life" of its own products and other available e-wastes.

(v) To provide contact details such as address, telephone no/helpline no. of authorized collection centers to consumers so as to facilitate return of used electrical & electronic equipment.

(vi) To create awareness through publications, advertisements, posters or by any other means of communication and information booklets accompanying the equipments, with regard to

- (i) Information of hazardous constituents present in the equipment.
- (ii) Information on hazards of improper handling, accidental breakage, damage and/or improper recycling of e-waste.
- (iii) Instructions and list of all do's and don'ts for handling the equipment after its use.
- (iv) A-fixing a visible symbol on the products or information booklets to prevent e-waste from being dropped in normal garbage bins meant for disposable waste.

(vii) To Maintain records of the e-waste handled and also makes such records available for inspection by state pollution control board or the committee concerned.

(vii) To adopt waste minimization techniques which significantly reduce the quantity of e-waste generated and thus result in less impact on the environment. Example of such technique is reversed production system which recover and re-use every material contend with in e-waste metals such as lead, copper, aluminum and gold, and various plastics, glass, wire. Such process will result in less mining of earth for raw material and thus also protect ground water.

RESPONSIBILITIES OF THE COLLECTION CENTER

Collection center according to the government policies and standards means a center established, individually or jointly or a registered society or a designated agency or a company or an association to collect e-waste. The various responsibilities of these are:

- (i) To obtain and authorization from state pollution control board or pollution control committee concerned and provide details such as address, telephone no./helpline no., email etc. of such collection center to the general public.
- (ii) To ensure that the e-waste collected by them is stored in a secured manner until it is sent to the registered dismantler.
- (iii) To ensure that during storage and transportation of the e-waste, no damage is caused to the environment.
- (iv) To maintain records of the e-waste handled by them and also make such records available for timely scrutiny by the state pollution control board or the pollution control committee concerned.

RESPONSIBILITIES OF CONSUMER

- (i) To ensure that the e-waste generated by them is channelized to authorized collection center or registered dismantler or recycler or is returned to the pickup or take back services provided by the producers.
- (ii) To donate electronics item which are in working condition for reuse thus extending the life's of item and also makes them out of the waste management system for a longer time. In addition to this, it also benefits society as the schools, non-profit organization and lower income families can now use those donated equipments which otherwise are not affordable for them.
- (iii) While buying, the consumer can opt for those which
 - Are energy efficient
 - Can easily upgrade and disassemble
 - Are made of fewer toxic components
 - Used recycled content
- (iv) To not dispose the e-waste with disposable garbage and other household wastes

RESPONSIBILITIES OF DISMANTLER

- (i) To ensure that no damage is caused to the environment during storage and transportation of e-waste.
- (ii) To ensure that the dismantling processes used don't have any adverse effect on the health and environment.
- (iii) To ensure that the facility and dismantling processes are in accordance with the standards or guidelines published timely by the central pollution control board.
- (iv) To ensure that the dismantled e-waste are segregated and sent to the registered recycling facilities for recover of materials.
- (v) To ensure that non recyclable/ non recoverable components are sent to authorized treatment storage and disposable facilities.

RESPONSIBILITIES OF RECYCLER

- (i) To ensure that the facility and recycling processes are in accordance with the standard laid down by the central pollution controlled board.
- (ii) To ensure that the residue generated thereof is disposed of in a hazardous waste treatment storage disposal facility.
- (iii) To make available all its records of the e-waste processed to the central or state pollution control board or pollution controlled committee of union territory for their timely inspection.

CONCLUSION

This paper gives the various responsibilities laid down by the Indian Government for the proper management of e-waste. But these are not enough. Much more can be done for the efficient management of the e-waste produced every year. If proper and modernized technique will be used for this then the annual e-waste produce



International Journal OF Engineering Sciences & Management Research

can be decremented by a very good margin. But for this, only the making of government policies is not enough unless and until we all will not contribute to it.

REFERENCES

1. Annual Report of Stop the E-waste Problem, an initiative by United Nations University, available at http://www.step-initiative.org/pdf/Annual_Report_2008.pdf accessed on March, 2009.
2. "Dumping e-waste is illegal now", available at <http://www.indianexpress.com/news/dumping-ewaste-is-illegal-now/943872/>, accessed during May, 2012.
3. E-waste Treatment & Disposal Methods, available at http://envis.maharashtra.gov.in/envis_data/files/Etreatment%20&%20disposal.html, accessed during April, 2012.
4. E-Waste Manual, Volume 1 available at http://www.unep.or.jp/ietc/Publications/spc/EWasteManual_Vol1.pdf, accessed during April, 2009.
5. Empa. E-waste pilot study Delhi: knowledge partnerships with developing and transition countries. St. Gallen: Empa; 2004. Fagerberg Jan, Mowery David C, Nelson Richard R., (2006). The Oxford Handbook of Innovation. Oxford University Press.
6. "Guidelines for Environmentally Sound Management of E-waste" (as approved vide MoEF letter no. 23-23/2007-hsmd dt. March 12, 2008, Ministry of Environment & Forests, Central Pollution Control Board, Delhi, March, 2008) (2008).
7. "Greenpeace study reveals E-Brands faltering on e-waste takeback in India", available at <http://www.greenpeace.org/india/en/news/greenpeace-study-reveals-e-bra/>, accessed during June, 2011.
8. Hazardous Wastes (Management and Handling) Amendment Rules, 2003, available at www.cpcb.nic.in, accessed during August, 2010.