E-waste and Environmental Degradation

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ABSTRACT

The industrial advancement made by man has generated huge quantity of solid and liquid wastes. But the high tech boom has given rise to a new type of waste called "Electronic waste or E-waste" This E-waste includes the electronic goods like computers, mobile, T V., audio system etc. These materials are discarded as advanced technology is marketed, thus generate huge quantity of E-waste in the society This e-waste is a brew of toxic substances, which includes toxic chemicals, heavy metals, plastic etc Recycling these products is very complex and pollute natural resources like soil, water and air.

India handles nearly two lakh ton of e-waste annually, of this 30-35% is computers and their peripherals. Today's free global trade has also given scope for generation and dumping of huge quantity of E-waste into developing and under developed countries like India. In a developed country e-waste is handled and scientifically recycled under controlled conditions. Where as in a country like India, recycling/disposal is done using bare hands in scrap yards by child labour and adult alike. Thus causing serious health hazards to the handlers and the environment around. Hence proper legislation have to be framed and implemented to check the e-waste dumping, its management and disposal. Also requires total ban of child labour and proper training for adults to handle these hazardous waste scientifically. Thus minimizing the health and environmental degradation

INTRODUCTION

The E-waste or electronic-waste in the terms used to discarded electronic gadgets like computers, TV, mobile phones, fax machines, audio equipments, refrigerators etc. It is difficult to account the amount of e-waste generated annually because of adverse publicity with respect to environmental problems. Today a huge quantity of e-waste is generated mainly because of the purchasing power of the consumers, resulting in going in for new advanced models which the manufacturers market each day discarding the old technology The e-waste totally accounts for nearly 8-10% of the total municipal solid waste worldwide. The safe disposal of e-waste is catching the society/community because of the serious environmental problems that are to be faced Hence a lot of discussions and publicity is give to the way and means of reducing, recycling and disposing the e-waste

SOURCE AND PRESENT STATUS

Electronic waste or E-waste contains both valuable and harmful material. These materials requires special handling and recycling techniques. For example the average life span of a computer is 2-3 years, since the hardware / software companies came out with a new/advanced model, thus generating huge quantity of e-waste But actually nearly 90-92% of the computer components can be recycled/reused but it is rarely done

A desktop computer which weigh about 25 Kgs by weight has these materials :

Material	Contents (% of total weight)
Plastic	23%
Ferrous Metals (eg Iron)	32%
Non ferrous metals (eg. Pb, Cd, Zn, Cr)	18%
Electronics (eg. Ag, Au, Platinum)	12%
Glass	15%

Plus other heavy metals and rare earth elements.

Thus the heavy metals such as lead, zinc, chromium, cadmium, mercury etc. are the some of the main components of e-waste generated which are harmful, both for living organisms as well as their environment. According to studies carried out it is estimated that in India nearly 2 lakh ton of e-waste is generated annually

from our own source or industry or users And added to this another 0.5-1 lakh ton/annually imported/dumped into the country as scrap The major cities in India generating and receiving e-waste are Ahamadabad, Bangalore, Bombay, Delhi, Chennai, Kolkata etc

POLLUTANTS

The main pollutants/contaminants from e-waste disposal are the heavy metals such as lead, zinc, mercury, cadmium, copper, chromium, silver, gold, glass, plastics etc These are used in circuit boards, cabinet of computers, screen, cathode ray tube (CRT), batteries, sensors, thermostats etc When these heavy metals accumulate say for example lead, its accumulation in living organisms damages nervous systems and kidney function Mercury accumulating in living organisms through food chain particularly fish damages brain

The recent investigations of workers involved in manufacturing the chips, drives and circuit boards are reporting health problems So also the personals from the recycling/scrap sector the health deteriorations is on high Reports have pointed out that the blood samples of these workers have higher percentage of hazardous chemicals in their blood samples

MANAGEMENT AND REMEDIAL MEASURES

The e-waste generated in the society became a major problem, people started thinking of means of disposing/handling these contaminant According to the available records recycling of e-waste has first attempted in 1991 and implemented in Switzerland by collecting old refrigerators and thus over a period of time all other electrical/electronic devices were added to the list This lead other countries to follow the suite and even they brought in the legislation to manage and dispose e-waste

The e-waste which was dumped by developed countries into developing and under developed countries, where the environmental rules/legislation are not strict Also the labour was cheap for this hazardous waste to be scraped and recycled Thus the poor people in developing and underdeveloped countries were forced to choose between poverty and poison And they choose the first for survival without thinking of their future In 1989 – Basel convention which was established by the world community in context to e-waste This is particularly with regard to the restricting of e-waste trans boundary movement of e-waste or hazardous waste being dumped into developing and under developed countries Though this law exists, there are developed countries which are not signatories to this and even if they are, they try to ship the e-waste to under developed countries They have scant respect for the law of that country or they force the poor countries to receive the same The poor countries are unable to stop this are forced to receive the scrap and thus paving way for pollution and health hazards Later over years lot of conventions and discussions were held Frame works were made to dispose the e-waste in a better and safe way But with all these, a dumping continues without any restrictions The e-waste was dumped to some East European, Africa and Asian countries To quote an example the cost of recycling glass of a computer monitor that is 1 kg of glass-to-glass

USA	CHINA	INDIA
1 $	0.1 $	0.15 $
Rs. 42	Rs 4	Rs. 6

The e-waste in a developed country where nearly 90% is incinerated/burnt to prevent unsafe handling Earlier it was landfills, subsequently due to contamination of soil and groundwater they restricted to incineration Where as in a developing / underdeveloped countries like, India, incineration is done openly polluting the atmosphere and the residue used in landfill, contaminates soil causing health hazards

The best way to manage e-waste is Reduce-Reuse-Recycle

Reduce – less generation of e-waste by maintaining of the equipment – lifespan increased

Reuse – if functional, donate or sell it to the user

Recycle – Components that can't be repaired

In case of recycling it involves both elders and child labour alike They do the recycling/scraping for their livelihood though its harmful Most of the time it is done by bare hands and also by burning in open to reclaim the precious metal etc thus polluting the area During recycling only 50% is recycled and the rest is just dumped Thus polluting the environment

In some developed countries the cost of recycling is added to the new product to be purchased, thus it goes a long way in minimizing e-waste generated where the fancy for exchanging or changing electronic devices can be stopped

CONCLUSION

E-waste contains material that contaminates water, air and soil Thus harmful to all living organism. The best way to reduce the impact on environment from e-waste is to generate as much less as possible. This can be achieved by reusing the appliances or the components if possible eg: IC, CRT etc. Thus the lifespan of the product is increased. The other alternative is to recover the precious metals scientifically and safely, thus conserving the depleting resources and also the contamination. Some major companies have developed and started using material that are eco-friendly or reusable material for their new products. Eg: Lead free solder alloy, Hazardous cleaning solvents replaced, Plasma screens etc. Also today house hold e-waste generation is increasing, hence awareness has to be created to minimize e-waste generation and also a safe disposal techniques.

Already there is a general awareness of this major problem as its seen at Schools, Offices, Malls and other places counters have been opened for the people to dump e-waste like used batteries, CD/Floppies etc Thus helping safe disposal Even NGO's have also gone a long way in educating, collecting and disposing e-waste All these are done to see that our environment is not polluted but at the same time the utility of advance technology can be used.