



E-Waste Management Protocol for Used Mobile Phones

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Abstract –

Now a days e-waste management is very much critical matter all over the world. Research on it is going on for estimation of e-waste generation from various electronic gadgets, remedies for reducing e-waste and effective processing for decomposition of e-waste materials. A traditional method to collect and decompose e-waste in the world is a mixed electrical, electronic waste product along with its accessories, enclosures, batteries, wires, cables, fixtures etc. Also for these decomposition processes creates hazardous effects on environmental conditions of that processing factory, ultimately the workers suffer from it. Hence a systematic research work for only one product mobile phone is considered for e-waste management in this paper. In the present work systematic survey, data bank creation for estimation of possible e –waste produced from various old mobiles and their decomposition process will be studied. This will set a protocol for e-waste management centre regarding disposal of old Mobile phones at Modern College, Shivajinagar, Pune.

Keywords - e-waste, recycle, Plasma TV, degradation, models.

I. INTRODUCTION :

Revolution in technology made consumers to abandon their consumer electronic products and purchase the newest models such as mobile phones, TV, PC, Laptops, Photocopier and many of electronic gadgets. This creates a slew of discarded products and a lot of e-waste including the products with end of life, old electronic spares, batteries, cables, plastic materials etc. Thus there is a major issue of e-waste management all over the world. Electronic waste is the electronic, electrical gadgets devices that become older or out of order, not repairable.

There is question whether these e-waste be dumped, repaired and reuse, break and use spare ones, recycle to other applications or convert them into ash. In all these disposal process one has to care about its major as well as minor environmental effects that can be hazardous to human beings. There is need to educate community about e-waste disposal or awareness about e-waste management following through certain procedures.

II. MY RESEARCH

My research work is entitled “Study and experimentation to establish a standardized e-waste management protocol for used mobile phones”. Most of the e-waste contains complex combinations of waste materials and various components down to microscopic levels. They are broken down in not just for recycling but for the recoverable materials such as plastic, iron, aluminium, copper and gold. However, since e-waste also contains significant concentration of substances that are hazardous to human health and the environment, even a small amount of e-waste entering the residual waste will introduce relatively high amount of heavy metals and halogenated substances to human body. Such harmful substances also affect the surrounding soil, water and air during waste treatment or when they are dumped in landfills or left to lie around near it. Sooner or later they would adversely affect human health and ecology. Hence suitable safety measures are to be taken, such that these toxic substances can minimally affect the health. It is important to prevent the toxic effects entering to the human body through respiratory tracts, through the skin, or through the mucous membrane of the mouth and ultimately to digestive tract. The electronic waste management has greater significance in India not only due to the generation of our own waste but also dumping



of e-waste particularly computer waste from the developed countries. This dumping contains lot of compositions of e-waste materials collected and dumped together, instead of sorted e-waste. Hence it is very uncertain that what will be the effect of this dumped e-waste after forthcoming years.

Now due to enhanced electronic technology every new electronic product becomes obsolete after few months. This situation is continuing from last few years and due to this many electronic instruments are not in use, which are treated as electronic waste. Management of this electronic waste is a big question. Dumping these in landfills may cause serious problems for living beings due to hazardous chemicals present in these instruments which cause a great threat to the human health and environment. The issue of proper management of wastes, therefore, is critical to the protection of livelihood, health and environment. It has created a serious challenge to the modern societies and it requires synchronized efforts with manufacturer and user to address it for achieving sustainable development. The general solutions are to reduce, reuse, resale, salvage and recycle these instruments. The importance and proper disposal procedures should be developed and must be known to citizens in urban and industrial areas.

Composition of E-waste

Advanced electronic gadgets have become a vital part of our daily lives providing us with more comfort, security, faster acquisition, more storage space and exchange of information. On the other hand, it has also turned into unrestrained resource consumption and an alarming waste generation. All over the world in developed countries and developing countries like India face the problem of e-waste management. The rapid growth of technology, upgradation of technical innovations and a high rate of obsolescence in the electronics industry have led to one of the fastest growing waste streams in the world which consist of end of life electrical and electronic equipment products very fast. It comprises a whole range of electrical and electronic items such as refrigerators, washing machines, computers and printers, televisions, mobiles etc. which contain toxic materials. Many of the trends in consumption and production processes are unsustainable and pose a serious challenge to environment and human health.

Minimization of waste, development of cleaner products and environmentally sustainable recycling and disposal of waste are some of the issues which need to be taken into consideration by all concerned users, manufacturers while ensuring the economic growth and enhancing the quality of life. E-waste therefore, broadly describes loosely discarded obsolete, broken, electrical or electronic devices. An 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 repair, recovery, recycling or disposal. It also includes computer and its all accessories monitors, printers, keyboards, central processing units etc. Also electronic typewriters, mobile phones and chargers, remotes, compact discs, headphones, batteries, LCD/ Flat Screen, Plasma TVs, air conditioners, refrigerators and other household appliances. The composition of e-waste is diverse and falls under 'hazardous' and 'non-hazardous' categories. It consists of ferrous and non-ferrous metals, plastics, glass, wood and plywood, printed circuit boards, concrete, ceramics, rubber and other items.

Impact of hazardous substances on health and environment

The waste from electronic products include toxic substances by majority such as cadmium and lead in the circuit boards; lead oxide and cadmium in monitor cathode ray tubes (CRTs); mercury in switches and flat screen monitors. Also chemicals like cadmium in batteries; polychlorinated biphenyls in older capacitors and transformers; and brominated flame retardants on printed circuit boards, plastic cabinets, flat cables and cable insulation that release highly toxic dioxins and furans when burned to retrieve copper from it. All of these substances are toxic and carcinogenic. The materials are complex and have been found to be difficult to analyse and recycle in an environmentally sustainable method even in developed countries.

An e-waste which contains complex combinations of materials and components down to microscopic levels. The wastes are initially broken or purposely broken for recycling and for the recoverable some materials such as plastic, iron, aluminium, copper and gold. However, since e-waste also contains significant concentration of substances that are



hazardous to human health and the environment, even a small amount of e-waste entering the residual waste will introduce relatively high amount of heavy metals and halogenated substances which are harmful substances for human health and ecology.

III. SURVEY FOR E-WASTE MANAGEMENT AWARENESS

A survey was arranged to study awareness among the community like what is e-waste, How it is Hazardous and should be minimized, properly recycled. A questionnaire was prepared for survey in various regions on Pune city, PCMC area and rural area in around Pune. The data obtained was analyzed and Champaign conducted regarding management of e-waste materials shown need to work in this field. This campaign appealed to peoples to reduce, reuse and recycle e-waste, and contact for systematic disposal of e-waste collection centre that will be established in college. Information regarding e-waste recyclers in Pune like SWaCH, Hi-tech, PCMC e-waste management centre as well as in national level are referred to develop systematic approach for disposal of e-waste particularly mobile phones.

To summarize, we propose research significance work for survey of e-waste disposal in Pune city, study current practices in this area, and establish e-waste management protocol particularly regarding mobile phones by following all legal aspects and international standards in Modern College, Shivajinagar, Pune -5. Research Topic is basically e-waste management. This research work is undertaken for systematic study of e-waste management particularly focusing on mobile phones as currently it's becoming great issue to manage e-waste systematically for preventing environmental damages and also health related issues to human beings, other lives on earth. In this work the main aim is to develop protocol for used mobile phones in sequence like preliminary testing, decision methodology for Reuse, Resale, Salvage, Recycle and disposal. Particularly for recycle and disposal research experimentations to degrade e-waste from mobile by various methods physico-chemical or biological treatment, incineration or any other suitable method and deposition in secured landfill. The research works will be useful to save local environmental from hazardous e-waste generated through used mobile phones.

IV. CONCLUSION

As far as e-waste management is considered globally, this research may give systematic procedure for particular product/gadgets i. e. mobile phone that will take care of e-waste management from manufacturing of the device, user, repairer and at last how it can be disposed safely. This will reduce e-waste generation due to mobile phones. A systematic survey of various models available in market, their manufacturing process and estimated e-waste will be analyzed through this research. The experimental work will focus on laboratory experimentation, Reuse of mobile, Resale of mobile, Salvage of mobile phones and Recycling of wasted parts, Systematic experimentation to segregate e-waste material after trying for reuse, resale and salvage be carried out. These will include physical degradation, Chemical decomposition, biological decomposition of the waste materials, yielding some bi products. The method for recycling will be optimized, In this regard recycling and disposal of mobile phone e-waste management rules set by Indian Government will be followed.

There is also one more possibility of entrepreneurship of second hand use of electronic gadgets particularly for mobile phone. There are many reasons to discard mobile phones, availability of new versions, upgraded technology, usage by user as per his needs or failure of mobiles due to ageing or accident fall or any other reasons. These mobiles can be deposited to distributors or buyback scheme and can be given to needy users at small price. Also unless these mobiles are come across with environmental factors like moisture, light, heat or any other contamination it does not create any harmful materials into environment. With this observation the discarded or somewhat defective mobiles after servicing can be used instead of pocket mobile for particular applications like to record music, use as camera, laboratory instrumentation until it works satisfactorily.

Output of this research work will have social impact regarding properly handling or disposing hazardous e-waste materials locally and we can prevent environment loss which will become great risk to human community in future.



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