

E-Waste-An Environmental Impact

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ABSTRACT

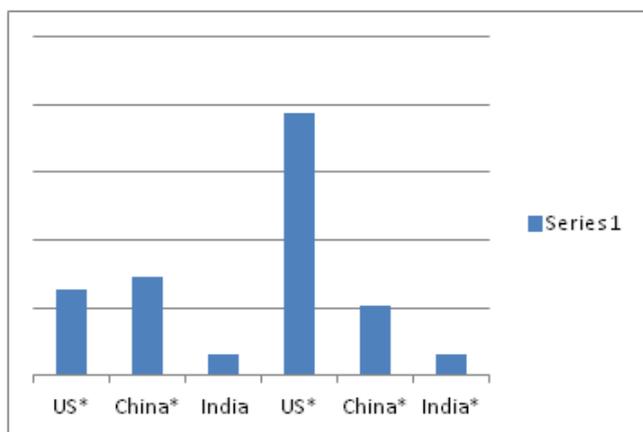
It is here that the relics of Information Age, with their miraculous microscopic circuits transistors Capacitors and semi conductors are bludgeoned and torched with stone age technology. For the residence in this squalor and filth make they living, first by hauling and then smashing, gutting and burning the television and Computers in a most ungreen form of "recycling" to recover metals- cropper, steel and aluminum. The Information and communication Technology has become the power of the global economy. Software and hardware parts of the Information Technology has entered most of the parts of the social, technical and natural environment. Obviously the increase in production of electric and electronic components and especially computer hardware manufacturing companies. Currently usage, dumping and recycling of all these electric and electronic components are directly affecting to human life and environment. The men, women and even the children using the ways which are not only environmentally harmful but also life frightening. The electronic market particularly computers hazardous impact of different chemicals disposed in environment in the process of computer usage, disposal and inefficient recycling.

Keywords: : IT, economy, electric and electronic, e-waste, hardware and software, manufacturing ,environment, hazardous

INTRODUCTION

E-waste comprises of waste generated from used the electronic devices and house hold appliances which are not fit for their original use and output to the user having not in well condition for recovery, recycling or disposal. Such waste covers wide range of electrical and electronic devices such as record players, radios, transistors, VCRs and black-and-white TVs. later on CD and DVD players, computers, mobile phones, including household appliances like refrigerators, air conditioners, water coolers, water filters, heater etc. E-Wastes contain many hazardous substances like heavy metals, PVC plastics and brominates flame retardants more than thousands of different components which are toxic and potentially hazardous to environment and also human health. E-Waste : 4,500 Eiffel Towers in 2016, 44.7 million metric tons of e-waste was generated. This is equivalent to almost 4,500 Eiffel Towers!

Global e-waste generated		
Year	Total E-waste	Per Person E-waste
2016	44.7 mt	6.1kg
2021	52.2mt	6.8 kg



Recycled or dumped	E-waste max in Asia
<p>20% (8.9) of e-waste is documented to be collected and properly recycled</p> <p>4% (1.7mt) of e- waste in the higher income countries is thrown into the residual waste.</p> <p>76% (34.1mt) of e-waste is likely dumped. Traded, or recycled under inferior conditions</p>	<p>Asia ,which has 45 contries with 4.4 billion population, accounts for</p> <p>40.7% (18.2mt) of global e-waste</p> <p>4.2kg or e-waste per capita</p>

Alarming data on the role of electronic waste and its effects on environment.(1.47 lakh tones or 0.573 MT per day in India, in which Maharashtra state generates approximately 20270.6 tones, Mumbai contributes 11017.06 tons, Maharashtra state ranks first in generating E-waste in India)

Manufacturing process of some components:

Microchip fabrication has over 400 distinct steps involve 4 general phases like layering having thin layer of desired material, usually silicon or aluminum, which then requires oxidation can change the semiconducting silicon layer into an insulating silicon oxide layer which then patterning process, can carving of a dense, maze-like set of furrows into layer and last step is etching can be made by using the solvents or particles bombardment to alter the layer pattern. The process requires great deal of ultra-pure water and the chips are bathed in chemical solvents the resources used are fossil fuels, chemicals, water for bathing the printer, circuit board ,CRT monitors, LCD/LED monitors.

Chemical elements used for lead in shouldering of printed circuit boards and other components also in glass for CRTs.It is estimated that 1.2 billion tons of lead was used in computer components between1997 to 2014.

Mercury is used in batteries, switches, housing and printed circuit boards. Mercury is also found in medical equipment, data transmission equipment, telecommunication equipment, and cell phones as well as estimated that 22% of the yearly use of Mercury is in electrical and electronic equipment although a small amount of Mercury is used in nearly all computer construction. Cadmium is used in resistors for chips, infrared detectors and in semiconductors and also in older CRTs.Plastics is found throughout the computer, largely from casings but also internally to hold components together. Specific form of plastics used is polyvinyl chloride (PVC) which is used in cabling and housing also.PVC is difficult to recycle and production and burning of PVC generates dioxins and furans.The plastics in computers are often treated with flame retardant chemicals,particularly brominates flame retardant.

List of Examples of devices containing these elements

- ✓ Tin:Shoulder
- ✓ Aluminum:Nearly all electronic goods using more than a few watts of power
- ✓ Iron:Steel chassis, cases and fixings
- ✓ Silicon:Glass,Transistors,ICs,Printed circuit boards
- ✓ Nickel and Cadmium: Nickel-Cadmium rechargeable batteries
- ✓ Lithium:Lithium -Ion battery
- ✓ Zinc:Plating and Steel parts.
- ✓ Gold:Connector plating,Primarily in Computer equipment
- ✓ Sulphur:Lead-acid Battery.
- ✓ Carbon:Steel,Plastics,Resistors

ENVIRONMENTAL IMPACT

1. The process of dismantling and disposing of electronic waste lead to a number of environmental impacts. Liquid and atmospheric release end up in bodies of water, ground water, soil and air and therefore in aquatic and terrestrial animals, in crops eaten by both animals and human and in potable water.
2. Cathode ray tubes used in TVs, computer monitors, ATM, video cameras are more Lead, Barium and other heavy metals leaching into ground water and release of toxic phosphor.
3. Printed circuit board image behind table-a thin plate on which chips and other electronic components are placed de-shouldering and removal of computer chips,open burning and acid baths to remove final metals after chips are removed air emissions as well as discharge into rivers of glass dust, tin, lead, brominates, dioxin, beryllium, cadmium and mercury.
4. Chips and other gold plated components chemical stripping using nitric and hydrochloric acid and burning of chips, hydrocarbons, heavy metals, brominate substances discharged directly into rivers acidifying aquatic organisms and flora. Tin and lead contamination of surface and ground water.
5. Air emissions of brominates, dioxins,heavy metals and plastics in and low temperature melting to be reused emissions of brominated dioxins, and hydrocarbons.
6. Computer accessories like cable burning and stripping to remove copper hydrocarbon ashes released into air water and soil.

IMPACT ON HUMAN BODY

1. The problem of lead can cause damage to the central and peripheral nervous systems, blood systems, kidneys, endocrine system and cause negative effects on child brain development, lead accumulates in the environment and has a toxic effects on flora ,fauna and microorganisms. Electronics contribute 40% of the total amount of lead found in landfills and can make its way from landfills into the water supplies.
2. The problem of mercury spreads out in water transforming into methylated mercury which easily accumulates in living organisms such as it enters the food chain through fish which can swim in polluted waters. Methylated mercury can cause chronic brain damage. Mercury will leach when certain electronic devises such as circuit breakers are destroyed .
3. Cadmium compounds accumulate in the human body, particularly the kidneys. Cadmium is absorbed through respiration and also food intake. When ruminated flame retardant plastic are cadmium containing plastics are land filled PBDE and cadmium have the potential to leach in to the soil and ground Water.
4. Cadmium has a half-life of 30 years so that cadmium can poison a human body slowly through human life.
5. Hexavalent Chromium (Chromium VI) is used to treat steel plates(an anti-corrosive) and is estimated that between 1997-2014,1.2 million pounds were used in computer components.

CONCLUSION AND SUGGESTIONS

We are willingly allowing hazardous substances to percolate into our water and air so that we may enjoy a new technology and this problem is not going away because the global population is growing and the demand of newer and better technology is creating huge amounts of old and outdated electronics. Most of

the countries discarded computers and monitors and TVs, eventually end up in landfills. There are better ways to dispose of this E-waste which include buy second hand electronic devices, try to fix it before throwing it away, and try to sell so that someone does not buy a new one. Currently there are very few rules and regulations on the disposal of E-waste and cannot be strictly implemented. Implement stricter laws and regulations to help and facilitate a moment towards recycling and reusing. Educate the population better so that they fully understand the potential consequences to improper disposal. Many large corporate sectors such as buy back versions will take back old and unwanted electronic devices. Always contact the large retailers before throwing away the electronic devices.

Conflicts of interest: The authors stated that no conflicts of interest.

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