

E-Waste and Their Management

Abstract

E-Waste contains hazards constituents that many negatively impact environment and affect-human health is not properly manage, countries have in place legislation mandating electronics manufacturers and improper to take back used electronics product.

Keywords: E-Waste, Electronics / Electrical Goods

Introduction

E waste is waste of electronics / electrical goods that have reached their end of life and cannot be used again. It is also termed as discarded electrical or electronic devices; these could be computers, office electronic equipment, mobile phones, television sets, entertainment device electronics and refrigerators. Electronic products often contain hazardous and toxic materials and should not be dumped with other wastes or in a common dumping site.

Monitors and televisions made with tubes i.e. Cathode Ray tubes have between 4 and 8 pounds of lead in them. Most of the flat panel monitors and TV's being recycled now contain less lead, but more mercury, from their mercury lamps. In a survey it has been observed that 40% of the heavy metals, including lead, mercury and cadmium, in landfills come from electronic equipment discards. Cathode ray tubes (CRTs) are considered one of the hardest types to recycle CRTs have relatively high concentration of lead and phosphors (not to be confused with phosphorus), both of which are necessary for the display.

The rate of e-waste generation is increasing by 10% every year. According to a report by UNEP titled, " Recycling –from E-waste to Resources," the amount of e-waste being produced – including mobile phones and computers –could rise by as much as 500 percent over the next decade in some countries , such as India. The United States is the world leader in producing electronic waste tossing away about 3 million tons each year. China already produces about 2.3 million tons (2010 estimate) domestically, second only to the United States. And, despite having banned e-waste imports, China remains a major e-waste dumping ground for developed countries.

Types of E-waste are

1. Telecommunication Waste
2. Electrical waste
3. Electronic waste
4. Cable waste

Facts and Figure

1. 1-6000 mobile phones give 3.5kg of silver, 340gm. of gold 130gm. of copper and 140gm. of palladium.
2. One PC consumes 1.5 tons of water 48 pound of chemicals 539 pound of fossil fuels.
3. The EPA estimates that in 2011 the US generated nearly 3.4 million TONS of e- waste. But only about 25% of that was collected for recycling.
4. An estimated 50 million tons of E-waste are produced each year.
5. The USA discards 30 million computers each year and 100 million phones are disposed of in Europe each year.

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6. The Environment Protection Agency estimates that only 15-20% of e-waste is recycled, the rest of the electronics go directly into landfills and incinerators.
7. Basel Action Network (BAN) estimates that the 500 million computers in the world contain 2.87 billion kgs plastics, 716.7 million kgs of lead and 286,700 kgs of mercury.

Issues and Chalanges

Recycling electronics isn't like recycling cardboard. These products are not easy to recycle. Proper and safe recycling often costs more money than the materials are worth. Disposing e waste is a difficult task. For that proper legal framework is required. Several Challenges faced during e waste are

1. Leaching of heavy metals from Landfills and Incinerators
2. Exposure to workers & communities
3. Unawareness
4. Less reuse
5. Collection system

Environment Impacts

The dumping of e waste without proper treatment is very dangerous and could affect the environment to worst conditions. While the health implications of e waste are difficult to isolate due to the informal working conditions, poverty, and poor sanitations, several studies in Guiyu, a city in southeastern China, offer insight. Guiyu is known as the largest e-waste recycling site in the world, and the city's residents exhibit substantial digestive, neurological, respiratory, and bone problems. For examples, 80 percent of Guiyu' children experience respiratory ailments, and are especially at risk of lead poisoning.

In a research done by Brett Robinson, a professor of soil physical sciences at Lincoln University, in New Zealand, warn that wind pattern in Southeast China disperse toxic particles released by open-air burning across the Pearl River Delta Gegion home to 45 million people. 4 In this way, toxic chemicals from e-waste enter the "soil-crop-food pathway," one of the most signification routes for heavy metal's exposure to humans. These increasing exposure risks.

Incineration of e waste is also a problem as incineration of e-wastes can emit toxic fumes and gases, thereby polluting the surrounding air. Improperly monitored landfills can cause environmental hazards. Mercury will leach when certain electronic devices, such as circuit breakers are destroyed. The same is true for polychlorinated biphenyls (PCBs) form condensers.

When brominated flame retardant plastic or cadmium containing plastics are land filled, both polybrominateddiphynylethers (PBDE) and cadmium may leach into the soil and groundwater. It has been found that significant amounts of lead ion are dissolved from broken lead containing glass, such as the cone glass of cathode ray tubes, gets mixed with acid waters and are a common occurrence in landfills.

Basel Convention

The fundamental aims of the Basel Convention are the control and reduction of trans boundary movement of hazardous and other wastes including the preventing and minimization of their generation, the environmentally sound management of such wasters and the active promotion of the transfer and use of technologies.

The United States is the largest generator of e-waste worldwide and the only industrialized nation not yet ratifying the Basel Convention.

Management of E-Waste

If e waste is managed properly it could be used again and waste going to dumping site would be very less. Many of e waste products can be reused, refurbished, or recycled in an environmentally sound manner so that they are less harmful to the ecosystem.

In industries management of e-waste should begin at the point of generation. This can be done by waste minimization techniques and by sustainable product design. Waste minimization in industries involves adopting:

1. Inventory Management,
2. Production-Process Modification,
3. Volume Reduction,
4. Recovery And Reuse

Regulations Adopted Around The World

1. Vehicle take-back laws
2. Eco-management and audit-scheme (EMAS)
3. Restriction on hazardous substances (ROHS)
4. Waste electrical and electronic Equipment (WEEE)
5. The ecodesign requirements for Energy using pro

To reduce the generation of e waste it is also the responsibility of citizen Waste prevention is perhaps more preferred to any other waste management option including recycling. Donating electronics for reuse extends the lives of valuable products and keeps the out of the waste management system for a longer time. But care should be taken while donating such items i.e. the items should be in working condition. Reuse, in addition to being an environmentally preferable alternative, also

benefit society. By donating used electronics, schools, not-profit organizations, and lower-income families can afford to used equipment that they otherwise cold not afford.

E-wastes sold never be disposed wt garbage and other household wastes. This should be segregated at the site and sold or donated to various organizations.

Conclusion

E-waste is a relatively new segment in the Global problem of waste removal. It is also the fastest growing segments word in discarded waste. This growing problem in the world is largely ignored, many people do not understand what it is or now it affects them, E-waste comes from the improper disposal of any number of electronics devices.

These devices include computers, television, cell phone or most other electronic equipments.

References

1. *Freeman M.H. 1989, standard Handbook of Hazardous Waste Treatment and Disposal, McGraw-Hill Company, USA.*
2. <http://www.ces.iisc.ernet.in/energy/paper/ewaste/ewaste.html>
3. *United Nations Environmental Program (UNEP), Recycling-From E-Waste to Resources (Ne w York : UNEP, 2009), accessed at www.unep.org on Jan. 23, 2013.*
4. https://en.wikipedia.org/wiki/Electronic_waste