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ISSUES ASSOCIATED WITH ELECTRICAL/ELECTRONIC WASTE MANAGEMENT IN NIGERIA

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ABSTRACT
Electrical and Electronic equipment (EEE), became technologically obsolete in a matter of months as a result of continuous development of new models. Most of the obsolete equipment finds their way into developing countries that are hungry for info- tech access. At the end of life, they eventually find their way into landfills as electronic waste (Waste EEE or E- waste) which may pose health and environmental hazards to humans, livestock and ecology if not properly managed. This paper reviews the sources of E- waste as well as their component and dangers in them. Alternative initiatives and means of managing E- Waste, both nationally and internationally are also discussed. Recommendations are made on appropriate treatment of E-Waste in order to make the environment safe for all.

KEYWORDS: Electronic waste, Pollution and management.

INTRODUCTION

Electrical and Electronics waste (EEW) have generally made life easy and convenient because of their efficiency and time saving in application. Communication system, as they are today, would not have been achievable without electronics technology, entertainment industries (Music, Video, television, cameras etc) would have remained crude if not continuing development in electronic household equipment, now making use of electricity and electronics, are making domestic chores (Washing, Cleaning, Cooling, heating etc.) continuously easier and more convenient.

Electronic wastes, particularly electronic device, become technologically obsolete in a matter of months as a result of continuous development of new models. This rapid technology growth loads to high rate of production of electronics equipment. Some 20 to 50 million metric tons of E-Waste are generated world -wide, every year.

In the U.S.A. alone, 14 to 20 million personal computers are thrown out each year, with an annual increase of 3-5%. However only 13-18% is recycled. In the end, the discussed equipment finds their way into various directions, some ending up in landfills where the pose environment and wealth hazards to humans, livestock and the soil. Some are incinerated, leading to environmental pollution from the fume. Electronic equipment that has reached their end of life becomes Electronic waste (E-Waste) and possible solution to this E-Problem. It identifies the sources of E- waste as well as their components and dangers in them. Alternative initiatives and means of managing the E-Waste in Nigeria are discussed and recommendations are made on appropriate treatment of E-Waste in order to make the environment safe for all.

Categories of e-waste

According to EU Initiative; Electric waste means equipment which dependent on electrical currents or electromagnetic fields in order to work properly and equipments for the generation transfer and measurement of such current and fields designed for use in a voltage not exceeding 100 volts for alternative current and 1500 volts for direct current. While waste is any substance or object which the holder disposes of or is required to dispose of pursuant, to the provision of national laws in force.

Table 1: Categories of electronic waste.

S/N	Category	Typical example
1	Large house hold appliances	Refrigerators, freezers, washing machines, cloth dryers, micro waves, farming/exhaust ventilation, conditioning equipment

2	Small household appliances	Vacuum cleaners, other cleaners/weaving textile appliances, toasters, fryers, pressing Iron, Shaving devices.
3	IT and telecommunication equipment	Mainframes, micro computer, printer, PC. (Desktop, Note books, Laptops) Photocopiers, type- writers, fax/telex equipment telephones
4.	Consumers equipment	Radio and TV Sets, Video camera/Decoder, Hi-Fi recorder, amplifiers, Musical Instruments.
5	Lightening Equipment	Luminaries for fluorescent lamps, low pressure sodium lamps
6.	E/E Tools	Drills, sews, sewing machines, turning/bending/ sewing cutting/ spreading etc.
7	Toys leisure and spoils equipment	Video games, sports equipment, com slot machines, drilling/ running raving computers.
8	Medical devices	Devices for radio therapy cardiology/ dialysis, ventilator, analyzers, freezers, fertilizers tests detecting/preventing/ monitoring treating alleviating illness injury or disability
9	Monitoring and control instrument	Smoke detectors, heating regulators control instruments,, appliances of laboratory.

Sources and Generation of e-wastes

The life cycle equipment is the time span which the items come to its end of life. It's defined as

Average Life cycle = Active life + Passive life + storage

Where

Active life – is the no of years the equipment can be efficiently used.

Passive life – is the time period, after active life when the equipment can be refurbished or reused.

Storage – is the time during which the equipment is stored and at repair shops before dismantling. In developed countries, passive life and storage life are literally non-existent; hence the average life cycle of electronic equipment is generally the same as the active life. Therefore the passive and disposal times are taken care by the developing countries

According to computers and allied product dealers Association of Nigeria, 75% of electronics shipped to the computer village in Ikeja Lagos are irreparable junk. However, such trade has been discovered to be unfair to developing countries because of the inherent dangers that E-Waste poses to the environment, humans, soil and livestock.

E-waste component technological growth resulting from for example technological obsolescence of electronic products leads to an increase in the amount of E-Waste generated. It is also becoming easier and more convenient to change malfuncting equipment then to repair or fix them.

Table 2 contains some electronic items and their associated components. The cathode ray tube (CRT) of a Television or Computer monitor example Contains Lead, phosphorous etc. in some proportion. Other toxic substance contained in various electronic items is selenium, bromine, cobalt etc.

Table 2: Hazardous components in E-Waste Items.

Item	Hazardous component
Cathode ray tube.	Lead, mercury, phosphorus.
Liquid crystal display.	Mercury.
Circuit board.	Lead, beryllium..
Florescent lamp.	Mercury, ph, flame retardants.
Cooling systems.	ozone depleting substance
Rubber.	Lead, phthalate plasticizer.
electrical wiring	Phthalate, plasticizer.
batteries	Lead, lithium, mercury, cadmium.

Dangers in e-waste

Table 3 summarizes the effects of some of the most hazardous E-Waste components.

Table 3: Effects of E-Waste on humans.

Items	typical sources	effects of humans
Mercury	Fluorescent lamps LCD TV, Monitors, switches, flat panel screams	Impariment of neurological development in fetuses and small children, tremours, emotional

		changes, motar function, insomnia, headaces, changes in nervous systems, kidney effects, reparatory failures, death
Lead	CRT of TV Computer monitor, circuit boards	Damages of brain and nervous system, slow growth in children having problem, blindness, diarrhea physical disorder etc.
Chromium	Untreated and galvanized steel plates, decorator or hardener for steel housing	Skin irritation, ulceration, respiratory irritation, kidney damage, liver damage
Cadmium	Light sensitive resistors as corrosion retardant, Ni-Cd- Battery	Inhalation due to proximity to hazardous dump, can cause server damage to the lungs, kidney, cognition

Apart from the hazardous effects on humans it is discovered that E-Waste leaches the soil due to the presence of mercury, cadmium, lead found in it. E waste can also cause uncontrolled fire risk, leading toxic fumes.

In addition, uncontrolled burning disassembly and disposal of E-Waste can cause a variety of environmental problems such as ground water contamination, atmosphere pollution and occupational and safety effects among those directly or indirectly involved in the processing of E-Waste.

E-Waste management solutions/initiatives

It is worrisome that a lot of Nigerians are unaware of the dangers inherent in careless handling of E-Waste. Therefore it is common to see both young and old scavenger's rummaging through solid waste heaps of dumpsites without coming about the health implications of such dangerous means of livelihood. It is therefore pertinent to discuss alternative groups of managing E-Waste, particularly in healthier and safer ways, the focal point of which is reducing, reusing and recycling (3Rs)

Nigeria efforts in E-Waste management have not been any serious as regards management of E-Waste. There are however a sizable number of government agencies that should be directly or indirectly involved in E-Waste management. Among these one:

1. Federal Environmental Protection Agency FEPA
2. National Environmental Standards and Regulatory Enforcement Agency (NESREA)
3. National Emergency Management Agency (NEMA)
4. National Space Research and Development Agency (NASRDA)
5. Nigerian customs services (NCS)

There is, therefore, some institutional frame work place through its effect is yet to be felt. In order therefore, to effectively address the issues surrounding E-Waste management in Nigeria. A number of challenges must be addressed for example.

- There is no legislatition to control the flow of used consumer electronic products
- Used electronic products are not regarded as contraband by the Nigerian customs services as long as appropriate duties and taxes are conducted on them
- There is no public awareness on the inherent dangers of handling E-Waste which for e.g is regarded as a business opportunity, except for smelting of carp metals.
- There are no E-Waste recycling facilities in the country.
- There is poor (if any) corporate social responsibility on the part of the industries on E-Waste. An attempt was made by NESREA in 2009 by sponsoring an international conference on E-Waste control tagged "The Abuja platform on E-Waste". Also the first international E-Waste summit E-Waste in Nigeria held tagged "Regulation and management of E-Waste in Nigeria". This summit was to encourage and enforce collection, recovery, re-use and re-cycling (3R) of E-Waste. Currently NESREA is conducting a nationwide service of sensitization workshop on the newly gazette national environmental regulations which have in four categories regulations governing the use and disposal of electronic waste fall under category III. According to the regulation, every facilities is expected to have, waste management plan which must be submitted to the agency. Violation of this provision by an individual attracts a fine not exceeding N200, 000 or imprisonment term not exceeding 6 months. For corporate organization, N100, 000 with an additional fine of N50,000 for everyday the offence subsists. While the effort of NESREA is commendable, Nigerians are waiting for its implementation. Nigerian society of Engineers (NSE) through its environmental division which organized in Nov. 2010 with the theme "Environmental impact to telecommunication projects in Nigeria" the main concern of its communiqué was the inherent dangers posed by E-Waste whose quantity is continually increasing at a fast rate while the government at all levels are doing little or nothing to address the situation. Since this is coming from a professional body, it is hoped that a substantial progress would be made in recommendation to government at all levels the need to legislate on E-Waste management.

Issues/Constraints of electronic inventory

Data in nigeria: There are serious constraints to obtaining reliable data on the amount of E-Waste generated. This makes any E-Waste inventory models

developed for developing countries to lack merit. Some are summarized as follows:

- Historical sales data sales of electrical/electronic equipment are rarely available.
- Expert import data are unreliable because of uncontrolled importation and generation of E-Waste
- Dynamic nature of electronic market makes it difficult to calculate the stock data for private and industrial sectors.
- Storage data may not be available because storage may be in the formal/informal sector.
- Obsolescence rate is prolonged because of cheaper options for repair, thus leading to reuse of E/E Equipment
- Data related to recycling are difficult to track and are not easily available because majority of E-Waste items are dismantled to recover usable parts and materials of economic value.
- E-Waste residues are dumped in landfills without any assessment of quality and quantity.

Recommendation

Recycling is an effective and economical solution to managing electronic waste. It is one of the components of 3R options to reduce, reuse and recycle E-Waste. There are many benefits of recycling E-Waste such as:

- Most electronic devices contain a variety of material including metal that can be recovered for future uses.
- Infarct natural resources are conserved by dismantling and providing reuse possibilities
- Air and water pollution that could be caused by hazardous disposal is avoided
- It leads to reduction in the amount of green house gas emission caused by the manufacturing of new products.

Few main steps of recycling of E-Waste should be involved; collection, transportation treatment and disposal. The regulatory agencies like NESREA, FEPA and Nigeria customs services (NCS) Should make sure and re-export of E-Waste on E-waste laden vessel and yet to collect tariffs and taxes, while used electronics products are not considered as contra band as long as duties and taxes are collected on them.

CONCLUSION

E-Waste management has become a typical issue, particularly because such waste easily find their way into developing countries where they are carelessly and uncontrollably dumped in landfills. It is increasingly causing concern all over the world, because of its hazardous effect on humans, live stock and ecology if not disposed of basically. Everyone is a stake holder in the generation of E-Waste as consumer, producer, importer etc. Therefore effective and efficient management of E-Waste as it concern everyone who must play their role in order to make the environment safe and healthy. The NSREA Intervention in Nigeria is therefore a welcome development.

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