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E-WASTE MANAGEMENT IN NIGERIA: NEED FOR EFFECTIVE LEGISLATIVE CONTROL*

Abstract

The growth in electrical and electronic equipment (EEE) production and consumption has been exponential in the last two decades. This has been as a result of the rapid changes in equipment feature and capabilities, decrease in prices and the growth in internet use. This creates a large volume of waste stream of obsolete electrical and electronic devices (e-waste) in developed countries and leads to a high level of trans-boundary movement of these devices as second-hand electronic equipment into developing countries in an attempt to bridge the 'digital divide'. The past decade has witnessed a high advancement in information technology (ICT) in Nigeria. This depends mainly on second-hand electrical and electronic equipment imported into the country. E-waste is a big issue in Nigeria¹ at the moment because the country lacks specific legislation dealing with its management and control. This has resulted in Nigeria being a dumping ground for ICT devices that come in from developed countries. This paper examines the challenges of e-waste in Nigeria and emphasizes the need for specific regulatory measures for effective e-waste

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¹ The bright and dark sides of Africa's information technology sector are both evident at the Ikeja Computer Village, near Lagos, Nigeria. Thousands of vendors pack this bustling market, one of three major hubs where imported used electronics are repaired and sold. Computers, fax machines, cell phones—if you want one, you can find it here, spruced up and ready to buy. But beyond the thriving storefronts and the piles of refurbished wares, a darker picture emerges. Up to 75% of the electronics shipped to the Computer Village are irreparable junk, according to the Computer and Allied Product Dealers Association of Nigeria, a local industry group. Nigeria has a thriving repair market, but no capacity to safely deal with electronic waste, most of which winds up in landfills and informal dumps. That's a problem, because this "e-waste" can be toxic: much of it is loaded with potentially toxic metals including lead, cadmium, and mercury. What's more, electronic components are usually housed in plastic casings that spew carcinogenic dioxins and polycyclic aromatic hydrocarbons when burned. Charles W. Schmidt Unfair Trade e-Waste in Africa retrieved on the 30th Sept., 2010, from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1440802/>.

management in conformity with international treaties² to which Nigeria is a signatory. It also suggests other issues that could be incorporated into the legislation so as to effectively curb the menace of e-waste in Nigeria.

Introduction

E-waste is a popular informal name for electronic products nearing the end of their useful life. They are considered dangerous as certain components of some electronic products contain materials that are hazardous depending on their condition and density. The hazardous content of these materials pose a threat to human health and the environment. Many of these products can be refurbished or recycled in an environmentally sound manner so that they are less harmful to the eco system.³

Presently, Nigeria is undergoing a massive growth in cell phone and computer use. a significant proportion of this is fuelled by the importation of second – hand equipment from rich developed countries. At the end of their useful life, they become wastes (electronic waste). While some can be directly reused or refurbished, there is a significant quantity of junk that finds its way into the unregulated disposal sites where it is routinely burnt releasing hazardous substances into the environment.⁴

The Basel Convention on The Control of Transboundary Movements of Hazardous Wastes and their Disposal⁵ is the only global framework on the control and management of hazardous and other wastes including e-waste. Nigeria became a signatory to the convention in 1989 and since then it has not evolved a regulatory framework to check the illicit trade in second-hand electronic products. Although there are some existing national laws in Nigeria that indirectly and

² Nnorom I. C., and Osinbajo, O. "Electronic Waste (E-waste) Material Flows and Management Practices in Nigeria" *Waste Management*, 2008, Vol. 28 pp. 1472-1479.

³ Ramachandra T. V., Saira Varghese K. "Environmental sound options for E-wastes management". <http://144.16.93.203/energy/paper/e-waste/html>.

⁴ Umesi, N. O. and Onyia S. "Disposal of e-waste in Nigeria: An Appraisal of Regulations and Current Practices", *International Journal of Sustainable Development And World Ecology*, Vol 15, issue 6, 2008. pp. 565-573.

⁵ The Basel Convention On The Control of Trans boundary Movements Of Hazardous Wastes and Their Disposal was adopted and opened for signature in Basel, Switzerland in 22 March, 1989. The Convention was initiated as a result of numerous international scandals in hazardous waste trafficking that started in the late 1980s. it entered into force on 5 May, 1992 with its Secretariat in Geneva. www.basel.int/.

remotely cover the issues of e-waste, but these provisions are not sufficient to curb the menace of e-waste in Nigeria. The national laws include; the Harmful Wastes (Special Criminal Provisions) Act⁶, the National Environmental Standards and Regulations Enforcement Agency (Establishment) Act⁷ (NESREA) and the Criminal Code Act⁸. These laws prohibit the carrying, depositing and dumping of harmful wastes in Nigeria without specific reference to e-waste.

In view of the above, coupled with the dangers posed by e-waste the Federal government needs to consider this issue seriously and enact specific laws for the control and management of e-waste in Nigeria in conformity with international law and the requirement of the present society.

Understanding the Concept of Electronic Waste (E-Waste) Management.

i. E-Waste Defined

E-waste for short or Waste Electrical and Electronic Equipment (WEEE)⁹ is the term used to describe the old, end of the life or discarded appliances using electricity. It includes computers, consumer electronics, fridges and so on, which have been disposed of by their original users. E-waste is used as a generic term embracing all types of waste containing electronically powered components. It contains both valuable materials as well as hazardous materials which require special handling and recycling methods.¹⁰The Wikipedia Encyclopedia defined

⁶ The Harmful Wastes (Special Criminal Provisions) Act Cap H1, LFN, 2004.

⁷ The National Environmental Standards and Regulations Enforcement Agency (Establishment) Act was signed into law by the late President of Nigeria, Umaru Musa Yar'Adua. It was published in the Federal Republic of Nigeria Official Gazette, No. 92 Vol. 94 of 31st July, 2007.

⁸ The Criminal Code Act, Cap C77, LFN 2004.

⁹ "Finally, the production of electric and electronic devices is a very resource-intensive activity. The environmental burden due to the production of electrical and electronic products ("ecological baggage") exceeds by far the one due to the production of other household materials. A UN study found that the manufacturing of a computer and its screen takes at least 240 kg (530 pounds) of fossil fuels, 22 kg (48 pounds) of chemicals and 1.5 tones of water - more than the weight of a rhinoceros or a car (Kuehr and Williams, 2003). "E-waste, The Hidden Side of IT Equipment's Manufacturing And Use," *Environment Alert Bulletin*, United Nations Environment Programme, January 2005. Available at: http://www.grid.unep.ch/product/publication/download/ew_ewaste.en.pdf.

¹⁰ A Knowledge base for the sustainable recycling of e-waste. <http://e-wasteguide.info/e-waste-definition>. assessed on the 31st June, 2010.

e-waste as e-scrap or Waste Electrical and Electronic Equipment (WEEE) which is a loose category of surplus, obsolete, broken electrical or electronic devices. It classified e-wastes as all secondary computers, entertainment device electronics, mobile phones and other items such as television sets and refrigerators whether sold, donated or discarded by their original owners. This definition includes used electronics which are designed for reuse, resale, salvage, recycling or disposal.¹¹

The concept of e-waste was further simplified as encompassing ever growing range of obsolete electronic devices such as computers¹², servers main – frames, monitors, televisions and display cellular phones and pagers¹³, calculators, audio and video devices, printers, scanners, copiers and fax machines. Besides refrigerators, air conditioners, washing machines and microwave ovens, e-waste also covers recording devices such as DVD's, CD's floppies, tapes, printing cartridges, military electronic waste, automobile catalytic converters, electronic components such as chips, processors, mother boards, printed circuit boards, industrial electronics such as sensors, alarms, sirens, security devices, automobile electronic devices¹⁴, and so on.

From the above it could be deduced that e-waste is a popular informal name for electronic products which have become obsolete due to changes in technology, fashion, style, and status, and are nearing the end of their useful life. However, many of these products can be reduced, reused and, recycled.¹⁵

¹¹ The Wikipedia encyclopedia. <http://en.Wikipedia.org/Wiki/e-waste>. E-waste Management; Indian Institute of Materials Management. www.iion.org.

¹² "In contrast with many home appliances, life cycle energy use of a computer is dominated by production (81%) as opposed to operation (19%)." Energy intensity of computer manufacturing: hybrid assessment combining process and economic input-output methods, Eric Williams United Nations University, *Environmental Science & Technology* 38(22), 6166 - 6174 (2004).

¹³ "A ton of used mobile phones, for example – or approximately 6,000 handsets (a tiny fraction of today's 1 billion annual production) -- contains about 3.5 kilograms of silver, 340 grams of gold, 140 grams of palladium, and 130 kg of copper, according to StEP. The average mobile phone battery contains another 3.5 grams of copper. Combined value: over US \$15,000 at today's prices. United Nations University (2009, September 17). Set World Standards For Electronics Recycling, Reuse To Curb E-waste Exports To Developing Countries, Experts Urge. ScienceDaily. Retrieved September 21, 2010, from <http://www.sciencedaily.com/releases/2009/09/090915140919.htm>.

¹⁴ E-waste Management; Indian Institute of Materials Management. www.iion.org.

¹⁵ Electronic Product Management, What is e-waste http://www.cimb.ca.gov/electronics/whatis_e-waste.

ii. **E-waste Management**

Certain components of some electronic products contain materials that render them hazardous depending on their condition and density. E-waste can best be managed by the mantra of; reduce, reuse, recycle.¹⁶

The first step in reducing electronic waste takes place before the equipment is purchased. When deciding to purchase equipment it is necessary to consider a number of factors that can impact the recyclability and efficiency of the equipment especially the packaging. Some purchasers arrange with the product suppliers to take back the packaging while the others arrange for these materials to be recycled.¹⁷ The volume of e-waste can also be reduced by the technique that removes the hazardous portion of a waste from a non hazardous portion. The technique can be classified into two categories as source segregation and waste concentration. Source segregation means that wastes containing different types of metals are treated separately so that the metal value in the sludge can be recovered. Concentration of a waste stream may increase the likelihood that the material can be recycled or reused. The methods include gravity and vacuum filtration, ultra filtration, reverse osmosis, freeze vaporization and so on. For example an electronic component manufacturer can use compaction equipments to reduce the volume of waste in cathode ray tube.¹⁸

Electronic waste generation can also be reduced through the production process modification.¹⁹ Reduction can be achieved by changing the materials used to make the product or by the more efficient use of input materials in the production process or both. This technique can be in three forms that is, improved operating and maintenance procedure, material change and process equipment modification. Improvement in the operation and maintenance of process equipment can be accomplished by reviewing current operational procedure and examination of the production process for ways to improve its efficiency. Instituting standard operational procedures, strict maintenance procedures, an employee training programme which include correct operating and handling procedures, proper equipment use, recommended maintenance and inspection schedules, correct process control specifications and proper

¹⁶ Ibid.

¹⁷ Ramachandra, T. V.; Saira Varghese, K. op. Cit at no. 3.

¹⁸ Ibid.

¹⁹ Ibid.

management for waste materials are key elements for any waste reduction programme.²⁰

Hazardous materials used in either a product formulation or a production process may be replaced with a less hazardous or non hazardous material. Installing more efficient process equipment or modifying existing equipment can significantly reduce waste generation.²¹

Recovery and reuse is a technique that could eliminate waste disposal costs, reduce raw material costs and provide income from a stable waste.

In the realm of solid waste reuse means the equipment is still working and can be sold or donated thus continuing the life of the product. Electronic equipments that are functioning can still be reused by donating or selling it to someone who can still use it.²²

Recycling is the third method of managing e-wastes. The term recycling means that the equipment is disassembled and the components such as plastics, glass and metals are recovered and used to manufacture new products.²³ A state of the art recycling technology comprises three steps;

i. **Detoxification**

This is the first step in the recycling process and it involves the removal of critical components from the e-waste in order to avoid dilution of and/or contamination with toxic substances during the down stream processes. Critical components include for example lead, glass, cathode ray tubes (CRT), screens, light bulbs and batteries.

ii. **Shredding**

This is a mechanical processing; a next step in e-waste treatment, normally an individual large scale operation to obtain concentrates of recyclable materials in a dedicated fraction and also to further separate hazardous materials. Typical components of a mechanical processing plant are crushing units, shredders, magnetic and eddy current and air separators. The gas emissions are filtered and effluents are treated to minimize environmental impact.

²⁰ Ibid.

²¹ Ibid.

²² <http://www.CIWMB.ca/gov/electronics/reuse/recycle>.

²³ <http://www.ciwm.ca.gov/electronics/Reuse/Recycle> assessed on the 23rd August, 2010.

iii. **Refining**

The third and very crucial stage of e-waste recycling is refining. Most of the fractions need to be refined or conditioned in order to be sold as secondary raw materials or to be disposed in a final disposal site respectively.²⁴

Overview of Strategies at E-Waste Management

a. **International Conventions**

The Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes and Their Disposal.²⁵

This Convention is the only global framework on the control and management of hazardous and other wastes. The over-reaching goal of the convention was to reduce the movements of hazardous wastes between nations and to specifically prevent transfer of hazardous waste from developed to less developed countries.²⁶ The Convention aims to protect human health and the environment against adverse effects resulting from generation, trans-boundary, movement and disposal of such hazardous and other wastes and to ensure that states have the full ability to protect their own environment and to enable them not to permit actions which might have adverse effects on the environments.

The Convention also places a general prohibition on the exportation or importation of wastes between parties and non-parties except the waste is subject to another treaty that does not take away from the Basel Convention.²⁷

The Convention requires prior informed consent (PIC) that must be followed before any export or import is allowed to or from another party. The exporting state is obliged to get written approval of the importing state for such a movement to be legal under the Basel

²⁴ <http://www.ewasteguide-info/state-of-the-art-recyclingtechnologie> assessed on the 23rd August, 2010.

²⁵ The Basel Convention on the Control of Trans-boundary Movement of Hazardous Wastes and Their Disposal. Op. cit at No. 5.

²⁶ The Wikipedia, the free encyclopedia, op. cit at no 11 one of the incidents that led to the creation of the Basel Convention was the 1988 koko case in which 5 ships transported 8,000 barrels of hazardous waste from Italy to the small town of koko in Nigeria.www.basel.int/text

²⁷ Ibid..

Convention.²⁸ In this context each party has the right to ban any import or export of hazardous or other wastes.²⁹

Article 4 of the Convention calls for an overall reduction of waste generation to the minimum taking into account social, technological and economic aspects. It encourages countries to keep wastes within their boundaries and as close as possible to the source of generation. Parties to the Convention must honour import bans of other parties. The Convention also states that illegal hazardous waste is criminal but contains no enforcement provisions.³⁰

After the initial adoption of the convention some LDC's and environmental organizations argued that it did not go far enough. Many nations and non-governmental organizations (NGOs) argued for a total ban on shipment of all hazardous wastes to LDCs. Many waste traders also sought to exploit the good name of recycling and begin to justify all exports as moving to recycling destinations. Many believed full ban was needed including exports for recycling and these concerns led to several regional trade bans.³¹

ii Basel Ban Amendment³²

Lobbying at the 1995 Basel Conference by LDC's, Green Peace and key European countries led to a decision to adopt the Basel Ban Amendment to the Basel Convention. This amendment was incorporated into the convention. It bans any export of hazardous wastes for any reason including recycling wastes from a list of developed countries to developing countries.³³ The Amendment also requires that state parties should ensure availability of adequate disposal facilities for the environmental sound management of hazardous and other wastes, prevent pollution, ensure reduction of wastes to the minimum consistent with the environmentally sound and efficient management of such wastes.³⁴

²⁸ www.basel.int/text assessed on the 24th August, 2010.

²⁹ Ibid.

³⁰ The Wikipedia the free encyclopedia, op cit at No. 11.

³¹ The Basel Ban Amendments was adopted at the 3rd conference of the Parties in 1995. As at mid 2009, 69 nations have ratified the Basel Ban Amendment, three fourths of the signatories were required to ratify the amendment to enter into force. Nigeria ratified the Amendment in 2004.

³² Basel Ban Amendment – <http://untreaty.un.org>.

³³ Ibid.

³⁴ Ibid.

Basel Action Network (BAN)³⁵

To ensure the implementation of the Basel Convention is the Basel Action Network (BAN). The mission is to prevent the globalization of the toxic chemical crisis. BAN conducts both domestic and international programmes to halt the toxic trade which is regarded as bankrupt from both moral and economic standpoint.

Apart from the Basel Convention, other international Conventions are as follows:

- i. **The Bamako Convention On The Ban of the Import into Africa And The Control of Transboundary Movement and Management of Hazardous wastes.³⁶**

The Bamako Convention is a treaty of African Nations prohibiting the import of any hazardous (including radioactive) waste. Impetus for the convention arose from the failure of the Basel Convention to prohibit trade of hazardous waste to LDCs and found realization that many developed countries were exporting toxic wastes to Africa. The Convention required all State Parties to take appropriate legal, administrative and other measures within their area of jurisdiction to prohibit the import of all hazardous wastes into Africa from non-contracting parties.

- ii. **The Rotterdam Convention on the Prior Informed Consent (PIC) for Certain Hazardous Chemicals and Pesticides in International Trade.³⁷**

The objectives of the convention are:

- (i) to promote shared responsibility and cooperative efforts among parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm.

To contribute to the environmental sound use of hazardous chemicals by facilitating information exchange about their characteristics by providing for a national decision-making process on their import and export and disseminating these decisions to parties.

³⁵ The Basel Action Network is a non-governmental organization based in Seattle, Washington, United States. www.ban.org.

³⁶ The Bamako Convention was negotiated by 12 nations of the Organization of African Unity at Bamako Mali in January 1991 and came into force in 1998. www.basel.int. Nigeria became a signatory on 22/12.2008. www.africa-union.org.

³⁷ The Rotterdam Convention was adopted in Rotterdam in 1998 and entered into force in 2004. Nigeria ratified the convention in 2001. <http://www.pic/en/text>
<http://www.sprep.org>.

iii. **The Waigini Convention To Ban the Importation Into Forum Island Countries of Hazardous And Radioactive Waste To Control The Trans-boundary Movement of Hazardous Waste Within The South Pacific Region.**³⁸

The Waigini Convention is a treaty that bans the exporting of hazardous or radioactive waste to Pacific Islands Forum and Prohibits Forum Island countries from importing such waste. The Convention is very similar to the Basel Convention which serves as the Primary instrument governing the trans-boundary movement and environmental management of hazardous wastes. The major difference is that Waigini Convention is administered within the Pacific Forum Region.³⁹

iv. **The Stockholm Convention On Persistent Organic Pollutants**⁴⁰

The convention is a global agreement developed under the auspices of UNEP. The objective of the Convention is to protect human health and the environment from persistent organic pollutants (POPs).

v. **The European Union**

The European Union (EU) has emerged as a global leader on hazardous substance policy.⁴¹ While such policy has been a cornerstone of EU environmental policy since the 1960s, the EU has recently developed a series of new policy initiatives to further address negative environmental and human health impacts of hazardous substances in electronics and electrical products. While these policies regulate the management of hazardous substances and e-waste across European countries, the EU policy also increasingly shapes decisions by policy makers, manufacturers and consumers around the world.⁴²

Three recent EU policy developments, (two directives and one regulation) in EU terms are of particular significance to the future management of hazardous chemicals and e-waste. The first directive

³⁸ The Waigini Convention was adopted in 1995 and entered into force in 2001. The Convention has been ratified by Britain, France, Japan and ten Pacific Region countries including Australia and New Zealand.

³⁹ <http://www.sprep.org>. Assessed on the 23rd August, 2010.

⁴⁰ The Convention was signed in 2001 and entered into force in 2004. Nigeria became a signatory in 2001 and ratified the convention in 2004.

⁴¹ Brethren G. and Vogler, J. *the European Union as a Global Actor*, 2ndedn. (New York; Routledge – environmental Policies of the United States and the European Union)(Cambridge: MA, MIT Press (2004).

⁴² Selin, H. and VanDeeer, S. D. "Raising Global Standards; in the European Union, The Environment, 2006, Volume 48, No. 10 pp. 16-17.

covers Waste Electrical and Electronic Equipment (WEEE)⁴³ and the second outlines restrictions on the use of certain hazardous substances (ROHS).⁴⁴ Finally, the regulation on the registration, evaluation and Authorization of chemicals (REACH) was to become legally binding since 2007.

E-waste is a rapidly growing problem in the EU . The Waste Electrical and Electronic Equipment (WEEE) and Restriction on Hazardous Substances (ROHS) are intended to tackle this problem by addressing hazardous substances in electronic and electrical products and waste streams. WEEE is designed to increase the recovery and recycling of electrical and electronic equipment thereby reducing the quantity of e-waste going to final disposal. Through the concept of Extended Producer Responsibility (ESR) consumers can return all regulated electrical and electronic equipment (free of charge) to the producers who are responsible for recycling, reprocessing and safely disposing of equipment and its components. Thus WEEE provides incentives to producers to design electric and electronic equipment in more environmentally friendly ways and to take future management requirement into account as they design new products.⁴⁵ ROHS contain restrictions on the use of certain hazardous substances in electrical and electronic equipment.

The EU legislation consistent with policy developments on the Basel Convention on the control of Trans-boundary Movement of Hazardous Wastes and their Disposal, prohibits member states from exporting hazardous wastes to developing countries to rid Europe of such problem. Since the adoption of WEEE and ROHS member states have worked to translate these directives into national legislation and regulations covering public authorities, domestic firms and consumers. Five countries, United Kingdom, Germany, France Spain and Italy account for all e-waste in Europe. As such effective implementation of WEEE and ROHS is critical for the successful tackling of e-waste problem. Some EU countries notably Belgium, Denmark, the Netherlands and Sweden had adopted domestic electronics legislation even before WEEE and therefore only needed to make limited

⁴³ Council Directive 2002/96/EC on waste electrical and electronic equipment (WEEE).

⁴⁴ Council Directive 2002/95/EC on the restriction of the use of certain hazardous substances (ROHS) in electrical and electronic equipment.

⁴⁵ Selin, H and VanDeer, S. D. op. cit. at No. 39. The Harmful Waste (Special Criminal Provisions Act,) cap 165, LFN, 2004.

additions.⁴⁶

b. Domestic Legislative Framework

Since the signing of the Basel Convention in 1989, Nigeria has not developed any specific legislation on e-waste but has relied on those national provisions for hazardous substances. This paper will identify and examine those laws in place in Nigeria.

These include;

i. **The National Environmental Standards and Regulations Enforcement Agency (Establishment Act)**⁴⁷

The Act provides for the discharge of hazardous substances and related offences. Section 27(1) provides that the discharge in such harmful quantities of any hazardous substance into the air or upon the land and the waters of Nigeria or at the adjoining share lines is prohibited, except where such discharge is permitted in Nigeria.⁴⁸ "Nigeria will not be used as a dumping ground, we will ensure that adequate regulations are put in place to check this menace. The developed world is ready and willing to cooperate and partner with Nigeria on this issue. We have received alerts from developed countries on e-waste to be dumped in Nigeria, because Nigeria is part of the global movement against e-waste, According to her, the principal thrust of the regulations 'is to prevent and minimize pollution, adding that "they have been divided into various parts with a view to covering the issues at stake from cradle to grave."⁴⁹

ii. **The Harmful Waste (Special Criminal Provisions Act).**⁵⁰

This Act prohibits all activities relating to the purchase, sale, importation, transit, transportation, deposit, and storage of harmful wastes.⁵¹

The above Act was enacted as a result of the discovery of the

⁴⁶ European Commission, Implementation of the Waste Electric and Electronic Equipment Directive in EU (Luxemberg office for official publications in the European commission (2006).

⁴⁷ S. 27 (1) The National Environmental Standards and Regulations Enforcement Agency (Establishment) Act, 2007. The Agency was established in place of the defunct Federal Environment Protection Agency (FEPA) which was established by Decree 58 of 1992.

⁴⁸ Ibid. Op. cit, no. 42.

⁴⁹ Dr Ngeri Benebo, Director-General of the agency, gave the assurance Thursday at the second Expert Critique Meeting on the Draft National Environmental Electrical and Electronic Sector Regulations in Abuja. Retrieved from <http://allafrica.com/stories/201007260977.html> on the 30th Sept., 2010.

⁵⁰ S. 1 (1), Ibid.

⁵¹ S. 1 (2), Ibid.

huge consignments of deadly toxic wastes secretly dumped at koko in June 1988. The Decree was promulgated for effective control of the disposal of toxic and hazardous wastes into any environment within Nigeria.⁵²

iii. **The Hazardous Chemicals and Toxic Waste Programme**

This programme was put in place in 1992 following the provisions of the Waste Management Regulations of 1991.

Following from the above, it would be observed that a total ban on importation, transit transportation, deposit and storage of harmful or hazardous waste has existed since 1988 but these laws have not been effective in combating the scourge of e-waste in Nigeria.

Challenges to the Effective Management of E-waste In Nigeria.

Following from the above legislative strategies aimed at tackling e-waste both at the international and domestic level, it would be observed that a total ban on importation, transit, transportation, deposit and storage of harmful or hazardous waste existed since 1988 but these efforts have not been effective in combating the scourge of e-waste in Nigeria. There is yet to be put in place a legal framework necessary for the implementation of the international treaties and the existing legislation in Nigeria do not specifically address the issue of e-waste but contains general provision for hazardous wastes.

Consequent upon the foregoing, Nigeria with the tremendous growth in its level of ICT is daily slowly and steadily being endangered by the increasing level of toxic waste in the polity. Dumping of e-waste into the African market especially Nigeria where the demand is so high has continued to be on the increase with the ugly trend which constitutes environmental pollution and the attendant health implications.⁵³

Industrial Technology (IT) experts say the Western economies must have taken action to prevent electrical waste (e-waste) from being illegally exported and dumped in countries such as Ghana, Nigeria and China among others. Given the economic implications of recycling these products, the western nations see Africa with the Nigeria in the lead as the final destination. Even with the Basel Convention prohibiting international waste transfer, hundreds of containers stuffed with

⁵² Ibid.

⁵³ Nkanga; E. Nigeria: Combating the Danger of E- Waste in Nigeria, this day Newspaper, 16th January 2008. <http://allafrica.com>.

overused personal computers and their accessories continue to be shipped to Africa continents especially Nigeria because of its high demand. Millions of computers enter the Nigerian ports every month. These computers it was learnt are fraudulently shipped most of the times as reused or refurbished thereby making the IT market look so untidy.⁵⁴

Even though e-waste is a global issue especially in most African countries where there is no effective e-waste management system, the fact remains that Nigeria has remained a dumping ground for all kinds of computer scraps that come into the country from the developed countries especially European and Asian markets by the day.

Personal computers, according to experts are just like other e-products and have components that contain highly toxic substances, gases and heavy metals which can be harmful to human health and the environment. The trash from old computers, mobile phones, or refrigerators, according to experts contain dangerous substances such as lead, mercury, cadmium, hexavalent, chromium, and barium among others.⁵⁵ Piles of unwanted electronic materials which are improperly disposed of according to them can leach toxins into the soil, air and ground water which later enter into crops, animals and human body systems, causing contamination and pollution. The poor in Nigeria regularly sort through piles of e-waste, burn plastics, break open lead-laden cathode ray tubes (CRTS) from computer monitors and pick apart electronic waste to salvage for the precious metals inside. The unsuspecting poor unwittingly expose themselves and their environment to abysmal amounts of toxic hazards thus becoming vulnerable to health risks.⁵⁶ Large parts of ground water in Nigeria have also become polluted and unsafe for human consumption due to indiscriminate disposal of e-waste. They have contaminated the soil, air and food also. Chemicals and toxins from e-waste are known to lead to serious health problems like reproductive failures, genital deformities, thyroid malfunctions, behavioural abnormalities and immune suppression.⁵⁷ The issue of hazardous content in electronic item has continued to worry medical experts. With this, medical experts have

⁵⁴ E-Waste Management still a challenge in Nigerian Market. <http://ewasteguide.info/e-waste-managements>.

⁵⁵ Ibid.

⁵⁶ E-Waste Poisoning in Nigeria, [Green Diary.com/entry/e-waste-poisoning-in-nigeria/](http://GreenDiary.com/entry/e-waste-poisoning-in-nigeria/)

⁵⁷ Ibid.

warned that exposure to these substances can cause damage to blood and nervous system, DNA, immune systems, kidneys, respiratory and skin disorders and lung cancers as well as interfere with regulatory harmony and brain development.⁵⁸

Disposal of e-waste is a particular problem faced in many regions across the globe. Computer wastes that are land filled produces contaminated lachets which eventually pollute the ground water. Acids and sludge obtained from melting computer chips disposed on the ground causes acidification of soil. Incineration of e-waste can emit toxic fumes and gases thereby polluting the surrounding air. Improperly monitored landfills can cause environmental hazards. If electronic items are discarded with other household garbage the toxics pose a threat to both health and vital components of the eco-system.

The impact of e-waste on health has been summarized as follows⁵⁹:

- i. Solder in printed circuit boards, glass panel and gaskets in computer contain lead (PB) and can cause damage to central and kidney damage.
- ii. Chip resistors and semi conductors contain cadmium (CD) which causes toxic irreversible effects on human health, accumulates in kidney and liver, and causes neural damage.
- iii. Relays and switches, printed circuit boards contain mercury (hg) which causes chronic damage to the brain, respiratory and skin disorders due to bioaccumulation in corrosion protection of untreated galvanized steel plates decorator or hardener for steel housings, contain hexavalent chromium (CR) which causes automatic bronchitis and DNA damage.
- iv. Cabling and computers housing contains plastics including PVC. It causes reproductive and development problems, immune system damage, interferes with regulatory hormones;
- v. Plastic housing of electronic equipments and circuit boards contain brominated flame retardants (BDR). It disrupts the endocrine system functions;
- vi. Front panel of CRTs contain (BA) short term exposure causes muscle weaknesses, damage to heart, liver and spleen;

⁵⁸ E-Waste Management Still A Challenge In Nigerian Market. op. cit.no.55.

⁵⁹ Ramanchandra, T. V. and Varghese S. K., op. cit, no.3.

- vii. Motherboard contains beryllium (Be). It causes carcinogenic lung cancer. Inhalation of fumes and dust causes chronic beryllium disease or beryillicosis, skin diseases such as warts.⁶⁰

The Way Forward

The present legal framework on hazardous wastes in place in Nigeria does not appear capable of resolving the problem of e-waste. Therefore, a comprehensive law that provides for e-wastes management and proper disposal is required for adoption by the Nigerian National Assembly. Such a law should limit and restrict the flow of hazardous substances and discarded electronics into Nigeria and regulate the management of e-waste generally. This provision must essentially reflect the provisions of the Basel Convention on the control of Trans-boundary Movement of Hazardous Wastes and their Disposal⁶¹ and the waste Electrical and Electronic Equipment (WEEE) Directive applicable to the European Union (EU).⁶² It is suggested that the provisions of NESREA Act be expanded to accommodate the proposed law on electronic waste and be administered by NESREA.

Under the Producer Pays Principle and the Extended Producer Responsibility of the WEEE Directive, producers of electrical equipment are responsible for finding the end of the life recycling of equipment within the EU but no such legislation exists for the millions of electronic products sold into Africa and Nigeria in Particular. This process should be adopted under the law to be enacted.

The Nigeria legislation on e-waste must also be made to incorporate the following;

1. Standard regulation for industries in the management of e-waste. This will require the companies to adopt waste minimization techniques with sustainable product design. Waste minimization involves the following inventory management. This involves proper control over the materials used in the manufacturing process as an important way to reduce waste generation. By reducing both the quantity of hazardous materials used in the process and the excess of raw materials in stock, the quantity of waste generated can be reduced.

⁶⁰ Ibid.

⁶¹ The Basel Convention op. cit No.5.

⁶² The WEEE Directive, op. cit , no 44.

Waste reduction can also be achieved by developing review procedures for all raw materials, purchased, ensuring that not only the needed quantity of materials is ordered for a specific period.

Other methods to employ for waste minimization by industries include; production process modification, improved operating and maintenance procedures, materials and equipment modification, instituting standards operation procedures which require strict regulation and maintenance programme, employee training, proper equipment use, correct operating and handling procedures, recommended maintenance and inspection schedules, correct process control specifications and proper management of e-waste materials.⁶³

The law must also provide that all personnel involved in handling e-waste in industries including those at the policy, management control and operational level should be properly qualified and trained. Companies can also be allowed under the law to adopt their own policies while handling e-waste.

2. Manufacturers, distributors and retailers should undertake the responsibility of recycling/disposal of their own products under the new law. Manufacturers of computers monitors, television sets and other electronic devices containing hazardous materials must be responsible for educating consumers and the general public regarding potential threat to public health and the environment. At the minimum all computer monitors, television sets and other electronic devices containing hazardous materials must be clearly labeled to identify environmental hazards and proper materials management. This should be a requirement of the new law.
3. By the new law, regulatory agencies in each state which are vested with the responsibility of coordinating the regulatory functions of the various government authorities regarding e-waste must be strengthened. Under this law, the agencies concerned must be allowed to conduct the following;
 - i. Collect basic information on the materials from manufacturers, processors and importers and to maintain an inventory of those materials. The information should include toxicity and harmful effects.⁶⁴

⁶³ Ramanchandra, T. V. and Varghese S. K., op. cit, no 3.

⁶⁴ Ibid.Okeh U. E-waste poisoning in Nigeria, op. cit, no 55.

- ii. Identify potentially harmful substances and require the industry to test them for adverse health and environmental effects.
 - iii. Control risk from manufacture, processing, distribution, use and disposal of electronic wastes.
 - iv. Encourage beneficial reuse of e-waste and encourage business activities using waste set up programmes so as to promote recycling among citizens and businesses;
 - v. Educate e-waste generators on reuse/recycling options.
4. The law should be made to enforce strict regulations against dumping e-waste in the country by outsiders. Where the laws are flouted, stringent penalties must be imposed. In particular, custodial sentences should be preferred to paltry fees which these outsiders/foreign nationals can afford to pay.⁶⁵
 5. The law should contain strict regulations and heavy fines levied on industries which do not practice waste prevention and recovery in the production facilities.
 6. Uncontrolled dumping is an unsatisfactory method for disposal of hazardous waste and should be phased out by legislation. There should be provision for the creation of strategic waste banks, selected locations and the exclusion of all electronics devices from landfills and incinerators.
 7. For a successful e-waste management programme, Nigerian citizens also have a responsibility in the area of waste prevention which is perhaps more preferred to any other waste management option, including recycling.⁶⁶ This could arise in the form of donating electronics that are still functioning for reuse so as to extend the life of valuable products and keep them out of the waste management system for a longer time. Reuse in addition to being an environmentally preferable alternative also benefits the society. By donating used electronics, schools, non-profit organizations and lower income families can afford to use the equipment they would otherwise have not been able to afford.
 8. There should be provision for massive public education exercise from time to time through print and electronic media on the contents of discarded electronics and the impact on the

⁶⁵ Ibid.

⁶⁶ There should be a provision of the law as it is contained in other international treaties earlier cited.

environment and health, and how to handle and dispose of them in an eco-friendly way.

9. Finally provision needs to be made for massive public stakeholder exercise which would include major electronics importers, state and local government officials, EU, UN and G-8 nations representatives, recyclers, retailers and environmental organizations to deliberate on e-waste and how to reduce its incessant flows to Nigeria.⁶⁷

Conclusion

It is now an acknowledged fact that all over the world the adoption of information communications technology (ICT) brings a lot of desirable benefits that usher in development and helps in changing the living standard of the people especially in developing countries. Technology has been used to perform medical, agricultural, economic and educational feats that transform how people live, work and play. But beyond the positive benefits lies its negative side. The flipside of the adoption of technology is the toxic aspects caused by the growing threat of hazardous waste.⁶⁸

The existing legislative framework and initiatives of the Nigerian government are not sufficient to curb the menace of e-waste in Nigeria. The federal government must therefore step in and curtail the importation of second hand (obsolete) electronic goods into the country and the indiscriminate dumping of e-waste in landfills, incinerators and other places by enacting specific laws in conformity with the requirements of the present society and ensure that adequate waste management policies are put in place to protect the environment. There is no alternative to breathing clean air and drinking clean unpolluted water. The fear of e-waste is the beginning of wisdom.⁶⁹

Harmonization of the issues of ecology and a developmental need of the society is the need of the hour. On one hand we must encase the benefits of information technology whereas on the other hand, we must have in place a strong and safe e-waste disposal management system in Nigeria. Ignoring either of them is not a wise option.⁷⁰ E-waste has its own advantage to the common Nigerian man as it

⁶⁷ Ibid.

⁶⁸ Nkanga, E. 'Nigeria: Combating the Danger of E-waste in Nigeria,' This Day Newspaper, 16th January 2008. <http://allafric.com>.

⁶⁹ Ibid.

⁷⁰ Ibid.

provides a means of livelihood to those that engage in its refurbishment and sale⁷¹, however its disadvantages far overrides this. A sound legal framework might not totally ban the importation of these wastes into the country but would ensure its safe use as second hand goods. "Companies can stop this illegal toxic trade now by ensuring their goods are free from hazardous components. It is critical they take full responsibility for the safe recycling of their products and put an end to the growing e-waste dumps that are poisoning people and the environment across the developing world,"⁷²

The recent move by the Lagos State Government to contain the rising trends of indiscriminate disposal of electronic wastes especially at dumpsites and some known electronic markets in the state is commendable⁷³. Other states in the country which are attractive to e-waste should emulate this in order to curtail the e-waste tsunami. Nigeria must concentrate upon the model of sustainable development where the conflicting interest of societal development and environmental degradation are reconciled for the common betterment of the society. The task is difficult but the need for e-waste regulation and management in Nigeria is more pressing.

⁷¹ Compared to disposal, computer reuse creates 296 more jobs per for every 10,000 tons of material disposed each year. Institute For Local Self Reliance, "Recycling Means Business," 1997. <http://www.ilsr.org/recycling/recyclingmeansbusiness.html>.

⁷² Martin Hojsík Greenpeace International Toxics Campaigner.

⁷³ The government through the Lagos State Environmental Agency (LASEPA) has engaged a consultant to mop up all obsolete and faulty electronic equipment within the Lagos metropolis. The preferred handler, Messrs. Maintenance System Consultant has been contracted by the state agency to evacuate electrical/electronic waste of industries, markets, organization, manufacturers and other stakeholders to its new site at Tamalo Village, along OgijoShagamu Road. The dumpsite covers a total of two and half acres of land. Retrieved from <http://www.ewaste.ch/nigeria-lasepa> on the 30th Sept., 2010.