

SUSTAINABLE E-WASTE MANAGEMENT IN NIGERIA

By

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Abstract

Waste Electrical and Electronic Equipment (WEEE) or E-waste is a major global environmental concern of the digital age precipitated by man's substantial reliance on Electrical and Electronic Equipment (EEE). E-waste contains hazardous substances like arsenic, mercury, lead, chromium etc which constitute environmental and health hazards when exposed to humans and the environment via improper e-waste disposal. Furthermore, e-waste should be managed properly because of its long-term effects on the sustainable use of natural resources. In Nigeria, the National Environmental (Electrical/Electronic Sector) Regulations 2011 were made to address all aspects of EEE from cradle to grave. The regulations have become the most comprehensive legal document regulating e-waste management in Nigeria and a viable legislative framework for sustainable e-waste management in Nigeria. This paper presents an argument for sustainable e-waste management via current e-waste regulations in Nigeria and recommends a review of Nigeria's e-waste regulations to guarantee effective EEE consumption and e-waste disposal.

Keywords: *E-waste, E-waste management, Environment, Sustainable Development*

Introduction

In today's society, almost every aspect of human life currently depends on or is greatly influenced by the availability and use of Electrical and Electronic Equipment (EEE) for increased productivity, cost-effectiveness, improved standard of living, compression of time and distance and reduced energy consumption. Consequently, there is an ever-growing demand for electronics in almost every home in every country in the world. Nigeria is currently West Africa's largest importer of used EEE as it races to bridge the gap in the 'digital divide'.¹ The nation's burgeoning

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demand for electronics has led to the importation of millions of electronics yearly as all classes in the social strata desire and strive to keep up with the trend as far as their pockets can manage. Waste Electrical and Electronic Equipment or E-waste is now the fastest growing waste stream in the industrialised world, growing at a rate of 3–5% per annum or approximately three times faster than normal municipal solid waste.² E-waste likely comprises more than 5% of all municipal solid waste.³ Presently, the amount of e-waste is rapidly growing in developing countries as they join the global information society. Solid waste agencies and recyclers anticipate a major increase in the volume of e-waste in the next five years.⁴

The global statistics on e-waste generation are alarming, affecting both developed and developing countries. In the US, e-waste accounted for 2.63 million tons of waste in 2005 (or 1.1% of the waste stream), with an increase of 7.8% since 2004. Of this volume, 87.5% was disposed rather than recycled. It is estimated that between 14 and 20 million are retired annually in the US.⁵ The total amount of generated e-waste in Europe was estimated at 6 million tonnes in 1998. This amount increased to 8.3 to 9.1 million tonnes in 2005⁶. In the UK (Western Europe) in 1998, 6 million tons of WEEE was generated, accounting for 4% of the municipal waste stream. Increasing at 3–5% a year, WEEE generation in the UK was estimated to

¹ O. Ogunbuyi and Others, *E-Waste Country Assessment Nigeria*. (The Basel Convention. The United Nations Education Program 2012) <http://www.basel.int/Portals/4/Basel%20Convention/docs/eWaste/EwasteAfrica_Nigeria-Assessment.pdf> accessed 27 March 2021.

² Jim Puckett and others. *Exporting Harm: The High Tech Trashing of Asia*. (The Basel Action Network. Silicon Valley Toxics Coalition 2002). <<http://svtc.org/wp-content/uploads/technotrash.pdf>> accessed 27 March 2021.

³ Ronald E. Hester and Roy M. Harrison, *Electronic Waste Management: Design Analysis and Application (Issues in Environmental Science and Technology, Band 27)* (Royal Society of Chemistry, 2009).

⁴ *Ibid*

⁵ Lauren D. and Louise O. 'Household Recycling Behaviour and Attitudes Towards the Disposal of Small Electrical and Electronic Equipment'[2005] (44) (1) *Elsevier Resources Conservation And Recycling*, 17–35.

⁶ Martin G. Introduction and overview, in Ronald E. Hester and Roy M. Harrison, *Electronic Waste Management: Design Analysis and Application (Issues in Environmental Science and Technology, Band 27)* (Royal Society of Chemistry 2009).

hit 12 million tons by 2010.⁷ In 2019, the globally generated e-waste amount was 53.6 metric tonnes.⁸ Asia generated the greatest amount of E-waste was: Asia generated. 24.9 metric tonnes; America, 13.1 metric tonnes; (Americans throw around 9.4 million tons of electronics every year)⁹; Europe, 12 metric tonnes; Africa: 2.9 and Oceania, 0.7 metric tonnes.¹⁰ Roughly 80 per cent of electronic waste generated in the U.S. is exported to Asia, a trade flow that is a source of considerable controversy.¹¹

Global and national attentions were drawn to Nigeria's e-waste problem in 2005; when the Basel Action Network produced the film "The Digital Dump". The film exposed the rapidly ignored trade in obsolete EEE, highlighting the need for rapid legal and governmental collaboration in responding to the imminent environmental dangers posed by electronic waste.

In Nigeria, there are only a few assembling companies. As a result, most of the consumed EEE is imported. In 2010, the Basel Action Network (BAN) conducted a survey to assess the E-waste problem in Nigeria and the import statistics revealed about 1.2 million tonnes of EEE were imported into Nigeria.¹² 50 per cent of them were new EEE (about 600,000 tonnes) and 50 per cent were UEEE.¹³ Of the 50 per cent of UEEE imported, 30 per cent were non-functional and needed to be classified as e-waste.¹⁴ Half of that percentage was repaired locally and sold to consumers while the remaining half were disposed of as WEEE. This indicates that approximately 100,000 tonnes of e-waste were illegally imported into Nigeria in 2010.¹⁵

⁷ Jirang Cui and Eric Forssberg, 'Mechanical Recycling of Waste Electric and Electronic Equipment: A Review' [2003] (99) (3) *Journal of Hazardous Materials*, 243 – 263.

⁸ V. Forti, and others, *The Global E-waste Monitor 2020: Quantities, Flows and the Circular Economy Potential*. (United Nations University (UNU)/United Nations Institute for Training and Research (UNITAR) 2020).

⁹ Meredith Leahy, 'Electronic Recycling: How to Recycle Your Business' E-Waste', *Rubicon* (15 December 2020). <<https://www.rubicon.com/blog/electronic-waste-problem/>> accessed 30 March 2021.

¹⁰ *Ibid.*

¹¹ *Ibid.*

¹² Ogungbuyi (n 2).

¹³ *Ibid.*

¹⁴ *Ibid.*

¹⁵ *Ibid.*

According to the survey, traditional households were the country's biggest EEE consumers, with a user base of 6,400,000 tonnes of large and small household appliances, IT, telecommunication, and consumer equipment.¹⁶ Institutional and corporate consumers had an estimated user base of 400,000 tonnes, mainly constituted of IT and telecommunication equipment. Overall, each year, about 1.1 Mio tonnes of EEE are rendered obsolete; about 440,000 tonnes become e-waste while the rest is either stored by the consumer or sold as fairly used EEE to repair and/ or refurbishment shops.¹⁷

Currently, less than a quarter of globally generated e-waste is recycled properly, leaving a whopping 75% of the globally generated e-waste in the hands of exporters, informal recyclers etc¹⁸. This presents not only an environmental threat but also a neglected potentially profitable economic opportunity for developing nations as e-waste not only contains toxic substances such as lead, mercury, arsenic etc; it also contains economically beneficial precious metals such as copper and gold¹⁹. These precious metals are mainly extracted from the e-waste by informal recyclers, using crude recycling methods that are injurious to human health and the environment.

E-waste must be controlled and managed effectively for several reasons. First, e-waste is being generated at an uncomfortably alarming rate²⁰. Second, e-waste contains non-bio-degradable materials which make it disposable only by man-made methods such as recycling, incineration, open burning etc. Unlike biodegradable waste which deteriorates by natural causes, undisposed e-waste constitutes an environmental nuisance, occupying otherwise useful land space. Secondly, e-waste must be managed because it is hazardous.²¹ WEEE is one of the most

¹⁶ *ibid.*

¹⁷ *ibid.*

¹⁸ Forti (n 9).

¹⁹ United Nations Industrial Development Organization, 'The Challenge: E-Waste is a Ticking Time Bomb' <<https://www.unido.org/our-focus/advancing-economic-competitiveness/investing-technology-and-innovation/competitiveness-business-environment-and-upgrading/information-and-communications-technology/programmes/electronic-waste>> accessed 30 March 2021.

²⁰ Ogungbiyi (n 2).

²¹ R. B. Balakrishnan and Others, 'Electrical and Electronic Waste: A Global Environmental Problem', [2007] (25)(4) *Waste Management and Research*, 307-318.

problematic waste streams in terms of recycling and potential pollution²² because of its complex composition that frequently contains hazardous and non-biodegradable materials. WEEE contains more than 1000 different substances (up to 60 elements from the periodic table) many of which are toxic to human health and the environment.

E-waste contains several toxic elements such as lead, cadmium, arsenic, mercury etc. which are injurious to public health and the environment.²³ Notwithstanding the hazardous effects of e-waste, if it is properly recycled and managed, some or even all of its components can be reused as raw materials for more production of electronics by the electrical industry. This presents a viable economic opportunity as e-waste contains some valuable metals like iron, aluminium, nickel, copper, and some precious metals.²⁴ The precious metals (PM) include gold, silver and platinum-group metals (PGM): platinum, palladium, rhodium, ruthenium, iridium and osmium.

A third critical but often overlooked problem of E-waste is that it contains valuable personal data. Martin and Harris opine that the mere fact that a computer or smart phone has become obsolete doesn't automatically erase its memory or delete data content.²⁵ This means a great deal of information can be gleaned from E-waste. They further stated that:

According to the Ponemon Institute, everything from bank records to classified missile test results were found on a random sample of hard drives on eBay...70% of data breaches come from offline computers, usually after they have been disposed of by the equipment owner.²⁶

The fourth consequence of e-waste is its retrogressive effect on the sustainable development of natural resources. The craze for the acquisition of the latest models of electrical and electronic equipment not

²²O.R. Gubanova, *Electronic Waste: Theory and Practice of Management* in Tetiana Shevchenko and Others, 'Understanding Consumer E-Waste Recycling Behavior: Introducing a New Economic Incentive to Increase the Collection Rates' [2019] (11) (2656) *Sustainability* 1-20.

²³ Balakrishnan (n 22).

²⁴ Forti (n 9).

²⁵ Katharine M Bohley and Chris Harris, 'An Analysis of E-waste: When Do Electronics Die?' [2014]17 (1)(3) *Journal of the Indiana Academy of the Social Sciences* <<https://digitalcommons.butler.edu/cgi/viewcontent.cgi?article=1034&context=jiass>> accessed 27 March 2021.

²⁶*ibid.*

only increases e-waste directly but also puts a strain on the environment as more resources are utilised to keep up with the demand for newer technology which could result in an unending cycle of non-stop environmental degradation and rapid exhaustion of natural resources.

As the E-waste statistics reach astronomical proportions, with even greater proportions estimated in the not too distant future, several efforts have been made in recent years to curb the problem as it affects both developed and developing nations in different magnitudes. The intermittent dumping of e-waste by affluent nations under the pretence of 'donations, reuse, or recycling has aggravated e-waste problems in developing countries such as Nigeria and China.²⁷ Consequently, developing nations are faced with two unhealthy situations: dealing with internally generated e-waste, and dealing with externally generated but indirectly imposed e-waste which they are currently ill-equipped to handle.

E-Waste regulation in Nigeria

Prior to 2011, there was specific no E-waste legislation. E-waste was indirectly regulated by the Environmental Impact Assessment Act,²⁸ the Harmful Waste (Special Criminal Provisions, etc) Act,²⁹ and several other regulations. In 2007, the National Environmental Standards Regulation Enforcement Agency (NESREA) Act established the National Environmental Standards Regulation Enforcement Agency (NESREA).³⁰ NESREA is empowered under the Act to, *inter alia*: make new environmental regulations;³¹ enforce all environmental laws, guidelines, policies, standards, and regulations;³² and ensure compliance with provisions of international agreements, protocols, conventions, and treaties on the environment to which Nigeria is a signatory.³³ Pursuant to its powers, NESREA made the National Environmental (Electrical/Electronics Sector) Regulations, 2011 (NE(EES)R 2011). The NE(EES)R 2011 addresses almost all aspects of e-waste from cradle to grave and has become the most comprehensive e-waste regulation in Nigeria.

²⁷ Forti (n 9).

²⁸ EIA 1992.

²⁹ HW (SCP)A 1988.

³⁰ NESREA 2007.

³¹ *Ibid*, s 34.

³² *Ibid*, s 2(a).

³³ *Ibid*, s 7 (c).

The regulations' main goal is to avoid and reduce pollution of the Nigerian environment from all electrical/ electronic sector operations and associated activities.³⁴ The regulations are based on the 5Rs: Reduce, Repair, Recover, Recycle, and Reuse as the sector's major drivers, and they will apply to all types and lists of electrical and electronic equipment.³⁵ It outlines procedures for importing new and used EEE. All new EEE must be fully functioning and bear the date of manufacture and warranty information.³⁶ Pin and serial numbers must be engraved on those imported and assembled in the nation.³⁷

The regulations encapsulate the provisions of the EIA act as it provides that a mandatory EIA is required for new projects and existing projects of every EEE producing, processing, operational, power organization and e-waste facility.³⁸ Corporate entities and organizations must use the most up-to-date best possible environmental solution, cleaner production, and green technologies to keep pollution to a bare minimum.³⁹ These practices should be geared towards economic, social and environmental benefits. Corporate bodies and organisations are required to have an emergency response plan to stop or reduce pollution.⁴⁰ Greater responsibility is placed on owners or operators of WEEE facilities to set up a practical emergency response plan that provides details on the prevention and mitigation of discharged hazardous substances.⁴¹

The Polluter Pays Principle is incorporated and it applies to both individuals and corporate bodies⁴² a step further from the National Environmental Protection (Pollution Abatement in industries and Facilities Generating Wastes) Regulations 1991. Manufacturers, assemblers or corporate bodies are required to apply new technologies in waste elimination⁴³ and the usage of hazardous compounds should be minimized as part of pollution prevention efforts.⁴⁴

³⁴ *Ibid.*

³⁵ *Ibid*, reg 3.

³⁶ *Ibid*, reg 3 (1).

³⁷ *Ibid*, reg 3 (2).

³⁸ *Ibid*, reg 4 (1)(a).

³⁹ NE (EES) R 2011, reg 4 (2).

⁴⁰ *Ibid*, reg 5 (1)(2).

⁴¹ NE (EES) R 2011, reg 5 (3).

⁴² *Ibid*, reg 7(1) - (3).

⁴³ *Ibid*, reg 8(2).

⁴⁴ *Ibid*, reg 8 (3).

Manufacturers, assemblers or corporate bodies are required to apply new technologies in waste elimination⁴⁵ and pollution preemption procedures shall focus on minimising the utilisation of hazardous substances.⁴⁶ Under the NE(EES)R 2011; importers, exporters, manufacturers, assemblers, distributors and retailers of different types of EEE must subscribe to a mandatory extended producer responsibility program including buyback.⁴⁷ Under the compulsory Extended Producer Responsibility Program, all damaged EEE including wires, (CRTs), transformers, metals, plastics, motors, etc. are to be adaptable to recovery by NESREA's accredited recyclers in an eco-friendly manner.⁴⁸

In terms of e-waste management, the NE(EES)R 2011 provide that every importer and technician (engaged in the repair, disassembling, and re-assembling) of UEEE must guarantee that e-waste is treated by an individual or corporate body authorised by the Agency to do so.⁴⁹ End-of-life, useless, or unrepairable EEE is prohibited from being imported into Nigeria,⁵⁰ as is the importation of Cathode Ray Tubes (CRT).⁵¹ Every individual, organisation, or corporate entity in control of a collection point must guarantee that e-waste is not kept on-site for more than a year;⁵² is not disposed of in trash receptacles, dumpsites, or landfills;⁵³ is collected for recycling and transported to designated recycling centres, and is not burned openly.⁵⁴ It is illegal for individuals, corporations, and organisations to dump, throw or drop e-waste anywhere other than at a designated receptacle or collection point.⁵⁵

Every facility operator, technician, assembler, or scavenger of e-waste is obligated to practice Environmentally Sound Management (ESM) of e-waste and must therefore not:⁵⁶ incinerate e-waste in the Nigerian

⁴⁵ *Ibid*, reg 8(2).

⁴⁶ *Ibid*, reg 8 (3).

⁴⁷ *Ibid*, reg 8 (3).

⁴⁸ *Ibid*, reg 11 (1) - (3).

⁴⁹ *Ibid*, reg 34 (1).

⁵⁰ *Ibid*, reg 34 (2).

⁵¹ *Ibid*, reg 34 (3).

⁵² *Ibid*, reg 34 (4) (a).

⁵³ *Ibid*, reg 34 (4) (b).

⁵⁴ NE (EES) R 2011, reg (4) (d).

⁵⁵ *Ibid*, reg 36 (1).

⁵⁶ *Ibid*, reg 36 (2).

environment;⁵⁷ get rid of e-waste at a dumpsite, land-fill site, water body, etc;⁵⁸ destroy Cathode Ray Tubes (CRTs) in an environmentally unsafe way;⁵⁹ release Chlorofluorocarbons (CFCs) from refrigerators and other cooling systems, and filter precious metals with acids and other chemicals from Printed Wire Boards (PWBs) or Printed Circuit Boards(PCBs).⁶⁰ Citizens must report illegal garbage disposal in non-designated areas to the proper authorities.⁶¹

The regulations require record keeping of e-waste imported into the country by 31st March in the preceding year.⁶² The Agency (NESREA) is empowered to enforce the provisions of the regulations against any defaulter.⁶³ It is an offence to default in fulfilling the conditions stipulated in the regulations.⁶⁴ Such offence is punishable by fines or terms of imprisonment, depending on the gravity of the offence.⁶⁵

Another notable but quite unpopular and fairly recent e-waste regulation is the Nigerian Communications Industry E-waste Regulations, 2018. The NCIER 2018 apply to all Type Approved EEE and to activities carried out by any person in relation thereto and in accordance with the Standards set out by the Commission⁶⁶ However the regulations are restricted to e-waste management within the Telecommunications Industry only.⁶⁷

Whilst enacting laws is one thing, enforcing them is another. Studies reveal that nations which have national e-waste legislation rarely implement the law.⁶⁸ Most underdeveloped nations lack readily accessible collection centres and recycling goals, which are required for effective legislation.⁶⁹ This is the narrative of Nigeria's e-waste

⁵⁷ *Ibid*, reg 36 (2) (a).

⁵⁸ *Ibid*, reg 36 (2) (c).

⁵⁹ *Ibid*, reg 36 (2) (d).

⁶⁰ *Ibid*, reg 36 (2) (f).

⁶¹ *Ibid*, reg 38 (a).

⁶² *Ibid*, reg 40 (1).

⁶³ *Ibid*, reg 61-66.

⁶⁴ *Ibid*, reg 56 (1).

⁶⁵ *Ibid*, reg 67.

⁶⁶ NCIER 2018, reg 1.

⁶⁷ *Ibid*, reg 2.

⁶⁸ C.P. Balde and Others, The Global E-waste Monitor, United Nations University (UNU), International Telecommunication Union (ITU) & International Solid Waste Association (ISWA) (2017) <<https://www.itu.int/en/ITU-D/Climate-Change/Documents/GEM%202017/Global-E-waste%20Monitor%202017%20.pdf>> accessed 1 March 2022.

⁶⁹ *Ibid*..

management dilemma. Regardless of the NE(EES)R 2011, the problem still persists. 290,000 tonnes of electronic waste were created in 2017, six years after the NE(EES)R 2011 was issued, a 170 per cent increase from 2009.⁷⁰ This shows that the regulations are yet to fulfill the legislative intent for their existence.

Several reasons have been cited for the persistence of the e-waste problem in Nigeria. Osibanjo aptly describes it thus:

One major challenge for Nigeria is to avoid the import of e-waste and near-end-of-life equipment without hampering the socio-economically valuable trade of used EEE of good quality. In addition, high volumes of domestically generated e-waste require well-functioning local take-back and recycling systems. Challenges include the establishment of appropriate collection strategies, ensuring that high volumes of valuable and non-valuable waste fractions are collected equally and that those fractions reach appropriate treatment and disposal facilities. In addition, connecting informal collectors to a formal recycling structure is pivotal, along with appropriate capacity building and training.⁷¹

Currently, accessible data are unable to monitor the exact amount of WEEE or UEEE shipped from developed countries to developing countries.⁷² A case study revealed that between 2015/2016, 77% of UEEE were imported from EU member states to Nigeria.⁷³ Furthermore, a critical examination of the NE(EES)R 2011 reveals that they contain copious preventive regulations, but scanty curative provisions. A good balance of preventive and curative regulations is required in Nigeria to adequately address the problem of e-waste. Preventive laws will pre-empt the entrance of e-waste into the country via illegal importation and curative laws will ensure the proper treatment of already imported WEEE (also known as historic waste).

⁷⁰ Irene Galan, 'Nigeria Turns the Tide on Electronic Waste' *United Nations Environment Program* (19 June 2019) <<https://www.unep.org/news-and-stories/press-release/nigeria-turns-tide-electronic-waste>> accessed 28 February 2021.

⁷¹ Ogungbuyi (n 2).

⁷² Balde (n 69).

⁷³ *Ibid.*

Another reason for the persistence of the e-waste problem in Nigeria is the poor enforcement of the e-waste regulations⁷⁴. This is partly because the NE(EES)R 2011, though commendable, is not specifically tailored to reflect Nigeria's current scientific and technological status and contemporary realities. Currently, there is gross ignorance about e-waste among the citizenry, no known collection centres, and very few formal recycling plants. These infrastructural setbacks make enforcement of the e-waste regulations impracticable. Furthermore, NESREA, the institutional agency charged with enforcing the regulations, has failed to effectively enforce the regulations' provisions.

Sustainable E-waste Management in Nigeria

As technology advances rapidly, unchecked environmental degradation brings adverse effects on the environment and threatens the existence of the human race if environmental safety is not prioritised. No manner of technological advancement can compensate for irredeemable environmental degradation, therefore it behooves nations to develop and enforce a body of laws to checkmate human excesses in dealing with the environment; to the end that it is habitable for present generations and future generations. This is the thrust of the concept of sustainable development - '...development that meets the needs of the present without compromising the ability of future generations to meet their own needs.'⁷⁵Sustainable Development aims to regulate human activities in such a way as to encourage technological advancements and economic developments without destroying the environment. Its principles can be applied to almost all aspects of technological and economic developments. Therefore, sustainable e-waste management entails the manufacturing, consumption and disposal of EEE at a rate that does not jeopardise the environment while ensuring the benefits of current users.

Sustainable e-waste management is the way forward for better global e-waste management. It aims for the use and enjoyment of EEE by the present generations without jeopardising the environmental health of present and future generations. Utkucan and others describe a sustainable e-waste management system as:

⁷⁴Balde (n 69).

⁷⁵*Ibid.*

A sustainable e-waste management system encompasses the development of a comprehensive management framework that understands the interlinked issues that make up the e-waste challenge on social, environmental and economic levels. In a sustainable society, e-waste is eliminated through closed-loop systems and new product service systems that eliminate planned obsolescence. This is only possible through developing a common global sustainable vision and global collaboration.⁷⁶

They further suggest six strategic themes which are considered essential components of a successful e-waste management program at the National University of Rwanda (NUR). They are:

1. Create Policy
2. Raise Awareness
3. Establish Collection
4. Establish Pre-Processing
5. Generate Student Projects

With slight adaptations to the Nigerian scenario, the strategies/actions for better e-waste management in Nigeria would include:

- Review current E-waste regulations: The current regulations as discussed above show a need for review to align with contemporary realities in the socio-economic, scientific and technological landscape of the nation. This would be achieved by providing copious curative relations to balance the preventive regulations. Historic waste ought to be addressed with specificity regarding amounts of WEEE collected and recycled annually by manufacturers, recycling fees payable etc.
- Raise Awareness: One major bane of the failure of the e-waste regulation is the crass ignorance of the populace on the subject. Creating awareness should not be the sole responsibility of manufacturers as provided in the regulations. It should be carried out by state actors and manufacturers to effective results. The swift response by the Federal Ministry of Environment to the Covid-19

⁷⁶Ece Utkucan, Matthew Lobach and Wyeth Larson, Sustainable E-waste Management: Using the FSSD in a Case study at NUR (Masters Thesis, Blekinge Institute of Technology, Karlskrona, Sweden, 2010).

pandemic in raising awareness among citizens is a good example for NESREA. Awareness should begin from the grassroots level to other strata of society. Awareness could range from advertisements via the telecoms industry to curriculum review in the educational sector to prohibitions from the Environmental sanitation Authorities etc., with the sole aim of enlightening the citizens on the existence of the e-waste problem, the adverse environmental effects occasioned by improper disposal of e-waste, the need for sustainable EEE manufacturing and e-waste disposal, the financial prospects of proper e-waste recycling and the obligations of citizens to deposit WEEE at collection centres, separate WEEE from other kinds of waste etc.

- Enforce Extended Producer Responsibilities
- Establish Collection Centres: Collection centres need to be established in every state of the country and such should be the duty of the government and manufacturers, not manufacturers alone.
- Establish Formal Recycling plants: This can be achieved via a public-private partnership or government-owned recycling plants and modalities should be put in place for funding recycling projects in a manner that all stakeholders share the cost of recycling.
- Update and maintain Data Registry: The establishment of data collection mechanisms and the operation of a fully updated data registry which should contain up-to-date information on e-waste inflow, internal e-waste generation, amount of recycled e-waste and the compliance of manufacturers, and retailers and the importance with the regulations.
- Ensure enforcement of e-waste laws; and
- Regulate the informal recycling sector: A strict regulation of the informal recycling sector with administrative measures that include registration and licensing of informal recyclers and baseline environmental standards for informal recycling of e-waste.

Conclusion

Although e-waste management is a global issue, efficacious sustainable EEE consumption and e-waste management possess the potential to reduce the problem to the barest minimum. Nigeria has made substantial legislative efforts in the recent decade to prevent and reduce e-waste. However, due to poor enforcement of the relevant regulations, lack of the necessary treatment technologies (e-waste recycling treatment plants) and technological know-how, lack of an effective collection system, widespread ignorance of the issue, and very little public participation, much remains to be desired in terms of efficacy. Tackling e-waste management through the lens of sustainable development guarantees e-waste management and EEE consumption that meets the needs of the present generation without jeopardising the future.