



E-Waste Management in Africa – Overview and Policy Developments

By

Nnanke Williams and Adetayo Adetuyi¹

1. Introduction

Electrical and electronic equipment (EEE) contain many important substances, both precious and toxic, which make them what they are and contribute to the way they function. Technological advancements, innovation in product design of EEE and rising consumer demand has led to an increase in global electronic waste (e-waste or waste EEE).² Overtime, as EEE lifespan has progressively reduced, industry has emphasized the making of new products over the repair of older ones. This has created rapid obsolescence in EEE, making them e-waste. However, global e-waste management practices have not kept up with the volume of e-waste generated globally. In 2021, global e-waste amounted to 57.4 million tonnes, a size outweighing the Great Wall of China³ and is projected to increase to about 74 million metric tonnes by 2030.⁴ Africa

generates the lowest regional amount of e-waste in the world, about 2.9 million metric tonnes,⁵ yet it hosts some of the largest e-waste dumpsites in the world. This is the result of illegal transboundary movement of e-waste from developed to developing countries especially in Africa.⁶ It represents the “decarbonization divide” where wastes generated in advanced and high-income countries are deposited in poorer countries.⁷

In Africa, the vast amounts of e-waste left at dumpsites are informally recycled for rare earth and non-ferrous metals, including gold copper, and aluminium, which have a high recycle market value exceeding 55 billion euros.⁸ However, there are severe health and environmental implications in using informal methods to recycle e-waste. Hazardous metals such as barium, mercury and lead are exposed to

¹ Nnanke Williams and Adetayo Adetuyi are Senior Consultants with Brooks and Knights Legal Consultants, a law firm established in Lagos, Nigeria to provide legal advisory and policy consulting services on clean energy and sustainability projects.

² Maphosa, V., and Maphosa, M. (2020). *E-waste management in Sub-Saharan Africa: A systematic literature review*, *Cogent Business & Management*, 7:1, 1814503, DOI: 10.1080/23311975.2020.1814503.

³ Rosane, O. (18th October 2021). *This year's e-waste to outweigh the Great Wall of China*. World Economic Forum. Retrieved March 19, 2022, from <https://www.weforum.org/agenda/2021/10/2021-years-e-waste-outweigh-great-wall-of-china/>.

⁴ Avis, W. (2021). *Drivers, barriers and opportunities of e-waste management in Africa*. K4D Helpdesk Report No. 1074. Institute of Development Studies. DOI: 10.19088/K4D.2022.016.

⁵ *Id.*

⁶ Maphosa, V., and Maphosa, M. (2020). *E-waste management in Sub-Saharan Africa: A systematic literature review*, *Cogent Business & Management*, 7:1, 1814503, DOI: 10.1080/23311975.2020.1814503.

⁷ Gordon, A., Daniels, C., Quaye, W., Ting, B.M., and Asante, A.A. (2021) *Transformative innovation policy approach to e-waste management in Ghana: Perspectives of actors on transformative changes*. Science and Public Policy 1–11. Retrieved from <https://doi.org/10.1093/scipol/scab005> Otherwise.

⁸ Avis, W. (2021). *Drivers, barriers and opportunities of e-waste management in Africa*. K4D Helpdesk Report No. 1074. Institute of Development Studies. DOI: 10.19088/K4D.2022.016.



the general atmosphere from the open burning done at these sites.

Policy considerations that address the socioeconomic and environmental and public health concerns are therefore an important aspect of e-waste management in Africa. This article considers the problem of e-waste in Africa, including the transboundary market for EEE, the current face of e-waste management in Africa, existing policies for e-waste and recommendations for closing the gap between the present policy landscape and appropriate enforcement of e-waste management on the continent.

2. The Problem of E-Waste in Africa

Leakage & Illegal Transboundary Movement of E-Waste

E-waste management in developed countries is well structured, and includes the policy, skill and infrastructure to recycle e-waste in a sustainable manner. In countries such as the United States, Germany, Sweden, China and the United Kingdom, formal waste collection and recycling mechanisms are in place.⁹ Despite these structures, it remains more lucrative to ship e-waste to developing countries, especially Africa,

where the policy and infrastructural landscape is weak and the market demand for used EEE is high. About 80% of the e-waste produced in developed countries is illegally exported to developing countries¹⁰ and this amounts to 60% of Africa's e-waste.¹¹ This process is known as leakage. E-waste mislabelled as used and usable EEE is the major form of this illegal transboundary trade in e-waste.

Leakage & Insufficient Regulatory Enforcement

Nigeria is the leading importer of used EEE in Africa. Other major recipients of used EEE in Africa are Ghana, South Africa, Tanzania, and Tunisia.¹² Enforcement of e-waste management laws and policies on the continent is low and this proliferates the practice of illegal transboundary movement of e-waste, both from outside and within the continent. Poor enforcement in Africa comes in different forms. First, many states do not have specific e-waste management policies.¹³ For states that have regulations, laws banning the importation of e-waste are barely enforced.¹⁴ Some existing regulations are not attuned to the current e-waste landscape in Africa, as it excludes participation and reincorporation into the formal sector of informal e-waste workers.¹⁵ There is also little

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¹⁰ *Id.*

¹¹ Avis, W. (2021). *Drivers, barriers and opportunities of e-waste management in Africa*. K4D Helpdesk Report No. 1074. Institute of Development Studies. DOI: 10.19088/K4D.2022.016.

¹² Maes, T., and Preston-Whyte, F. (2022). *E-waste it wisely: lessons from Africa*. *SN Appl. Sci.* 4, 72. <https://doi.org/10.1007/s42452-022-04962-9>.

¹³ Maphosa, V., and Maphosa, M. (2020). E-waste management in Sub-Saharan Africa: A systematic

literature review, *Cogent Business & Management*, 7:1, 1814503, DOI: 10.1080/23311975.2020.1814503.

¹⁴ This is the case in Ghana and Nigeria, where e-waste and hazardous waste importation are explicitly prohibited yet importation is rife. *Id.*

¹⁵ Gordon, A., Daniels, C., Quaye, W., Ting, B.M., and Asante, A.A. (2021) *Transformative innovation policy approach to e-waste management in Ghana: Perspectives of actors on transformative changes*. Science and Public Policy 1–11. Available at: <https://doi.org/10.1093/scipol/scab005> Otherwise.

coordination on e-waste enforcement between various agencies such as customs and port officials and environmental protection agency officials. These enforcement gaps have resulted in the creation and operation of large e-waste dumpsites in African nations such as Ghana and Nigeria.

Rising Cost of Living and Inadequate Recycling Facilities

Rising living cost and inflation, long with the recent COVID-19 pandemic has increased the number of Africans below the poverty line and are unable to afford the purchase of new EEE. This has led to a thriving used EEE market in Africa.¹⁶ The problem with imported used EEE is two-fold. First, most used EEE shipped into Africa are usually at the end of their useful life and shortly after purchase, become non-functional and need to be discarded. When discarded, they end up in landfills due to the total or near absence of formal EEE recycling facilities on the continent. Second, as is often the case, used EEE are usually shipped with non-functional and unrepairable EEE. In such cases, these EEE head straight to the landfills.

3. The Face of E-Waste Management in Africa

Predominance of the Informal Market

The e-waste market in Africa is dominated by informal participants who use rudimentary

means such as open burning and acid leaching to process and recycle the useful materials in e-waste. Informal recycling of e-waste is the predominant form of recycling at Ghana's Agbogbloshie dumpsite, where 15% of global e-waste is received.¹⁷ The informal market includes collectors, dismantlers, and recyclers. The informal recycling process may consist of manually stripping electronic boards for resale, unprotected burning of wires to recover base elements (such as copper, aluminium and iron) and the disposal of bulk components in dumpsites.¹⁸

Environmental and Health Concerns

These practices come with severe environmental and health concerns. Practices involved in informal recycling release toxic metals and hazardous waste into the air, soil and water. In 2021, it was estimated that harmful substances released from e-waste dumping in Africa amounted to about 9.4 mega tonnes of CO₂ greenhouse gas emissions, 0.01 kilo tonnes of mercury and 5.6 kilo tonnes of brominated flame retardants.¹⁹ Communities working and living in and around dumpsites are exposed to severe health concerns such as respiratory infections, cancers, blood disorders, congenital disabilities and damages to vital organs.²⁰ Research on communities in South Africa,²¹

¹⁶ This is discussed further in section 6 of this article.

¹⁷ Maphosa, V., & Maphosa, M. (2020). E-waste management in Sub-Saharan Africa: A systematic literature review, *Cogent Business & Management*, 7:1, 1814503, DOI: 10.1080/23311975.2020.1814503.

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²⁰ Maphosa, V., and Maphosa, M. (2020). E-waste management in Sub-Saharan Africa: A systematic literature review, *Cogent Business & Management*, 7:1, 1814503, DOI: 10.1080/23311975.2020.1814503.

²¹ *Id.*

Nigeria²² and Ghana²³ have confirmed health impacts of e-waste.

Formal versus Informal Sector

The predominance of the informal sector inhibits the growth of the formal e-waste management sector, which is the sector favoured by existing regulation.²⁴ Regulation favours the formal sector due to its technical skills and its environmentally favourable recycling practices. The informal sector lacks the technical or capital requirements of the formal sector. However, they are unregulated and require less capital to complete their processes as they use rudimentary methods. They are able to easily source for waste EEE as they live and work around the dumpsites. Formal e-waste processors have collection requirements that sometimes come at a cost. These differing economic considerations has made it difficult for the formal sector to scale and makes regulation difficult to enforce. In countries such as South Africa and Morocco, formal e-waste recycling facilities have struggled to scale up as they compete with informal participants, who are more localized, face lower compliance costs and have easier access to e-waste at lower prices.²⁵

²² Avis, W. (2021). *Drivers, barriers and opportunities of e-waste management in Africa*. K4D Helpdesk Report No. 1074. Institute of Development Studies. DOI: 10.19088/K4D.2022.016.

²³ Gordon, A., Daniels, C., Quaye, W., Ting, B.M., and Asante, A.A. (2021) *Transformative innovation policy approach to e-waste management in Ghana: Perspectives of actors on transformative changes*. Science and Public Policy 1–11. Available at: <https://doi.org/10.1093/scipol/scab005> Otherwise.

4. Renewable Energy & E-Waste – The Future Face of E-Waste in Africa

Green energy technology such as solar panels, wind turbines and energy storage batteries pose environmental hazards at the end of their lifecycle. While the rapid expansion of solar and wind energy has had positive effects on greenhouse gas emissions and climate adaptability, they pose environmental and health concerns due to the proliferation of solar and wind e-waste.²⁶ This is especially the case for lower income African communities where the use of off-grid solar has rapidly increased in recent years to meet the energy demand for these communities and reduce the need to use unclean energy sources for power. Due to the recent proliferation of renewable energy technologies in Africa, policies and regulations are yet to catch up with the future threat of renewable energy waste.

5. The Nature of E-Waste Regulation in Africa

The legal landscape for e-waste management in Africa is changing. In 2020, thirteen (13) countries have adopted policies and legislation on e-waste. This is a significant increase from three (3) as of 2018.²⁷ The countries are Cameroon, Cote d'Ivoire, Egypt, Ghana, Kenya,

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²⁵ *Id.*

²⁶ Avis, W. (2021). *Drivers, barriers and opportunities of e-waste management in Africa*. K4D Helpdesk Report No. 1074. Institute of Development Studies. DOI: 10.19088/K4D.2022.016.

²⁷ Maes, T., and Preston-Whyte, F. (2022). *E-waste it wisely: lessons from Africa*. *SN Appl. Sci.* **4**, 72. <https://doi.org/10.1007/s42452-022-04962-9>.

Madagascar, Nigeria, Rwanda, Sao Tome & Principe, S/ Africa, Uganda, Tanzania and Zambia.²⁸ Nigeria and Ghana have the highest regional coverage of e-waste legislation.²⁹ A number of regional conventions on e-waste management exist, including the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa. Other regional activities include the East Africa Communication Organization (EACO) which developed working groups to address e-waste issues and E-Waste Association of South Africa (eWASA) was formed to establish sustainable ways of managing e-waste.³⁰

E-waste policies in Africa are modelled after those in developed countries, especially Europe. These policies suffer from a failure to adapt to the African context. In Europe, challenges of informal collection and recycling are not prevalent. Waste management infrastructure exists, and the market is generally aware of the relevant waste management practices.³¹ This means that African e-waste regulation landscape favours the formal e-waste recycling structure and ignores or criminalizes the informal (yet predominant) sector. European policies reflect the principle of Extended Producer Responsibility which places the burden of managing e-waste on the

manufacturers of EEE.³² EPR policies allow consumers to return obsolete EEE to manufacturers in exchange for a fee. It encourages producers to design and produce EEE by taking into account lifecycle issues including repair, upgrading, re-use, disassembly and recycling.³³

EPR policies framed in the African context would place the burden on managing e-waste on importers of the EEE, as importation is more prevalent than manufacturing in Africa. It is therefore necessary for African regulations to develop alternate models for e-waste regulations that reflect existing realities. In 2018, Ghana imposed an eco-levy on all EEE imported into the country. Kenya's draft e-waste regulations (Draft Bill on Environmental Management and Coordination (Electrical and Electronic Waste Management) Regulations 2019) direct EEE producers to report on the number of their products placed in the market annually as well as their projections for the following year in order to determine their financial obligations.³⁴

6. The Dichotomy Between Environmental and Economic Considerations in African E-Waste Management

²⁸ Avis, W. (2021). *Drivers, barriers and opportunities of e-waste management in Africa*. K4D Helpdesk Report No. 1074. Institute of Development Studies. DOI: 10.19088/K4D.2022.016.

²⁹ *Id.*

³⁰ *Id.*

³¹ Africa Clean Energy Programme Technical Assistance Facility (ACE-TAF) and Sofies Group (2019). *E-Waste Policy Handbook*. Nairobi, Kenya: ACE-TAF. Available at <https://www.ace-taf.stratech.co.ke/kb/e-waste-policy-handbook/>.

³² Maphosa, V., and Maphosa, M. (2020). *E-waste management in Sub-Saharan Africa: A systematic literature review*, *Cogent Business & Management*, 7:1, 1814503, DOI: 10.1080/23311975.2020.1814503.

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³⁴ *Id.*

There exists a dichotomy between environmental and economic considerations in e-waste management in Africa.

Thriving Used EEE Market in Africa Supports Illegal Transboundary Movement of E-Waste

Illegal transboundary movement of e-waste into Africa is popular because of the thriving used EEE market, as more Africans are better able to afford used products than new products. The used EEE market also creates employment for the teeming youth population in African countries who are engaged in the collection, repairs and refurbishing of EEE. The refurbishing sector in Lagos, Nigeria, for instance, is a regional hub that does not only serve Lagos and Nigeria with second-hand products but also exports them to other West African and Central African countries. Furthermore, many shops and workshops located in the refurbishing clusters in a country are subject to various types of taxes thus serving as a source of income to the government. However, used EEE have shorter lifecycles and turn to e-waste much faster than new products. Furthermore, waste EEE is inappropriately tagged as used EEE and end up on dumpsites on arrival in Africa. In essence, the environmental concerns from waste EEE must be balanced against the market demand for used EEE in Africa, which ultimately becomes waste EEE outside of the country of manufacture and therefore outside of the e-waste infrastructure processes of such country.

Cheaper Informal E-Waste Recycling Methods

Despite the environmental and health concerns from the use of rudimentary methods, it remains a cheaper means of recycling e-waste and source of livelihood for many Africans.³⁵ In Nigeria, over 30,000 e-waste workers earn their income from informal recycling and contribute to the GDP. The Agbogbloshie e-waste dumpsite in Ghana directly employs over 15,000 informal e-waste workers.³⁶ Informal e-waste workers are also working with low capital and cannot afford the use of more sustainable means to retrieve the rare earth and non-ferrous metals in e-waste. Funding is therefore required to upgrade equipment and upskill informal e-waste workers toward more sustainable practices.

7. Recommendations

In order to properly regulate and manage e-waste in Africa, the economic and environmental dichotomy must be addressed through comprehensive policy solutions that combine the interests of all participants in the industry. Some of the participants in the African e-waste industry include e-waste artisans (collectors and dismantlers), government agencies, international development partners, private actors and non-governmental organizations (NGOs).³⁷

Collectors and dismantlers require training and equipment to dismantle and recover the valuable components from e-waste. This was done in Ghana and has led to a reduction in the burning of e-waste in Agbogbloshie.³⁸ Informal workers also require assurances from the

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³⁷ *Id.*

³⁸ *Id.*

government regulators of their secured livelihood. Abolishing their practice without providing a means to convert them into the formal e-waste recycling sector only further drives the dichotomy and propagates the problem. Regulators must understand the role that informal e-waste workers play in the 55 billion euros industry as well as their contribution to national GDP.

Government agencies require uniformity and synchronisation in the different rules governing e-waste management. Regulations must be practicable and applicable to the African context in order to be properly enforced. African regulations need to reflect the current reality of African countries as majorly importers of EEE. Thus, transplanting the provisions on e-waste management in European legislation to African countries without adapting them to the peculiarities of the African climate will not yield the desired results.

From the African perspective, environmental regulators must work in conjunction with ICT regulators and customs officials to ensure e-waste regulation is efficient. An effective e-waste management framework will address issues and involve stakeholders working across these different sectors. Efficient regulation requires funding. African regulators may consider the different funding models including waste-holder financing, producer financing, consumer financing or a hybrid model that combines any of the previous models. This will ensure there is dedicated funding for both regulation and development of the industry.

Development partners, NGOs and private actors are other important stakeholders who will

inform and provide a sustainable e-waste management industry, by providing financing, developing e-waste recycling facilities, training and equipping informal workers and incorporating them into the formal sector.

African policymakers developing policies for e-waste management may consider some of the following models in designing policies that are applicable in the African context:³⁹

- a) *Waste-holder financing*: Here, the person disposing the waste will be liable to a tax or levy for an e-waste fund to fund the sustainable management of e-waste;
- b) *Consumer financing*: the consumer pays directly to the e-waste fund upon purchase of a new product;
- c) *Producer financing*: the producer / manufacturer or importer of the original equipment will be liable to tax on the product for the e-waste coming from such product; and
- d) *Hybrid model*: taxpayers will finance access to waste while producers finance the remaining processes involved in recycling.

8. Conclusion

E-waste management in Africa is an important and rapidly growing area of concern in policy. The environmental concerns from waste EEE must be balanced against the market demand for used EEE in Africa, which ultimately becomes waste EEE outside of the country of manufacture and therefore outside of the e-waste infrastructure processes of such country. More African countries must adopt the Bamako

³⁹ *Id.*



Convention and enact local laws and regulations for the regulation of e-waste management. Local regulations must be tailored to the specific situation of the relevant country. Adopting a European model will negate the practicability of the laws and make the difficult to enforce. There is a significant funding gap for e-waste management and enforcement in Africa that must be addressed.

