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Responsible E-Waste Value Chains in Africa

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Question

What are the potential avenues for developing a responsible e-waste value chain in Africa? What skills, jobs and trade concerns/barriers might need to be considered? (this links to a green growth agenda and zero waste agenda) If possible – are any countries better suited to this industry? Is anyone investing in this space (private sector or donors) – how, what, where?

Contents

The K4D helpdesk service provides brief summaries of current research, evidence, and lessons learned. Helpdesk reports are not rigorous or systematic reviews; they are intended to provide an introduction to the most important evidence related to a research question. They draw on a rapid desk-based review of published literature and consultation with subject specialists.
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1. Summary

Population growth, increasing prosperity and changing consumer habits globally are increasing demand for consumer electronics. Further to this, rapid changes in technology, falling prices, increased affordability and consumer appetite for new products have exacerbated e-waste management challenges and seen millions of tons of electronic devices become obsolete. This rapid literature review collates evidence from academic, policy focussed and grey literature on e-waste value chains. The report should be read I conjunction with an earlier report on e-waste management[1]. The report is structured as follows:

- Section two provides an overview of what constitutes an e-waste value chain, including a reflection on similarities and differences between chains that involve formal and informal actors. In particular, the section highlights that when e-waste is handled in the informal economy, the value chain is more complex, with multidirectional flows and numerous actors.
- Section three provides an overview of what constitutes a "responsible" e-waste value chain. The section highlights that current estimates suggest that only circa 17% of total e-waste generated globally is formally collected and recycled. It also identifies challenges that are faced in developing efficient and effective e-waste management value chains. The section concludes with a reflection on how a transition to a circular economy and the application of digital solutions can support sector wide improvement.
- Section four reflects on some of the elements that may support the development of more efficient and effective e-waste value chains the role of multinational enterprises, micro, small and medium enterprises, cooperatives as well as regional integration.
- Section five concludes with an indicative reflection on which countries may be well placed to develop e-waste management systems. This draws on those elements that contribute to a sustainable and scalable systems.

E-waste is any electrical or electronic equipment, including all components, subassemblies and consumables, which are part of the equipment at the time the equipment becomes waste. When e-waste is collected and treated formally, it normally includes the following steps: **Collection, Sorting and disassembly, Size reduction, Separation**.

The following five pillars of a sustainable e-waste management system have been identified:

- **Business and finance**: The most sustainable system is one that is self-financing.
- **Policy and regulation**: This signals the government's intent to engage in e-waste management.
- **Technology and skills**: Appropriate technology and skills across the value chain are essential for successful implementation.
- **Monitoring and control**: Monitoring and enforcement create a level playing field.
- **Marketing and awareness**: Awareness on the part of consumers and commercial customers is key to e-waste management (focussed on recycling and reuse).

As such, to support the development of a responsible e-waste value chain, the following elements must be addressed.

[1] Avis, W. (2021). *Drivers, barriers and opportunities of e-waste management in Africa.* K4D Helpdesk Report No. 1074. Institute of Development Studies. https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/17152

- Understanding how e-waste is currently managed is a crucial starting point for all countries looking to establish or revitalize their e-waste management system.
- There is no one-size-fits all solution to building a robust e-waste management system based on extended producer responsibility. Although there are good practices and lessons from across the world, it is important that countries take these examples and adapt them to their local situations, having regard to their e-waste generation rates, recycling capabilities, the presence of 'producers' and expectations of stakeholders.
- An e-waste system built without a participatory approach is likely to be hampered by a series of issues, such as lack of stakeholder buy-in, unrealistic expectations and regulations that do not adequately reflect the reality on the ground.
- An overarching policy is necessary, but specific guidelines and implementation action plans are important, too.
- The choices made for the sector should be founded on two crucial elements – data from on the ground, and inputs from stakeholders.
- Enforcement is incumbent on the government mandate, and adequate resources and financing need to be set aside for this aspect.

The push towards a circular economy has provided stakeholders across the value chain with an impetus to initiate systemic improvements and invest in infrastructure and awareness raising.

2. E-Waste Value Chains

Population growth, increasing prosperity and changing consumer habits globally are increasing demand for consumer electronics. Further to this, rapid changes in technology, falling prices and consumer appetite for new products have exacerbated e-waste management challenges and seen millions of tons of electronic devices become obsolete.

Of the estimated 53.6 million Mt of e-waste generated globally in 2019, 82.6% or 44.3 million Mt was not documented (of this figure 43.7 million Mt of e-waste is unknown (this is dumped, traded or recycled) and 0.6 million Mt of e-waste is estimated to have ended up in residual waste bins in EU countries) (Forti et al., 2020). The remaining 17.4% or 9.3 million Mt of e-waste is documented as collected and properly recycled. Small equipment (38%) and large equipment (20%) represent the main forms of e-waste (Forti et al., 2020).

Box 1: ***What is e-waste? (WHO, 2021)***

E-waste is any electrical or electronic equipment, which is waste, including all components, subassemblies and consumables, which are part of the equipment at the time the equipment becomes waste. Such items include:

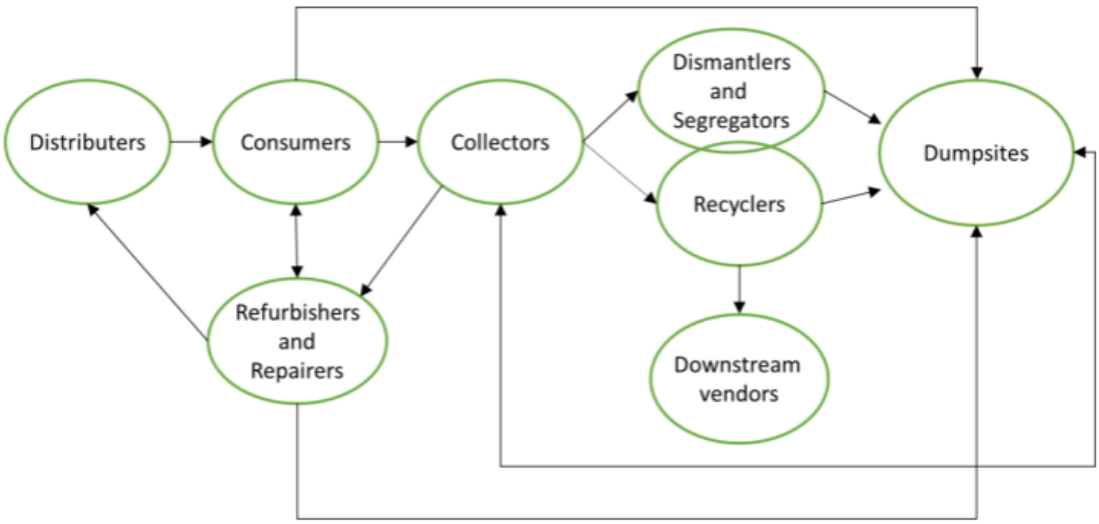
• computers, monitors and motherboards, chips • wireless devices and other peripheral items • printers, copiers and fax machines • telephones, mobile phones and tablets • video cameras • televisions • stereo equipment • cathode ray tubes • transformers • cables and batteries • lamps and light bulbs (including mercury-containing CFL and fluorescent bulbs) • large household appliances (refrigerators, washers, dryers, microwaves) • toys and sports equipment • tools • medical devices (some microscopes, electronic blood pressure monitoring devices, electrocardiogram machines, spectrophotometers, etc.).

Challenges in e-waste management are exacerbated by a lack of awareness, environmental legislation and limited financial resources. These issues are particularly evident in low and middle income countries (LMICs). Proper disposal of e-waste requires training and investment in recycling and management technology as improper processing can have severe environmental and health effects. Countries that import Used Electrical and Electronic Equipment (UEEE) and e-waste often lack policies, knowledge, and appropriate disposal facilities, thus resulting in the accumulation of e-waste (Nganji & Brayshaw, 2010). Increased attention is focussed on how to encourage the better management of e-waste across the value chain.

A value chain is a concept describing the full chain of a business's activities in the creation of a product or service -- from the initial reception of materials through to its delivery to market. Formal e-waste recycling is an important and growing industry in many countries. In many contexts, downstream vendors purchase the e-waste components that have been separated, dismantled and recovered by recyclers. When e-waste is collected and treated formally, it normally includes the following steps (ILO, 2019: 8-9).

- **Collection**: products are collected from public recycling centres, non-profit or community organisations, workplaces, public institutions or private sector companies;
- **Sorting and disassembly**: a product is separated into its components and hazardous components are removed manually;
- **Size reduction**: products are broken down into relatively homogenous streams by mechanical and physical processes, and reusable and recyclable components are salvaged;
- **Separation**: the streams are again separated and detoxified by thermal, chemical and metallurgical methods to recover materials.

Figure 1: ***A general structure of the informal value chain***

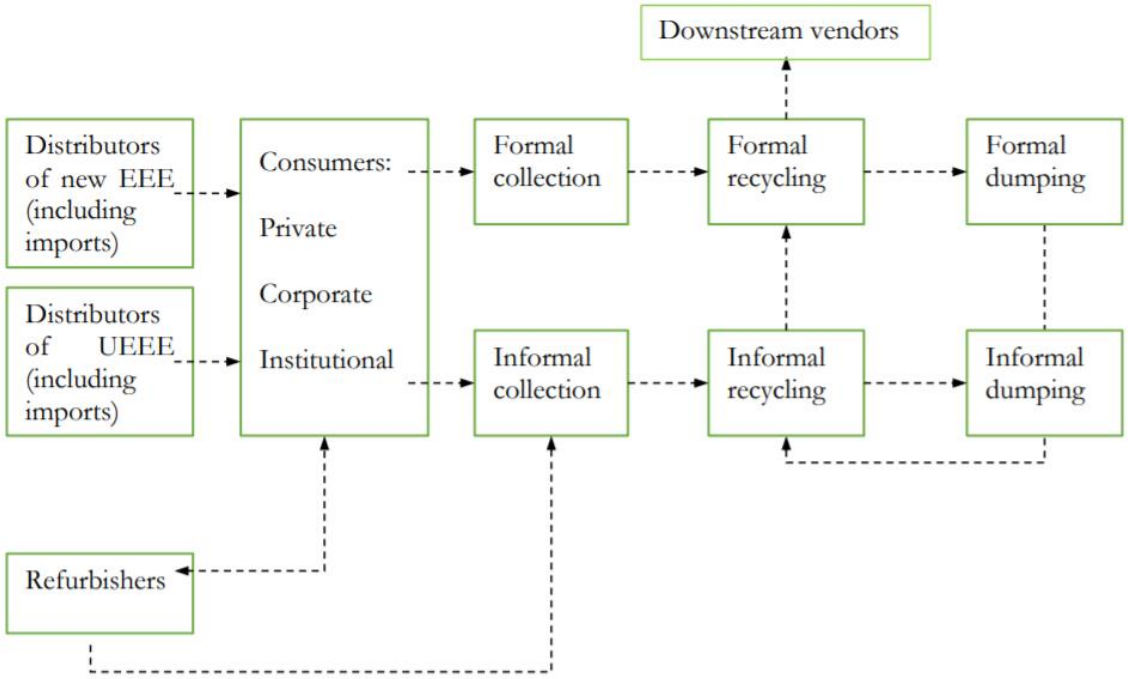


Source: Copyright © International Labour Organization 2019

When e-waste is handled in the informal economy, the value chain is more complex, with multidirectional flows and numerous actors (see figure 2 below). While informal e-waste value chains differ from country to county, mapping that the ILO has carried out in Argentina, India and Nigeria suggests that there are some similarities (ILO, 2019: 9-10):

- **Distributers** are entities that buy new and used electrical and electronic equipment (UEEE) from various sources domestically or internationally and sell the equipment to consumers directly.
- **Consumers** of new and UEEE can be divided into three categories: individual, public and corporate consumers.
- **Collectors** go from door to door to buy or collect UEEE, or they scavenge dumps for e-waste. Also referred to as waste pickers or scavengers, the majority operate in unsafe conditions in the informal economy, and many belong to disadvantaged groups or minorities.
- **Repairers and refurbishers** extend the lifetime of both new and UEEE, which they sell for reuse, but they also generate e-waste from the equipment that cannot be repaired. They are among the better organised actors in the value chain, often specialising in the refurbishment of specific types of equipment.
- **Dismantlers or segregators** manually break down the used equipment that cannot be repaired to usable and marketable components and materials.
- **Recyclers** burn, leach and melt e-waste to convert it into secondary raw materials, which are sold to suppliers of manufacturing industries.
- **Downstream vendors** purchase the e-waste components that have been separated, dismantled and recovered by recyclers.
- All waste is co-disposed at dumpsites. Collectors scavenge dumpsites for e-waste and components finally discarded by the aforementioned actors are disposed on dumpsites.

Figure 2: ***Overview of the actors in the e-waste value chain***



Source: Copyright © International Labour Organization 2019

3. Responsible e-Waste Value Chains

In 2019, it was estimated that only 17.4% of total e-waste generated globally was documented as formally collected and recycled. Even countries with relatively mature e-waste systems have low collection rates. For instance, Europe despite having high collection rates, only recycling 42.5% of e-Waste (ITU et al., 2021). ITU (2021) have identified the following five pillars of a sustainable e-waste management system:

- **Business and finance**: The most sustainable system is one that is self-financing. This implies covering the cost of environmentally sound management, collection, logistics, dismantling, pre-treatment, value extraction and eventual disposal. The role of businesses and entrepreneurship in e-waste management is essential.
- **Policy and regulation**: A policy is an important first step. It signals the government's intent to engage in e-waste management. A successful system is governed by regulation. This should clearly specify the roles and responsibilities of stakeholders along the value chain. Regulation should be simple, yet clearly stipulate who covers the cost of collection and take-back of e-waste. It should be enforceable
- **Technology and skills**: Appropriate technology and skills across the value chain are essential for successful implementation. It involves safe and environmentally sound waste management practices including recycling infrastructure. Skilled workers are needed so that hazardous materials are dealt with effectively, e-waste is separated with value retention in mind, and to ensure that logistics are improved and enforcement remains effective.
- **Monitoring and control**: Monitoring and enforcement create a level playing field. If there is no enforcement, producers who comply with EPR schemes could be at a disadvantage to those who do not. Key performance indicators (KPI's) need to be developed, implemented and tracked to measure system performance. E-waste collection and recycling targets set out in policy documents should be frequently monitored through transparent data collection.
- **Marketing and awareness**: Awareness on the part of consumers and commercial customers is key to e-waste management. The Waste Hierarchy should be adhered to so that anyone discarding equipment is aware of the options for better e-waste management, such as reduction, reuse or repair.

Implementation challenges are impeding the creation of a more efficient and circular e-waste management system. Some of the challenges faced by stakeholders in the value chain are highlighted below (ITU et al., 2021: 6-8).

- **Insufficient and unreliable data on stocks and flows of e-waste:** Accurate data about e-waste import, export, generation, collection and recycling is critical for the definition of fair and effective regulation and policies, realistic collection targets and tailored e-waste management programmes. Having the right data allows regulators to set informed targets and better monitor national e-waste management efforts over time.
- **Information asymmetry and limited trust:** Information asymmetries, such as those between producers and recyclers on product compositions, or repairers and recyclers on product components, are an issue. This can occur due to lack of designated and secure channels as well as concerns from producers on the confidentiality of product information. While some formal systems provide mitigative measures e.g. registered

recyclers, asset disposition firms and the use of bill of materials, such measures mostly cater to large corporations in high and upper middle-income economies.

- **Informal and illegal material flows:** In many economies where e-waste management systems are not fully developed, or absent altogether, common in LMICs, the informal sector primarily manages the e-waste. This leads to unsound and ineffective e-waste treatment and a loss of vital data on e-waste recycling as e-waste management is not regulated (leading to lack of governmental records).
- **Insufficient consumer participation:** Consumers play a key role in e-waste management as they determine the use phase of EEE and if/how it is diverted into proper end of life channels, for instance by returning it to the producer or depositing at a municipal e-waste sites. Low worldwide collection and formal recycling rates indicate that barriers to consumer participation exist in developed and developing e-waste management systems alike.
- **Inefficient e-waste management processes:** Current e-waste management processes from collection to end of life treatment can be costly and complicated as more EEE product types are introduced in the market. Lower income countries experience significant difficulty in recovering solid waste operations costs. In particular, transportation poses a significant cost burden to the reverse logistics operation as large volumes of e-waste have to be transported up the value chain from the collection of e-waste to its transport to a temporary warehouse or recycler as well as the delivery of secondary materials to producers.

In a similar vein, CLASP (2019) identify the following challenges associated with e-waste management (see table 1).

Table 1: ***Challenges to E-Waste Management Initiatives***

LOW VOLUMES (HIGH UNIT COST)	• No collection points • No take-back schemes • Limited collection (3rd party and informal) • Customers hold onto waste (perceived value and low awareness of risk)
TREATMENT COSTS	• Intrinsic material value • Lack of lithium-ion batteries recycling facilities in Africa • Product design (may hard to be separate fractions) • Recyclers are only present in a few markets
HIGH RISK	• Costs uncertain • "Business models" untested • Legislation is in its infancy
WEAK (AND DIFFICULT) SUPPLY CHAIN	• Partnership not in place • Low volumes • Transport costs

Source: Author's own. Created using data from CLASP, 2021

E-Waste Management and the Circular Economy

Given the above challenges, and wider concerns around the environment and climate change, many have argued that current businesses practices are no longer fit for purpose. ITU (2021) have commented that current, linear economic models are not sustainable and suffer from

instability due to their high dependence on limited natural resources. This has led to calls for the development of circular value chains (including in the production of electronic goods). As noted in the accompanying report, Ellen McArthur Foundation (2021) define a circular economy as follows:

> Looking beyond the current take-make-dispose extractive industrial model, a circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles: design out waste and pollution; keep products and materials in use; regenerate natural systems.[2]

The Ellen MacArthur Foundation (2021) comment that a circular economy for e-waste will provide the following socio-economic and environmental benefits:

1. **Repairing, remanufacturing, and upcycling to extend use cycles and create employment**. Repairing, remanufacturing, and upcycling electronics provide income opportunities, and benefit the environment by extending product's end-of-life, therefore reducing the need for materials and decreasing harmful waste and pollutants.
2. **Capturing the economic opportunity of urban mining**. The economic opportunity for e-waste urban mining is significant. Smartphones are a good example, almost 1.5 billion are shipped every year, with each unit containing components worth over US$ 100 – this represents a potential US$ 150 billion of value that enters the market each year.
3. **Scaling up e-waste recycling to create income generation opportunities**. The development of e-waste collection, grading, and recycling facilities represents a key opportunity. The establishment of community e-waste collection centres will provide technical and material supply chains for the recycling of electronic products, and harness the value of e-waste at the grassroots level.
4. **Harnessing the enabling role of technology for e-waste management**. Employing digital solutions to enhance operational efficiency is seen as particularly relevant for the high transport and logistical costs associated with the trade of recyclables and haulage. Another area in which technology can play a role is in increasing the transparency in trade and the mitigation of waste crime.

To support the development of a circular economy governments must (Ellen MacArthur Foundation, 2021):

Create and enforce legislation to limit the import of e-waste. This requires ensuring the proper definition of waste and adopting the technical guidelines on transboundary movements of e-waste.

Implement extended producer responsibility (EPR) principles. There is a need to increase producer responsibility/accountability.

Products should be designed for durability, reuse and safe recycling, with unsustainable inputs phased out. Higher usage rates can be achieved through reintegration of manufacturing

[2] https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview

scrap, repair, second life and durability, including adopting product-as-a-service models. Higher product collection with incentives for returns and advancing recycling will preserve materials.

Establish proper recycling and collection facilities for current and domestic e-waste that incorporate both formal and informal operators. Countries need to build a recycling system that is inclusive of formal and informal sectors. This requires investing in recycling plants and developing collection systems that promote green recovery methods.

The push towards a circular economy has provided stakeholders across the value chain with an impetus to initiate systemic improvements and invest in infrastructure and awareness raising.

Digital Solutions to e-Waste Management

ITU et al. (2021) comment that the quantity of e-waste that needs to be managed demands a speed, accuracy and accessibility that only digital systems can provide. Digital Solutions can be applied to the whole waste-management value chain – from design and raw material sourcing to all aspects of product distribution and use, to closing the loop by reintroducing secondary materials recovered from e-waste (ITU et al., 2021).

Technologies and methods such as cloud computing, scanning/identification, automated validation, and document verification technologies help e-waste managers collect data and record activities across the value chain, improve the chain-of-custody visibility, and control of in-built management systems. Applications of digital technologies can include (ITU et al., 2021)

Reducing waste in the manufacturing process: Digital solutions can strengthen manufacturing production processes that aim to maximise productivity while simultaneously minimise waste within manufacturing operations. Sensors, big data, artificial intelligence and specialised software can combine to provide data-driven production management, inspection and control, and a digitally enabled workforce.

Making products circular by design: This entails increasing electrical product lifespans by building in durability, reparability and recyclability, and reducing waste by design to make products more circular from inception. The “right-to-repair” policy is also being advocated globally to make producers design products that can be easily repaired and make repair more accessible through the availability of spares and repair services.

Creating transparency and ensuring traceability in the supply chain: EEE supply chains are expansive and complex, with products being designed, manufactured and sold globally. An increasing number of companies are using tagging or track and trace technology solutions such as radio-frequency identification (RFID) tags, blockchain, quick response (QR) codes to increase transparency and traceability along the supply chain.

Connecting users to match demand and supply of pre-owned EEE: By acting as intermediary standards enforcers, online marketplaces can combine the guarantee of a pre-vetted seller alongside other inherent advantages of wider choice, convenience and accessibility.

Facilitating repair: For many products, the bulk of greenhouse gas (GHG) emissions arise from the manufacturing stage, and therefore by extending product lifetimes, the demand for more products to replace non-functioning products is reduced. In the European Union, approximately 4 Mt CO2eq 1 could be saved annually by 2030 from extending the lifetime of washing machines, smartphones, notebooks and vacuum cleaners by one year.

Unlocking circular business models: Internet of Things devices can unlock circular business models such as PaaS by enabling cost effective, continuous and non-invasive (remote) monitoring of product usage and conditions. This incentivises service providers and producers to optimise use and plan maintenance, as well as create long lasting products that are easily repaired and refurbished.

Facilitating convenient, incentivised and optimised e-waste collection and takeback: In conventional waste management systems, there is little inspection of waste as it is resource intensive, thus any improper segregation that takes place is difficult to track.

Optimising e-waste sorting, dismantling and recycling: Manual disassembly and separation of e-waste usually leads to the high recovery of materials but is labour and time intensive and some processes can also be hazardous to health. Other methods of e-waste separation such as mechanical shredding are faster but destructive, resulting in poor recovery of precious materials. The recovery of base materials is also not prioritised due to limited financial value and an inefficient recovery process.

Creating marketplaces for e-waste and materials across the value chain: Digital marketplaces can help connect different stakeholders in the e-waste value chain by facilitating discovery, purchase and sale; e.g. Recykal Marketplace that brings together bulk e-waste generators, aggregators and recyclers from across India using an online platform.

Enabling informal sector integration and mainstreaming: In many countries, especially LMICs, the informal sector dominates the collection and processing of e-waste. The unregulated, market-driven nature of the informal sector prioritises material recovery at the cost of worker health. Digital technologies, aided by mobile connectivity and affordable access to data, are being leveraged to fast track the mainstreaming of the informal sector. In particular, smart phone apps allow users to build greater digital literacy through technologies that can help transform day-to-day businesses, such as mobile payments. Karo Sambhav, in India, has established a wide network of partners (originally from the informal sector) by building trust through financial transactions. They helped workers establish bank accounts and register their tax information and consider digital payments.

Facilitating knowledge generation across the value chain: Online platforms and databases are being designed to collect information on e-waste with the aim of building sector knowledge.

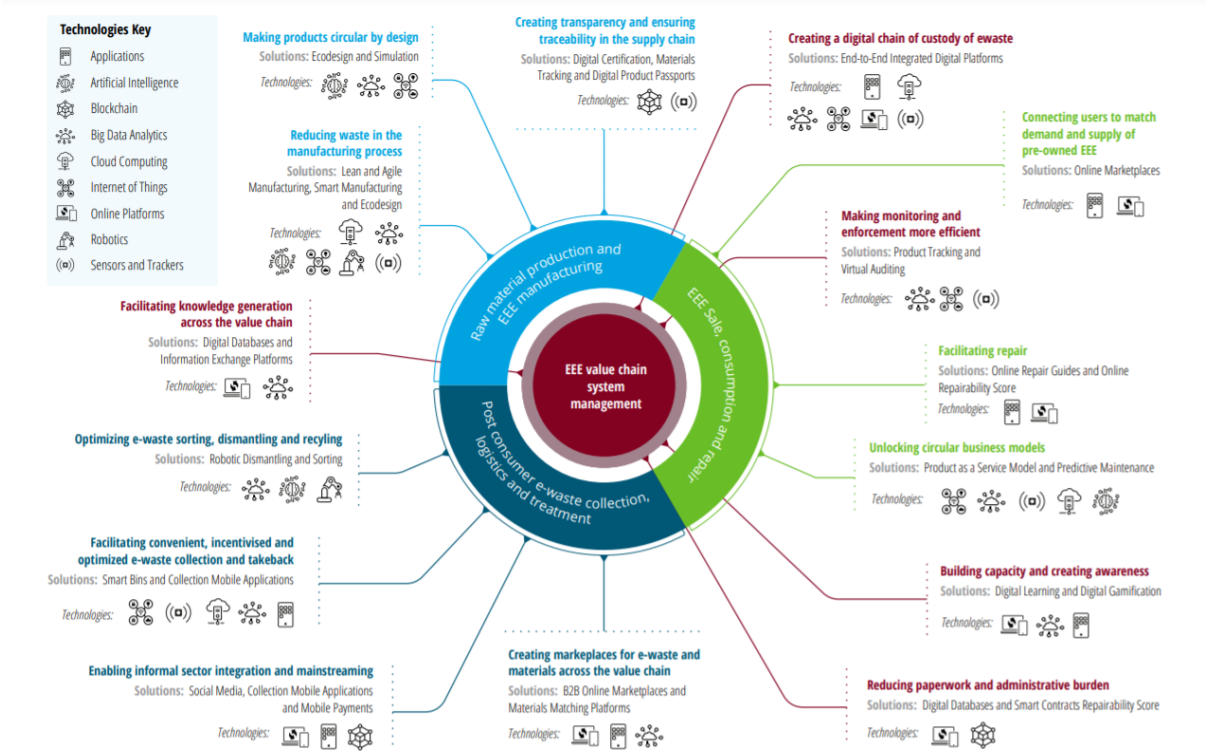
Creating a digital chain of custody of e-waste: Technologies and methods such as cloud computing, scanning and identification and automated validation and document verification technologies are helping the e-waste value chain system managers to better collect data and record activities, improve chain of custody visibility and control of in-built management systems.

Making monitoring and enforcement more efficient: The increase in connectivity of EEE through technologies, such as sensors and IoT tags (QR codes, RFID tags, GPS trackers etc.), supports the live tracking of e-waste flows and activities, which in turn enables effective monitoring and enforcement.

Building capacity and creating awareness: Digital technologies can be leveraged for capacity building in the e-waste management sector, as well as creating awareness on EEE use and proper disposal. In early 2020, ITU, together with the Basel, Rotterdam and Stockholm Conventions, the European Institute for Innovation and Technology Climate Knowledge and

Innovation Community (EIT Climate-KIC) and other key stakeholders, released the first MOOC on e-waste management[3].

Figure 3: ***Digital solutions for a circular electronics value chain***



Source: ITU et al, 2021 p 9 reproduced under CC BY-NC-SA 3.0 IGO

4. Governing E-Waste Value Chains

While there are concerns that the transition to a green economy may result in reduced employment in the extraction of resources and manufacturing, it is expected that new employment opportunities will arise in reprocessing, services and waste management. By 2030, global employment in the broader waste sector is projected to increase by 70%. Jobs in the reprocessing of lead and secondary precious metals, for instance, are predicted to grow by 15% and 11.2%, respectively (ILO, 2019).

In order to develop responsible e-waste value chains, the following need to be considered

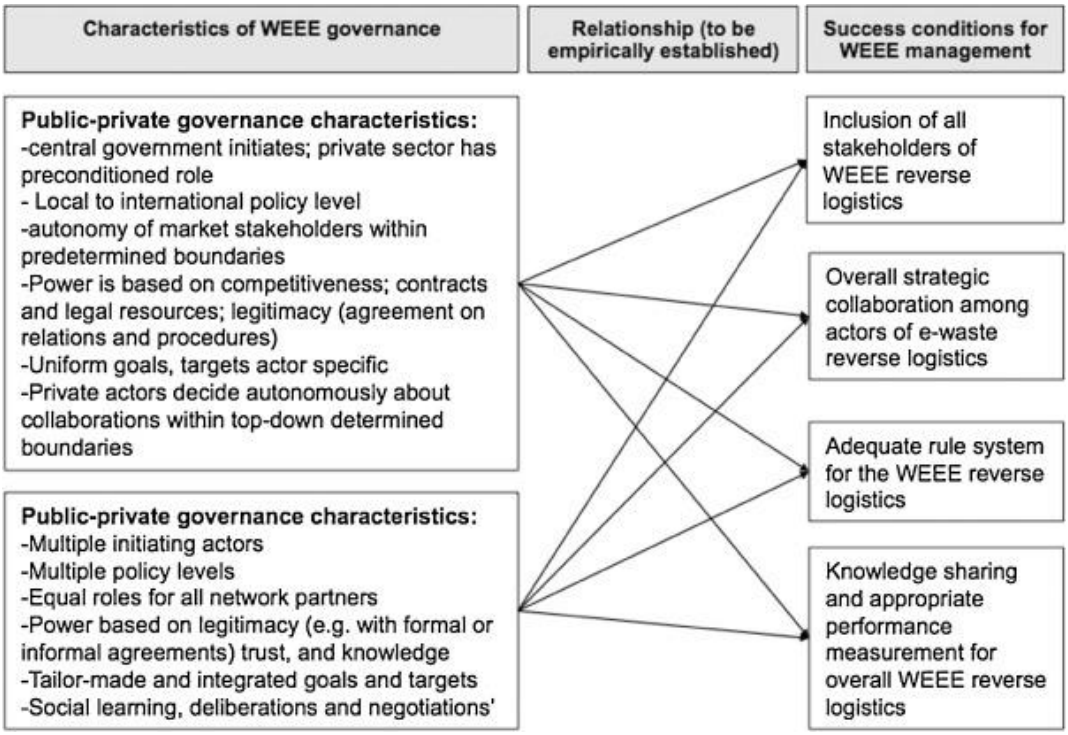
- Understanding how e-waste is currently managed is a crucial starting point for all countries looking to establish or revitalize their e-waste management system.
- There is no one-size-fits all solution to building a robust e-waste management system based on EPR. Although there are good practices and lessons from across the world, it is important that countries take these examples and adapt them to their local situations, having regard to their e-waste generation rates, recycling capabilities, the presence of ‘producers’ and expectations of stakeholders.

[3] https://www.itu.int/hub/2020/05/united-nations-offers-massive-open-online-course-on-e-waste-management/

- An e-waste system built without a participatory approach is likely to be hampered by a series of issues, such as lack of stakeholder buy-in, unrealistic expectations and regulations that do not adequately reflect the reality on the ground.
- An overarching policy is necessary, but specific guidelines and implementation action plans are important, too.
- The choices made for the sector should be founded on two crucial elements – data from on the ground, and inputs from stakeholders.
- Enforcement is incumbent on the government mandate, and adequate resources and financing need to be set aside for this aspect.

In a similar vein, Börner and Hegger (2018) identify four success conditions for e-waste governance (inclusion of all stakeholders, overall strategic collaboration, an adequate rule system and knowledge sharing/performance management) (see figure 5).

Figure 5: Characteristics of WEEE governance and success conditions for its management



Source: Börner & Hegger, 2018 reproduced under CC BY-NC-ND 4.0

ILO recommends the following steps to support the development of e-waste value chains (ILO, 2019: 30)

- produce more reliable data and information about the generation and flows of e-waste, the e-waste value chain and key actors;
- raise awareness of stakeholders about the e-waste issue;
- invest in waste management systems and infrastructure to handle the increasing flows of solid waste as well as the rapidly growing streams of e-waste;
- revise or adopt e-waste laws, regulations and policies;
- strengthen the capacity of environmental and labour administrations to enhance enforcement of e-waste laws and regulations;

- enhance the capacity of employers' associations and trade unions to advance decent work in e-waste management, including through social dialogue;
- provide incentives for enterprises to explore the design of more sustainable products and business models in the electronics industry and to foster green innovation and sustainable models of production;
- support the transition to a formal e-waste economy;
- foster an enabling environment for sustainable enterprises and cooperatives in the management of e-waste, including by identifying and removing constraints faced by enterprises, such as limited access to finance to adopt new clean technologies;
- invest in the skills for a circular economy to avoid skills shortages in the future;
- develop and provide education and training programmes and materials especially for e-waste workers in developing countries;
- provide support for all workers to have full access to fundamental principles and rights at work, and to exercise their rights to organise and bargain collectively;
- protect the safety and health of e-waste workers, improve working conditions and enhance access to universal health care and social security;
- foster greater policy coherence for advancing decent work and a circular economy approach in e-waste management at the global, regional and national levels, including through partnerships and collaboration with other international/regional organizations.

Regional integration

In the African context, commentators have highlighted the potential for regional integration among countries as a tool to addressing pan-African e-waste issues. Possible benefits include (ITU, 2021):

- Pooling and consolidation of e-waste management efforts.
- Improving the quality of recycled products through competition.
- Increasing economies of scale.
- Opening up larger, more diverse markets.
- Increased trade flow and integration.
- More capital through consolidation.
- Better information, technology and knowledge sharing.
- Potential for promoting a diversified workforce.

Efforts to support regional integration more broadly have included the following policy interventions and initiatives the African Circular Economy Alliance (ACEA), which is a government-led coalition, the United Nations Sustainable Development Goals (SDGs), the African Union's Agenda 2063, the African Continental Free Trade Area (AfCFTA), the African Ministerial Conference on the Environment (AMCEN) and the transformational technologies of the fourth industrial revolution. In May 2008, ICT ministers, under the auspices of the African Union, adopted a reference framework for the harmonisation of ICT regulations. The aim was to align policies and liberalise markets. In 2020, the African Telecommunications Union has also (ATU) published e-waste guidelines for ATU member states. More broadly, international and regional agreements such as the Basel and Bamako Conventions, and to some extent national

regulations, are the major regulatory tools for controlling the transboundary movement of hazardous waste in Africa.

Multinational Companies

In most countries, the responsibility for waste management resides with municipalities, which in turn have adopted different institutional models with various degrees of outsourcing. While the involvement of private sector companies in waste management differs from country to country, in many regions there has been an increase in the operations of large multinational waste management enterprises (ILO, 2019).

Further to this, leading brands such as Apple, Canon, Google, Huawei, Microsoft and Samsung have established ambitious targets for the use of recycled or renewable materials in new products and for the recovery of their used products. However, the performance of such take-back schemes is undermined by a lack of consumer awareness. Other issues include inconvenient methods of collection, consumer concerns about data privacy, and the fact that many used products fetch a higher price in the second-hand market than brands are offering (ILO, 2019).

Small and medium-sized enterprises

Micro, small and medium-sized enterprises introduce new technologies and bring innovative business models to the market, and are also responsive to emerging issues and needs. For instance, the ever-increasing use of electronic data has offered new opportunities for companies that guarantee safe data destruction (ILO, 2019).

Cooperatives

ILO (2014) explored the potential of cooperative enterprises to tackle informality in e-waste management. It concluded that cooperatives and other social and solidarity economy organisations, supported by regulation and capacity-building, could create jobs, improve working conditions, lift e-waste workers higher in the value chain, and address environmental impacts. Many waste pickers organise into cooperatives and other cooperative-like social and solidarity economy enterprises in Africa, Latin America and Asia in order to (ILO, 2019: 16):

- create economies of scale and share risks when collecting, segregating and recycling waste or selling recycled items;
- obtain the necessary permits and licenses to operate;
- identify and establish partnerships, including with municipal corporations;
- strengthen their collective voice and negotiation power with local governments, middlemen, and other market actors, particularly for integration into formal waste management systems, fair remuneration, social protection and improved occupational safety and health;
- facilitate their access to services such as finance, insurance, housing, child care and education;
- provide opportunities for skills training; and
- raise awareness about the significance of appropriate waste management, as well as about waste pickers to reduce social stigma.

5. African countries and E-Waste Management

As noted earlier in this report, five pillars of effective e-Waste management have been identified by ITU et al., (2021). These include; Business and finance, Policy and regulation, Technology and skills, Monitoring and control, Marketing and awareness. These pillars provide a mechanism for identifying which countries may be better placed to develop a responsible e-Waste management value chain.

Thirteen African countries have national e-waste legislation/policy or regulations in place, these include; Cameroon, Côte d'Ivoire, Egypt, Ghana, Kenya, Madagascar, Nigeria, Rwanda, Sao Tome and Principe, South Africa, Uganda, Tanzania and Zambia.

Of these countries, South Africa, Egypt, Nigeria and Ghana produce the most significant amounts of e-waste both in terms of Kilo Tonnes and of kg per capita (see table #).

Table 2: E-waste generation

Country	E-waste generated (kt) (2019)	E-waste generated (kg per capita) (2019)	E-waste documented to be collected and recycled (kt)
South Africa	416	7.1	18
Egypt	586	5.9	N/A
Nigeria	461	2.3	N/A
Ghana	53	1.8	N/A
Sao Tome and Principe	0.3	1.5	N/A
Côte d'Ivoire	30	1.1	N/A
Cameroon	26	1	0.05
Kenya	51	1	N/A
Tanzania	50	1	N/A
Zambia	19	1	N/A
Uganda	32	0.8	0.18
Madagascar	15	0.6	N/A
Rwanda	7	0.6	0.7

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Nigeria

Due to significant flows from other countries into Nigeria, and because of the nations' increasing demand for electrical and electronic equipment and devices, e-waste has become a rapidly growing waste stream. As recycling and reuse rates are low, e-waste poses a threat to human health and the environment.

According to ILO (2019a), with the right infrastructure, regulations, incentives, policies and processes in place to manage e-waste in Nigeria in ways that advance decent work and protect the environment, UEEE has the potential to fuel the generation of sustainable enterprises and the creation of decent employment opportunities. ILO (2019a) identifies the following steps that could support the development of this nascent industry.

- Social dialogue is essential to engaging governments and employers' and workers' organisations in the formulation and revision of laws, regulations and policies, and to ensuring that they are effectively coordinated and implemented in practice.
- Capacities should be strengthened in the various branches of Government that are engaged in ensuring decent work in e-waste management, and coordination should be enhanced between ministries and agencies at all levels.
- Cooperatives and other social and solidarity economy organisations and enterprises perform a key role in e-waste management in many countries. They have promoted the rights of informal workers, advocated their inclusion and recognition, and created formal and decent work opportunities. While not the case in Nigeria, cooperatives could be explored as a means of better organising informal e-waste workers.
- There is an urgent need to raise awareness about the growing challenge posed by e-waste management and effectively engage all relevant stakeholders, such as governments, employers, producers, workers and consumers, to promote sustainable production and consumption, advance decent work and protect the environment during the entire life cycle of electrical and electronic equipment, in particular through e-waste recovery, reuse and recycling.

Nigerian Private Sector

E-Terra Technologies Limited is a leading Nigerian e-waste management company. It offers e-waste collection, recycling, and shredding of hardware and data. The company manages e-waste by either refurbishing or recycling locally, providing refurbished products, or harvesting components for reuse in the manufacturing of new products. Hazardous components are sent to recycling partners (local and international) for further processing and proper disposal (Ellen Macarthur Foundation, 2021: 10).

Ghana

In August 2016 the Ghanaian Parliament passed the Hazardous and Electronic Waste Control and Management Act. The Ghanaian Ministry of Environment, Science, Technology and Innovation (MESTI) uses advisory services and international exchange to develop and effectively implement suitable e-waste regulations. The exchange organised by the ministry with affected groups in society promotes mutual understanding of the challenges and produces jointly developed specific approaches.

National legislation with respect to e-waste is comprised of three key documents:

- Hazardous and Electronic Waste Control and Management Act 2016 (Act 917)
- Hazardous, Electronic and other Wastes (Classification), Control and Management Regulations, 2016 (L.I. 2250)
- Technical Guidelines on Environmentally Sound E-waste Management in Ghana

The recently formed association of formal recycling enterprises is recognised by the Ghanaian Government as an official stakeholder.

Further to this, the Ghanaian government and GIZ have supported the development of a training centre established on the Old Fadama site that holds regular courses on the correct handling of e-waste. The courses are taught by teaching staff trained for this purpose. Suitable curricula have been developed as the basis for this. The project has mediated between hostile groups on the Old Fadama site. This has reduced tensions and facilitated a jointly developed vision for the future. An incentive and financing model for the recycling of problematic e-waste has been tested successfully. It is now used to operate a recycling fund[4].

Kenya

Kenyan Private Sector

Safaricom has integrated the Sustainable Development Goals (SDGs) into its operations. Their initiative aims to collect all types of old electronics including (but not limited to) radios, phones, laptops, batteries and chargers and related accessories, and delivers them in to a recycling partner (Waste Electrical and Electronic Equipment Centre - WEEE). The WEEE Centre separates products into different parts, and recycles the locally recyclable materials and sends the non-recyclable materials to other partners outside of the country for safe end of life management.

They key objectives of the Safaricom project are:

- To educate the public on the need for proper e-waste management.
- To collect e-waste from the market and to handle end-of-life management in a responsible way, contributing to a cleaner environment.
- To encourage and promote wider participation from multiple stakeholders in the e-waste management process.

Non-Governmental and Civil Society Organisations

WEEE Centre offers the services of awareness creation (training) and safe disposal of electrical and electronic waste (e-Waste); in accordance with National Environment Management Authority waste regulations and WEEE regulations that are protective to both the environment and public health[5].

E-Waste Initiative Kenya (E-WIK) supports e-waste management, predominantly in the informal sector.

[4] https://www.giz.de/en/worldwide/63039.html

[5] https://weeecentre.com/

6. Investment in E-Waste Management

Gesellschaft für Internationale Zusammenarbeit - Environmentally Sound Disposal and Recycling of E-waste in Ghana

To improve the prerequisites for sustainable handling of e-waste, the project targets three areas, combining policy advice with measures to strengthen the recycling industry and helping informal recycling workshops make the transition to formal small businesses.

In the area of **policy advice**, the project supports the Ghanaian Ministry of Environment in implementing its e-waste standards. This includes developing financing mechanisms for sustainable handling of e-waste. The project also supports the Ministry in regulating this sector more effectively. The objective is to enhance collaboration with other government bodies and improve dialogue with the private sector, municipalities, non-governmental organisations and representatives of the informal recycling industry.

Collaboration with the **private sector** strengthens the representation of recycling business interests. Companies receive support to develop innovative and financially viable products and services. This also creates opportunities for start-ups.

The work in the **informal recycling industry** focuses on the Old Fadama waste site. Exchange and advisory services are intended to demonstrate how the site can undergo a transition to a sustainable recycling park with more regulated structures on a participatory basis.

The World Resources Forum and the Öko-Institut are both assisting the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH with implementation of the project. The project is part of a programme being implemented jointly with KfW Development Bank.

GIZ (2019). E-Waste Training Manual: This training manual about safe and sound handling of electric and electronic waste (e-waste) was developed within the framework of the German Cooperation programme for “Environmentally Sound Disposal & Recycling of E-Waste” (E-Waste Programme, 08/2016 – 01/2020), with its objective to support the Ghanaian Ministry of Environment, Science, Technology and Innovation (MESTI) to improve the conditions for sustainable management of e-waste in Ghana

https://www.giz.de/en/downloads/giz2019-e-waste-management.pdf

ITU

ITU has a broad portfolio of activities in the area of e-waste and strives to tackle the challenges faced by this waste stream at the global, regional and national level. It focusses on a number of priorities in the area of e-waste, from conducting life-cycle analysis of products and processes, helping shift current economic models to a green and circular economy for ICT equipment, supporting policy and regulatory development, producing standards, improving and collecting worldwide e-waste data and helping raise awareness, globally, in order to make encourage accountability.

National Policy and Regulatory Development: ITU provides technical assistance to its Member States, with close-knit support in the following: a.) country profile and literature review; b.) assembly of a technical team; c.) rapid or in-depth national e-waste assessment; d.) drafting of policy recommendations and framework report or actual policy document.

Developing International standards: he work of ITU's standardization sector (ITU-T's) Study Group 5 includes developing international standards to support city stakeholders and the ICT sector in developing a sustainable e-waste management system, evaluating the environmental impacts of e-waste, defining a safe procedure for recycling rare metals in ICTs and implementing the e-waste reduction target of the Connect 2030 agenda.

Improving and Collecting Data: ITU is a founding member of the Global E-waste Statistics Partnership, which also includes the United Nations University (UNU) and the International Solid Waste Association (ISWA).

United Nations E-waste coalition: During WSIS in 2018, ITU and a number of other UN entities joined forces, signing a Letter of Intent, paving the way for greater coordination and collaboration on United Nations system-wide support for e-waste management, targeting 3 core areas: advocacy, knowledge sharing and intervention**.**

Massive Open Online Course (MOOC) on e-waste management:
https://news.itu.int/united-nations-mooc-e-waste/

UN

The UN E-waste coalition is a group of seven UN agencies who have come together to increase collaboration, build partnerships and more efficiently provide support to Member States to address the e-waste challenge. The coalition includes: International Labour Organization (ILO); International Telecommunication Union (ITU); UN Environment; United Nations Industrial Development Organization (UNIDO); United Nations Institute for Training and Research (UNITAR); United Nations University (UNU), and the Secretariats of the Basel and Stockholm conventions. It is supported by the World Business Council for Sustainable Development (WBCSD), the World Health Organization (WHO) and the World Economic Forum and coordinated by the Secretariat of the Environment Management Group (EMG).

International collaboration and partnerships

Issue Management Group on Tackling E-waste: he United Nations Environment Management Group's Issue Management Group on Tackling E-waste since its inception. In 2017, the Group prepared a report which identified 154 initiatives that the UN and related entities were or had been implementing. Survey findings contained in the report highlighted the need to engage more with the private sector in order to address business responsibility in the production of electronic and electrical equipment. The report stressed the importance of adopting a lifecycle approach whereby more attention should be paid to upstream activities, such as design and production, and repair and refurbishment activities should be supported by reducing taxes on reuse and repair operations.

Other

- **The East Africa Communication Organisation** (EACO) has developed working groups to address e-waste issues. EACO has held regional conferences and produced several reports and strategies addressing e-waste management, awareness, and the status of e-waste in member nations. EACO aims to train national representatives in better e-waste

management, facilitating interventions, and the development of more reliable regional and national statistics[6].

- **The e-Waste Association of South Africa** (eWASA) was formed to establish sustainable ways of managing e-waste. Its members include electronics manufacturers, importers, and retailers. eWASA has struggled to affect the import of e-waste in South Africa. One reason for this is that e-waste and its economic benefits have been championed by business-people who may not consider or be aware of short- and long-term impacts of e-waste (Tetteh & Lengel, 2017).
- In Ghana, **Pure Earth**, has partnered with government and advocacy groups on a recycling centre to improve working conditions through safer recycling of cables and cords. The facility trains recyclers in the use of machines that strip plastics from valuable metals and aims to reduce air pollution from burning while ensuring that workers do not lose their livelihoods (Heacock et al., 2018).
- **Solving the E-waste Problem** (StEP) has a number of projects running in Africa. **The Person in the Port Project** assessed the quantities, qualities, composition, origins and economic impacts of UEEE imports into ports in Nigeria over a two-year period. Other StEP interventions include collaboration between the Ethiopian Government and international partners to develop a national e-waste management strategy and e-waste management pilot projects in West African countries[7].
- The **International Labour Organisation** (ILO) has produced strategies on ensuring the safety of e-waste workers that can be adapted to African contexts (ILO, 2019).
- The **E-waste Coalition** has three functions: *advocacy* including awareness raising and campaigns; *knowledge* and best practice sharing; and the development of an *intervention* model for the implementation of e-waste work (WEF, 2019).
- Through its Switch Africa Green project in Ghana, United Nations Environment Programme (UNEP) , jointly with the Environmental Protection Agency and in partnership with Ghana National Cleaner Production Centre, implemented a project on electronic waste and developed the Ghana e-waste model that formed the basis for the Hazardous and Electronic Waste Control and Management Act (2016). This led to the Government of Ghana to prepare for the setup of an e-waste recycling plant at Agbogbloshie.

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Annex: Regulations in African Countries

Nigeria

Title of regulation	Description	Status	Legally binding	Legislation naming convention
National Environmental (Electrical/Electronic Sector) Regulations SI No 23 of 2011	The principal aim of these regulations is to prevent and minimise pollution from all operations and associated activities of the electrical/electronic sector to the Nigerian environment. These regulations shall cover both new and used EEE/UEEE. Manufacturers, importers, distributors or retailers are to take back end-of-life EEE and set up collection points/centres. Manufacturers and producers of EEE to ensure environmentally sound management of e-waste from collection points/centres to accredited recyclers. Importers of new and/or used EEE to pay administrative fee to promote environmentally sound management of WEEE.	In force	Yes	NIG01
Import of Used Electrical Electronic Equipment (UEEE), Guidelines, 2011	This guidance document highlights some of the dos and don'ts of shipment of UEEE into Nigeria. It is intended to help importers including private persons, companies, organisations and shipping companies to differentiate between UEEE and WEEE.	In force	No	NIG02
Harmful Waste (Special Criminal Provisions, etc.) Act, 2004 - Proposed Amendment - (on import of electronic devices) Senate Bill No. 287, 2009	Electronic devices imported into Nigeria from the commencement of this Act shall be Subject to these regulations as provided in other to reduce electronic Waste- (i) All electronic devices imported into Nigeria shall be in good condition. (ii) Electronic devices which has been used for more than five years outside Nigeria is prohibited from being imported into Nigeria. (iii) All electronic devices shall have	Draft	Not yet	NIG03

	accession number before imported or allowed into Nigeria.			
National Environmental (Ozone Layer Protection) Regulations, S.I. 32/2009	No person shall import, manufacture in part or in whole, install, offer for sale, sell or buy new or refurbished facilities intended to be used for the production of any ozone-depleting substance (ODS), unless for the recovery and recycling of substances already in use.	In force	Yes	NIG04
Consumer Protection Council Act (1992 No 06) Consumer Protection (Products and Services Monitoring and Registration) Regulation, 2005	Every product manufactured, imported, advertised, sold or distributed in Nigeria shall be registered with the Council in accordance with the provisions of these regulations.	In force	Yes	NIG05
The National Environmental Standards and Regulations Enforcement Agency Act, 2007	It provides data on the waste sector and its administration and prescribes sanctions for offences or acts, which are contrary to proper and adequate waste disposal practices. The act mandates that industries that manufacture hazardous substances and waste, establish in-house procedures to treat waste, or contract the removal, transfer and disposal of these waste typologies to a licensed hazardous waste service provider. The National Environmental Standards and Regulations Enforcement Agency is the responsible authority.	In force	Yes	NIG10
The Management of Solid and Hazardous Wastes Regulations, 1991	Regulates the collection, treatment and disposal of solid and hazardous waste for municipal and industrial sources; provides a comprehensive list of chemical waste typologies that constitute hazardous waste; identifies sources of toxic and hazardous waste produced by manufacturers and industry; provides guidelines on the storage and collection of wastes from industrial areas.	In force	Yes	NIG11

Ghana

Title of regulation	Description	Status	Legally binding	Legislation naming convention
Hazardous and Electronic Waste Control and Management, Law, (Act 917) 2016	An act to provide for the control, management and disposal of hazardous waste, electrical and electronic waste and for related purposes. Part one translates the provisions of the Basel Convention into national law. This means that hazardous waste may only be imported into Ghana or exported from Ghana when following the "prior-informed-consent procedure" of the Basel Convention. Transboundary movements of hazardous waste not in-line with these procedures are illegal. The First Schedule also entails categories of wastes to be controlled with Part 1 of this Act. As the list is identical with Annex I of the Basel Convention, Ghana's definition of hazardous waste is in-line with international consent. Part two of Act 917 specifically addresses the management of e-waste. Main elements of this part are provisions to collect an "electrical and electronic waste levy" (also referred to as "advanced eco levy") from manufacturers and importers of new and used EEE. The levy is destined to go into an "Electrical and Electronic Waste Management Fund" with the objective "to provide finance for the management of e-waste and reduce the adverse impacts of e-waste on human health and the environment.	In force	Yes	GHA01
Hazardous, Electronic and Other Wastes (Classification) Control and Management Regulations 2016 (L.I. 2250)	The purpose of these regulations are to establish a mechanism and procedure for the listing of waste management activities that do not require a Waste Management Permit, regulate the classification, control and management of waste,	In force	Yes	GHA12

	prescribe requirements for the establishment of take-back systems, prescribe requirements and timeframes for the management Of wastes listed in the First Schedule, prescribe general duties of waste generators, waste transporters and waste managers; and, prescribe requirements for the disposal of wastes.			
Prohibition on Manufacture, Sale and Import of Incandescent Lamps and Sale and Import of Used Refrigerators, Freezers and Air Conditioners, Regulations, LI 1932, 2008	Prohibition of manufacture or importation of incandescent filament lamp. Prohibition of importation of used air-conditioner. Prohibition of importation and sale of used refrigerator, refrigerator-freezer and freezer.	In force	Yes	GHA02
Energy Efficiency Standards and Labelling (Non-ducted Air Conditioners and Self-ballasted Fluorescent Lamps) Regulations, LI 1815, 2005	Regulations apply to non-ducted air conditioners or self-ballasted fluorescent lamps manufactured in Ghana or imported for use in Ghana.	In force	Yes	GHA03
Energy Efficiency Standards and Labelling (Household Refrigerating Appliances) Regulations, LI 1958, 2009	Energy Efficiency Standards and Labelling (Household Refrigerating Appliances) Regulations, LI 1958, 2009 The purpose of these regulations is to provide for (a) the enforcement of minimum energy efficiency for household refrigerating appliances prescribed in these regulations and measured in accordance with the Ghana Standard the GS IEC 62552: 2007; and (b) the labelling of household refrigerating appliances.	In force	Yes	GHA04
Technical Guidelines on Environmentally Sound E-Waste Management for Collectors, Collection Centres, Transporters, Treatment Facilities and Final Disposal in Ghana, 2018	The following guidelines are mandatory in compliance with Act 917, Act 328 and LI 2250 with respect to every undertaking operating in the field of collection, storage, transport, treatment and final disposal of e-waste in Ghana.	In force	No	GHA05

The Environmental Assessment Regulations 1999 (LI 1652)	Outlines the enforcement of environmental laws and clear definitions of the responsibilities of local government and waste producers. The Environmental Protection Agency is the responsible authority. Specifically regulation governs the ecological consequences from waste dumping; the establishment of waste disposal sites; the responsibilities of local authorities to establish facilities for the safe disposal of solid and hazardous waste; the procedure for issuing environmental permits and environmental impact assessments and environmental management planning and the certification of plans. However, does not make any specific reference to the four sectors in focus however does provide insight into the operating and licensing requirements of an existing or potential investor.	In force	Yes	GHA11

Kenya

Title of regulation	Description	Status	Legally binding	Legislation naming convention
Environmental Management and Co-ordination Act (EMCA - 1999) - revised in 2015	An Act of Parliament to provide for the establishment of an appropriate legal and institutional framework for the management of the environment and for the matters connected therewith.	In force	Yes	KEN01 & KEN02
National Environment Policy, 2013	Better quality of life for present and future generations through sustainable management and use of the environment and natural resources. One of the goals was to develop a national waste management strategy.	In force	No	KEN03
Environmental Management and Co-Ordination Draft E-waste Regulations, 2013	Regulations to manage e-waste, in accordance to EMCA. A producer who intends to introduce new or used EEE into Kenya shall apply for registration from the authority. Every producer operating in Kenya must register with the authority within 60 days of the coming into force of this regulation. Wants to develop an extended producer responsibility for sustainable management of e-waste.	Draft	Not yet	KEN04
E-Waste Guidelines Kenya, 2010	The guidelines have been developed with the strategic objective of providing a framework for the development of regulations and policies in Kenya. Specific objectives of the guidelines include: • To enhance environmental protection from e-waste. • To establish a basis for a policy and regulatory frameworks on e-waste management. • To raise public awareness on sustainable management of e-waste in Kenya.	In force	No	KEN05
National E-waste Management Strategy, 2019	The purpose of the strategy will help to analyse the current situation of E-Waste in the country, with the aim of helping the government and stakeholders at all levels to understand the need to come up with regulations on e-waste management through collaborative process. The National E-Waste Management Strategy is a five-year	Draft	No	KEN06

	plan covering the period 2019/20 to 2023/24. On the legal aspect, it has two main goals: review and streamline the existing Policy, laws, standards and guidelines to be in line with e-waste management in Kenya and identify gaps and develop a national e-waste policy, laws, and standards to act as model guiding the national strategy.			
National Sustainable Waste Management Policy, 2017 (revised in 2019)	The Policy also provides a framework for sustainable waste management nationally, through the full implementation of zero waste and circular economy principles, and through practical planning and implementation of waste management at the county level. The national government should also establish and fully implement coordinated policies and regulatory frameworks to address hazardous waste, electronic waste, industrial waste, agricultural chemicals and medical waste, which have been a major source of pollution, contaminating rivers and positing serious health and environmental threats.	Draft	No	KEN07
Sustainable Waste Management Bill, 2019	Overarching bill to establish appropriate legal and institutional framework for waste management in Kenya including establishment of a Waste Management Directorate Explicitly mentions EPR for electronic products including establishing a registry. Proposed timeline: within a period of eighteen months from the entry into force of the act.	Draft	Not yet	KEN08
Machakos County E-Waste Management Act, 2015	This act is to establish an institutional framework necessary for purposes of ensuring an efficient e-waste management in the county as well as to establish appropriate strategies for end-of-life management of EEE.	In force	Yes	KEN09
The National Solid Waste Management Strategy 2015	Provides current waste management and recycling practices in Kenya and sets out guidelines, recommendations, and targets for the country to enable waste management systems that are in line with an Integrated Solid Waste Management Plan	In force	No	KEN16

Waste Management Regulations, 2006	The Minister for Environment and Natural Resources, on the recommendation of the National Environment Management Authority and upon consultation with the relevant lead agencieswrote these regulations on the backahnd of the 1999 EMCA act. These regulations apply to all categories of waste. Main points are: any person whose activities generate waste, shall segregate such waste by separating hazardous waste from non hazardous waste, any person who owns or controls a facility or premises which generates waste shall minimize the waste generated, no person shall be granted a license under the Act to transport waste unless sucj person operates a transportation vehicle approved by the authority. These regulations also define hazardous waste. No specific mention of e-waste per se, but can be considered under general definition of waste.	In force	Yes	KEN17
National information & communications (ICT) policy, 2016	The ICT policy includes provisions for e-waste management calling for appropriate recycling and disposal facilities as requirements for the renewal of communications licences. It is based on the Kenya Vision 2030, which aims to provide the national long-term development blue-print to create a globally competitive and prosperous nation, transforming Kenya into a newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. The strategy of Vision 2030 is to undertake reforms in eight key sectors that form the foundation of society for socio-political and economic growth, one of them being ICT.	Draft	No	KEN12
The Environmental Management and Co-Ordination (Extended Producer Responsibility) Regulations 2020	The object and purpose of these regulations is to provide for mandatory extended producer responsibility schemes for all products and packaging in all phases of their life cycle to enhance environmental sustainability. In the regulations, it is stated that “no	Draft	Not yet	KEN18

	person or entity shall produce, import, market or distribute a product unless they have obtained producer responsibility registration from the Authority". EEE and packaging are in the list of products and packaging subject to extended producer responsibility compliance scheme, defined in Schedule 1 of the regulations. The main EPR regulations are: every producer, shall take financial and or physical responsibility for the management, treatment and disposal of their post-consumer products and end-of-life treatment for the waste generated by their products; the producers shall fulfil their obligations by setting up individual enterprise-based extended producer responsibility compliance scheme; or collectively through a pooled compliance scheme. A producer can transfer part or their full obligations subject to membership agreement to a collective compliance scheme through a producer responsibility organisation, in which they take membership.			

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