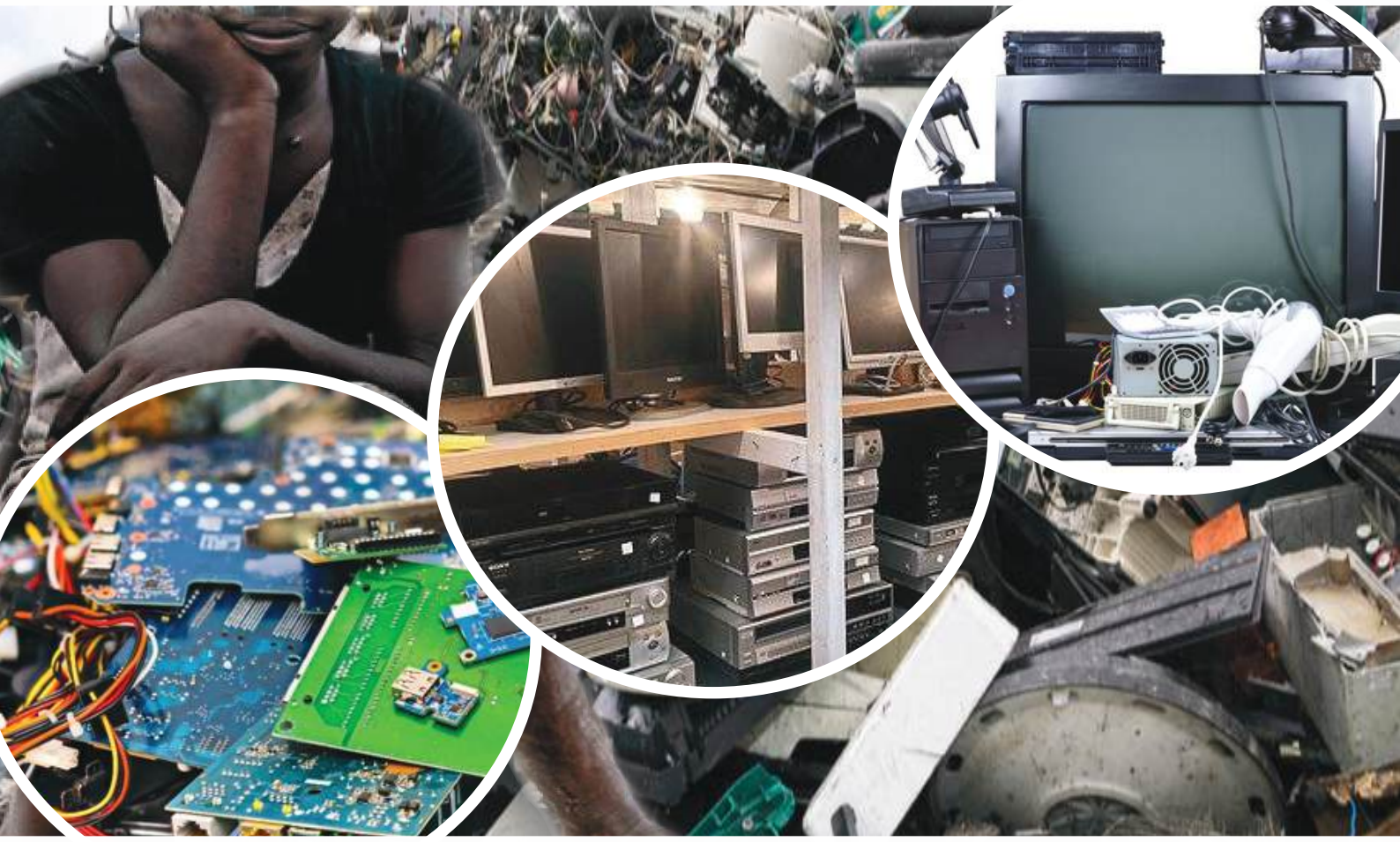
E-Waste Management in Kenya

Simplified Guidelines



Reduce, Reuse, Recycle: Keep E-Waste in Check!

E-Waste Management in Kenya

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ISBN Number...

All Correspondence should be addressed to:

Director General
National Environment Management Authority
P.O Box 67839-00200 - Nairobi
Tel: +254-20-2183718, 2101370
Mobile: 0724253398, 0723363010, 0735013046
E-Mail: info@nema.go.ke

Editorial Team

1. David Ong'are
2. Francis Chwanya
3. Newton Osoro
4. Kennedy Ojwando
5. Anthony Waswa
6. Damaris Maina
7. Lencer Obondo
8. Alex Kamakei
9. Carrie Karanja
10. Gilbert Karimu
11. Ngararu Maina
12. Polivious Gitonga

Design and Layout

Anthony Waswa

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Definition of Terms

Collection centre	means a facility established individually or jointly by a registered society, designated agency, a company or an association to undertake collection operations of waste;
Electrical equipment	meansequipmentforthegeneration,transferormeasurement of electric current that is designed to be used with a voltage rating not exceeding one thousand volts of alternating current or one thousand five hundred volts of direct current;
Electronic equipment	means equipment which requires electric current or an electromagnetic field and is designed to be used with a voltage rating not exceeding one thousand volts of alternating current or one thousand five hundred volts of direct current and includes the products
Producer	means a person who introduces new or used electrical or electronic equipment int o the market and includes a person who manufactures or sells electrical or electronic equipment under their own brand; resells electrical or electronic equipment that is produced by another person under their own brand; imports electrical or electronic equipment for sale; assembles electrical or electronic equipment for sale; distributes electrical or electronic equipment; or receives electrical or electronic equipment for donation.
Recycler	means any person or entity engaged in the recycling, reprocessing or assembling of electrical and electronic waste or parts of electrical and electronic waste;
Recycling	means the process by which materials from waste are reprocessed into other products, materials or substances, whether for their original or other purposes;
Refurbish	means the repair, dismantling and improvement, of used electrical or electronic equipment, to extend the working life of that equipment;
Take-back	means the process of returning or repossessing used electrical or electronic equipment by a producer or their representative from the market;
Transporter	means a person or entity licensed by the NEMA to convey waste from one point to another;
Treatment	means the processing of waste through eco-friendly technology to ensure compliance with environment al standards; “treatment facility” means a licensed plant, pre mise or establishment for processing waste;
E- waste	means any substance resulting from discarded electrical or electronic equipment or any components, sub-assemblies and consumables that for part of the electrical or electronic equipment that is disposed after being used.
Waste generator	means any person whose activities or activities under his or her direction produces waste and where that person is not known, the person who is in possession or control of that waste.
Problematic fraction	means a part of waste where the collection and treatment cost of that waste outweighs the material recovery value

Acronyms/Abbreviations

ARF	Advanced Recycling Fee
ASAL	Arid and Semi-Arid Lands
BAT	Best Available Techniques
BEP	Best Environmental Practices
CAK	Communication Authority of Kenya
CFCs	Chlorofluorocarbons
CIDP	County Integrated Development Plan
CRT	Cathode Ray Tube
EA	Environmental Audit
EAC	East Africa Community
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act, 1999
EEE	Electrical and Electronic Equipment
EPR	Extended Producer Responsibility
ESM	Environmentally Sound Management
EU	European Union
IEC	International Electrotechnical Commission
ICT	Information and Communication Technology
ICTA	Information and Communication Technology
KNBS	Kenya National Bureau of Statistics
KEBS	Kenya Bureau of Standards
KRA	Kenya Revenue Authority
MSWMA	Sustainable Waste Management Act, 2022
NCCAP	National Climate Change Action Plan
NEMA	National Environment Management Authority
OSHA	Occupational Safety and Health Act, 2007
PBDEs	Polybrominated diphenyl ethers
PIC	Prior Informed Consent (under Basel Convention)
PRO	Producer Responsibility organization
PVC	Polyvinyl Chloride
POP	Persistent Organic Pollutant
PPE	Personal Protective Equipment
PPP	Public-Private Partnership
RACHP	Refrigeration, Air Conditioning and Heat Pump
SWOT	Strengths, Weaknesses, Opportunities and Threats
UNEP	United Nations Environment Programme
WEEE	Waste Electrical and Electronic Equipment

FOREWORD

Dr. Deborah M. Barasa
Cabinet Secretary,
Minister for Environment, Climate Change & Forestry

The environment sector is important in economic development of Kenya. This is because the sector provides raw materials to support various economic activities and livelihoods. However, the sector is also the recipient of waste products from production and disposal processes often becoming harmful to both human health and the environment. The situation has been escalated by the increasing population, changing consumption patterns and lifestyles leading to increased reliance on electrical and electronic equipments. The resulting e-waste generated by these appliances is a major concern to sound environmental management in the country.

While the use of electronics has greatly improved efficiency and quality of life for Kenyans, electronic and electrical appliances generate e-waste at their end of life. The e-waste is a new and emerging waste that is causing environmental degradation due to limited capacity on its handling and disposal. The generation of e-waste has escalated due to increased access to low quality electronic goods and subsequent high rates of obsolescence. The situation is escalated by obsolete donations especially from developing countries which add to the high generation of e-waste.

The e-waste Guidelines have been developed to streamline the procedures of handling and disposal of e- waste generated by various sectors. The e-waste guidelines provide a framework for identification, collection, sorting, recycling and disposing of electrical and electronic waste (e-waste). The guidelines provide the basis for developing legal instruments to enhance enforcement to lay down procedures. We are therefore determined to address e-waste to encourage separation to enhance material recovery and promote recycling.

In addition the country will explore other available options and opportunities contained in international instruments which Kenya is a signatory. For instance, the Bamako as well as Basel Conventions prohibits the importation of any hazardous waste. Kenya welcomes the provisions to ship e-waste back to the country of origin whenever such consignments are detected.

It is important to note that the management of e-waste is in-line with the provisions of Vision 2030 which calls for a clean and healthy environment for development. The Guidelines are also in line with the Vision of the Ministry of Environment & Mineral Resources that aspires for a clean, secure and sustainably managed environment and mineral resources to support national prosperity. The management of e-waste will therefore enhance the quality of the environment by controlling the quantities of e–waste generated.

Cabinet Secretary,
Minister for Environment, Climate Change & Forestry

PREFACE

Dr. Eng. Festus Ngeno, MIEK, CBS
Principal Secretary
Ministry of Environment, Climate Change & Forestry

A clean and healthy environment is of utmost importance to all citizenry whether in the public or private sector. With global development and innovations in technology, electronic devices are a constant feature of day-to-day life. In this regard, the Kenyan government has rolled out an e-government programme to promote use of information and communication technology (ICT) in all sectors. The resultant waste from their usage has over the years accumulated, and now poses a threat to our environment.

E-waste management is an emerging challenge that requires a comprehensive mechanism to address it effectively. All sectors use electronic and electrical appliances thus generating e-waste. Although the telecommunication sector has put in place preliminary systems for the collection and call back systems, there is need for a national coordination in the management of e-waste in the country. In addition, manufacturers of specific products will be tasked to bear costs related to the collection and disposal of waste associated with their respective products.

The Ministry of Environment and Mineral Resources through NEMA has developed the e-waste Guidelines to streamline the collection and disposal of e-waste. A comprehensive awareness will be conducted among various stakeholders to build their capacity in handling and disposing e-waste. The guidelines have identified the various types of e-waste and mode of handling including transportation, sorting, treatment, recycling, re-use and disposal. The guidelines were developed through elaborate consultations with relevant stakeholder thus ensuring ownership and effective implementation.

A clean and healthy environment is critical for all. As such, the Ministry is determined to put in place relevant programmes to promote a high quality of the environment. Although the use of electronic and electrical appliances is necessary across all sectors, the resulting e-waste has to be addressed in order to balance environmental conservation and development in-line with the principles of sustainable development.

Principal Secretary
Ministry of Environment, Climate Change & Forestry

STATEMENT

Emilio Mugo
Chairman,
NEMA Board of Management

As Chair of the Board of the National Environment Management Authority, I want to speak directly to the work under way to strengthen waste management in Kenya, with a clear focus on e-waste.

Kenya is dealing with growing volumes of discarded electrical and electronic equipment. This growth affects towns, rural areas and every part of the waste chain. The country needs clear rules and coordinated action to manage these materials in a safe and responsible way. The Guidelines on e-waste management have been developed to guide the country a practical and consistent framework.

The purpose of the guidelines is to set out clear roles, procedures and compliance duties for every stakeholder. Government agencies get direction on oversight. Producers get responsibility for proper take-back systems. Recyclers get standards for safe operations. Consumers get guidance on responsible disposal. The informal sector gets a path to participate in a safer and more organized system. This clarity strengthens the entire chain and supports sound environmental practices.

The guidelines outline how e-waste should be collected, sorted, stored, transported and processed. They promote safe handling, protect workers, reduce pollution and improve recovery of valuable materials. They also support county governments with planning tools, approval processes and operational requirements. Private actors are encouraged to invest in compliant facilities to help expand national capacity.

Training and awareness will support the rollout. County staff, recyclers, community groups and the informal sector will receive guidance on safe handling, record-keeping, reporting and proper collection systems. Better understanding leads to cleaner waste streams, safer workplaces and stronger recycling outcomes.

NEMA will continue to work with counties, producers, recyclers and community groups during implementation. These engagements help refine approaches and build long-term commitment.

These guidelines give the country a strong foundation. NEMA remains committed a cleaner and safer environment for all.

Chairman,
NEMA Board of Management

ACKNOWLEDGEMENT

Mamo. B. Mamo, PhD, EBS
Director General
National Environment
Management Authority

This document follows the zero waste principle and the circular use of waste. Waste is treated as a resource with economic potential. It supports new jobs, new business opportunities and reduced environmental pollution. The limited waste handling infrastructure in the country created a need for clear guidance on the establishment and operation of Material Recovery Facilities. These facilities will handle the final sorting of waste before recycling or disposal. Their success depends on strong collaboration with County Governments to secure strategic sites and to strengthen waste segregation at the source.

The development of these guidelines involved a committed taskforce. Their collective effort shaped the technical direction, structure and practicality of the document. Their contribution improved the quality, clarity and relevance of the final guidelines.

Appreciation also goes to the National Environment Management Authority leadership for their guidance throughout the process. Their support ensured steady coordination, timely decisions and a strong institutional framework for the development of these guidelines.

Director General,
National Environment Management Authority

EXECUTIVE SUMMARY

Electronic waste (e-waste) consists of discarded electrical and electronic equipment, and Kenya generates about 51,300 metric tonnes annually, of which only 5% is formally recycled. Most e-waste is handled through unsafe informal practices, resulting in pollution and health risks. Institutions like the WEEE Centre, together with global frameworks such as the Basel and Stockholm Conventions, support Kenya's efforts toward safer e-waste management. The national e-waste guidelines aim to protect human health and the environment by establishing clear regulatory structures, involving stakeholders across the value chain, enhancing environmental protection, and raising public awareness. Their development is driven by rising electronic consumption, increased hazardous waste volumes, and the need for sustainable, circular economy practices.

Globally, e-waste is the fastest-growing waste stream, exceeding 60 million tonnes annually, yet formal recycling rates remain low. Africa faces similar challenges, with limited formal recycling facilities and widespread informal processing that involves burning, crude dismantling, and unsafe recovery methods.

In Kenya, e-waste continues to rise due to increased ICT use and growth in consumer electronics, while gaps remain in enforcement, awareness, and collection infrastructure. Strengthening Extended Producer Responsibility (EPR), expanding partnerships, and establishing regional recycling hubs present opportunities for improved management.

A national SWOT analysis highlights Kenya's strengths—policy momentum, job creation potential, and valuable recoverable materials alongside weaknesses such as inadequate infrastructure, limited public awareness, and informal sector dominance. Opportunities include circular economy development, technological advances, and urban mining, while threats include toxic exposures, illegal imports, and rapid product obsolescence.

E-waste contains hazardous substances such as heavy metals and persistent organic pollutants, which expose informal recyclers and communities to serious health risks. Kenya's management system is guided by international conventions and supported by national policies including the National E-Waste Management Strategy, Sustainable Waste Management Policy, NCCAP, and Vision 2030. The legal framework—anchored in the Constitution, EMCA, the Sustainable Waste Management Act, EPR Regulations, and related legislation—provides strong institutional and enforcement foundations and supports development of the forthcoming E-Waste Regulations 2025.

The guidelines outline e-waste categories and define roles for all actors along the value chain. Manufacturers, assemblers, and importers must comply with standards, provide proper labeling, establish take-back systems, and fulfill EPR obligations. Consumers are responsible for segregating and returning e-waste to licensed facilities while avoiding banned disposal practices. Repairers and refurbishers extend product life but must manage waste safely and maintain records. Collectors and transporters ensure safe movement of e-waste to licensed treatment facilities.

Recycling and material recovery facilities must use environmentally sound technologies, keep detailed records, protect workers, and comply with environmental licensing and audits. Final disposal sites manage non-recyclable fractions through controlled landfilling or specialized incineration while monitoring emissions.

Overall, the guidelines provide a comprehensive framework to improve e-waste management in Kenya, reduce environmental and health impacts, strengthen compliance, and advance the country's shift toward a circular, sustainable economy.

CHAPTER 1

Introduction

This chapter presents the backgound and rational for the development of the guidelines

Introduction

E-waste is a generic term encompassing various forms of electrical and electronic equipment that are old, end-of-life appliances, or have ceased to be of any value to their owners (UNEP, 2023). Globally, about 60 million tonnes of e-waste are generated annually but only 22.3% of it is formally collected and recycled while Africa with a generation capacity of about 2.9 million tones, only 0.9% was collected and recycled annually (Global e Waste Monitor, 2020). Here in Kenya, approximately 51,300 metric tonnes of electronic waste is generated annually however, only about 5 percent of this waste is effectively recycled. The remaining 95 percent is frequently disposed of through unsafe practices, resulting in significant environmental pollution and associated public health risks. This therefore gives a gap on how collection and recyclability can be enhanced to turn the waste into economic fortunes. Institutions such as the WEEE Centre play a critical role in the collection and recycling of e-waste, and various initiatives are underway to enhance public awareness and increase the designated collection points. Furthermore, Kenya aligns its e-waste management efforts with international instruments, including the Basel and Stockholm Conventions, as well as national frameworks such as the Environmental Management policies. E-waste contains toxic and hazardous substances that pose a threat to human health and the environment. It is in response to these gaps that these guidelines will address in preparation for E-waste regulations in the future.

Overall Goal

The primary goal of e-waste guidelines is to provide a structured approach to safeguard human health and protect the environment by ensuring the safe handling and disposal of electronic waste.

Objectives

- To establish a standardized and practical framework for the environmentally sound management of e-waste in Kenya.
- To enhance environmental protection and human health 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.

Rational/Justification

The rapid growth of electronic devices has led to an increase in electronic waste (e-waste), which poses significant environmental and health risks if not properly managed.
Developing clear e-waste guidelines provides a structured approach to managing electronic waste responsibly. These guidelines will ensure safe disposal, promote recycling and resource recovery, and encourage manufacturers, consumers, and waste handlers to adopt sustainable practices. The guidelines will help reduce environmental pollution, protect public health, and support a circular economy where electronic materials are efficiently reused and recycled.

Scope of Application

These guidelines apply to the handling and management of the various categories and elements of e-waste in Kenya. The guidelines provide a clear mechanism for the management of e-waste at various stages in the supply chain, the objective being to ensure the integrity of the environment is assured against the potential adverse impacts of e-waste and its elements.

CHAPTER 2

Situation Analysis

This chapter represents the global and national context on the status of e-waste

Introduction

Electronic waste (e-waste) has become one of the fastest-growing waste streams globally due to rapid technological advancement, increased consumer demand, short device lifespans, and inadequate waste management systems. In Kenya, the rise in ICT penetration, off-grid solar adoption, and expansion of digital services has accelerated the generation of e-waste across all counties. This chapter provides a comprehensive situational analysis spanning global, regional, national, and county-level perspectives to inform the development and implementation of effective e-waste management guidelines.

Global Context

Globally, more than 60 million tonnes of e-waste are generated annually, with only a fraction formally collected and recycled. The gap between generation and recycling widens each year due to increasing device consumption and insufficient recycling infrastructure. Informal handling predominates in many regions, posing significant health and environmental risks. Key global challenges include transboundary movement of undocumented e-waste, lack of circular design, and limited producer responsibility compliance.

The global e-waste crisis has reached unprecedented levels. Baldé et al. (2024) in the Global E-Waste Monitor 2024 report that global e-waste generation reached 62 million metric tonnes in 2022, with projections indicating growth to 82 million tonnes by 2030. This represents a 2.6% annual growth rate, five times faster than documented formal recycling rates (United Nations Institute for Training and Research, 2024).
The rapid growth is driven by increasing consumption of electronic and electrical equipment (EEE), shorter product lifespans due to planned obsolescence, and limited repair infrastructure (Ellen MacArthur Foundation, 2015).

Of critical concern, only 17.4% of global e-waste was collected and recycled through formal channels in 2022, leaving 51 million tonnes improperly managed (Baldé et al., 2024). The uncollected material contained an estimated USD 91 billion worth of recoverable raw materials, including precious metals (gold, silver, platinum), base metals (copper, aluminum), and rare earth elements essential for electronics manufacturing (Buchert et al., 2012).

Regional Context

Africa generates lower per-capita e-waste than other regions; however, its formal recycling capacity remains limited. East African countries, including Kenya, face increasing volumes of obsolete electronics from households, institutions, and businesses. Informal recovery activities—often involving open burning or rudimentary dismantling—dominate the sector.

East African countries are increasing policy dialogue and cooperation (regional conferences, protocols), but practical infrastructure (collection networks, licensed recyclers, downstream smelters) remains thin.
Illegal or informal transboundary movement of e-waste remains a risk, often masked as second-hand equipment — complicates accurate accounting and enforcement.

National Context

Kenya experiences rising e-waste generation driven by increased ICT usage, widespread adoption of solar home systems, and growth in consumer electronics. Kenya developed a National E-Waste Management Strategy (2019/20–2023/24) to coordinate national and county roles, raise awareness, and build institutional capacity. The Sustainable Waste Management Act (2022) and related instruments strengthen the legal basis.
Recent national figures report Kenya's e-waste reached roughly 53,559 tonnes in 2024 (rising from 46,211 tonnes in 2020), reflecting more devices and shorter lifecycles. (KNBS / media reporting).

Few licensed formal recyclers; most collection, repair, and material recovery happens in the informal sector. Limited local recycling capacity means valuable materials are lost or exported for downstream processing.

County-Level Context

E-waste generation patterns across Kenya's 47 counties vary based on population density, economic activity, technological uptake, and urbanization. Counties can be grouped into five categories to better understand trends and tailor interventions.

2.5.1 Metropolitan and High-Density Urban Counties

Counties: Nairobi, Mombasa, Kiambu, Kisumu, Nakuru, Uasin Gishu.
These counties generate the highest quantities of e-waste due to concentrated ICT use, industrial activity, and large commercial sectors. Informal recycling is prevalent, and while some counties have initiated pilot collection and awareness activities, formal infrastructure remains inadequate.

2.5.2 Urbanizing and Secondary Town Counties

Counties: Machakos, Kajiado, Laikipia, Nyeri, Kakamega, Kericho, Bungoma, Trans Nzoia, Embu, Meru, Kisii, Bomet, Tharaka-Nithi, Nandi, Vihiga, Homa Bay, Migori, Busia, Kirinyaga, Murang'a.
These counties exhibit rapidly growing demand for electronics. E-waste often moves informally to larger urban hubs for dismantling. Repair culture is strong, yet certified collection centres are scarce.

2.5.3 Rural Agricultural Heartland Counties

Counties: Nyandarua, Baringo, Elgeyo-Marakwet, Siaya, Narok, Nyamira, Taita Taveta, West Pokot (rural parts).
E-waste generation in these areas primarily arises from schools, households, and agricultural equipment. Stockpiling of obsolete ICT equipment is common due to limited disposal pathways.

2.5.4 Arid and Semi-Arid Lands (ASAL) Counties

Counties: Turkana, Marsabit, Isiolo, Garissa, Wajir, Mandera, Samburu, Tana River, Kitui, Makueni, Lamu (inland), parts of Kilifi and Kwale.
ASAL regions record substantial amounts of solar-related e-waste, including batteries, panels, and controllers. Disposal systems are either absent or rudimentary, and hazardous materials often end up in open dumpsites.

2.5.5 Coastal Counties

Counties: Mombasa, Kilifi, Kwale, Tana River, Lamu, Taita Taveta.
Tourism and port activities contribute to unique e-waste streams, such as commercial appliances and second-hand electronics. Risks of illegal imports and inadequate disposal near sensitive ecosystems are noteworthy.

2.5.6 Cross-Cutting Challenges across the 47 Counties

Across all counties, some common issues hinder effective e-waste management:

- Lack of county-specific e-waste data and reporting systems.
- Low public awareness on proper disposal.
- Limited formal recycling capacity and collection networks.
- Weak coordination between counties and national institutions.
- Insufficient regulation and monitoring of informal recyclers.
- Inadequate financial resources for county-level implementation.

2.5.7 Opportunities for Strengthening County-Level E-Waste Management

- Establishing standardized county e-waste collection centres.
- Developing regional recycling and consolidation hubs.
- Providing training and incentives to integrate informal collectors.
- Implementing school-based and health facility take-back schemes.
- Promoting solar e-waste management initiatives in ASAL counties.
- Introducing county-level bylaws aligned with national EPR regulations.

Conclusion

This situational analysis demonstrates that e-waste challenges in Kenya are diverse, multi-layered, and county-specific. Effective management requires:

- Harmonized national and county roles.
- Adaptive approaches tailored to county clusters.
- Strengthening enforcement, data systems, and public participation.
- Building sustainable financial and operational models for county implementation.

A coordinated, multi-stakeholder strategy integrating national leadership, county action, private sector participation, and community engagement is essential for Kenya to transition toward a safe and circular e-waste system.

SWOT Analysis

Strengths	*Weaknesses*
• Growing awareness and policy interest: Increasing recognition of e-waste as a public health and environmental issue has prompted development of regulatory frameworks (e.g., extended producer responsibility, national e-waste guidelines). • Large volume of recoverable materials: E-waste contains valuable metals such as gold, copper, silver, aluminium, and rare earth elements, offering opportunities for resource recovery and circular economy initiatives. • Emerging formal recycling infrastructure: Establishment of licensed e-waste collection centers by Government agencies and private firms. • Job creation potential: The e-waste sector supports employment in collection, repair, refurbishing, and recycling, especially for youth and small enterprises. • Partnership opportunities: Collaboration with international organizations and technology companies provides access to training, technology, and funding.	• Lack of gazzetted regulations for E-waste management: Existing laws are often weakly implemented due to low capacity, limited inspections, and informal sector resistance. • Dominance of informal recycling sector: A large share of e-waste is processed using unsafe, rudimentary methods that expose workers to toxic chemicals and reduce material recovery efficiency. • Insufficient infrastructure: Few formal collection points, inadequate transportation systems, and limited processing technologies hinder effective management. • Low public awareness: Consumers often dispose of electronics with general waste due to lack of awareness or convenient drop-off options. • High cost of safe recycling: Environmentally sound recycling technologies and facilities require significant investment, making them inaccessible for smaller operators. • Incomplete data: Lack of comprehensive national statistics on e-waste generation, flow, and recycling rates challenges planning and policy-making.
Opportunities	***Threats***
• Producer responsibility programs: Implementing EPR schemes can shift financial and operational responsibility to manufacturers and retailers, improving collection rates. • Circular economy expansion: Growing demand for recycled materials and sustainable production creates opportunities for innovation, green businesses, and material recovery. • Technological advancements: Modern recycling technologies can improve efficiency, worker safety, and environmental protection. • Public–private partnerships: Investors and tech companies increasingly support e-waste projects, from safe recycling facilities to digital tracking systems. • Job creation & skills development: Training programs can formalize informal workers, improving livelihoods while ensuring safer practices. • Urban mining: Recovering valuable metals from existing landfill sites and accumulated waste streams presents new resource opportunities.	• Health and environmental risks: Toxic emissions, heavy metal contamination, and improper dumping pose long-term risks to public health, water sources, soil quality, and biodiversity. • Rapid growth of electronic consumption: Increasing gadget use and shorter product lifespans accelerate e-waste generation, often outpacing management capacity. • Informal sector resistance: Restricting unsafe practices without providing alternatives may trigger socio-economic backlash or illegal operations. • Illegal imports and dumping: Weak border controls can lead to inflows of obsolete or unserviceable electronics from other countries. • Market volatility: Prices of recovered metals fluctuate, affecting recycling profitability. • Climate change effects: Flooding or extreme weather can spread contaminants from dumpsites and uncontrolled waste storage areas.

Risks Associated with E-Waste Handling

Kenya has experienced rapid growth in the use of electrical and electronic equipment, driven by rising consumer demand. This surge has led to increasing volumes of electronic waste (e-waste), much of which is processed by informal recyclers. Informal e-waste recycling typically relies on rudimentary methods to extract valuable materials such as gold, silver, copper, and aluminium. However, e-waste also contains numerous toxic substances, including heavy metals like lead, cadmium, mercury, and nickel, as well as hazardous organic compounds such as flame retardants, chlorofluorocarbons, polycyclic aromatic hydrocarbons (PAHs), polybrominated diphenyl ethers (PBDEs), and polychlorinated dibenzo-p-dioxins and furans (PCDD/Fs).

Although e-waste recycling recovers valuable resources including iron, rare earth elements, and precious metals excessive or unsafe exposure poses significant risks to both human health and the environment.

A survey conducted across Kenya's 47 counties found that workers involved in activities such as collection, repair, dismantling, processing, and cross-border trade of e-waste frequently experience health problems. Reported issues include physical injuries (cuts, burns, lacerations), headaches, musculoskeletal disorders, electrocution, respiratory difficulties, chest pain, dizziness, and hearing loss.

Improper disposal practices—such as dumping mixed waste at dumpsites or transfer stations—further degrade the environment. Soil pollution, contamination of water sources, and the release of toxic fumes from open burning directly affect surrounding ecosystems and public health.

Toxic metals including lead (Pb), chromium (Cr), beryllium (Be), and palladium (Pd) can enter the food chain through contaminated air, water, and soil. Once ingested, these substances may cause serious adverse health effects.

Humans are exposed to hazardous e-waste constituents through multiple pathways: ingestion (contaminated food, water, or soil), inhalation (fumes and particulate matter from burning), dermal contact (corrosive chemicals), and transplacental transfer to unborn children. E-waste is a significant source of carcinogenic, teratogenic, and mutagenic substances, including heavy metals and persistent organic pollutants such as arsenic, lead, mercury, cadmium, and PCBs

E-Waste Component	**Hazardous Materials present**	**Health effects**
Data Tapes and Floppy Disks	Chromium (VI)	· Causes bronchitis
Ink and tonner Batteries Cathode ray tubes (CRTs)	Cadmium	· Toxic irreversible effects on human health · Accumulates in the kidney and liver · Causes neural damage
Cathode ray tubes fluorescent lamps	Mercury	· Chronic damage to the brain · Respiratory and skin disorders · Renal problems (World Health Organization (WHO), 2021)
Batteries	Lithium	· Lithium can pass into breast milk and may harm a nursing baby · Inhalation of the substance may cause lung edema
Batteries Cathode Ray Tubes (CRTs)	Nickel	· Skin and Lung allergen · Causes dermatitis if in contact with skin · Causes asthma if inhaled, due to allergic reaction to the lungs
Cathode ray tubes (CRTs) Batteries Printed Wiring (circuit) Boards Glass panels Gaskets in computer monitors	Lead	· Damage to the central and peripheral nervous system · Kidney damage · Adverse effects on the brain development of children · Reproductive systems
CRTs	Zinc	· Nausea and vomiting · Risk of heart diseases · Fever, chills, coughs, headache, and fatigue · Blood disorders · Reduced immunity · Stomach pain, diarrhea, and in extreme cases, gastrointestinal damage
CRTs Fluorescent lamps	Barium	· Cause muscle weakness and damage to the heart, liver, and spleen
Printing wiring boards Thermoplastics	POPs and PAHs	· Affects thyroid function · Reproductive system
Motherboards	Beryllium	· Lung cancer carcinogen · Berylliosis
Copper wires, Printed circuit board tracks.	Copper	· Stomach cramps, nausea, liver damage, or Wilson's disease
Integrated circuit and semi- conductors	Arsenic	· Affects the digestive tract, and causes lung and skin cancer

By-products of e-waste	PBDEs	· Affects thyroid function, reproductive health, and endocrine disruption

Ecological, economic, and social consequences resulting from poor handling and management of e-waste include:

Environmental consequences	Economic consequences	Social consequences
· Air pollution, especially when e-waste is burnt · Waste management problem of non-biodegradable equipment · Toxicity and radioactive nature of e-waste to the human, water, soil, and animals · Blockage of water runoff channels · Increased amount of waste · Waste management disposal problem	· Substantial public spending on health care · Investments in complex and expensive environment remediation technologies · Loss / waste of resources that can be recycled for re-use · Opportunities for recycling industries and employment lost · Ozone depletion has led to unpredictable weather conditions. Prolonged droughts and floods demand the use of resources which should be deployed for growth and development in other sectors	· E-waste affects people's health (e.g., lead poisoning and cancerous mercury). · Growth of informal waste disposal centers in the neighborhood · Informal trade and management of e-waste · Loss of appreciation for ICT

Social Risks Associated with E-Waste

E-waste has a social component, as its production is influenced by social practices, purchasing power, preferences, attitudes, and perceptions. There are significant differences in consumption patterns across the globe. Because our economies are linear, the formula is simple: the more money you have, the more EEE you buy and the more you throw away. Consumers have diverse preferences for electronic devices, which corresponds with their incomes.

Tradition, customs, and tacit knowledge are intrinsically and inextricably intertwined with practice. In contrast to the belief that consumption is merely an expression of personal preference and unrelenting freedom of choice that inevitably leads to rampant consumerism, e-waste disposal practice is created through a social rather than an individual process. Most people purchase used electronics that are imported or purchased from friends at a nominal cost. These devices have a shorter lifespan; consequently, they become waste and are dumped on the side of the road or even in homes. The greater the escalation, the greater the dangers associated with these electronic devices. ICT's rapid expansion has also influenced the diversity of people's preferences. The advancement of numerous electronic devices compels consumers to upgrade, resulting in the replacement of their current devices with newer models. This has led to an increase in e-waste. The habit of people buying second hand electronic gadgets has been influenced by the believe formed by the society that used electronics are cheaper that brand new gadgets which they believe are expensive to buy. Consumers have different tastes in electronic gadgets, and this goes hand in hand with their earnings. Most people purchase second hand electronics that are imported or bought from their friends at a throw away price. These gadgets have shorter lifespan hence they become waste and they are dumped on the roadside or even in houses. People also have different preferences, and this is influenced by the rapid growth of ICT. Many electronic gadgets are advanced forcing the consumers to upgrade, hence ending up dumping the ones they have for the new gadgets. This has increased the levels of e-waste. The purchase of second-hand electronic gadgets has contributed to a lot of e-waste in most cities, increasing the risks associated with those electronics.

Attitudes and perception of e-waste also impact the e-waste sector: Several people perceive e-waste associated activities to be for the poor and slum dwellers. This is because the condition and methods of dismantling e-waste are cheap and most children who are fetching the e-waste come from the slums. People perceive e-waste recycling is for the poor and a dirty activity. Some people perceive that those recycling companies get more money than what they give them for their waste electronics and end up refusing to dispose them for proper e-waste management

resulting in dumping in public dumpsites.

Employees handling e-waste may experience adverse health effects from these toxins, including damage to the brain, heart, liver, kidneys, and skeletal system. Long hours and dangerous working conditions, along with low pay, are commonplace for employees, which include child laborers. The long-term effects of toxins like lead are a concern for these workers, but they also run the risk of being hurt or killed by falling machinery and carelessly dumped electronics. The society is losing youthful generation who are actively involved in dismantling electronics using dangerous methods due to low their affordability. In relation to consumer level many low-income earners purchase cheap electronics which damages easily and because e-waste hence their health is at risk compared to high income earners who buy original gadgets that take time before becoming e-waste.

Socio- Economic impacts of e-waste may also be positive as well as negative. Poor e-waste management directly impacts many ecosystems and species as well as air pollution and climate change. Landfills release methane, a potent greenhouse gas linked to climate change and the waste hierarchy's last resort. E-waste through its environmental pollution leads to agricultural production problems which bring famine because of droughts. It also impacts on households' income especially those who rely on agricultural activities.

Electronics may also include components necessary for recovery. For instance, a mobile phone may contain over 40 elements that are suitable for recycling, such as base metals like copper, specialty metals like cobalt, and precious metals like gold. Many people within the community are involved in collecting and dismantling the e-waste whereby there is a likelihood of being impacted with the risks associated with the e-waste. On the positive impact the e-waste recycling processes has created employment to youths who might have been involved in crimes. They are involved in dismantling of the electronic gadgets although some are under-age hence promoting child labor which is illegal. The e-waste management companies have contributed to income generation for slum dwellers hence promoting security in the slums.

Existing Opportunities in E-Waste Management

Effective management of e-waste has tremendous positive impact in the growth of the nation's economy, through value recovery of precious base metals in e-waste ,employment to the citizens, taxes to the government from employees and businesses and incomes to those involved in e-waste circular economy. Increased incomes lead to better livelihoods and living standards of the community.

Efficient e-waste management can achieve near 100% waste reduction through circular economy concept contributing to massive reduction in environmental pollution and consequent exposure of human to environmentally transmitted contaminants from e-waste.
Increasing sustainability of the use and exploitation of natural resources is an important benefit that can result from improved and efficient e-waste management as alternative sources of raw material for production.

CHAPTER 3

Policy, Legal and Institutional Frameworks

This chapter elaborates on the national laws and international conventions and agreements relating to environmental management

International Framework and Agreements

Kenya's approach to electronic waste (e-waste) management aligns with several international frameworks and agreements designed to promote environmentally sound practices and protect human health. Key international frameworks include:

Basel Convention (1989):

This treaty aims to reduce the transboundary movement of hazardous waste, including e-waste, and ensure its environmentally sound management. Kenya is a signatory. Amendments effective January 1, 2025, subject all e-waste to the Prior Informed Consent (PIC) procedure. International Electrotechnical Commission (IEC) Standards: The IEC is developing standards like IEC 63395 for systematic and sustainable e-waste management, emphasising extended producer responsibilities.

Global E-Waste Statistics Partnership:

This initiative offers data and analysis on global e-waste, helping countries like Kenya formulate effective policies. Digital Cooperation Organization (DCO) E-Waste Management Framework: This framework guides member states in effective e-waste management to foster environmental sustainability, public health, digital inclusion, and economic growth.

OECD Guidelines:

The Organisation for Economic Co-operation and Development (OECD) has policies and guidelines for e-waste, focusing on Regulatory Impact Analysis (RIA) to ensure effective and efficient regulations. The OECD Control System for waste recovery streamlines recyclable material trade. OECD countries updated their rules in 2024 to align with the Basel Convention for international e-waste shipments.

Rotterdam Convention:

While not directly regulating e-waste, it focuses on prior informed consent for hazardous chemicals and pesticides in international trade. This is relevant to e-waste due to hazardous chemicals in electronics, facilitating information exchange, and complementing the Basel and Stockholm Conventions. For Kenya, it aids in enhancing regulatory frameworks, preventing illegal imports, and capacity building. Some of the key chemicals that are found in electronic products and regulated under the Rotterdam Convention and examples of such products containing these chemicals are: o Polychlorinated Biphenyls (PCBs, Asbestos, Decabromodiphenyl ether (DecaBDE), Hexabromocyclododecane (HBCDD), Short-chain chlorinated paraffin (SCCPs), Mercury compounds, Tributyltin compounds (TBTs).

Stockholm Convention on Persistent Organic Pollutants (POPs):

This treaty addresses chemicals that persist in the environment, accumulate in organisms, and are toxic19. It influences e-waste management as POPs like PCBs, PBDEs, and HBCD are found in e-waste. It provides guidelines for identifying and managing POPs-containing equipment, environmentally sound management (ESM), best available techniques (BAT), best environmental practices (BEP), and managing contaminated sites, often collaborating with the Basel Convention.

Minamata Convention on Mercury:

This global treaty protects human health and the environment from mercury. It influences e-waste management by addressing mercury in components like fluorescent lamps, batteries, and switches. Obligations include phasing out mercury-added products by 2020 and ensuring environmentally sound management of mercury waste, referencing Basel Convention guidelines.

Montreal Protocol on Substances that Deplete the Ozone Layer:

This protocol aims to phase out ozone-depleting substances (ODS) and impacts e-waste containing ODS like CFCs and HCFCs found in refrigeration and air-conditioning equipment. Guidelines include identification, environmentally sound dismantling, recycling, disposal, training, and public awareness.

Kigali Amendment to the Montreal Protocol:

This amendment focuses on phasing down hydrofluorocarbons (HFCs), potent greenhouse gases found in RACHP equipment. Its implementation involves gradual HFC reduction, environmentally sound dismantling, recycling, disposal, training, and public awareness. Rwanda is cited as a case study for policy development, stakeholder engagement, and capacity assessment.

Bamako Convention:

This regional African treaty bans hazardous waste imports into Africa and regulates transboundary movements within the continent, including e-waste. It broadly defines hazardous waste to cover elements common in e-waste and characterises illegal import as a criminal act.

National Policy Frameworks

Kenya has established a comprehensive national policy framework to manage electronic waste (e-waste), aiming to protect environmental and public health. Collectively, these components form a robust national policy framework aimed at ensuring the effective management of e-waste in Kenya, thereby safeguarding environmental and public health. The key components of the policy framework include:

The Kenya Environmental Sanitation and Hygiene Policy 2016-2030 (KESHP)	Envisions a clean, healthy, and economically prosperous Kenya free from sanitation and hygiene-related diseases.
The National E-Waste Management Strategy	Outlines Kenya's vision of "Towards zero E-Waste in Kenya by 2030," aiming to establish a sustainable e-waste management system.
The National Sustainable Waste Management Policy	Aligns with Kenya's development agenda (Vision 2030) and emphasises the need for robust legislative and institutional mechanisms for effective waste management at both national and county levels.
The Environmental Management and Coordination Act (EMCA, CAP 387) and the Waste Management Regulations (2024)	Serve as the primary legislation guiding e-waste management in Kenya, prohibiting the handling, transportation, and disposal of waste without valid licenses issued by the National Environment Management Authority (NEMA).
The Kenya National Adaptation Plan 2015-2030	Is a critical response to climate change challenges, aiming to enhance climate resilience and support the attainment of Vision 2030 and beyond.
The Kenya National Climate Change Policy	Focuses on the interlinkages between sustainable national development and climate change, acknowledging the adverse impacts of climate change on various sectors.
The Kenya Digital Economy Acceleration Project (KDEAP)	Emphasises the importance of identifying and assessing existing legislation, policies, and regulations related to e-waste management to propose necessary amendments or new regulations.
The Youth Climate Action Strategy for Kenya 2021-2030	Highlights the development of policies, laws, institutions, and strategies to address climate action and green jobs, including the National Climate Change Action Plan.
The Kenya Vision 2030 strategy	Aims to investigate and model the relationship between economic growth, energy consumption, and CO_2 emissions, with projections of CO_2 emissions from fossil fuel combustion through to 2030.

The Kenya's Green Leadership initiative	Aims to achieve 100% renewable energy by 2030 and expand its energy grid capacity to 100 gigawatts (GW) by 2040, positioning Kenya as a leader in Africa's climate future.
The Policy Framework Guiding E-Waste Management in Kenya	Emphasises the need for effective policies and regulations for e-waste management, highlighting the role of the Environmental Management and Coordination Act (EMCA, CAP 387), and the Waste Management Regulations 2024.
The Role of Regulatory Framework on E-Waste in Kenya study	examines the impact of regulatory frameworks on e-waste management, focusing on Nairobi County from 2010-20223.
The Towards Development of Effective Policies and Regulations for Solar E-Waste in Kenya article	Discusses the need for specific legislation addressing solar e-waste, noting that existing laws like EMCA, CAP 387and Waste Management Regulations 2024 are the main guides for e-waste management.
The Guidelines for E-Waste Management in Kenya developed by NEMA/MEMR	Aim to establish e-waste regulations and policies, enhancing environmental protection and providing frameworks for e-waste treatment technologies and disposal procedures.
The National Climate Change Action Plan (NCCAP) 2023–2027	Outlines Kenya's strategic priorities for addressing climate change over a five-year period. This plan emphasizes the importance of integrating climate considerations across various sectors, including waste management. In the context of the proposed Electronic and Electrical Waste (E-Waste) Regulations, 2025, the NCCAP 2023–2027 is highly relevant. It underscores the need for sustainable waste management practices that not only mitigate environmental pollution but also reduce greenhouse gas emissions associated with improper disposal of electronic waste. By aligning the E-Waste Regulations with the NCCAP's objectives, Kenya aims to promote a circular economy approach, encouraging recycling and responsible disposal of electronic products.
Sessional Paper No. 5 of 2016 on National Climate Change Framework Policy	Serves as a cornerstone in Kenya's efforts to address climate change, aiming to enhance adaptive capacity, build resilience, and promote low-carbon development. Aligning the E-Waste Regulations with the National Climate Change Framework Policy ensures that climate considerations are integrated into waste management practices.
Kenya Vision 2030	Is the nation's long-term development blueprint, aiming to transform Kenya into a newly industrializing, globally competitive, and prosperous country with a high quality of life by 2030. It emphasises the importance of policy, legal, and institutional reforms to enhance environmental governance. Developing and enacting an E-Waste Management Policy is identified as a critical step in this process.
The Fourth Medium Term Plan (MTP IV) 2023–2027	Is a strategic framework guiding Kenya's development agenda, focusing on economic recovery and sustainable growth as part of the Kenya Vision 2030 initiative. Effective e-waste management is crucial for mitigating environmental hazards and promoting public health, thereby supporting the plan's goal of sustainable development.
The National E-Waste Management Strategy (2019–2024)	Serves as a foundational framework for addressing electronic waste challenges in Kenya. Its primary goal is to promote a sustainable e-waste management system, supported by strategic objectives such as strengthening legal and institutional frameworks, developing infrastructure, fostering research and innovation, and raising public awareness.
National ICT Policy 2019 The National ICT Policy 2019	Outlines Kenya's strategic approach to harnessing information and communication technologies for sustainable development. A significant component of this policy is its emphasis on environmental conservation, particularly concerning the management of electronic waste (e-waste).

Policy Directives on E-Waste Management

The policy mandates several key actions to address e-waste challenges:

- E-Waste Recycling Initiatives: The policy advocates for the development and implementation of e-waste recycling programs to mitigate environmental harm and promote resource recovery.
- Incentives for Stakeholders: To encourage active participation in e-waste management, the policy proposes incentives for investors and other stakeholders involved in energy management, e-waste recycling, and related environmental conservation efforts.

National Legal Frameworks

Kenya has established a comprehensive regulatory framework to address the challenges posed by electronic waste (e-waste). The key components of this framework include:

Constitution of Kenya, 2010	The Constitution of Kenya is the supreme law of the Republic of Kenya and binds all persons and all State organs at both County and National levels of government. It establishes principles of public participation (Article 10), good governance (Article 232) that underpin the regulatory process, environmental rights (Article 42), and sustainable development: (Article 10).
Kenya's Environmental Management and Coordination Act (EMCA Cap 387)	This Act serves as the primary framework for environmental management, addressing various waste types, including e-waste. E-waste is categorized as hazardous waste under EMCA Cap 387, and handling, transportation, and disposal require valid licenses issued by the National Environment Management Authority (NEMA).
The Sustainable Waste Management Act, 2022	The Sustainable Waste Management Act, 2022, establishes a comprehensive legal and institutional framework for sustainable waste management in Kenya. A "producer" means an entity that introduces goods, products and packaging into the country using authorised means by manufacturing, importing, converting, filling, refilling, repackaging or rebranding. By aligning the proposed E-Waste Regulations, 2025, with the provisions of the Sustainable Waste Management Act, 2022, Kenya can establish a robust and cohesive approach to managing electronic waste, fostering environmental sustainability and public health protection.
Sustainable Waste Management (Extended Producer Responsibility) Regulations, 2024 (EPR Regulations)	The Sustainable Waste Management (Extended Producer Responsibility) Regulations, 2024 (EPR Regulations) establish a legal framework in Kenya that mandates producers to manage the entire lifecycle of their products and packaging, emphasizing waste reduction, recycling, and environmentally sound disposal practices60. Incorporating the mandates of the EPR Regulations into the proposed E-Waste Regulations ensures a comprehensive evaluation of how producer responsibilities can effectively mitigate e-waste challenges in Kenya, fostering environmental sustainability and compliance with national waste management policies.
The Climate Change Act, 2016 (amended, 2023),	The act serves as a foundational framework for Kenya's climate change mitigation and adaptation strategies. In summary, the Act provides the necessary policy direction, institutional support, and legal mandate that underpin the development and implementation of the proposed E-Waste Regulations, ensuring they contribute effectively to Kenya's climate change mitigation and adaptation efforts.
Energy Act, Cap 314	This Act was enacted in 2019, serves as Kenya's comprehensive legislation governing the energy sector, encompassing electricity, renewable energy, petroleum, and related areas. In summary, while the Act does not explicitly address e-waste management, its provisions on promoting energy efficiency, regulating electrical equipment standards, and encouraging sustainable practices create an enabling environment that aligns with the objectives of the proposed E-Waste Regulations, 2025. The Act's emphasis on sustainability and regulatory oversight indirectly supports the establishment of a comprehensive e-waste management framework in Kenya.

Public Health Act, Cap 242	The Public Health Act, Cap 242, is a fundamental piece of legislation in Kenya aimed at securing and maintaining public health. In summary, the Act establishes a legal and institutional framework that is integral to the effective management of e-waste. By defining health-related nuisances, empowering health authorities, and emphasizing environmental protection, the Act underpins the necessity and enforcement of the proposed E-Waste Regulations, 2025, thereby contributing to the protection of public health and the environment.
The Health Act, Cap 241	The Health Act, Cap 241, serves as a comprehensive framework for health services delivery in Kenya. The Act provides a legal foundation that supports the development and implementation of the proposed E-Waste Regulations, 2025. By emphasizing health rights, policy development, research, protection of vulnerable populations, and safe healthcare practices, the Act aligns with the objectives of the e-waste regulations to protect public health and the environment from the hazards of electronic and electrical waste.
Occupational Safety and Health Act (OSHA), Cap 236A	The Occupational Safety and Health Act (OSHA), Cap 236A, is a pivotal piece of legislation in Kenya that aims to ensure the safety, health, and welfare of workers in all workplaces. The Act provides a legal framework that supports the safe management of e-waste in workplaces. The proposed E-Waste Regulations, 2025, would complement OSHA by offering specific guidelines and standards for handling electronic and electrical waste, thereby enhancing worker safety and health in industries dealing with such materials.
Consumer Protection Act Cap 501	The Consumer Protection Act, Cap 501, is a pivotal piece of legislation in Kenya designed to safeguard consumers from unfair trade practices and ensure their rights are upheld in the marketplace. The Act offers a robust framework that aligns with and supports the objectives of the proposed E-Waste Regulations, 2025. By promoting accurate information, preventing deceptive practices, facilitating consumer education, establishing liability for defective products, and enhancing enforcement mechanisms, the Act plays a crucial role in fostering responsible e-waste management practices that protect both consumers and the environment.
County Governments Act, No. 17 of 2012	Under the County Governments Act, county governments are vested with the authority to manage functions previously handled by local authorities, including waste management services. This transition aligns with the devolved system of governance introduced by Kenya's 2010 Constitution, which aims to bring services closer to the people and enhance local accountability. Their involvement is essential for the successful implementation of the proposed E-Waste Regulations, 2025, as they are responsible for localizing national policies, engaging stakeholders, enforcing compliance, and allocating resources to manage e-waste effectively within their jurisdictions.
Waste Management Regulations, 2024	The Environmental Management and Co-ordination (Waste Management) Regulations, 2024, established under Kenya's Environmental Management and Coordination Act (EMCA, CAP 387), provide a comprehensive framework for waste management across various categories, including hazardous waste. These regulations set standards for handling, transportation, and disposal of waste, including specific provisions for electronic and electrical waste (e-waste).
The Environmental Management and Co-ordination (Management of Toxic and Hazardous Chemicals and Materials) Regulations, 2024 (Legal Notice No. 182)	The regulation developed under Kenya's Environmental Management and Coordination Act (EMCA, CAP 387), aim to regulate the lifecycle of toxic and hazardous chemicals and materials, encompassing their manufacture, import, export, transport, storage, handling, and disposal. By integrating principles and provisions from the Toxic and Hazardous Chemicals and Materials Management Regulations, 2024, the proposed E-Waste Regulations, 2025, can establish a robust framework for managing the hazardous components of electronic waste, thereby safeguarding environmental and public health.

The Environmental Management and Co-ordination (Controlled Substances) Regulations, 2025 (Legal Notice No. 53)	The regulations established under Kenya's Environmental Management and Co-ordination Act (EMCA, CAP 387) aim to regulate the production, trade, and use of controlled substances, particularly those that deplete the ozone layer. By integrating the principles and guidelines from the Environmental Management and Co-ordination (Controlled Substances) Regulations, 2025 (Legal Notice No. 53), the proposed E-Waste Regulations, 2025, can establish a comprehensive framework that addresses the complexities of hazardous substances within electronic waste, thereby enhancing environmental sustainability and public health protection.
The E-waste Bill, 2025 vs The E-Waste Regulations, 2025	The bill seeks to establish a structured and enforceable system for electronic waste (e-waste) management across Kenya. It mandates a legal framework for the collection, sorting, and recycling of e-waste, aimed at improving environmental and public health outcomes and fostering a green economy.

Institutional Framework

S/N	Institution	Roles/Responsibilities
1.	National Environment Management Authority (NEMA)	Serves as the primary environmental regulator and the central authority overseeing e-waste management. NEMA's mandate is extensive; it licenses e-waste handlers, approves Producer Responsibility Organisations (PROs), and maintains a national register of producers. It is also responsible for compliance monitoring, which involves regular inspections of facilities, assessment of operational practices, and enforcement through penalties for non-compliance. This ensures that all actors in the e-waste value chain adhere to the legal framework and environmental standards.
2.	The Information, Communication and Technology Authority (ICTA)	The ICT Authority (ICTA) plays a specialised role in managing the lifecycle of ICT assets within government institutions. It integrates take-back clauses into ICT procurement contracts, coordinates national-level ICT recycling initiatives, and maintains a centralised database of decommissioned government ICT equipment. This ensures that public sector ICT waste is systematically collected and directed to authorised recycling channels.
3.	The Ministry of Environment, Climate Change & Forestry	The Ministry provides high-level leadership in policy development and strategy formulation. It coordinates national waste management strategies, oversees the alignment of e-waste management with broader environmental goals, and ensures that Kenya meets its international obligations for environmental reporting and treaty compliance.
4.	The Kenya Bureau of Standards (KEBS)	The Kenya Bureau of Standards (KEBS) supports e-waste management by developing and enforcing product standards that promote repairability, recyclability, and the use of safe materials. KEBS helps prevent environmental harm and facilitates easier recycling by setting standards for product design and material composition.
5.	The Kenya Revenue Authority (KRA)	The Kenya Revenue Authority (KRA) and Customs are responsible for regulating the cross-border movement of electrical and electronic equipment (EEE) and e-waste. Their duties include monitoring imports and exports, collecting Advanced Recycling Fees (ARF) where applicable, and ensuring that all transboundary movements of e-waste comply with the Basel Convention requirements.
6.	County Government (devolved units)	At the county government level, local administrations are responsible for implementing e-waste management guidelines within their jurisdictions. This includes establishing and maintaining e-waste collection points and aggregation centers to make disposal more accessible for residents. Counties also enforce local waste management bylaws specific to e-waste, run awareness campaigns in partnership with national agencies, and integrate e-waste considerations into their County Integrated Development Plans (CIDPs) to secure resources and institutional backing for local initiatives.

7.	The Private Sector (Formal)	Within the private sector, producers and Producer Responsibility Organizations (PROs) play a central role in implementing the Extended Producer Responsibility (EPR) scheme. They finance and organize the complete e-waste management process—from collection and transport to treatment, recycling, and environmentally sound disposal. In addition, they are required to submit annual reports and financial statements to NEMA, and they must conduct awareness campaigns, including school outreach programs, to educate the public on proper e-waste disposal practices.
8.	Informal	The operational backbone of the e-waste system is formed by recyclers, refurbishers, and the informal sector. Licensed recyclers and refurbishers must comply with NEMA's environmental and occupational health and safety (OHS) standards. The guidelines also encourage informal sector actors to participate in formalisation programs, receive training, and obtain certification to ensure their work is conducted safely and sustainably. All operators, formal or informal, are required to report data on their collection, processing, and disposal activities to NEMA to strengthen transparency and traceability across the sector.

Designated Collection and Sorting Infrastructure

Ward consolidation sites:	All individuals and organisations must deposit e-waste at designated collection points within their respective wards.
County-level sorting centres:	Governors are responsible for establishing county sorting facilities (minimum 5 acres plus a 2-acre buffer).
National recycling plant:	The Environment Cabinet Secretary, in consultation with NEMA, must establish a national e-waste facility on at least 30 acres with a 5-acre buffer.

Licensing and Enforcement

- E-waste collectors: Must be licensed by the county environment executives. Only licensed collectors can transport materials from ward sites to sorting centres or the national plant.
- Recycling operators: Need explicit approval from the Environment Cabinet Secretary before operating.

Conclusion

Through these defined institutional roles and responsibilities, Kenya's e-waste management system operates as a multi-stakeholder network, ensuring that environmental protection, public health, and sustainable resource use are upheld throughout the e-waste lifecycle.

CHAPTER 4

E-Waste Categorization

This chapter describes the different categories of electronic and electrical appliances, the e-waste resulting from them and their levels of toxicity

There are many classifications that can be used to describe e-waste which includes the Harmonized Commodity Description and Coding System (HS), Basel convention classification, EU-WEEE (Waste electrical and Electronic Equipment) Directives and the United Nations University classification.

4.1 Categorization Based on Mode of Operation and Function

Categorization and scope of products in the WEEE Directive are broad enough to be relevant for the rest of the world. This has seen the adoption of the WEEE Directives in many countries including Mauritius and the EAC.

Table 4.1: E-Waste Categories Based on the Directive on WEEE Issued by EU

Category	Electrical and Equipment Class	Examples
Category 1	Large household appliances	Electrical stove, washing machines, refrigerators, freezers, air conditioners, microwaves, electric radiators
Category 2	Small household appliances	Vacuum cleaners, iron boxes, toasters, coffee machines, fryers, electric knives
Category 3	IT and telecommunications equipment	Personal computer, phone, cellular phone, notepads, copying equipment, electrical and electronic type writers, calculators, telex
Category 4	Consumer equipment	TVs, radios, VCD, DVD, music instruments, amplifiers
Category 5	Lighting equipment	Luminaries for fluorescent lamps, fluorescent lamps, pressure lamps
Category 6	Electrical and electronic tools	Drills. Saws, sewing machines, milling, sanding, wood and metal processors, riveting, screwing machines
Category 7	Toys, leisure and sports equipment	Electrical trains and car racing sets, video games
Category 8	Medical devices	Radiotherapy equipment, cardiology, dialysis, pulmonary ventilators machines, laboratory equipment, analysers
Category 9	Monitoring and control instruments	Smoke detector, heating regulators. Thermostats, measuring/weighing appliances
Category 10	Automatic dispensers	Automatic dispensers for drinks, milk, cooking oil, money
Category 11	End of life batteries, solar PV and related equipment	Portable,automotive batteries and industrial batteries ,solar panels, charge controllers , inverters

4.2 Categorization Based on Element Composition

This category is based on the physical, chemical and gaseous components found in the electrical and electronic appliances. They include epoxy resins, fibber glass, Polychlorinated biphenyl (PCBs), (polyvinyl chlorides) (PVC), chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), thermosetting plastics, lead, tin, copper, silicon, beryllium, carbon, iron and Aluminium. They also vary in quantity:

4.2.1 Elements found in small amounts.

They include cadmium, mercury, and thallium.

4.2.2 Elements found in trace amounts

They include americium, antimony, arsenic, barium, bismuth, boron, cobalt, europium, gallium, germanium, gold, indium, lithium, manganese, nickel, niobium, palladium, platinum, rhodium, ruthenium, selenium, silver, tantalum, terbium, thorium, titanium, vanadium, and yttrium etc
Almost all electronics contain lead and tin (as solder) and copper (as wire and printed circuit board tracks), though the use of lead-free solder is now being promoted all over the world. These substances can be divided further based on their level of toxicity to humans and the environment

Moreover, Electronic Waste under the Basel Convention is classified as a hazardous waste in Annex VIII under list A and Non-hazardous under Annex IX B.

4.2.3 Hazardous elements

This category includes those elements that are harmful to the environment and human health.

Table 4:2: Hazardous elements in electrical and electronic equipment

Element	***electrical and electronic equipment where the elements occur***
Americium	Smoke alarms (radioactive source).
Mercury	Fluorescent tubes, switches, mechanical doorbells
Sulphur	Lead -acid batteries
PCBs	Wiring insulations
Cadmium	Light sensitive resistors, corrosion-resistant alloys for marine and variation environments and nickel – cadmium batteries
Lead	Old solder, CRT monitor glass, lead- acid batteries and formulations of PVC
Beryllium Oxide	Filler in some thermal interface materials such as thermal grease used on heat sinks of CPUs and power transistors, magnetrons, X-ray transparent ceramic windows, heat transfer fins in vacuum tubes and gas lasers.
Polyvinyl chloride	Vinyl products

4.2.4 Non hazardous elements

Table 4.3 Non-hazardous elements found in electrical and electronic equipment

Element	***Electrical and electronic equipment where the elements occur***
Tin	Solder, component leads, Coatings on connectors
Copper	Copper coated electrical wiring and cables, printed circuit board tracks, component leads
Aluminium	Nearly all electronic goods using few watts of power, including electronic capacitors
Iron	Screws, bolts, Steel chassis, cases, structural frames of appliances such as fridges, microwaves
Germanium	1950s-1960s transistorized electronics
Steel	Refrigerators and washing machine bodies, TV stands, computer casings, office electronic frames
Silicon	Solid Glass, transistors, printed circuit boards, diodes, transistors, solar PV cells
Nickel	Metallic part of Nickel-cadmium batteries
Lithium	Metallic part of Lithium-ion batteries found in mobile forms, laptops, tablets, power banks, UPS backup systems, blue tooth devices and drones
Zinc	Plating for steel parts, metal casing
Gold	Connector plating in computing equipment, microprocessor pins
Magnesium	Camera frames, light weight laptop bodies, phone casing
Platinum	Hard drive disks, sensors
Silver	Switch contacts, printed circuit boards, solder in some electronics

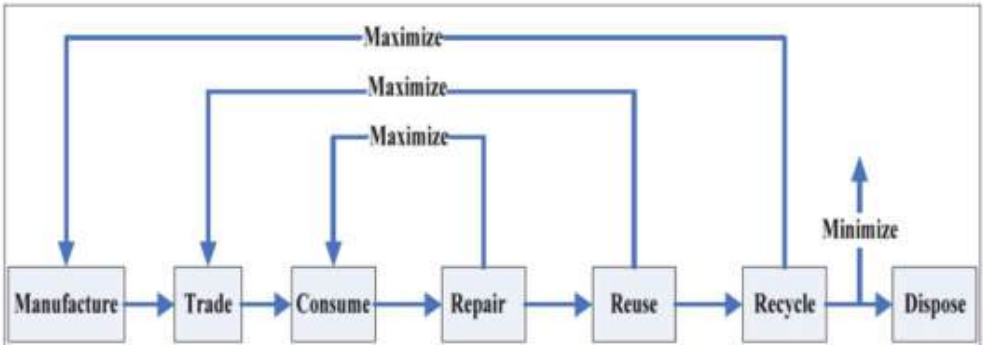
CHAPTER 5

Guidelines for Target Groups

The chapter gives specific guidelines to specific target sectors in the e-waste management value chain

Guidelines for E-Waste Value Chain Actors

These guidelines seek to implement the 4Rs, (Reduce, Repair, Reuse and Recycle) to effectively minimize e-waste. The proposed flow is presented in the figure below.



Value chain actors include those responsible for designing, manufacturing, importation, marketing, distribution, retailing, consumption, refurbishing, repairing, discarding, collecting, transporting, aggregating, segregation, dismantling, recovery of parts, recycling, disposal and regulation of electrical and electronic goods and the resultant e-waste. They include both formal and informal sector players, individuals, corporates and government agencies.

Manufacturer

There are very few manufacturers of electrical and electronic equipment in Kenya. Most of the goods are therefore imported. Manufacturers are required to:

- Practice cleaner production methods by conserving raw materials and energy and educing toxic emissions and wastes
- Incorporate environmental concerns in the design and disposal of the products
- Clearly label products for ease of identification and to declare the
- hazardous constituents of the product
- Monitor the product life cycle from beginning to end by identifying and eliminating potential negative impacts of the product, enabling the recovery and re-use of the product where possible as well as promoting and supporting reclamation and recycling
- Establish channels to collect the end of life wastes.
- Comply with Kenya standards in the manufacture of electronic goods.
- Register with NEMA as a Producer of electrical and electronic goods.
- Fulfil their extended producer responsibility obligations.
- Observe that manufacturing of electrical and electronic equipment containing Cathode ray tubes is strictly prohibited, except for those used for medical purposes.

Assemblers

Assemblers of electronic and electrical goods are required to:

- Comply with Kenyan standards on the assembly of electronic goods.
- The goods are clearly labeled with the dates of manufacture, manufacturer and country of origin.
- Observe that assembling of electrical and electronic equipment containing Cathode ray tubes is strictly prohibited, except for those used for medical purposes.
- Ensure that the goods have user manuals in English.
- Clearly label products for ease of identification of hazardous product constituents.
- Register with NEMA as Producers of electrical and electronic goods.
- Fulfil their extended producer responsibility obligations.

Importers

Importation involves both new and used electronic and electrical goods. Importers are required to ensure that:

- The goods comply with Kenyan standards.
- The goods are not restricted or prohibited/ banned in Kenya.
- Observe that the importation of electrical and electronic equipment containing Cathode ray tubes is strictly prohibited, except for those used for medical purposes.

- The goods are functionally complete (all components are present).
- The goods are clearly labeled with the dates of manufacture, manufacturer and country of origin.
- The goods have user manuals in English.
- Used/ second hand goods are not those classifiable as waste (being brought in as sources of spare parts).
- They register with NEMA as Producers of electrical and electronic goods.
- They fulfil their extended producer responsibility obligations.

Users/Consumers

Consumers include individuals, corporate organisations, government institutions, educational institutions, religious organizations, etc. that own devices which falls into one of the e-waste categories and which is considered to have ceased to be of any value. Consumers are the generators of e-waste. Consumers are required to:

- Consider taking the electrical and electronic devices to refurbishers for revival.
- Take back the equipment to the manufacturer, importer or assembler, if such take-back systems exist.
- ·Segregate e-waste from other wastes to facilitate collection, treatment and recycling
- Take the e-waste to the nearest buy-back centres, collection centres or material recovery facilities.
- Deposit e-waste into the appropriate colour-coded bags/bins for recyclable dry waste to be collected by waste handlers.
- Large generators of e-waste are encouraged to have contractual arrangements with NEMA-licensed e-waste handlers for seamless management of the e-waste they generate from time to time.

Generators and Handlers

E-waste generators and handlers shall not dispose of electrical and electronic waste:

- by open burning
- in any water body
- in a non-designated waste receptacle
- by burying
- by dumping in a dumpsite
- by abandoning waste anywhere other than in a collection centre or at a licensed recycling facility.

Recyclers/Refurbishers

Refurbishing and repairing extends the functional life of equipment. Refurbishers and repairers are required to:

- Ensure wastes (unusable parts) arising from their operations are handed over to collectors licensed by NEMA.
- Ensure they do not carry out open burning of the electrical and electronic equipment at the facility.
- Ensure that irreparable equipment are handed over to operators of e-waste Material recovery facilities or recyclers who are duly licensed by NEMA.
- Ensure they keep accurate records of equipment sent to them for refurbishing/ repairing.
- Provide suitable incentives to the consumer to hand over end-of life equipment. These could be in the form of buy-back, trade-ins, or related incentives.
- Conduct their operations in a manner that does not expose them and the public to the hazards contained in e-waste. For instance, they should use appropriate PPE, avoid any form of open burning of e-waste fractions, dump non-value e-waste together with municipal waste etc.
- Repairers and refurbishers are required to register with NEMA (at no fee).

Collectors/Transporters

Collectors and Transporters of e-waste are required to:

- Ensure e-waste is properly contained in bags, bins or other colour coded receptacles for collection.
- Ensure vehicles transporting e-waste are licensed by NEMA.
- Ensure e-waste is taken to e-waste treatment sites licensed by NEMA
- Keep records of the e-waste transported to e-waste treatment sites licensed by NEMA
- Use appropriate PPE to minimize exposure to hazardous components of e-waste

Collection Centers

Collection infrastructure requires establishment of e-waste collection points/centres and storage areas. The following are guidelines for establishing collection points and storage areas:

- Collection points and storage areas should provide sorting infrastructure to effectively separate e-waste from other municipal waste.

- Collection facilities should be available in every neighborhood and accessible taking into account the population density.
- Collection points should be manned.
- There should be a system for recording quantities and types of e-waste received at the facility.
- Collection points should be equipped with the environmental protection facilities covered under below under storage.

Storage of E-Waste

Proper storage ensures integrity of the components intended for reclamation and aids in the containment of hazardous materials.

Whether at the generation point, collection centre, Material recovery or recycling facility, e-waste should be;

- Well covered and protected from moisture, dust and potential fire sources.
- The covering should be weatherproof to prevent exposure to elements of weather.
- E-waste items should be separated and kept in appropriate well marked containers as per the approved waste colour coding
- The storage area should have impermeable surfaces and sealed drainage system. This will prevent liquid run-offs into the drainage channels and ensure all liquids entering the storage area are collected in a sealed sump.
- Spillage collection facilities should be provided. They should include impermeable pavements and sealed drainage system as the primary means of containment.
- A separate storage area should be provided for disassembled spare parts (e.g. motors and compressors) that contain oil or other types of fluids. These should be stored in containers that will not allow oil and other fluids to escape.
- Components and residues arising from the treatment of e-waste should be contained for disposal or recovery.
- If the residues contain hazardous substances, they should be stored on impermeable surfaces and in appropriate containers or bays with weatherproof covering.
- Containers should be clearly labelled to identify their contents and must be secured from liquids and rainwater seepage.
- E-waste components should be segregated based on the compatibility of their components and their eventual destinations.
- Batteries should be handled and stored with a clear knowledge of their potential fire risk.
- Batteries must therefore be prevented from potential short-circuitry.

Material Recovery Facilities

Material Recovery Facilities receive, segregate, dismantle, and recover re-usable, recyclable and disposable components from the e-waste. This is done using specialized equipment and tools and sometimes under controlled conditions.

Operators of Material Recovery Facilities are required to:

- Conduct Environmental Impact Assessment (EIA) and obtain EIA licenses prior to establishment of the Material Recovery Facilities.
- Obtain from NEMA, licenses to own/operate the facilities
- Use equipment and infrastructure with environmentally sound technologies to manage electrical and electronic waste.
- Ensure that dismantling and recovery is done in an environmentally safe manner.
- Ensure all workers use appropriate PPE.
- Ensure disposable waste is transferred to facilities licensed by NEMA for safe disposal.
- Keep accurate records of e-waste received, recovered and disposed.
- Keep records of problematic fractions and share the same with NEMA.
- Obtain permits from NEMA to export e-waste.
- Conduct annual environmental self-audits and submit to NEMA, and to comply with the improvement actions therefrom.

Recyclers

Operators of e-waste recycling facilities are required to:

- Conduct Environmental Impact Assessment (EIA) and obtain EIA licenses prior to establishment of the Facilities.
- Obtain from NEMA, licenses to own/operate the facilities
- Use equipment and infrastructure with environmentally sound technologies to manage electrical and electronic waste.
- Ensure recycling operations are done in an environmentally safe manner.
- Ensure all workers use appropriate PPE.
- Monitor emissions and discharges from the recycling facility and ensure compliance with applicable environmental standards
- Recycling plants with emissions covered

in the Air Quality Regulations must obtain Emission Licenses from NEMA.
- Ensure disposable waste is transferred to facilities licensed by NEMA for safe disposal.
- Keep accurate records of e-waste received, recovered and disposed.
- Keep records of problematic fractions and share the same with NEMA.
- Obtain permits from NEMA to export e-waste.
- Conduct annual environmental self-audits and submit to NEMA, and to comply with the improvement actions therefrom

Final Disposal Site/ Plant

As appropriate (depending on the material composition), e-waste fractions that cannot be recycled further such as the glass screens, insulation material, some plastic components, films etc., can be disposed of through landfilling or incineration. Components containing persistent organic pollutants shall not be incinerated (except in highly advanced and specialized incineration plants).
Disposal sites/ plants are required to:
- Conduct Environmental Impact Assessment (EIA) and obtain EIA licenses prior to establishment of the Facilities.
- Obtain from NEMA, licenses to own/operate the dsisposal plants/sites.
- Use equipment and infrastructure with environmentally sound technologies to manage potential pollution from electrical and electronic waste.
- Monitor emissions and discharges from the disposal facilities and ensure compliance with applicable environmental standards.
- Disposal plants with emissions covered in the Air Quality Regulations must obtain Emission Licenses from NEMA.
- Conduct annual environmental self-audits and submit to NEMA, and to comply with the improvement actions therefrom

Statutory regulators

As already discussed under the section on Policy, Legal and Institutional Framework, the key regulators of the e-waste industry include:
NEMA
ICTA
County Governments
CAK
KRA
KEBS
Anti-Counterfeit Authority
KNBS
Ministry of Trade
Ministry of Transport

The regulators are expected to:
- Formulate appropriate standards to regulate the quality of electrical and electronic goods being introduced into the Kenyan market.
- Set minimum standards to be met by used electrical and electronic goods being introduced into the Kenyan market.
- Issue enabling regulations that control the management of e-waste in Kenya.
- Enforce compliance with regulations governing counterfeit electrical and electronic goods.
- Maintain and share data on the quantities of electrical and electronic goods being introduced into the Kenyan market.
- Set minimum incentives for value chain players in the e-waste industry.
- Establish / create an enabling environment for the establishment infrastructure of for the collection, transportation, recovery. treatment, recycling and disposal of e-waste.
- Promote the use of non-regulatory instruments that promotes industry self-regulation.
- · Promote information sharing on best practices in managing e-waste.
- Promote international collaboration on the management of e-waste.
- Promote research, awareness and education on the e-waste topic.

@NemaKenya www.nema.go.ke

For More Information, Contact
DIRECTOR GENERAL
National Environment Management Authority
P.O Box 67839-00200, Nairobi, Eland House, Popo Road
Tel: 254-20-2183718, 2101370 Mobile: 0724253398, 0723363010, 0735013046 Email: info@nema.go.ke