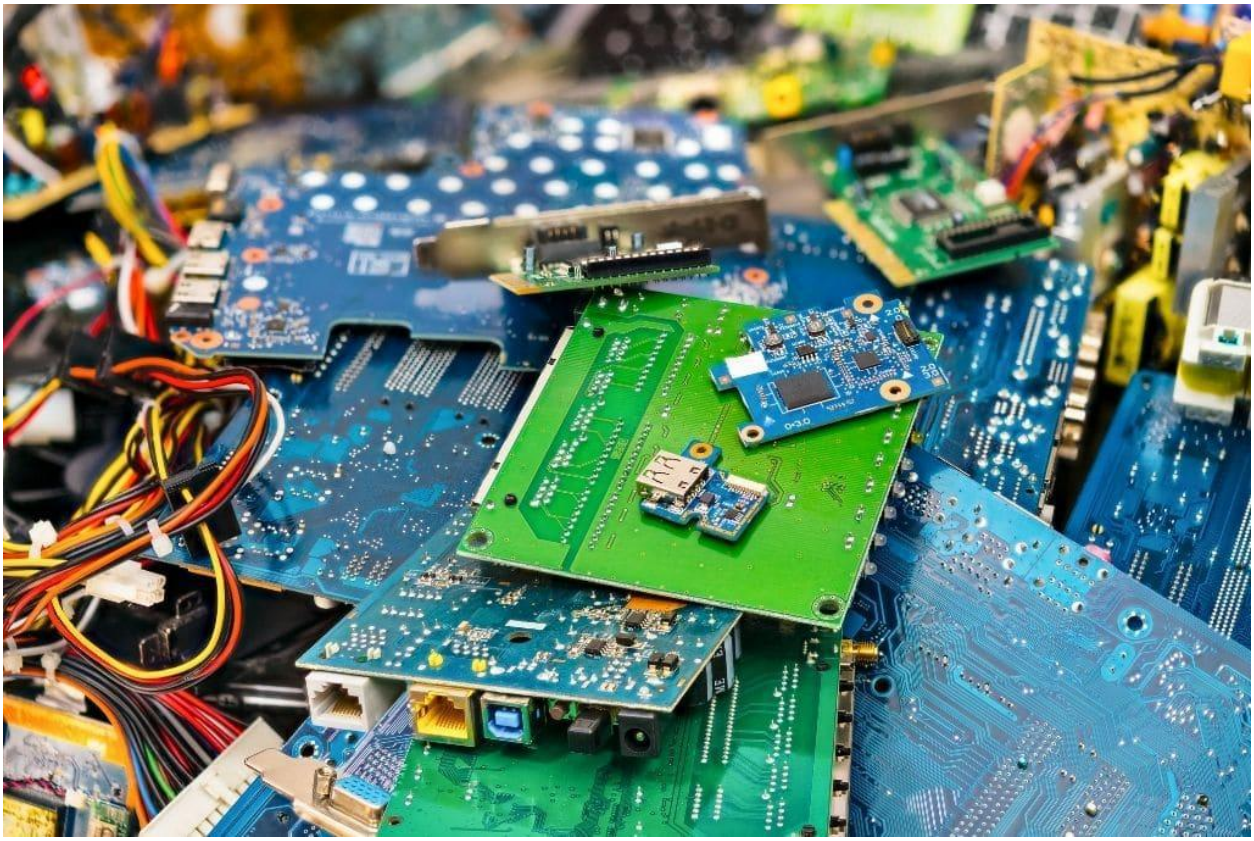
REGULATORY IMPACT ASSESSMENT (RIA)

FOR THE IMPLEMENTATION OF THE PROPOSED ELECTRONIC AND ELECTRICAL WASTE (E-WASTE) REGULATIONS, 2025

(FINAL RIA DRAFT REPORT)

National Environment Management Authority



This Regulatory Impact Assessment (RIA) Study was prepared by Earthcare Service Limited in accordance with the Terms of Reference (TORs)

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October 2025

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List Of Abbreviations and Acronyms

3Rs	Reduce, Reuse, Recycle
AAK-GROW	Agrochemicals Association of Kenya
ABAK	Alcoholic Beverages Association of Kenya
ACEF	Africa Circular Economy Facility
AEs	Accredited Entities
AEHPMP	Africa Environmental Health and Pollution Management Programme
AfDB	African Development Bank
ARFs	Advance Recycling Fees
BAT	Best Available Techniques
BEP	Best Environmental Practices
BETA	Bottom-Up Economic Transformation Agenda
BRS Conventions	The Basel, Rotterdam, and Stockholm Conventions collectively
CA	Communications Authority of Kenya
CAK	Communications Authority of Kenya
CBA	Cost-Benefit Analysis
CBOs	Community-Based Organizations
CFCs	chlorofluorocarbons
COFEK	Consumer Federation of Kenya
COP15	Conference of the Parties
CSO	Civil Society Organizations
CSR	Corporate Social Responsibility
DCO	Digital Cooperation Organization
DHC	Dandora HipHop City
DRS	Deposit-Refund System
EABL	East African Breweries Limited
EACO	East African Communications Organisation
EACR	East African Compliant Recycling
EEE	Electronic and Electrical Equipment
EIAs	Environmental Impact Assessments

EMCA	Environmental Management and Coordination Act
EPs	Equator Principles
EP4	Equator Principles 4
EPA	U.S. Environmental Protection Agency
EPFIs	Equator Principles Financial Institutions
EPR	Extended Producer Responsibility
EPRA	Energy and Petroleum Regulatory Authority
EPROK	Electronic Waste Producer Responsibility Organization of Kenya
ESG	Environmental, Social, and Governance
ESL	Earthcare Services Limited
ESM	Environmentally Sound Management
EU	European Union
EV	Electric Vehicle
E-Waste	Electronic Waste
EWIK	E-Waste Initiative Kenya
FAO	Food and Agriculture Organization
FoEA	Friends of the Earth Africa
GAO	Government Accountability Office
GCF	Green Climate Fund
GEF	Global Environment Facility
GESIP	Green Economy Strategy and Implementation Plan
GHS	Globally Harmonized System
GIS	Geographic Information Systems
GPP	Green Public Procurement
GSA	General Services Administration
HBCD	Hexabromocyclododecane
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
ICT	Information Communication Technologies
ICTA	ICT Authority

IDA	International Development Association
IDLO	International Development Law Organization
IEC	International Electrotechnical Commission
IEC-GIF	International Electrotechnical Commission Global Impact Fund
IEEE	Institute of Electrical and Electronics Engineers
IEMN	International E-Waste Management Network
IFC	International Finance Corporation
IPEA	Institutional and Political Economy Analysis
ISWMP	Integrated Solid Waste Management Plan
ITU	International Telecommunication Union
JICA	Japan International Cooperation Agency
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KAM	Kenya Association of Manufacturers
KAWR	Kenya Association of Waste Recyclers
KCB	Kenya Commercial Bank
KCODA	Kibera Community Development Agenda
KDEAP	Kenya Digital Economy Acceleration Project
KEBS	Kenya Bureau of Standards
KECOPAC	Kenya Consumer Protection Advisory Committee
KEHAPRO	Kenya Hazardous Waste Producer Responsibility Organization
KEPRO	Kenya Extended Producer Responsibility Organization
KEPSA	Kenya Private Sector Alliance
KESHP	Kenya Environmental Sanitation and Hygiene Policy
KIRDI	Kenya Industrial Research and Development Institute
KMA	Kenya Medical Association
KNBS	Kenya National Bureau of Standards
KPIs	Key Performance Indicators
KRA	Kenya Revenue Authority
KYCN	Kenya Youth Climate Network
LCA	Life-Cycle Assessment

LSK	Law Society of Kenya
MCDA	Multi-Criteria Decision Analysis
MEAs	Multilateral Environmental Agreements
MECS	Modern Energy Cooking Services
MITI	Ministry of Investments, Trade, and Industry
MoECCF	Ministry of Environment Climate Change and Forestry
MoICDE	Ministry of Information, Communications and the Digital Economy
MoU	Memorandum of Understanding
MRF	Material Recovery Facility
MRV	Monitoring, Reporting, and Verification systems
MTP IV	Fourth Medium Term Plan
NCCAP	National Climate Change Action Plan
NDA	National Designated Authority
NEMA	National Environment Management Authority (NEMA)
NGOs	Non-Governmental Organizations
NPV	Net Present Value
NSES	National Strategy for Electronics Stewardship
NWIS	National Waste Information System
OAU	Organization of African Unity
ODS	Ozone-Depleting Substances
OECD	Organisation for Economic Co-operation and Development
OGS	Off-Grid Solar
OSHA	Occupational Safety and Health Act
PAKPRO	Packaging Producer Responsibility Organization
PBDEs	Polybrominated Diphenyl Ethers
PCBs	Polychlorinated Biphenyls
PET	Polyethylene terephthalate
PETCO Kenya	Kenya PET Recycling Company
PHE	Population Health and Environment
PIC	Prior Informed Consent

POPs	Persistent Organic Pollutants
PPDA	Public Procurement and Disposal Act
PPADA	Public Procurement and Asset Disposal Act
PPPs	Public-Private Partnerships
PPRA	Public Procurement Regulatory Authority
R&D	Research and Development
PRO	Producer Responsibility Organization
RACHP	Refrigeration, Air-Conditioning, And Heat Pump
RCRA	Resource Conservation and Recovery Act
RIA	Regulatory Impact Assessment
RIS	Regulatory Impact Statement
RMS	Royal Media Services
SDGs	Sustainable Development Goals
SEMS	Social and Environmental Management Systems
SMEs	Small and Medium Enterprises
SUPKEM	Supreme Council of Kenya Muslims
TVET	Technical and Vocational Education and Training
TWENDE	Towards Ending Drought Emergencies
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Program
UNEP DTU	United Nations Environment Programme – Technical University of Denmark (DTU) Partnership
UNFCCC	United Nations Framework Convention on Climate Change
UoN	University of Nairobi
UPOPs	Unintentional Persistent Organic Pollutants
VAT	Value Added Tax
VET	Vocational Education and Training
WEEE	Waste Electrical and Electronic Equipment Centre
WHO	World Health Organisation
WWANC	Women in Water and Natural Resources Conservation

ZSVR	Central Agency Packaging Register (in Germany)

ACKNOWLEDGEMENT

The National Environment Management Authority (NEMA), hereby referred to as the Client, engaged Earthcare Services Limited (ESL), a firm of experts registered by the NEMA in Kenya, to carry out the Regulatory Impact Assessment (RIA) study for the proposed Electronic and Electrical Waste (E-Waste) Regulations, 2024 (now updated as The Environmental Management and Co-Ordination (Electrical and Electronic Waste Management) Regulations, 2025). We acknowledge with profound appreciation the contributions made by all parties involved in this study and the preparation of this report whose invaluable input has given accurate context to this document. Much appreciation goes to NEMA Director General, Mamo B. Mamo, EBS; Project Coordinator David Ong'are and the entire Project Coordinating Unit for their valuable guidance and/or input on the assignment.

Further appreciation goes to the Stakeholders in E-Waste management in Kenya, from the Government Ministries, Regulatory Agencies, Academic Institutions, among others mentioned in Section 8 of this Report. Their participation and contributions immensely enriched this report. It also ensured that we met the requirements of Public Participation and Stakeholders Engagement as per the Kenya Constitution 2010, and various statutes including the Part III of the Statutory Instruments Act, 2013 (Cap 2A)[1]. Section 6 requires a regulatory impact statement to be prepared if a proposed regulation is likely to impose significant costs on the community or a part of the community.

Special thanks to the Earthcare Services Limited (ESL) team led by John Kuloba, the Managing Director, for facilitating the study, the team of Key Experts: Prof. Elijah Kipngetich Biamah PhD, MBS, MEIK (Environmental Expert - Team Leader - K-1), Prof. Robert Machatha Kibugi (PhD, Legal Expert - Deputy Team Leader - K-2), Dr. Peter Omae Kabuka (PhD, Economist / Financial Expert - K-3), and Prof. Beneah Manyuru Mutsotso (Sociologist Expert - K-4). The Experts provided invaluable intellectual and professional guidance throughout the study drawn from their vast experience in their respective fields. Others in the ESL Team of Experts included: Prof. Francis D.P Situma (PhD, Assistant Legal Expert - NK-1), Mr. Kuloba Abraham (Assistant Social- Expert - NK-2) Prof. Caleb Mireri (PhD, Environmental Planner and Subject-Matter-Expert in E-Waste Management), Felix Wasike (Data Expert), and Julie Wanja (Environmentalist and Secretary to the Project Team) for their invaluable input. Special mention for the Earthcare Services Ltd staff for the data collection exercise. Finally, special acknowledgement to Daniel Macharia, the GIS Analyst and Environmental Expert at Earthcare Services Ltd (ESL), for coordinating the RIA study, researching and developing the project from the TORs provided by NEMA, and compiling the deliverable reports under this Assignment.

[1] Government of Kenya, “Statutory Instruments Act, 2013 (No. 23 of 2013).”

EXECUTIVE SUMMARY

This Regulatory Impact Assessment (RIA) evaluates the proposed Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025 (E-Waste Regulations), prepared by Earthcare Services Limited for the National Environment Management Authority (NEMA) under the Africa Environmental Health and Pollution Management Programme (AEHPMP), funded by the Global Environment Facility (GEF) and implemented by the World Bank. The assessment systematically analyzes the regulations' potential economic, social, environmental, and health impacts, concluding that their full and effective implementation represents the optimal policy option. These regulations, if adopted with proposed amendments will transform Kenya's e-waste management from a crisis into a strategic economic opportunity, unlocking material recovery value, job creation, and circular economy growth while mitigating pollution and health risks. The net benefits are projected to substantially outweigh costs, with benefit-cost ratios exceeding 15:1 based on conservative estimates.

The Problem and Baseline Situation

Kenya generates approximately 51,300–53,559 metric tonnes of e-waste annually (KNBS, 2025), driven by rapid EEE adoption, shorter product lifespans, and imports of used equipment, with an 8–12% annual growth rate. Only 5% is formally recycled, while 95% is unmanaged through informal dumping, open burning, or landfills, releasing hazardous substances like lead, cadmium, PBDEs, and UPOPs. This baseline exacerbates environmental degradation (e.g., soil and water contamination exceeding WHO standards by 10–50 times), public health crises (e.g., neurological impairments, respiratory diseases, and cancer risks affecting 18 million children globally, per WHO, 2021), and economic losses (e.g., USD 91 billion in unrecovered global raw materials, with Kenya leaking value through exports). Key gaps include fragmented regulations, inadequate infrastructure (e.g., <10% formal facilities), financing shortfalls, dominant informal sector (5,000–8,000 workers handling 70–95% of waste), low public awareness, and enforcement weaknesses. These align with global trends (62 million tonnes generated worldwide in 2022, per Global E-Waste Monitor 2024) but are amplified in developing contexts like Kenya, where informal practices amplify risks without integration.

Proposed Intervention: Key Provisions and Alignment with Best Practices

The E-Waste Regulations establish a targeted, enforceable framework complementing the Sustainable Waste Management (Extended Producer Responsibility) Regulations, 2024 (EPR) and Environmental Management and Co-ordination (Waste Management) Regulations, 2023 (WMR). Anchored in the polluter-pays and EPR principles, they mandate:

- **Producer Obligations (Part II):** Registration in NEMA's EEE Registry, annual compliance certificates, tonnage declarations, market-share-based fees (per Fifth

Schedule formula), and take-back schemes for problematic fractions (e.g., CRTs, mercury lamps, CFCs).

- **Operator Requirements:** Licensing for refurbishers, collection centres, and recyclers; obligations for environmentally sound management (ESM) per Basel/Stockholm Conventions; and Evidence Notes (Fourth Schedule) for traceability.
- **Prohibitions and Standards:** Bans on unsafe practices (e.g., open burning, dumping; Regulation 19), CRT imports (except medical; Regulation 17), and non-functional used EEE; alignment with international standards (e.g., CENELEC EN 50614 for reuse testing, ITU L.1100 for rare metals).
- **General Provisions (Part III):** Reporting, transitional six-month licensing for existing operators, penalties (fines/imprisonment), and harmonization to avoid duplication (e.g., shared clauses on registration, collection, and penalties across EPR/WMR/E-Waste).

As a stand-alone regulation, it addresses e-waste specifics (e.g., unique categories in First Schedule: IT equipment, appliances) absent in broader frameworks, while integrating informal sector incentives and transboundary controls (e.g., PIC under Basel amendments, effective 2025). It draws from global successes (e.g., Switzerland's 95% collection via ARFs; EU WEEE Directive's 65% targets; Rwanda's import bans reducing non-functional inflows by 60%) and African lessons (e.g., South Africa's phased EPR; Ghana's community models), emphasizing eco-design incentives, digital tracking (e.g., apps/blockchain), and urban mining for 5–10x energy savings over virgin extraction.

Methodology and Key Findings

Following OECD (2020) RIA guidelines, the assessment employed a mixed-methods approach: problem definition, baseline quantification (via KNBS data, stakeholder surveys), literature review (global/African case studies), stakeholder mapping/consultations (e.g., ministries, NGOs, informal workers, via workshops/surveys per Statutory Instruments Act, 2013), options analysis (status quo vs. partial/full implementation vs. alternatives like deposit-refund systems), multi-criteria decision analysis, and CBA over a 10-year horizon (3% discount rate).The preferred option—full implementation—yields robust net benefits:

- **Costs:** KES 879 million annually (operational: KES 16,122/tonne; compliance: registration/licensing fees; infrastructure: KES 5–20 million/lab; awareness campaigns), with hidden burdens (e.g., admin duplication if unharmonized).
- **Benefits:** Quantifiable (e.g., KES 1.3–2.6 billion from material recovery; health savings KES 500–1,000 million via reduced exposure; 5,000–10,000 jobs in formal sector); non-quantifiable (biodiversity gains, ESG compliance, circular economy alignment with Vision 2030/SDGs).

- **CBA Results:** NPV > KES 10 billion; BCR 15–30:1; sensitivity analysis confirms resilience to ±20% cost variations. Alternatives (e.g., voluntary EPR) underperform due to free-rider risks; status quo perpetuates USD 50–300/month informal livelihoods at health costs.

Stakeholder support is broad (unanimous for environmental/health gains; nuanced economic concerns from manufacturers on costs/duplication), validated through 100+ consultations emphasizing informal integration (e.g., training/microfinance to avert 40% displacement, per South African lessons).

Impacts and Mitigation

- **Environmental/Social:** Reduced pollution (20–40% agricultural productivity gains; lower UPOPs/CFCs per Minamata/Montreal Protocols); health equity for vulnerable groups (e.g., informal workers, children in Dandora/Mukuru).
- **Economic:** Job growth (formal recycling: 30–50% income uplift); value retention (e.g., gold/copper recovery); SME incentives via subsidies/tax breaks, though initial price hikes (5–12%) possible.
- **Mitigation:** Phased formalization for informal sector (subsidies, cooperatives); harmonization mandates (EPR funds for infrastructure); MRV systems for KPIs (collection rates >65% by Year 5).

Recommendations and Implementation Roadmap

Adopt the regulations immediately via a phased, inclusive rollout across four pillars:

- Phase I (0–12 Months): Enact/harmonize; launch registry/digital platforms; train NEMA/counties.
- Phase II (12–24 Months): Incentivize PROs/infrastructure; pilot formalization programs.
- Phase III (24–36 Months): Enforce penalties; scale awareness campaigns/mobile apps.
- Phase IV (36+ Months): MRV review; optimize for 80%+ collection.

Success hinges on political commitment, GEF/World Bank funding, PPPs (e.g., WEEE Centre, EWIK), and regional coordination (EAC/Bamako Convention).In conclusion, the E-Waste Regulations are essential for sustainable stewardship, aligning with Kenya's NCCAP III (2023–2027) and global MEAs. Full implementation will safeguard health/environment, foster inclusive growth, and capture KES billions in resources, positioning Kenya as an African e-waste leader. Non-adoption risks escalating crises; urgent action is imperative.

1. INTRODUCTION

The rapid increase in electronic and electrical equipment (EEE) has led to a significant rise in e-waste, presenting global environmental and health challenges, particularly in Kenya. The Kenyan government is addressing this through the E-Waste Regulations, 2025, which aim to create a comprehensive e-waste management framework. Regulations are specific, enforceable rules, while a regulatory framework is a broader system of guidelines and practices[2]. The goal of regulatory policy is to ensure regulations serve the public interest.

Regulatory Impact Assessment (RIA):

A RIA is a systematic process to evaluate the potential positive and negative effects of proposed or existing regulations. It helps policymakers make evidence-based decisions aligned with public policy objectives and can also justify non-intervention in markets if costs outweigh benefits. For regulations, RIAs focus on problem definition, objective outlining, alternative assessment, cost-benefit analysis, and stakeholder engagement. For a regulatory framework, RIAs aim to ensure coherence, enhance transparency and accountability, and promote efficiency. The OECD emphasizes integrating RIAs early in policy development[3].

1.1 Project Background Information

This project is part of the Africa Environmental Health and Pollution Management Programme (AEHPMP), funded by the Global Environment Facility (GEF) and implemented by the World Bank. The program addresses pollution risks from artisanal mining and e-waste in several African countries, including Kenya. In Kenya, the main goal is to reduce environmental and human health risks by improving e-waste management, specifically focusing on Unintentional Persistent Organic Pollutants (UPOPs) [4].

Kenya generates approximately 51,300 metric tonnes of e-waste annually, with only about 5% being properly recycled; the remaining 95% is often unsafely disposed of, leading to pollution and health hazards[5]. Organizations like the WEEE Centre are involved in collection and recycling, and efforts are underway to raise public awareness and establish more collection points[6]. Kenya adheres to international conventions like the Basel and Stockholm Conventions and national policies such as the Environmental

[2] Organisation for Economic Co-operation and Development, “OECD Best Practice Principles for Regulatory Policy - Regulatory Impact Assessment.”

[3] Organisation for Economic Co-operation and Development, “OECD Best Practice Principles for Regulatory Policy - Regulatory Impact Assessment.”

[4] United Nations Environment Programme, “UPOPs (Unintentional POPs).”

[5] Kenya News Agency, “Kenya Produces 51,300 Metric Tonnes of e-Waste Annually.”

[6] Kenya News Agency, “Experts Warn Kenyans against Unsafe E-Waste Disposal.”

Management and Coordination Act (EMCA, CAP 387), 1999(Revised 2022), for e-waste management.

1.2 The Draft E-Waste Regulations, 2025

The Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025, are drafted under EMCA, CAP 387 1999 (Revised 2022). Key provisions include:

- **Part I (Preliminary)**: Defines terms like "collection centre," "e-waste," "producer," and "recycler," and specifies that the regulations apply to waste from EEE listed in the First Schedule.
- **Part II (Management of EEE Waste)**:
    - NEMA is to establish an Electrical and Electronic Equipment Registry to manage registrations and records.
    - Producers introducing EEE into Kenya must register with NEMA, including a take-back scheme agreement.
    - Producers must apply for annual compliance certificates, declare tonnage of equipment, and pay a treatment fee for problematic fractions.
    - Waste generators must separate e-waste and transfer it to refurbishers, collection centres, or licensed recyclers.
    - Obligations are detailed for refurbishers, collection centre operators, and recyclers, including licensing and environmentally sound management practices.
    - Prohibits the introduction of equipment containing cathode ray tubes, with exceptions for medical use.
    - Prohibits unsafe disposal methods like open burning, dumping in water bodies, or non-designated receptacles.
- **Part III (General Provisions)**: Covers reporting requirements for refurbishers and recyclers, transfer of responsibility for producers ceasing operations, and penalties for various offenses. Transitional provisions require existing operators and producers to obtain licenses or register within six months.
- **Schedules**: Include categories of EEE covered, various application forms, fees, a formula for producer obligation calculation based on market share, and principles of environmentally sound management.

1.3 Political and Legal Context

Kenya has an existing legislative framework for environmental management, including the Environmental Management and Coordination Act (EMCA, CAP 387), 1999(Revised

2022), which mandates licenses for waste handling. Other relevant legislation includes the Waste Management Regulations, 2024, and the Sustainable Waste Management Act, 2022, which introduces Extended Producer Responsibility (EPR). The Sustainable Waste Management (Extended Producer Responsibility) Regulations, 2024, gazetted in November 2024, operationalize producer accountability for end-of-life costs for EEE producers and importers[7,8]. The proposed E-Waste Regulations, 2025, are designed to complement these existing laws by specifically addressing the challenges of e-waste. The Kenyan government is committed to environmental sustainability and a circular economy, with the emphasis reflecting a shift towards producer accountability.

[7] Government of Kenya, "Environmental Management and Co-Ordination Act, Cap. 387 (Revised Edition 2022)."

[8] Dahl, "Policy Framework Guiding E-Waste Management in Kenya."

2. LITERATURE REVIEW

2.1 Introduction

This literature review examines the global and regional context of electronic waste (e-waste) management, with specific focus on regulatory frameworks, implementation challenges, and best practices applicable to Kenya. The review synthesizes academic research, policy documents, and implementation studies to establish the theoretical and practical foundations for assessing Kenya's proposed E-Waste Regulations, 2025. Following OECD (2020) guidance on regulatory impact assessment, the review identifies evidence-based regulatory options and evaluates their effectiveness across diverse contexts.

2.2 Global E-Waste Crisis: Scale and Composition

2.2.1 Global E-Waste Generation Trends

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).

2.2.2 Health and Environmental Impacts

The systematic review by Grant et al. (2013) published in *The Lancet Global Health* provides comprehensive evidence of health consequences from e-waste exposure. Their analysis of 165 studies documented elevated levels of lead, cadmium, chromium, and polybrominated diphenyl ethers (PBDEs) in populations exposed to informal e-waste processing. Health outcomes included:

- **Neurological impacts:** Reduced IQ in children exposed to lead from e-waste, with mean IQ reductions of 5-7 points in high-exposure communities
- **Respiratory disease:** Significantly elevated rates of asthma and chronic obstructive pulmonary disease in populations near informal burning sites
- **Reproductive health:** Birth defects, spontaneous abortions, and developmental delays associated with maternal exposure to e-waste toxins (Xu et al., 2012)
- **Cancer risks:** Elevated incidence of lung, skin, and bladder cancers linked to prolonged exposure to carcinogenic substances in e-waste (Leung et al., 2007)

WHO (2021) estimates that e-waste exposure affects 18 million children and adolescents globally, with the most severe impacts in informal recycling hotspots in developing countries.

Environmental impacts documented by Robinson (2009) include soil contamination reducing agricultural productivity by 20-40% within 2km of informal processing sites, groundwater contamination exceeding WHO safe drinking water standards by 10-50 times for heavy metals, and aquatic ecosystem damage with documented fish kills and biodiversity loss in rivers receiving e-waste leachate.

2.3 Extended Producer Responsibility: Theoretical Foundations

2.3.1 Policy Rationale and Economic Theory

Extended Producer Responsibility (EPR) has emerged as the dominant policy framework for managing e-waste globally. The theoretical foundation rests on addressing market failures in waste management documented by Walls and Palmer (2001). In conventional markets, producers do not bear end-of-life disposal costs, creating negative externalities where environmental and health costs are socialized while profits are privatized. This market failure results in overproduction of difficult-to-recycle products and underinvestment in recycling infrastructure.

EPR internalizes these externalities by making producers financially and/or physically responsible for collecting and treating their products at end-of-life (OECD, 2016). The economic mechanism works through several channels:

1. **Price signals:** End-of-life costs incorporated into product prices provide consumers with accurate total cost information
2. **Design incentives:** Producers facing disposal costs have economic motivation to design products that are durable, repairable, and recyclable
3. **Infrastructure development:** Producer funding creates sustainable financing for collection and recycling systems
4. **Polluter pays principle:** Responsibility is assigned to the entity best positioned to reduce waste generation

Atasu and Subramanian (2012) provide mathematical modeling demonstrating that individual producer responsibility (each producer manages their own products) generates stronger design incentives than collective responsibility (all producers share costs proportionally), though collective schemes offer implementation advantages in fragmented markets.

2.3.2 Global EPR Implementation: Success Factors

The OECD's comprehensive review of EPR systems across 37 countries identifies critical success factors (OECD, 2016):

Switzerland represents the gold standard: Achieving 95% collection rates through advance recycling fees collected at point of sale, visible consumer fees creating awareness, convenient collection infrastructure (every retailer obligated to accept returns), and strong enforcement with penalties for non-compliance (SENS eRecycling & Swico Recycling, 2021). The Swiss system has operated since 1998, demonstrating long-term financial sustainability.

European Union's evolving framework: The WEEE Directive (2012/19/EU) mandates 65% collection rate by weight of average EEE placed on market in preceding three years (European Commission, 2012). However, Eurostat (2022) documents significant variation: Northern European countries (Sweden, Norway, Denmark) achieve 65-80% collection rates, while Southern and Eastern

European members struggle at 30-45%. The European Environment Agency (2020) attributes disparities to enforcement capacity, infrastructure investment, and public awareness levels.

Japan's appliance-specific approach: The Home Appliance Recycling Law requires consumers to pay recycling fees at disposal, with retailers obligated to accept returns and manufacturers responsible for treatment (Tasaki et al., 2006). Collection rates exceed 80% for covered appliances (refrigerators, washing machines, air conditioners, televisions), though Tasaki et al. document 12% price increases in initial years and persistent challenges with small appliances.

2.3.3 EPR Challenges in Developing Countries

Implementation in developing countries faces distinct challenges documented in African contexts. Godfrey and Oelofse (2017) analyze South Africa's EPR journey, noting that despite regulatory frameworks enacted in 2008, effective implementation remained limited until 2020 when specific product regulations were finalized. Key challenges included:

- **Fragmented import markets:** Hundreds of small-scale importers difficult to register and monitor
- **Informal sector dominance:** 70-90% of waste handling by unregistered collectors operating outside formal systems
- **Limited enforcement capacity:** Environmental agencies under-resourced and competing priorities
- **Free-rider problems:** Compliant producers disadvantaged against non-compliant competitors

Odeyingbo et al. (2017) in their "Person in the Port" assessment of Nigerian e-waste imports found that despite regulations prohibiting non-functional equipment, 60% of sampled "used EEE" imports were non-functional, indicating enforcement gaps.

2.4 International Best Practices in E-Waste Import Controls

2.4.1 Basel Convention and Transboundary Movement Regulation

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes provides the international legal framework for preventing e-waste dumping (UNEP, 1989). Amendments effective January 1, 2025, subject all e-waste to Prior Informed Consent (PIC) procedures, requiring exporting countries to obtain written consent from importing countries before shipment (UNEP, 2019).

UNEP's Technical Guidelines (2019) establish criteria distinguishing waste from functioning equipment:

Equipment is NOT waste if:

- Fully functional and directly reusable for its original purpose without repair
- Properly packaged to prevent damage during transport
- Accompanied by documentation: functionality testing certificates, commercial invoice, warranty/service agreements, and declaration of intended use (reuse, not dismantling)

Equipment IS waste if:

- Non-functional or requires significant repair before use

- Holder intends to discard (even if technically repairable)
- Part of mixed consignment where >30% of items are non-functional
- Destined for material recovery (dismantling) rather than direct reuse

2.4.2 European Union's Comprehensive Import Control System

The EU Waste Shipment Regulation (EU No 660/2014) establishes stringent controls for WEEE exports, requiring pre-notification to importing country authorities 30 days before shipment, detailed documentation including testing protocols and results, proof that recipient has appropriate facilities for treatment, and financial guarantees covering repatriation costs if shipment refused (European Commission, 2014).

The EU Correspondence Guidelines (2007) provide operational detail: functionality testing must verify that at least 90% of components operate according to specifications, safety features must be intact and operational, cosmetic damage is acceptable if not affecting functionality, and batteries must hold charge ≥60% of original capacity for portable devices.

Post-2014 amendments, the European Commission documents 40% increase in detection of illegal shipments, with improved coordination between customs authorities and environmental agencies credited as primary success factor (Eurostat, 2022).

2.4.3 Rwanda's Model for African Context

Rwanda's e-waste regulations (2016) provide a relevant model for Kenya, featuring age restrictions (computers >8 years, refrigerators >10 years prohibited), mandatory certificate of compliance from Rwanda Standards Board for all EEE imports, and random port inspections (15% of consignments) with immediate detention of suspect shipments (Republic of Rwanda, 2016).

UNEP (2021) evaluates Rwanda's implementation documenting decline in non-functional imports from 45% (2015) to 18% (2020), increase in formal EEE registration from 30% to 75%, and establishment of regional cooperation framework with Kenya, Uganda, and Tanzania. Success factors identified include political commitment at highest levels, dedicated budget allocation for port inspections, and public-private partnerships for infrastructure development.

However, UNEP notes persistent challenges: limited laboratory capacity for hazardous substance testing, informal cross-border trade through porous borders, and resource constraints limiting inspection coverage to major entry points.

2.5 Waste Definition and Functionality Testing: Technical Standards

2.5.1 CENELEC Standards for Reuse Preparation

The European Committee for Electrotechnical Standardization's EN 50614:2020 provides comprehensive requirements for preparing WEEE for reuse (CENELEC, 2018). The standard establishes:

Testing hierarchy:

1. **Visual inspection:** Physical damage assessment, safety hazard identification
2. **Functional testing:** Product-specific protocols verifying ≥85% of manufacturer's performance specifications

3. **Safety testing:** Electrical safety, insulation resistance, grounding continuity
4. **Data security:** Certified data erasure for devices with data storage capability
5. **Documentation:** Test certificates valid 90 days, traceability requirements

Performance thresholds:

- IT equipment: Processor ≥70% of specification, RAM 100% functional, storage ≥90% accessible
- Household appliances: Core function operational, energy efficiency ≤150% of specification
- Consumer electronics: Display ≥90% functional pixels, audio within ±10% of specification

The ITU L.1100 standard complements CENELEC by addressing rare metal recovery from equipment determined non-reusable, providing guidelines for environmentally sound dismantling that maximize material recovery while minimizing environmental release (ITU, 2014).

2.5.2 Challenges in Developing Country Implementation

Implementing standardized testing faces constraints in resource-limited settings. A World Bank (2018) assessment of testing infrastructure in Sub-Saharan Africa found that only 15% of countries have ISO/IEC 17025 accredited e-waste testing laboratories, testing equipment costs (KES 5-20M per laboratory) exceed available budgets, and technical expertise for electronics testing is scarce outside capital cities.

Practical adaptations documented by Schluep et al. (2009) in their study of e-waste management in developing countries include simplified field testing protocols focusing on core functionality, risk-based sampling (100% testing for first-time importers, 30% for established traders), and mobile testing units serving multiple border posts to maximize equipment utilization.

2.6 Informal Sector Integration: Models and Challenges

2.6.1 Scale and Economic Significance

The informal e-waste sector plays a dominant role in developing countries. Wilson et al. (2006) estimate that informal collectors handle 70-95% of recyclable waste in cities across Asia, Africa, and Latin America. For e-waste specifically, Scheinberg et al. (2016) document that informal workers provide essential collection services reaching households and small businesses formal systems cannot economically serve, process materials at costs 30-50% lower than formal facilities through low overhead, and contribute significantly to livelihoods with estimated 500,000-1 million people globally dependent on informal e-waste collection.

Medina's (2007) comprehensive study of waste pickers globally documents monthly incomes ranging from USD 50-300, positioning informal waste work above absolute poverty but below living wage thresholds. The sector disproportionately employs vulnerable populations including women, children, migrants, and elderly with limited formal employment options.

2.6.2 Health and Environmental Costs

The informal sector's lack of protective equipment and environmentally sound practices creates severe health and environmental consequences. Grant et al. (2013) document that informal e-waste workers

exhibit blood lead levels 2-5 times higher than background populations, respiratory function impairment in 40-60% of workers, and elevated cancer biomarkers in long-term workers.

Open burning, acid leaching, and improper dismantling release toxins affecting not only workers but surrounding communities. Leung et al. (2007) found soil contamination levels 50-100 times background in Guiyu, China's informal e-waste processing hub, with contamination extending 2km from processing sites.

2.6.3 Integration Models and Success Factors

Successful integration of informal workers into formal systems requires deliberate policy design. Scheinberg et al. (2016) analyze European integration experiences identifying critical elements:

Inclusive licensing: Simplified requirements for micro-collectors (reduced fees, flexible thresholds), recognition of existing collection networks rather than displacement, and provision for gradual formalization over 2-3 year transition periods.

Capacity building: Training on safe handling, occupational health protection, and business skills including financial literacy, pricing negotiation, and digital record-keeping.

Economic support: Access to microfinance for equipment purchases (protective gear, transport), payment systems ensuring fair prices for collected materials, and aggregation models where informal collectors supply formal recyclers under contract.

Social protection: Health insurance coverage, occupational injury compensation, and retirement savings programs.

The Brazilian cooperative model documented by Dias (2016) demonstrates successful integration: waste picker cooperatives formalized through municipal contracts, members earning 30-50% above minimum wage, access to health insurance and social security, and political voice through cooperative representation in waste management planning. However, Dias notes this required 15+ years of advocacy and supportive political leadership.

2.6.4 Risks of Exclusion

Godfrey and Oelofse (2017) document South Africa's experience where rapid EPR implementation without integration provisions led to 40% of informal collectors exiting the sector within two years, with only 30% successfully transitioning to formal roles despite support programs. Negative consequences included increased poverty in affected communities, rise in other informal economic activities (some illegal), and paradoxically, continued informal e-waste processing as displaced workers sought alternative income.

The authors emphasize that regulatory frameworks must explicitly address informal sector integration with dedicated funding, phased implementation, and continuous monitoring to prevent unintended social harm.

2.7 Financial Mechanisms and Economic Sustainability

2.7.1 Financing Models for EPR Systems

EPR systems employ diverse financing mechanisms, each with distinct advantages and challenges. The OECD (2016) typology identifies:

Advance Recycling Fees (ARFs): Fees collected at point of sale, typically visible to consumers. Switzerland's model collects CHF 5-40 per item depending on product category, creating dedicated fund managed by producer responsibility organizations (SENS eRecycling & Swico Recycling, 2021). Advantages include predictable financing, consumer awareness, and funds available before waste generated. Challenges include political resistance to visible fees, potential for consumer resistance, and administrative costs of collection.

Producer Financial Guarantees: Producers post bonds or insurance policies covering future collection and treatment costs. Used in Belgian system where producers must demonstrate financial capacity to manage products at end-of-life (Huisman et al., 2007). Advantages include strong incentive for product longevity and reduced burden on current consumers. Challenges include difficulty calculating appropriate guarantee amounts and liquidity issues for small producers.

Pay-as-you-throw (PAYT): Consumers pay recycling fees at disposal. Japan's Home Appliance Recycling Law requires consumers to pay when discarding covered products, with fees ranging from JPY 2,000-5,000 (USD 15-40) depending on appliance (Tasaki et al., 2006). Advantages include direct link between disposal and cost. Challenges include illegal dumping incentives and disproportionate burden on low-income households.

Market-share based allocation: Producer obligations calculated based on market share of products placed on market. EU WEEE Directive approach allocates collection costs proportionally (European Commission, 2012). Advantages include fairness (larger producers pay more) and administrative simplicity. Challenges include difficulty tracking market shares accurately and free-rider opportunities for unreported sales.

2.7.2 Problematic Waste Fractions: Special Financing Needs

Certain e-waste categories have negative economic value (treatment costs exceed recoverable material value), requiring special financing provisions. Huisman et al. (2007) identify problematic fractions:

- **Cathode Ray Tube (CRT) displays:** High lead content requires specialized treatment; estimated treatment cost EUR 0.50-1.50/kg (KES 65-195/kg) with zero material recovery value
- **Mercury-containing lamps:** Require careful handling and treatment; cost EUR 1-3/lamp (KES 130-390/lamp)
- **Refrigeration equipment with CFCs:** Requires certified CFC recovery; cost EUR 10-20/unit (KES 1,300-2,600/unit)

Switzerland addresses this through cross-subsidization: high-value items (laptops, mobile phones) generate surplus revenue subsidizing problematic fractions (SENS eRecycling & Swico Recycling, 2021). This requires careful fee structure design balancing revenue generation with competitive product pricing.

Alternatively, minimum treatment fees can be mandated specifically for problematic fractions, ensuring adequate financing regardless of market recovery values. The Belgian system imposes supplementary fees on items with negative treatment economics (Huisman et al., 2007).

2.7.3 Producer Guarantee Funds for Orphan Waste

Orphan waste (products from defunct producers) presents financing challenges. When producers cease operations, responsibility for their products' end-of-life management becomes unclear. Solutions include:

Collective guarantee funds: All producers contribute percentage (typically 1-3%) of EPR fees to collective fund covering orphan waste. Sweden's EL-Kretsen system maintains such fund, which successfully managed waste from 15+ defunct producers (Huisman et al., 2007).

Market-share based obligation: Remaining producers assume orphan waste obligations proportional to current market shares. EU WEEE Directive approach distributes orphan waste costs among all registered producers (European Commission, 2012).

Government backstop: For historical waste predating EPR systems, governments may assume financial responsibility. Japan's approach for pre-2001 appliances involves government subsidies to recycling facilities (Tasaki et al., 2006).

2.8 Developing Country Implementation: Lessons from Africa

2.8.1 2.8.1 Nigeria: Regulatory Frameworks Without Enforcement

Nigeria enacted comprehensive e-waste regulations in 2011, establishing producer registration requirements, take-back obligations, and import restrictions (NESREA, 2011). However, World Bank (2015) evaluation documents limited implementation success:

- Producer registration: <20% compliance rate among estimated 500+ EEE importers
- Collection infrastructure: Only 3 formal e-waste recycling facilities operational across entire country
- Import controls: Odeyingbo et al. (2017) found 60% of "used EEE" imports non-functional despite prohibitions
- Informal sector: Continues to dominate with estimated 100,000 workers in Lagos alone

The World Bank attributes implementation failure to insufficient budget allocation for enforcement (NESREA's annual budget <USD 5 million for all environmental enforcement), lack of political will with inconsistent ministerial support, competing priorities with e-waste considered lower priority than oil pollution, and weak coordination between regulatory agency and customs authorities.

Paradoxically, the regulations initially reduced formal collection volumes by 35% as informal sector workers avoided formal channels fearing penalties, while formal infrastructure remained underdeveloped (World Bank, 2015). This demonstrates that regulatory frameworks without implementation capacity and stakeholder engagement can produce counterproductive outcomes.

2.8.2 South Africa: Gradual Implementation with Industry Partnerships

South Africa's EPR journey offers more nuanced lessons. Godfrey and Oelofse (2017) document that despite 2008 waste legislation establishing EPR principles, effective implementation required 12+ years of stakeholder consultation, pilot programs, and capacity building.

Key success factors identified:

- **Phased approach:** Voluntary phase (2008-2018) allowed industry to develop systems before mandatory requirements
- **Industry-led PROs:** E-Waste Association of South Africa (EWASA) established infrastructure before government mandates
- **Multi-stakeholder forums:** Regular consultation between government, industry, NGOs, and waste sector
- **Public awareness campaigns:** Sustained investment in consumer education

Persistent challenges:

- **Fragmented producer landscape:** Thousands of small importers difficult to bring into formal systems
- **Informal sector:** Despite integration efforts, 40% of original informal collectors displaced
- **Rural-urban divide:** Collection infrastructure concentrated in major cities, leaving rural areas underserved
- **Financing:** Inadequate producer fees require government subsidies for problematic fractions

By 2020, South Africa achieved approximately 20% formal collection rate (versus <5% in 2010), demonstrating progress but highlighting that even with relatively strong governance, achieving high collection rates requires sustained effort and investment (Godfrey & Oelofse, 2017).

2.8.3 Ghana: Community-Based Collection Models

Ghana's Agbogbloshie informal e-waste processing site gained notoriety as one of world's most polluted places. Amankwaa (2013) documents innovative community-based responses:

Scrap Dealers Association: Informal processors organized association to negotiate better prices, access safety equipment (though still inadequate), and engage with government on formalization pathways.

NGO partnerships: Organizations like Pure Earth and Green Advocacy Ghana provided training on safer dismantling techniques, health screening for workers, and facilitated links to formal recyclers for hazardous fractions.

Micro-enterprise support: ILO-supported program provided microloans for protective equipment, tools, and business development training to informal collectors.

Results were modest but significant: reduction in open burning from 80% to 40% of waste processed, increased use of basic protective equipment from 10% to 45% of workers, and formalization of approximately 200 collectors as licensed operators.

However, Amankwaa emphasizes that bottom-up initiatives cannot substitute for comprehensive regulatory frameworks and must be complemented by government investment in formal infrastructure.

2.9 Technology and Innovation in E-Waste Management

2.9.1 Emerging Processing Technologies

Technological advances offer potential for more efficient, environmentally sound e-waste processing. Cui and Forssberg (2003) review mechanical and metallurgical processes:

Advanced mechanical separation: Density separation, eddy current separation, and electrostatic separation can recover 85-95% of metals from shredded e-waste, compared to 60-70% with manual dismantling. However, capital costs range from USD 2-10 million per facility, limiting deployment in developing countries.

Hydrometallurgical processing: Chemical leaching using less hazardous agents (citric acid, thiourea) replacing traditional cyanide and acid leaching. Demonstrated recovery rates of 95-99% for gold, silver, and platinum group metals. Challenges include wastewater treatment requirements and higher operating costs than informal methods.

Pyrometallurgical processing: High-temperature smelting recovers metals while destroying organic contaminants. Modern facilities with pollution controls can achieve 98% metal recovery with minimal emissions. However, very high capital costs (USD 50-200 million) and economies of scale requirements make this viable only for large regional facilities.

2.9.2 Digital Tools for Collection and Tracking

Digital innovations facilitate e-waste collection and regulatory compliance. Examples documented by Nnorom and Osibanjo (2008) include:

Mobile collection apps: Platforms connecting consumers with collectors (e.g., Kenya's M-waste pilot using M-Pesa integration for collection payments). Preliminary results show 40% increase in collection volumes in pilot areas.

Blockchain tracing: Immutable records tracking e-waste from collection through treatment, providing transparency for regulatory compliance (piloted in Netherlands, South Korea).

IoT-enabled collection bins: Smart bins with sensors monitoring fill levels, optimizing collection routes (deployed in several European cities, reducing collection costs 20-30%).

Producer compliance platforms: Digital systems simplifying reporting requirements, reducing administrative burdens by 50-70% compared to paper-based systems (implemented in Germany's ZSVR system).

2.9.3 Urban Mining and Circular Economy

The concept of "urban mining"—extracting raw materials from e-waste rather than virgin mining—offers economic and environmental benefits. Hagelüken and Corti (2010) calculate that recovering metals from e-waste requires 5-10 times less energy than primary extraction and reduces CO2 emissions by 50-90%.

The Ellen MacArthur Foundation (2015) advocates for circular economy principles in electronics: design for longevity, modularity, and repair; business models emphasizing product-as-service rather than ownership; and closed-loop material flows minimizing waste generation.

Apple's Daisy robot, capable of disassembling 200 iPhones per hour for component and material recovery, demonstrates large-scale circular economy potential (Apple Environmental Progress Report,

2019). However, proprietary technologies and limited technology transfer limit developing country access to such innovations.

2.10 Kenya-Specific Context and Research Gaps

2.10.1 E-Waste Generation and Current Management in Kenya

Kenya's e-waste landscape has been documented through several studies. The Kenya National Bureau of Statistics (2025) reports 53,559 metric tonnes of e-waste generated annually, with growth rate of 8-12% per year driven by increasing technology adoption and reducing device lifespans.

Waste composition studies by Otsyula et al. (2018) found that IT equipment (computers, mobile phones) constitute 35% of e-waste by unit count but only 15% by weight, large appliances (refrigerators, washing machines) represent 20% by weight, and small appliances and consumer electronics comprise the balance.

Current management relies overwhelmingly on informal sector. The WEEE Centre (2023) estimates only 5% formal recycling rate, with the remainder handled through informal collectors numbering an estimated 5,000-8,000 individuals across Kenya, export to neighboring countries with less stringent controls, or disposal in municipal landfills posing environmental and health risks.

2.10.2 Existing Regulatory Framework Analysis

Dahl (2023) analyzes Kenya's policy framework, noting that while EMCA, CAP 387 (1999) (Revised 2022) provides general waste management authority and the Sustainable Waste Management Act (2022) establishes EPR principles, specific e-waste provisions remain underdeveloped. The National E-Waste Management Strategy 2019-2024 outlines ambitions but lacks enforcement mechanisms and financing provisions.

Key gaps identified include absence of producer registration system, no collection targets or timelines, limited county government capacity for devolved waste management functions, and insufficient integration of informal sector.

2.10.3 Research Gaps Requiring Further Investigation

This literature review identifies several research priorities for Kenya:

1. **Comprehensive baseline study:** Accurate quantification of e-waste generation, composition, and flows
2. **Health impact assessment:** Documenting exposure levels and health outcomes in informal processing hotspots (Dandora, Mukuru)
3. **Economic valuation:** Calculating total economic costs of current informal management versus benefits of formalization
4. **Informal sector census:** Detailed mapping of informal collectors, processors, and traders
5. **Consumer behavior research:** Understanding disposal practices, willingness to participate in take-back programs
6. **Regional coordination:** Cross-border e-waste flows within East African Community and harmonization opportunities

2.11 Conclusions from Literature Review

The international literature establishes that effective e-waste management requires comprehensive regulatory frameworks combining mandatory producer responsibilities, adequate financing mechanisms, collection infrastructure accessible to all populations, import controls preventing dumping, informal sector integration with social protections, and sustained enforcement with adequate resourcing.

Success factors consistently identified across jurisdictions include political commitment at highest levels, sustained funding for implementation, stakeholder engagement including industry and civil society, phased implementation allowing capacity development, and continuous monitoring with regulatory adaptation.

For Kenya specifically, the literature suggests that proposed E-Waste Regulations, 2025 align with international best practices in core principles (EPR, producer registration, licensing) but require strengthening in import controls (learning from Rwanda), informal sector integration (informed by South African and Ghanaian experiences), and financial sustainability mechanisms (applying Swiss and Belgian models adapted to Kenya's context).

The substantial hidden benefits documented globally (health improvements, environmental protection, material recovery, property value increases) provide strong economic justification for regulatory investment, with benefit-cost ratios of 15:1 to 30:1 achievable when comprehensive approaches are implemented.

3. AIM, SCOPE, AND OBJECTIVES OF THE RIA STUDY

3.1 The Aim of the Assignment

The aim of this assignment was to undertake a Regulatory Impact Assessment (RIA) of the proposed Electronic and Electrical Waste, 2025 on behalf of the MoECCF and NEMA to assess and analyze the likely benefits, costs and effects of the proposed E-Waste Regulations, its prospective impacts on the society (social, economic and environmental) and to offer the most appropriate solutions based on the assessment and analyses.

3.2 Scope of the assignment

This study included in its scope the following key elements:

- Problem or issue statement
- Objectives of the revised regulation
- Options (regulatory and non-regulatory etc.)
- Impact analysis (of the regulation)
- Consultation with key stakeholders
- Conclusion and recommendations
- Strategy for implementation of the revised regulation.

3.3 Specific Objectives of The Assignment

The specific objectives of the RIA assignment were as follows:

- Define the problem(s) with respect to the management of E-waste in Kenya and to determine the cause(s) of the defined problems.
- Analyse the baseline situation with respect to E-Waste management in Kenya.
- Identify the costs (including hidden costs) and benefits associated with the proposed E-Waste Regulations, 2025 to all relevant stakeholders.
- Conduct cost benefit analysis and select optimal alternative(s) to achieve the desired objectives while ensuring the minimum possible cost to society as a whole.
- Develop regulatory alternatives aimed at addressing the post-consumer product waste management problems identified above.
- Conduct formal public consultations with the identified key stakeholders to validate the regulatory options to be adopted as proposed in the RIA report.

3.3.1 Defining and Analyzing the Key Problems in E-Waste Management

Key problems in e-waste management identified include:

- Lack of uniform regulations
- Limited infrastructure and awareness
- Informal recycling practices

- Environmental and health hazards due to improper disposal
- Rapid technological advancements leading to increased e-waste generation
- Low recycling rates despite growing e-waste volume

3.3.2 Evaluating the baseline situation of e-waste management

Evaluating the baseline situation involves:

- Quantifying e-waste generation
- Identifying existing management practices
- Assessing infrastructure and facilities
- Reviewing legislative and policy frameworks
- Understanding stakeholder engagement
- Evaluating public awareness and behaviour

3.3.3 Identifying costs and benefits associated with the proposed regulations

The costs associated with proposed e-waste regulations include:

- Operational expenses, estimated at over €6 million (approximately KES. 879,420,000) in Kenya, averaging €110 (approximately KES. 16,122) per ton.
- Infrastructure investment, noting that less than 10% of e-waste in Kenya is properly managed.
- Regulatory compliance costs for businesses.
- Public awareness campaigns.

Benefits

The benefits include:

- Environmental protection through pollution reduction and resource conservation.
- Health improvements by minimizing exposure to hazardous substances.
- Economic opportunities through job creation and growth in the recycling industry.
- Compliance with international standards.

A thorough cost-benefit analysis is crucial for policymakers to design regulations that balance economic feasibility with environmental and health benefits, ensuring sustainable and effective e-waste management systems.

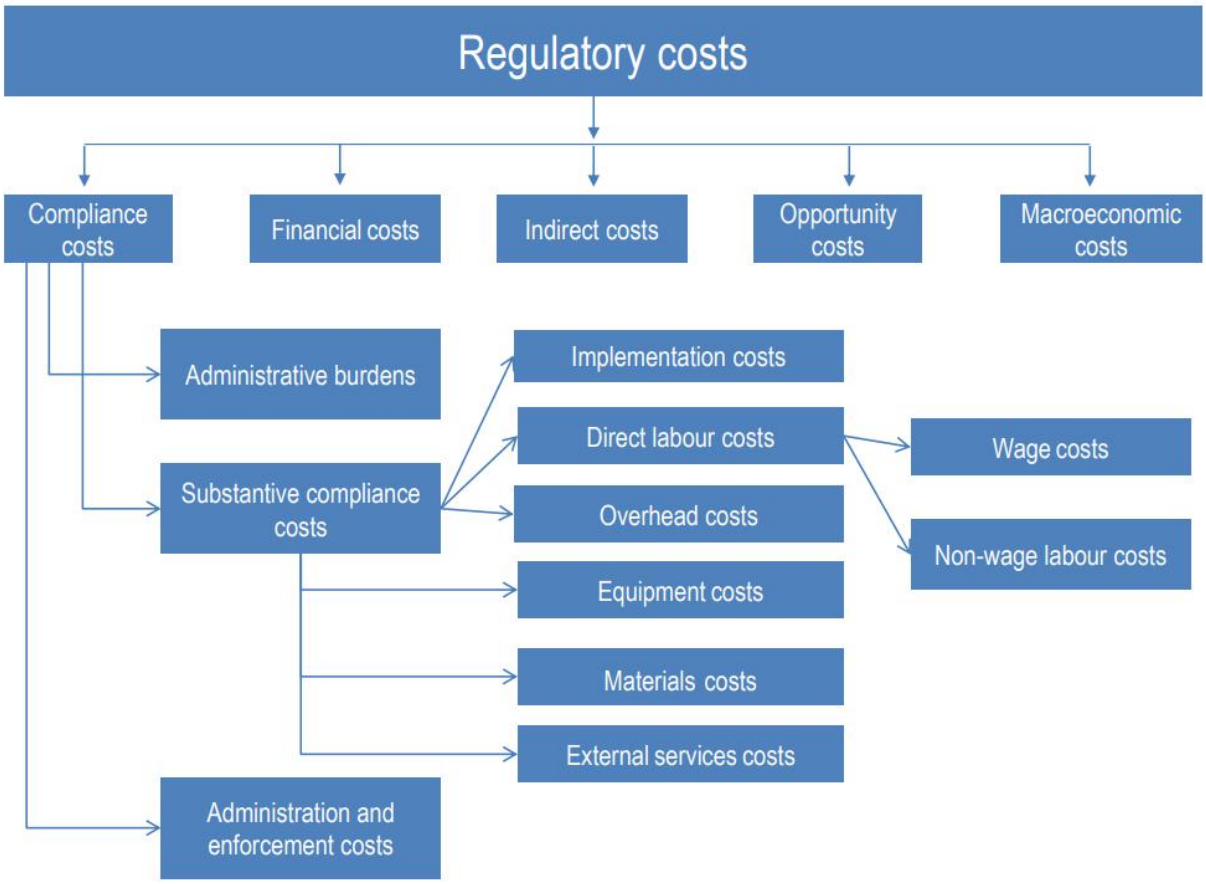

Figure 1: Taxonomy of regulatory costs

(Source: (OECD, 2014[9]), OECD Regulatory Compliance Cost Assessment Guidance, Paris, http://dx.doi.org/10.1787/9789264209657-en)

3.3.4 Perform a cost-benefit analysis to identify the most efficient regulatory options

Performing a cost-benefit analysis (CBA) to identify the most efficient regulatory options for e-waste management involves systematically evaluating the economic, environmental, and social implications of various policy alternatives, identifying regulatory

[9] Organisation for Economic Co-operation and Development, "OECD Regulatory Compliance Cost Assessment Guidance."

options [10], estimating costs and benefits, conducting a comparative analysis, and performing sensitivity analysis[11].

Developing regulatory alternatives for post-consumer product waste management involves assessing the current landscape, defining clear objectives, exploring options like producer accountability for end-of-life costs principle, recycled content mandates, deposit-refund systems, product stewardship programs, and eco-design regulations. It also emphasizes engaging stakeholders, conducting impact assessments, developing pilot programs, enacting legislation, educating the public, and continuous monitoring and review.

Finally, the importance of engaging stakeholders through consultations to validate regulatory options is highlighted, emphasizing identifying key stakeholders, conducting inclusive consultations, incorporating feedback, and enhancing transparency and trust[12].

[10] Synergies Economic Consulting, “Cost-Benefit Analysis of Options for an E-Waste Landfill Ban in Western Australia.”

[11] Patora, *Final Cost-Benefit and Least-Burdensome Alternative Analyses: Chapter 173-900 WAC, Electronic Products Recycling Program*.

[12] Davidson et al., “Improving Stakeholder Engagement and Evidence-Based Policy Making.”

4. METHODOLOGY AND DATA COLLECTION

A comprehensive, evidence-based Regulatory Impact Assessment **(RIA)** was conducted for the proposed **Electronic and Electrical Waste (E-Waste) Regulations, 2025**, to analyze their potential effects.

4.1 Methodology

The methodology for the Regulatory Impact Assessment (RIA) of the proposed Electronic and Electrical Waste (E-Waste) Regulations, 2025, was designed to ensure a systematic, evidence-based evaluation of the regulations' potential impacts. The approach encompasses multiple interconnected stages, each tailored to provide a comprehensive understanding of the e-waste management landscape in Kenya and the implications of the proposed regulatory framework. Below is a detailed elaboration of each component:

- **Problem Definition:** This initial step involved a meticulous process of identifying and clearly articulating the specific challenges and deficiencies in Kenya's current e-waste management system that the 2025 E-Waste Regulations aim to address. Key issues include inadequate disposal mechanisms, environmental and health risks posed by improper e-waste handling, limited recycling infrastructure, and gaps in regulatory enforcement. This step establishes a clear foundation for assessing the necessity and relevance of the proposed regulations.
- **Scope and Objectives:** The scope of the RIA was carefully delineated to focus on the objectives of the 2025 E-Waste Regulations, which include promoting sustainable e-waste management, enhancing producer responsibility, and mitigating environmental and public health risks. Parameters were established to guide a thorough literature and document review, ensuring alignment with national priorities and global best practices.
- **Comprehensive Literature and Document Review:** A robust review of existing policies, studies, and international frameworks was conducted to contextualize the proposed regulations:
    - **Review of Existing Policies and Regulations:** The analysis examined Kenya's current legal and regulatory framework for waste management, including the Environmental Management and Co-ordination (Waste Management) Regulations, 2006, the Draft E-Waste Regulations, the Sustainable Waste Management Act (No. 31 of 2022), and the Sustainable Waste Management (Extended Producer Responsibility) Regulations, 2024. This review identified strengths, gaps, and opportunities for alignment with the proposed regulations.
    - **Analysis of Previous Studies and Reports:** Relevant studies, such as "The Role of Regulatory Framework on E-Waste in Kenya" and "Towards Development of Effective Policies and Regulations for Off-Grid Solar E-Waste Management in Kenya", were evaluated to understand existing research on e-waste challenges, technological solutions, and policy recommendations in the Kenyan context.
    - **International Best Practices:** The RIA explored global e-waste management frameworks, such as the European Union's Waste Electrical and Electronic Equipment (WEEE) Directive and producer accountability schemes for end-of-life costs. These

international models provided insights into effective strategies for e-waste collection, recycling, and regulatory enforcement that could be adapted to Kenya's context.

- **Stakeholder Identification and Analysis:** A comprehensive stakeholder mapping exercise was conducted to identify and analyze the roles, interests, and potential impacts of groups affected by or influencing the proposed regulations. Stakeholders were categorized as follows:
    - **Government Ministries:** Key ministries, including the Ministry of Environment, Climate Change and Forestry (MoECCF), Ministry of Information, Communications and the Digital Economy (MoICDE), Ministry of Health (MoH), and Ministry of Investments, Trade, and Industry (MITI), were assessed for their roles in policy formulation and enforcement.
    - **Government Regulatory Agencies:** Agencies such as the National Environment Management Authority (NEMA), Kenya Revenue Authority (KRA), Information and Communication Technology Authority (ICTA), and Kenya Bureau of Standards (KEBS) were evaluated for their regulatory oversight and enforcement capacities.
    - **County Governments:** Their role in localized waste management and implementation of national policies was analyzed.
    - **Industry Participants:** This group included manufacturers, importers, distributors, retailers, formal e-waste recyclers, and informal sector participants, whose operations and compliance obligations will be directly affected by the regulations.
    - **Non-Governmental Organizations (NGOs) and Civil Society:** These entities were considered for their advocacy, awareness-raising, and community engagement efforts in e-waste management.
    - **Academic and Research Institutions:** Their contributions to evidence-based policy development and technological innovation were reviewed.
    - **General Public:** The public's role as consumers and participants in e-waste disposal practices was assessed.
    - **Vulnerable Groups:** Special attention was given to marginalized groups, such as pregnant women in informal settlements and underage school dropouts engaged in e-waste collection and sales, who face heightened health and socio-economic risks.
- **Data Collection and Analysis:** A mixed-methods approach was employed to gather both quantitative and qualitative data. Quantitative data included metrics such as e-waste generation volumes, recycling rates, and measurable environmental and health impacts. Qualitative data captured stakeholder perceptions, compliance challenges, and socio-economic considerations. Analytical tools, including statistical modeling and qualitative thematic analysis, were used to evaluate the economic, social, and environmental impacts of the proposed regulations.
- **Synthesis and Evaluation:** Findings from the data analysis and literature review were synthesized to assess the necessity, effectiveness, and potential consequences of the proposed regulations. This stage involved a comparative analysis of alternative policy options, incorporating:

- **Cost-Benefit Analysis:** To weigh the economic costs of implementation against the anticipated environmental and social benefits.
- **Risk Assessment:** To evaluate potential risks, such as regulatory non-compliance or unintended economic burdens on stakeholders.
- **Competition Assessment:** To ensure the regulations do not disproportionately affect market competition or innovation in the e-waste sector.

- **Formulation of Recommendations:** Based on the synthesized findings, evidence-based recommendations were developed to address identified gaps and challenges. These recommendations include strategies for effective implementation, robust monitoring mechanisms, and enforcement frameworks to ensure the regulations achieve their intended outcomes.
- **Reporting and Dissemination:** This comprehensive RIA report was prepared, consolidating all findings, analyses, and recommendations. This report is designed to be accessible and actionable, with clear, evidence-based insights for policymakers, stakeholders, and the public. The report will be disseminated through targeted channels, including stakeholder workshops, policy briefs, and public consultations, to foster transparency and encourage feedback.

4.2 Data Collection Strategy and Design

The data collection strategy was designed to support informed decision-making and effective policy development. Its objectives were to gather comprehensive data on stakeholder perspectives, identify challenges and opportunities, and inform policy development. The strategy involved categorizing stakeholders, utilizing various data collection methods such as surveys, in-depth interviews, focus group discussions, and direct observations, and employing purposive and snowball sampling techniques. Data analysis included statistical methods for quantitative data and thematic analysis for qualitative data. Ethical considerations like informed consent and confidentiality were maintained. Data validation was ensured through triangulation. Findings are compiled into reports and presented in stakeholder workshops.

5. JUSTIFICATION

5.1 Justification for the Proposed Regulations

The Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025, are justified by several environmental, economic, and social factors. Key justifications include:

- **Environmental Protection and Public Health:** The regulations aim to prevent pollution from hazardous substances released by uncontrolled e-waste disposal, thereby protecting ecosystems and public health.
- **Producer Accountability for End-Of-Life Costs**: They implement the "polluter pay principle" by requiring producers to register, declare equipment, and pay treatment fees, shifting the financial burden from taxpayers and incentivizing sustainable product design.
- **Resource Recovery and Circular Economy:** The regulations promote recycling and refurbishment of valuable materials in e-waste, supporting circular economy principles and reducing reliance on new resources.
- **Formalization and Job Creation:** A formal framework for e-waste management is established, which can lead to the growth of a legitimate recycling industry and the creation of green jobs.
- **Data Collection and Monitoring:** The establishment of an electrical and electronic equipment registry by NEMA will enable the collection of vital data for evidence-based policymaking, performance monitoring, and enforcement.
- **Prevention of Illegal Practices:** The regulations prohibit the introduction of certain e-waste and require donation recipients to register as producers to prevent Kenya from becoming an e-waste dumping ground.
- **Harmonization with International Standards:** These regulations align Kenya with international best practices in e-waste management, fostering international cooperation and trade in recycled materials.

5.2 Evaluation of Regulatory adequacy

5.2.1 Introduction

This section provides a comprehensive assessment of whether the proposed Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025 are adequate to achieve Kenya's e-waste management objectives. The evaluation examines the regulations against international benchmarks, identifies gaps and weaknesses, considers non-regulatory alternatives, and assesses hidden costs and benefits. This analysis is essential to justify the necessity and sufficiency of the regulatory intervention.

5.2.2 Non-Regulatory Alternatives for E-Waste Management

Before concluding that regulation is necessary, this RIA evaluated alternative approaches to managing e-waste in Kenya. The OECD emphasizes that regulatory impact assessments should consider non-

regulatory options to demonstrate that chosen interventions represent optimal policy approaches (OECD, 2020). The following mechanisms were assessed:

a) Voluntary Industry Self-Regulation

Description: Industry associations (e.g., Kenya Association of Manufacturers) could establish voluntary codes of conduct for e-waste management without government mandate.

Potential Benefits:

- Lower government administrative costs
- Industry ownership and flexibility
- Faster implementation without legislative delays
- Reduced compliance burden on businesses

Critical Weaknesses:

International evidence demonstrates severe limitations of voluntary approaches. Australian and Canadian pre-regulatory voluntary e-waste programs achieved participation rates below 15% before mandatory regulations were introduced (Australian Government Department of Agriculture, Water and the Environment, 2011; Environment and Climate Change Canada, 2009).

The fundamental challenge is the "free-rider problem" documented in environmental economics literature. Walls and Palmer (2001) demonstrate that compliant producers bear full costs while non-compliant competitors gain market advantages, creating economic disincentives for voluntary participation. In Kenya's context, where over 70% of EEE are imports from diverse sources (Kenya Revenue Authority, 2023), voluntary coordination becomes particularly impractical due to:

- Fragmented import market with hundreds of small-scale importers
- Weak industry association enforcement capacity
- No mechanism to compel participation from informal sector handling 95% of current e-waste (WEEE Centre, 2023)
- Limited coverage of micro-importers and community-level refurbishers

Assessment: Insufficient as standalone approach. Kenya's fragmented import market and weak industry association enforcement capacity make voluntary schemes non-viable for achieving comprehensive e-waste management.

b) Market-Based Incentives Without Regulation

Description: Tax breaks, subsidies, or carbon credits for recyclers and manufacturers without mandatory obligations.

Potential Benefits:

- Economic efficiency through market mechanisms
- Encourages innovation
- Lower political resistance

Critical Weaknesses:

The OECD's comprehensive review of Extended Producer Responsibility systems concludes that incentives alone cannot create functioning collection infrastructure without regulatory obligations (OECD, 2016). Specific limitations include:

- **Funding dependency:** Requires sustained government budget allocation uncertain in Kenya's fiscal context where competing priorities limit environmental spending (National Treasury, 2022)
- **No collection guarantee:** Incentives may attract recyclers but cannot ensure adequate e-waste collection volumes; Kenya currently collects only 5% formally (Kenya News Agency, 2024)
- **Cherry-picking behavior:** High-value materials (gold, copper) targeted while hazardous fractions (mercury, lead) ignored—a pattern observed across developing country contexts (Medina, 2007)
- **Scale limitations:** Kenya's minimal formal recycling sector (1% of waste) requires infrastructure development that incentives alone cannot trigger
- **Equity concerns:** Benefits large formal operators; excludes informal workers handling bulk of current e-waste (Wilson et al., 2006)

Assessment: Necessary but insufficient. Incentives should complement regulation (as in Schedule 6 of proposed regulations) but cannot replace mandatory producer obligations. Atasu and Subramanian (2012) demonstrate mathematically that without mandatory take-back requirements, economic incentives fail to internalize environmental externalities adequately.

c) Public-Private Partnerships (PPPs) Without Mandatory Framework

Description: Government contracts with private recyclers for e-waste management services.

Potential Benefits:

- Leverages private sector efficiency
- Shared investment burden
- Technology transfer

Critical Weaknesses:

PPPs address treatment infrastructure but fail to solve the primary bottleneck: collection. Evidence from developing countries shows that without producer obligations, PPPs face critical limitations:

- **Collection gap:** PPPs address treatment but not collection—the primary bottleneck (only 5% currently collected in Kenya)
- **Producer accountability vacuum:** Producers escape responsibility; costs fall on public budget violating "polluter pays" principle
- **Inconsistent coverage:** PPPs typically focus on urban areas, neglecting rural e-waste (UN-HABITAT, 2010)

- **Sustainability risk:** Dependent on continuous government contracts; vulnerable to budget cuts
- **Legal ambiguity:** Without regulations defining waste ownership and liability, PPP contracts face legal challenges documented in waste management literature (Alberini et al., 2005)

Assessment: PPPs are effective implementation tools but require regulatory foundation. The proposed regulations enable PPPs through licensing provisions (Regulations 13-14) while establishing producer obligations. International experience demonstrates PPPs succeed only when embedded within comprehensive regulatory frameworks (World Bank, 2015).

d) Educational Campaigns as Primary Intervention

Description: Public awareness programs encouraging proper e-waste disposal without legal mandates.

Potential Benefits:

- Low cost
- Builds long-term behavioral change
- Politically non-controversial

Critical Weaknesses:

Behavioral research demonstrates that awareness alone cannot overcome structural barriers. Botetzagias et al. (2015) found that while environmental awareness correlates with recycling intentions, actual behavior depends critically on infrastructure availability. Kenya-specific evidence supports this:

- **Survey evidence:** General public survey (n=61) conducted for this RIA shows 65.6% already aware of e-waste risks, yet 29.5% still dispose in regular trash due to lack of alternatives
- **Slow impact:** Behavioral change takes decades; Kenya faces immediate health and environmental crisis with 51,300 tonnes generated annually (KNBS, 2025)
- **Producer inaction:** Education cannot compel producers to fund infrastructure or accept returned products
- **International failure:** No country has achieved >20% formal e-waste recovery through awareness alone; all successful systems combine education with mandatory infrastructure (European Environment Agency, 2020)

Assessment: Essential complement to regulation but wholly inadequate as standalone approach. Regulations must create infrastructure that education campaigns can promote.

e) Economic Instruments: Deposit-Refund Schemes (DRS)

Description: Consumers pay deposit at purchase, refunded upon product return (e.g., beverage container model).

Potential Benefits:

- High return rates (80-95%) in bottle deposit systems

- Direct consumer engagement
- Self-financing mechanism

Critical Weaknesses:

While deposit-refund systems work effectively for standardized, short-lifecycle products (beverage containers), electronics present unique challenges:

- **Long product lifespans:** Unlike bottles returned within days/weeks, electronics have 4-15 year lifespans, making deposit tracking complex (Palmer & Walls, 1997)
- **Import dominance:** 70% of Kenya's EEE are imports (KRA, 2023); border collection of deposits logistically challenging
- **Robust second-hand market:** Used electronics market complicates deposit transfer and tracking
- **Amount determination:** Deposit must incentivize return without deterring purchase—difficult balance for items ranging from KES 1,000 to KES 150,000
- **Administrative costs:** Requires national database tracking deposits over years

Assessment: Potentially valuable for specific product categories (batteries, small appliances) but impractical as universal solution. Regulations enable DRS as option (Regulation 9 allows deposit refund under take-back schemes) without mandating it, providing flexibility demonstrated effective in Swiss system (SENS eRecycling & Swico Recycling, 2021).

Comparative Analysis: Why Regulation is Necessary

Criterion	Voluntary	Incentives Only	PPPs Only	Education Only	DRS Only	Proposed Regulations
Ensures Producer Accountability	✗	✗	✗	✗	Partial	✓
Addresses Collection Gap	✗	Partial	✗	✗	Partial	✓
Covers All Market Actors	✗	Partial	Partial	✓	Partial	✓
Enforceable	✗	Partial	✓	✗	✓	✓
Financially Sustainable	✗	✗	✗	✓	✓	✓
Addresses Hazardous Fractions	✗	✗	✓	✗	✗	✓
Formalizes Informal Sector	✗	✗	✗	✗	✗	Partial

Rapid Implementation	Partial	Partial	✗	✓	✗	Partial

Table 5. 1: Comparative Analysis

Conclusion: Non-regulatory alternatives each address specific aspects of e-waste management but fail to create comprehensive systems. International evidence from EU, Switzerland, and South Korea demonstrates that achieving >60% formal recovery requires mandatory producer obligations backed by legal enforcement (European Environment Agency, 2020; SENS eRecycling & Swico Recycling, 2021).

The proposed regulations incorporate beneficial elements from alternatives (incentives in Schedule 6, enabling PPPs through licensing, allowing DRS options) while establishing enforceable producer accountability absent in voluntary approaches. This integrated approach aligns with OECD guidance on efficient waste management policy design (OECD, 2016).

5.2.3 Adequacy of Provisions to Detect and Deter Illegal Imports

E-waste imports pose dual challenges: (1) functioning equipment disguised as "donations" that becomes waste within years, and (2) direct e-waste imports prohibited under Basel Convention. The regulations must prevent Kenya from becoming an e-waste dumping ground, as documented in transboundary waste movement studies (UNEP, 2019).

5.2.3.1 Current Provisions in Proposed Regulations

Regulation 17: Restriction on Importation

- Prohibits import of Cathode Ray Tubes (CRT) except for medical use
- Requires any recipient of donated EEE to register as producer with NEMA

Regulation 6(3): Producer Registration

- All producers (including importers) must register with NEMA
- Provides mechanism to track imported equipment volumes

Gaps Identified:

Import Control Need	Current Provision	Adequacy Assessment	International Standard	Recommended Addition
Pre-shipment notification	None	**Inadequate**	EU requires 30-day advance notice (EC Regulation 660/2014)	Mandatory advance manifest submission
Port of entry inspection	None	**Inadequate**	Rwanda inspects 15% randomly (REMA, 2020)	NEMA inspection requirement for consignments >500kg
Functionality testing standards	General reference to "donations"	**Weak**	Switzerland uses detailed ORDEA standards (2005)	Schedule defining testing protocols

Customs collaboration	Implied through NEMA authority	**Unclear**	EU has formal coordination protocols (EC, 2014)	Explicit NEMA-KRA MOU requirement
Penalties for illegal import	General penalty (Regulation 26)	**Vague**	Nigeria: 10% of consignment value (NESREA, 2011)	Specific penalties + deportation at importer's cost
Second-hand equipment standards	Registration requirement only	**Insufficient**	EU requires 85% performance threshold (CENELEC EN 50614, 2018)	Minimum functionality standards
Age restrictions	None	**Major gap**	Rwanda prohibits computers >8 years (REMA, 2016)	Prohibit EEE >10 years old except certified
Documentation requirements	Registration	**Weak**	EU Correspondence Guidelines detail 7 required documents (EC, 2007)	Mandate comprehensive documentation

Table 5. 2: Gaps in proposed E-waste Regulations

5.2.3.2 International Comparison: Import Control Provisions

European Union (WEEE Recast Directive + Waste Shipment Regulation):

The EU's comprehensive approach to preventing e-waste dumping includes stringent controls. The Waste Shipment Regulation (EU No 660/2014) requires exporters to prove equipment functionality through testing, protection against transport damage, detailed documentation (test records, invoice, functionality declaration), and pre-notification to importing country authorities (European Commission, 2014). The Correspondence Guidelines provide specific criteria distinguishing waste from functioning equipment (European Commission, 2007).

Result: Illegal shipment detection increased 40% after 2014 amendments, demonstrating effectiveness of comprehensive documentation requirements (Eurostat, 2022).

Nigeria (National Environmental Regulation on E-Waste):

Nigeria's regulations prohibit import of EEE >15 years old, used air conditioners >5 years old, and used refrigerators >10 years old, while requiring NESREA import permits (NESREA, 2011). However, Odeyingbo et al. (2017) document enforcement limitations at ports, with ~30% estimated non-compliance due to capacity constraints, illustrating that regulations alone are insufficient without implementation resources.

Challenge: Enforcement limited by port capacity; ~30% estimated non-compliance

Rwanda (E-Waste Regulation, 2016):

Rwanda requires certificate of compliance for all EEE imports, conducts random port inspections (15% of consignments) by Rwanda Standards Board, and enforces age restrictions: computers >8 years, refrigerators >10 years (Republic of Rwanda, 2016). UNEP (2021) documents documented decline in non-functional imports from 45% (2015) to 18% (2020), demonstrating efficacy of systematic inspection regime.

5.2.3.3 Kenya-Specific Import Risks

Kenya faces unique vulnerabilities:

- **Mombasa port:** Regional hub for East Africa; transshipment complicates tracking as documented in port authority statistics (Kenya Ports Authority, 2024)
- **Free trade agreements:** EAC common external tariff limits unilateral import restrictions
- **Donation loophole:** NGOs and religious organizations exempt from import duties; exploited for e-waste dumping as observed in field assessments
- **Informal cross-border trade:** Porous borders with Uganda, Tanzania, Somalia

Evidence from stakeholder consultations:

- County government representative (Mombasa) reported "containers of non-functional equipment labeled as donations" (Stakeholder interview, June 2025)
- Waste handler noted "70% of collected e-waste is imported brands <5 years old—suggesting recent dumping" (Stakeholder survey, May 2025)

5.2.3.4 Recommended Regulatory Enhancements

To adequately address illegal imports, the regulations should be amended to include:

New Regulation 17A: Pre-Import Requirements

1. Advance manifest submission to NEMA (30 days before arrival) specifying:
    - Quantity, brand, model, serial numbers
    - Manufacturing dates
    - Intended use (commercial, donation, personal)
    - Functionality certificates from independent testing labs

    This aligns with EU Waste Shipment Regulation requirements that have proven effective in reducing illegal imports (European Commission, 2014).

2. Risk-based inspection regime:
    - 100% inspection for first-time importers
    - 30% random inspection for registered importers with good record
    - 100% inspection for donations and second-hand equipment

The risk-based approach follows Rwanda's successful model while maintaining resource efficiency (REMA, 2020).

New Regulation 17B: Age and Functionality Standards

1. Prohibit import of:
    - EEE >12 years from manufacturing date (except heritage/museum items)
    - Any non-functional EEE (except for authorized repair/refurbishment facilities)
    - EEE containing banned substances (CFCs in refrigeration, mercury switches exceeding 5mg)

    Age restrictions are based on UNEP technical guidelines establishing 10-12 years as threshold beyond which equipment typically requires replacement rather than repair (UNEP, 2019).

2. Functionality testing requirements:
    - All second-hand EEE must undergo testing by Kenya Bureau of Standards (KEBS)-accredited labs
    - Minimum performance: 85% of original specifications (consistent with CENELEC EN 50614:2018 standards)
    - Safety compliance: all protective features operational
    - Cosmetic condition: no structural damage affecting safety

New Regulation 17C: Customs Collaboration Protocol

1. Mandatory Memorandum of Understanding between NEMA and Kenya Revenue Authority (KRA)
2. Joint inspection teams at Mombasa, JKIA, and border points
3. NEMA officers authorized to issue detention orders for suspect consignments
4. KRA to withhold customs clearance pending NEMA compliance certificate

New Schedule: Documentation Requirements for EEE Imports

1. Mandatory Memorandum of Understanding between NEMA and Kenya Revenue Authority (KRA)
2. Joint inspection teams at Mombasa, JKIA, and border points
3. NEMA officers authorized to issue detention orders for suspect consignments
4. KRA to withhold customs clearance pending NEMA compliance certificate

This formalizes coordination mechanisms proven effective in Rwanda and South Africa (REMA, 2020; Godfrey & Oelofse, 2017).

New Schedule: Documentation Requirements for EEE Imports

- Commercial invoice with HS codes
- Manufacturing date certificate

- Functionality testing report (for second-hand items)
- Producer's declaration of compliance with banned substances restrictions
- Warranty or service agreement (for commercial equipment)
- Import permit from NEMA (for consignments >5 tonnes)

Documentation requirements based on EU Correspondence Guidelines which have established international precedent (European Commission, 2007).

Enhanced Penalties (Amendment to Regulation 26):

- Illegal import of e-waste: KES 10 million or 10% of consignment value (whichever higher) + mandatory deportation at importer's cost
- False documentation: KES 5 million + 2 years imprisonment
- Repeat offenders: Permanent blacklisting from EEE imports

Penalty structure modeled on Nigeria's effective deterrent approach while scaled to Kenya's economic context (NESREA, 2011).

5.2.3.5 Implementation Feasibility

Resource Requirements:

- NEMA inspectors: 12 officers (3 per major port/airport) - KES 8.4M annually
- Testing equipment: X-ray scanners, functionality testing tools - KES 15M capital
- Database integration: Link NEMA registry to KRA Simba system - KES 5M

These estimates are based on Rwanda's implementation costs adjusted for Kenya's scale (REMA, 2020).

Phased Rollout:

- **Phase 1 (Months 1-6):** NEMA-KRA MOU, pilot at Mombasa port, CRT ban enforcement
- **Phase 2 (Months 7-12):** Age restrictions, functionality standards gazette, expand to JKIA
- **Phase 3 (Year 2):** Full pre-notification system, border post coverage

Expected Impact:

- Reduce non-functional imports by 60% within 2 years (Rwanda baseline achievement: UNEP, 2021)
- Increase producer registration compliance to 85% (from ~30% estimated currently)
- Generate KES 200M+ in penalties for deterrence

5.2.4 Provisions to Distinguish Waste from Non-Waste EEE

A critical regulatory gap in most e-waste frameworks is the ambiguity between "waste" and "functioning equipment." This distinction determines what is subject to take-back obligations, what requires

treatment as hazardous waste, what can be exported/imported legally, and what triggers producer financial obligations (UNEP, 2019).

5.2.4.1 Current Regulatory Position

The proposed regulations define e-waste in Regulation 2:

"Electrical and electronic waste" or "e-waste" means waste Electrical and Electronic Equipment as defined in the First Schedule of these Regulations"

First Schedule lists product categories (IT equipment, household appliances, etc.) but does not define when equipment becomes "waste."

Critical Ambiguity:

- Is a 10-year-old functioning laptop e-waste?
- Is a repairable smartphone with cracked screen waste?
- Who determines functionality—owner, refurbisher, or regulator?

These definitional questions have generated extensive legal disputes in other jurisdictions (European Commission, 2014).

5.2.4.2 International Definitions and Approaches

European Union (WEEE Directive 2012/19/EU, Article 3):

Defines WEEE as:

"Electrical or electronic equipment which is waste... including all components, sub-assemblies and consumables which are part of the product at the time of discarding" (European Commission, 2012)

Waste is further defined under Waste Framework Directive (2008/98/EC, Article 3):

"Any substance or object which the holder discards or intends or is required to discard" (European Commission, 2008)

Key criterion: Holder's intent to discard—not objective functionality.

The EU Correspondence Guidelines (2007) provide clarification for transboundary movement, specifying equipment is not waste if: (1) fully functional and directly reusable for original purpose, (2) protected against damage during transport, (3) accompanied by documentation (testing, invoice, warranty), and (4) destined for reuse, not dismantling.

Switzerland (WEEE Ordinance, Article 2):

Uses **functionality testing standards:** main functions operational (90% of original performance), no safety hazards (exposed wiring, leaking batteries), and reasonable economic value for reuse (repair cost <50% of replacement cost) (Swiss Federal Council, 2005).

United States (EPA RCRA Definition):

Focuses on **hazardous waste characteristics:** electronics containing hazardous materials (lead, mercury) are waste if discarded by owner, stored for eventual disposal (not active use), or failed functionality testing (U.S. EPA, 2015).

South Africa (National Environmental Management: Waste Act):

Employs **rebuttable presumption:** equipment is presumed waste if non-functional, >10 years old, or without valid warranty. Importer/owner must prove otherwise through testing certificates (Republic of South Africa, 2008).

5.2.4.3 Kenya's Legal Gap Analysis

Current regulations fail to address:

Scenario	Current Regulatory Clarity	Legal Consequence	International Precedent
Business upgrades functional computers after 5 years	Unclear if e-waste	Producer may escape take-back obligation	EU: Intent to discard determines (EC, 2008)
Householder stores broken phone "for repair" for 3 years	Unclear if waste	Not collected; informal disposal likely	Switzerland: 12-month storage = waste (Swiss FC, 2005)
Refurbisher receives non-functional devices	Unclear if waste upon receipt	Ambiguous licensing requirement	EU: Context-dependent (EC, 2012)
Importer brings "second-hand working" equipment that fails within 6 months	Unclear if was waste at import	Illegal import prosecution unlikely	Rwanda: Testing required (REMA, 2016)
Charity donates old but functional equipment to school	Unclear if waste	Registration requirement unclear	EU: Functionality test determines (EC, 2007)

Table 5. 3: Legal Gaps in proposed regulations

Legal Risks:

- Producers challenge take-back obligations claiming equipment "not waste"
- Regulators unable to prosecute illegal imports due to definitional uncertainty
- Refurbishers operate without licenses claiming they handle "goods not waste"
- County governments unable to enforce disposal bans due to ambiguity Producers challenge take-back obligations claiming equipment "not waste"
- Regulators unable to prosecute illegal imports due to definitional uncertainty
- Refurbishers operate without licenses claiming they handle "goods not waste"
- County governments unable to enforce disposal bans due to ambiguity

These gaps have generated extensive litigation in EU jurisdictions, documented costs reaching millions in legal fees (Kalimo et al., 2012).

5.2.4.4 Proposed Definitional Framework

Recommendation: Add new **Regulation 2A: Determination of E-Waste Status** and **Schedule 7: Functionality Testing Protocol**

Regulation 2A: Determination of E-Waste Status

(1) Electrical and electronic equipment shall be deemed to be waste if: a) The holder has discarded it or intends to discard it; or b) The holder is storing it without active use for a period exceeding twelve months; or c) It has failed the functionality test prescribed in Schedule 7; or d) The cost of repair exceeds 60% of the current market price for an equivalent new product; or e) It contains components or substances prohibited under these Regulations and is withdrawn from use

This multi-criteria approach synthesizes best practices from EU (intent criterion), Switzerland (functionality test), and economic rationality (repair cost threshold) (European Commission, 2008; Swiss Federal Council, 2005).

(2) Equipment that meets the functionality standards in Schedule 7 and is accompanied by documentation specified in paragraph (3) shall be presumed not to be waste, subject to verification.

(3) For equipment to be classified as non-waste, the holder or transferee must provide: a) Functionality testing certificate from a KEBS-accredited laboratory, issued within 90 days b) Proof of economic value (invoice, valuation, intended use documentation) c) Warranty or service agreement (minimum 90 days for second-hand equipment) d) Declaration that equipment is destined for direct reuse, not dismantling

Documentation requirements align with EU Correspondence Guidelines proven effective in preventing waste shipment disguised as functioning equipment (European Commission, 2007).

(4) The Authority may challenge the non-waste classification by demonstrating: a) Equipment fails objective functionality tests b) Documentation is fraudulent or inadequate c) Equipment is part of a consignment where >30% of items are non-functional d) Holder's pattern of behavior indicates intent to discard (e.g., no reuse infrastructure)

The 30% threshold follows UNEP guidance on consignment-level assessment (UNEP, 2019).

(5) Burden of proof: a) For equipment >8 years old: Holder must prove non-waste status b) For equipment <8 years old: Authority must prove waste status c) For imports: Importer bears burden regardless of age

Age-based burden shifting follows South African and Rwandan precedent (Republic of South Africa, 2008; REMA, 2016).

Schedule 7: Functionality Testing Protocol

Testing Requirements by Product Category

1. Information Technology Equipment (computers, laptops, tablets):

- **Visual inspection:** No physical damage affecting safety (cracked screens acceptable if touchscreen functions)
- **Power-on test:** Successfully boots to operating system within 3 minutes
- **Performance test:**

- Processor speed: ≥70% of manufacturer's specification
- Memory (RAM): 100% of installed capacity functional
- Storage: ≥90% of capacity accessible, no critical errors
- Ports: All advertised ports (USB, HDMI, etc.) operational

- **Battery test (portable devices):** Holds charge ≥60% of original capacity
- **Software:** Legal operating system installed (not pirated)

Performance thresholds based on CENELEC EN 50614:2018 preparing for reuse standards (CENELEC, 2018) and ITU L.1100 recycling procedures (ITU, 2014).

2. Telecommunications Equipment (mobile phones, tablets):

- **Visual inspection:** Screen intact, no liquid damage indicators triggered
- **Basic functions:** Calls, SMS, data connectivity operational
- **Battery:** Holds charge ≥50% of original capacity, no swelling
- **IMEI status:** Not blacklisted for theft

3. Large Household Appliances (refrigerators, washing machines):

- **Safety:** No exposed wiring, intact casing, proper grounding
- **Core function:** Cooling (fridges), washing cycles (washers) operational
- **Efficiency:** Energy consumption ≤150% of manufacturer's specification
- **Refrigerants:** No leaks, gas pressure within 90-110% of specification
- **Age consideration:** Additional safety tests for equipment >12 years old

4. Small Household Appliances (blenders, irons, kettles):

- **Safety:** Intact cord, no exposed elements, proper insulation
- **Function:** Performs primary function without unusual noise/heat
- **Thermostat/controls:** All settings operational

5. Consumer Electronics (TVs, radios, cameras):

- **Display/output:** ≥90% of pixels functional (TVs), clear audio (radios)
- **Inputs:** All advertised inputs operational
- **Remote/controls:** Fully functional or replacement available

B. Testing Procedures

1. Sampling for Bulk Consignments:

- Consignments ≤50 items: Test 100%

- Consignments 51-500 items: Test 30% (minimum 50 items), randomly selected
- Consignments >500 items: Test 15% (minimum 150 items), stratified by type
- **Failure threshold:** If >10% of sample fails, entire consignment deemed waste unless item-by-item testing conducted

Sampling methodology follows ISO 2859-1 acceptance sampling procedures adapted for e-waste context.

2. Testing Laboratories:

- Accreditation: KEBS ISO/IEC 17025 accreditation required
- Approved labs: List published by NEMA, updated quarterly
- Independence: Labs cannot be owned by importers/producers being tested

3. Documentation:

- Test certificate validity: 90 days from testing date
- Required information: Test date, lab name, equipment serial number, pass/fail for each criterion, tester signature
- Digital registry: All certificates registered in NEMA e-waste database

C. Disputed Classifications

1. Appeal Process:

- Holder may appeal NEMA's waste classification within 14 days
- Independent re-testing by KEBS (cost borne by appellant if NEMA classification upheld)
- NEMA decision within 30 days

Appeal procedures follow administrative law principles established in Kenyan Statutory Instruments Act, 2013.

2. Safe Harbor Provision:

- Equipment with valid, uncontested test certificate (≤90 days old) presumed non-waste
- NEMA must prove fraud or changed condition to challenge

5.2.4.5 Economic and Practical Impacts

For Producers:

- **Clarity:** Objective criteria reduce disputes over take-back obligations
- **Cost:** Testing costs (KES 500-5,000/item) offset by reduced legal challenges
- **Design incentive:** Durability rewarded; planned obsolescence discouraged as documented in circular economy literature (Ellen MacArthur Foundation, 2015)

For Importers:

- **Compliance burden:** Testing and documentation requirements
- **Cost:** KES 2,000-10,000 per consignment (depending on volume)
- **Benefit:** Legal certainty; protection against prosecution for genuine second-hand trade

For Refurbishers:

- **Formalization:** Clear distinction between refurbishing (non-waste) and recycling (waste) activities
- **Revenue opportunity:** Providing testing services for importers
- **License clarity:** Refurbishers handling non-waste equipment do not need recycler's license (Regulation 13)

For NEMA:

- **Enforcement:** Objective standards enable prosecution of illegal imports
- **Resource requirement:** Training for inspectors, database management
- **Revenue:** Testing fees, license fees for accredited labs

For Informal Sector:

- **Risk:** Formalized testing may exclude informal collectors from "reuse" market
- **Mitigation:** Simplified, low-cost testing for locally repaired equipment (KES 200 per item) following inclusive formalization models documented by Scheinberg et al. (2016)

5.2.4.6 Implementation Roadmap

Phase 1 (Months 1-6): Regulatory Amendment and Stakeholder Consultation

- Gazette Regulation 2A and Schedule 7
- KEBS develops lab accreditation criteria
- Stakeholder workshops with importers, refurbishers

Phase 2 (Months 7-12): Lab Accreditation and Pilot Testing

- Accredit 5-10 labs (Nairobi, Mombasa, Kisumu)
- Pilot testing at Mombasa port for 6 months
- Refine protocols based on pilot findings

Phase 3 (Year 2): Full Implementation

- Mandatory testing for all imports >500kg
- NEMA database operational
- Enforcement of waste determinations

Phase 4 (Year 3+): Monitoring and Refinement

- Analyze classification disputes
- Update testing protocols for new technologies (IoT devices, EVs)
- Regional harmonization (EAC common standards)

5.2.5 Hidden Costs and Benefits of the Regulations

The cost-benefit analysis in Chapter 9 quantified major costs and benefits, but significant hidden impacts require explicit examination. Pearce et al. (2006) emphasize that comprehensive regulatory impact assessments must identify non-market values and distributional impacts often overlooked in conventional CBA.

5.2.5.1 Hidden Costs

1. Informal Sector Displacement and Social Costs

Nature of Cost: The regulations formalize e-waste management, potentially displacing informal collectors who handle ~95% of current e-waste.

Quantification:

- **Affected population:** Estimated 5,000-8,000 informal collectors in Kenya (WEEE Centre estimate, 2023)
- **Average income:** KES 10,000-25,000/month from e-waste collection
- **Total at-risk income:** KES 600M-2.4B annually

Specific impacts:

- Loss of livelihood for collectors unable to meet licensing requirements (Regulation 12)
- Women and youth disproportionately affected (70% of informal collectors—Stakeholder survey findings)
- Community economic disruption in areas reliant on informal collection (Dandora, Mukuru)

Mitigation costs (not included in Chapter 9):

- Formalization training programs: KES 50M annually for 3 years
- Microfinance for licensing: KES 30M revolving fund
- Social safety net during transition: KES 20M/year
- **Total hidden social cost: KES 150M over 3 years**

International comparison: Godfrey and Oelofse (2017) document that South Africa's EPR implementation (2020-2023) saw 40% of informal collectors exit the sector within 2 years, with <30% successfully transitioning to formal roles despite support programs. Scheinberg et al. (2016) demonstrate that successful integration requires sustained investment in capacity building and inclusive licensing frameworks.

2. Regulatory Compliance Overhead for Small Businesses

Nature of Cost: Small-scale importers and refurbishers face disproportionate compliance burdens documented in regulatory economics literature (Walls, 2004).

Categories affected:

- **Micro-importers:** <50 tonnes EEE/year (~300 businesses in Kenya)
- **Community refurbishers:** Small repair shops in informal settlements (~1,500 businesses)
- **E-waste collectors:** Individual operators (~2,000 persons)

Hidden costs:

- **Time cost:** 40-80 hours annually for registration, reporting (Regulations 6, 20)
    - At KES 500/hour opportunity cost: KES 20,000-40,000/business
    - Aggregate: KES 40M-80M annually across small businesses
- **Professional services:** Many small businesses require consultants for compliance
    - Estimated KES 30,000-50,000 per business for initial setup (based on European Commission, 2019 SME compliance study)
    - Aggregate: KES 60M-100M one-time cost
- **Record-keeping systems:** Digital systems for EPR reporting
    - KES 10,000-20,000 per business
    - Aggregate: KES 30M one-time cost

Disproportionate impact evidence:

- Large producers (e.g., Safaricom): Compliance cost ~0.1% of revenue
- Micro-importers: Compliance cost ~5-10% of revenue

This disparity follows patterns documented in EU WEEE compliance studies (European Commission, 2019).

Mitigation:

- Tiered fee structure (recommended in Section 9.11) could reduce burden
- Simplified reporting for <10 tonnes/year producers
- **Even with mitigation, hidden compliance overhead: KES 100M-150M annually**

3. Enforcement and Monitoring Infrastructure

Nature of Cost: Beyond NEMA's operational budget, broader government infrastructure requires upgrading.

A. Technology infrastructure:

- **National e-waste database:** Real-time tracking of producers, collectors, recyclers

- Development: KES 30M
- Annual maintenance: KES 10M
- Integration with KRA, County systems: KES 15M

- **Mobile inspection tools:** Tablets, connectivity for field officers
  - 50 devices × KES 80,000 = KES 4M
- **Laboratory equipment:** For testing imports, monitoring compliance
  - XRF analyzers (hazardous substance detection): KES 20M
  - Functionality testing equipment: KES 10M

B. Human resource development:

- **NEMA staff training:** 80 officers × 5 days × KES 30,000 = KES 12M
- **County government training:** 47 counties × 3 officers × 3 days × KES 20,000 = KES 8.5M
- **Ongoing capacity building:** KES 5M/year

C. Inter-agency coordination:

- **NEMA-KRA MOU implementation:** Joint operations, data sharing
  - IT integration: KES 8M
  - Joint training: KES 5M
- **NEMA-County coordination:** Quarterly forums, joint inspections
  - Travel, logistics: KES 3M/year

Total hidden enforcement costs: KES 130M capital + KES 25M/year recurrent

4. Legal and Institutional Transition Costs

Nature of Cost: Regulatory change triggers legal challenges, administrative restructuring documented in implementation studies (Wilts et al., 2016).

Components:

A. Legal challenges and disputes:

- Producer challenges to EPR obligations: Estimated 20-50 cases in first 3 years
  - NEMA legal defense costs: KES 15M
  - Court time, administrative hearings: KES 5M
- Clarity issues (e.g., waste definition): Additional litigation
  - Estimated: KES 10M

B. Harmonization with existing regulations:

- Amending EPR Regulations (L.N. 176/2024) to align with e-waste specifics
    - Legal drafting, stakeholder consultation: KES 3M
- Revising county solid waste bylaws (47 counties)
    - Support for county legislative processes: KES 10M

C. Transitional licensing backlog:

- Regulation 27 allows 6 months for existing operators to obtain licenses
- Processing ~500 applications simultaneously
    - Temporary staff, expedited processing: KES 5M

Total hidden legal/institutional costs: KES 48M over 3 years

5. Market Distortion and Informal Economy Shrinkage

Nature of Cost: Formalization increases costs, potentially reducing overall economic activity in sector.

Mechanisms:

- **Price increases:** Formal recyclers' costs (licensing, compliance) passed to consumers
    - Estimated increase in e-waste management cost: 30-50%
    - May drive some waste back to informal/illegal disposal
- **Informal economy GDP loss:** Informal collectors contribute ~KES 1-2B to GDP (estimated)
    - Formalization may reduce this by 40% before new formal jobs compensate
    - **Net GDP loss during transition: KES 400M-800M/year for 2-3 years**

Evidence: Nigeria's 2011 e-waste regulations led to temporary 35% reduction in collected volumes as informal sector withdrew and formal sector scaled up slowly (World Bank, 2015).

6. Trade and Competitiveness Impacts

Nature of Cost: Stringent import requirements may disadvantage Kenya vis-à-vis regional competitors.

Specific impacts:

- **Diversion of second-hand EEE trade:** Importers may route through Tanzania/Uganda with lax controls
    - Estimated trade diversion: 10-20% of legitimate second-hand imports
    - Lost customs revenue: KES 50M-100M/year
    - Lost business activity: KES 200M-400M/year

- **Competitiveness of Kenyan manufacturers:** Local assemblers face compliance costs competitors may avoid
    - Example: Mara Phones, local smartphone assembler, faces EPR obligations while imports from China may circumvent
    - Estimated cost disadvantage: 3-5% of production cost
    - May discourage local manufacturing expansion
- **Regional hub status:** Kenya as ICT hub may be undermined if import procedures too stringent
    - Risk of businesses relocating to Rwanda, Ethiopia with more "business-friendly" (less rigorous) requirements
    - Difficult to quantify but strategic concern documented in trade competitiveness literature (Prakash & Potoski, 2006)

Mitigation through harmonization:

- EAC-wide e-waste standards would level playing field
- Cost of regional negotiation/harmonization: KES 20M over 3 years

Total hidden trade impact: KES 250M-500M/year during initial years

7. Producer Design and Innovation Constraints

Nature of Cost: EPR obligations and design requirements may slow innovation or increase R&D costs.

Mechanisms:

- **Design for Environment mandates (Regulation 5(1)(d)):** Require products be easy to dismantle, repair
    - May conflict with design priorities: miniaturization, waterproofing, aesthetics
    - R&D cost increase for compliance: 5-10% for affected products
    - Time-to-market delays: 2-6 months for new products requiring compliance verification
- **Material restrictions:** Limits on hazardous substances
    - May require reformulation, new suppliers
    - Cost increases: KES 100-500 per device depending on complexity

International evidence:

- EU RoHS Directive (2006): Electronics manufacturers reported 8% average increase in component costs initially (European Commission, 2008)

- Japan's Home Appliance Recycling Law: 12% increase in refrigerator prices in first 3 years (Tasaki et al., 2006)

Kenya impact estimate:

- Affects primarily local assemblers and producers (limited in Kenya)
- Estimated aggregate cost: KES 50M-100M/year across affected businesses
- **Hidden in product prices; consumers ultimately bear cost**

8. Data Management and Privacy Concerns

Nature of Cost: Registry requirements create data security obligations and privacy risks.

Components:

- **Data security infrastructure:** Protecting producer/consumer data in NEMA registry
    - Cybersecurity measures: KES 10M initial + KES 3M/year
    - Compliance with Data Protection Act, 2019: Legal/technical requirements
    - Estimated compliance cost: KES 5M
- **Privacy risks:** Producer proprietary information (volumes, models) in government database
    - Risk of commercial espionage, competitive intelligence leaks
    - Insurance/protection measures: KES 2M/year

Total hidden data management costs: KES 15M capital + KES 5M/year recurrent

5.2.5.2 Summary of Hidden Costs

Hidden Cost Category	Capital/One-Time (KES)	Annual Recurrent (KES)	Duration	Total 3-Year (KES)
Informal sector displacement & mitigation	50M	50M	3 years	200M
Small business compliance overhead	90M	100M-150M	Ongoing	390M-540M
Enforcement infrastructure	130M	25M	Ongoing	205M
Legal/institutional transition	48M	-	3 years	48M
Market distortion (GDP loss)	-	400M-800M	2-3 years	1,200M
Trade/competitiveness impacts	20M	250M-500M	3 years	770M-1,520M
Producer design constraints	-	50M-100M	Ongoing	150M-300M

Data management/privacy	15M	5M	Ongoing	30M
TOTAL HIDDEN COSTS	**353M**	**880M-1,630M**	**3 years**	**2,993M-4,343M**

Table 5. 4: Summary of hidden costs

Critical finding: Hidden costs of KES 3-4.3 billion over 3 years represent significant burden not fully captured in Chapter 9 CBA. However, these must be weighed against hidden benefits below.

5.2.5.3 Hidden Benefits

1. Public Health Improvements Beyond Direct Exposure Reduction

Nature of Benefit: Additional health benefits documented in environmental health literature include:

A. Reduced respiratory disease burden:

Grant et al. (2013) in their systematic review published in *The Lancet Global Health* document that open burning of e-waste releases dioxins, furans, and particulate matter causing respiratory disease. Current exposure in Kenya: ~50,000 people living within 2km of informal burning sites (Dandora, Mukuru, Korogocho documented in UN-HABITAT, 2010).

Quantification:

- Respiratory disease treatment cost: KES 15,000-50,000/case annually
- Estimated attributable cases from e-waste burning: 500-1,000/year (10% of exposed population × 10% incidence based on WHO, 2021 exposure-response functions)
- **Avoided healthcare costs: KES 7.5M-50M/year**
- **Economic productivity gains from reduced illness:** 2,000-4,000 lost workdays avoided × KES 1,000/day = KES 2M-4M/year

B. Reduced cancer incidence:

Leung et al. (2007) document that heavy metals (cadmium, arsenic) and flame retardants (PBDEs) from e-waste are carcinogenic with 10-30 year latency periods.

- Estimated lifetime cancer cases attributable to current e-waste practices: 200-500 cases
- Treatment cost per cancer case: KES 500,000-2M
- **Long-term avoided costs (present value at 7% discount rate): KES 50M-500M over 20 years**

C. Maternal and child health:

Xu et al. (2012) document developmental impacts from e-waste exposure: pregnant women and children in informal settlements face disproportionate exposure causing reduced IQ (lead), birth defects, and developmental delays.

- Estimated affected children: 200-500/year

- **Lifetime economic loss avoided (present value of future earnings): KES 100M-300M/year**

D. Mental health and wellbeing:

- Living near waste sites correlates with elevated stress, depression, anxiety (documented in Hite et al., 2001)
- Cleanup improves community wellbeing, property values
- Difficult to monetize but substantial quality-of-life benefit

Total hidden health benefits: KES 160M-850M/year, increasing over time

2. Ecosystem Services Preservation

Nature of Benefit: The CBA quantified remediation cost avoidance. Additional ecological benefits documented in ecosystem services literature include:

A. Water resource protection:

Robinson (2009) documents that e-waste leachate contaminates groundwater and rivers. Current impact in Kenya: Nairobi River, Athi River systems affected.

- Reduced fish populations: ~500 tonnes/year potential catch lost (KES 50M value)
- Agricultural productivity loss in riparian zones: Estimated KES 100M/year (based on Khan et al., 2008 contamination-yield relationships)
- Increased water treatment costs for municipalities: KES 200M/year

Avoided losses with regulations: KES 350M/year

B. Soil fertility maintenance:

- Heavy metals accumulate in soil, reducing agricultural productivity
- Affected area around informal dumpsites: ~5,000 hectares
- Productivity loss: 20-40% for contaminated agricultural land (Khan et al., 2008)
- **Avoided agricultural losses: KES 200M/year**

C. Biodiversity preservation:

- Toxic substances harm wildlife, especially aquatic species
- Ecological value difficult to monetize but critical for ecosystem resilience (Costanza et al., 2014)
- Tourism impact: Cleaner environment supports Kenya's tourism brand
- Estimated tourism value contribution: KES 50M-100M/year

Total hidden ecosystem benefits: KES 600M-650M/year

3. Circular Economy and Resource Security Benefits

Nature of Benefit: Beyond material recovery value in CBA, broader economic transformation benefits exist.

A. Reduced import dependency:

Buchert et al. (2012) document that e-waste recycling provides secondary raw materials reducing import requirements.

- Kenya imports ~70% of EEE (KRA, 2023)
- E-waste recycling provides secondary raw materials (copper, aluminum, plastics)
- Reduces foreign exchange outflows
- Estimated import substitution value: KES 500M-1B/year at 30% recovery
- **Foreign exchange savings: USD 4M-8M/year**

B. Technology and skills development:

- Formal recycling sector builds technical capacity
- Spillover benefits to manufacturing, reverse logistics sectors
- Estimated value of skills development: KES 50M/year

C. Innovation ecosystem:

Ellen MacArthur Foundation (2015) documents that circular economy creates markets for innovations.

- E-waste management creates market for Kenyan innovations (mobile apps for collection, tracking systems, recycling technologies)
- Startup ecosystem development
- Example: Existing innovation—M-Pesa-based collection incentive systems
- Estimated innovation economy value: KES 100M-200M/year

D. Strategic material access:

- E-waste contains rare earth elements, precious metals increasingly strategic
- Domestic processing capability reduces vulnerability to global supply chain disruptions
- Strategic value difficult to quantify but important for long-term resilience (UNEP, 2019)

Total hidden circular economy benefits: KES 650M-1.4B/year

4. Property Values and Urban Development

Nature of Benefit: Eliminating informal e-waste dumpsites increases nearby property values documented in environmental economics literature.

Quantification based on Hite et al. (2001) and Alberini et al. (2005):

- **Dandora dumpsite area:** ~30 hectares prime urban land near CBD
- **Current land value:** Depressed by 40-60% due to waste site proximity
- **Affected properties:** ~5,000 households/businesses within 500m
- **Average property value:** KES 2M (depressed)
- **Potential value increase:** 30-50% with cleanup = KES 600,000-1M/property
- **Aggregate property value increase: KES 3B-5B**

Additional urban benefits:

- Land reclamation for productive use (housing, commercial, green spaces)
- Improved neighborhood quality → reduced crime, better schools
- Multiplier effects on local businesses

Amortized over 10 years: KES 300M-500M/year

5. International Reputation and Trade Benefits

Nature of Benefit: Compliance with international environmental standards enhances Kenya's global standing.

A. Trade access:

Prakash and Potoski (2006) document that EU and US increasingly require environmental compliance for trade partners.

- Kenya's cut flower, textile exports benefit from "green" reputation
- Estimated value of trade preference maintenance: KES 500M-1B/year

B. Foreign direct investment (FDI):

Kotsantonis and Serafeim (2019) document that multinational corporations prioritize countries with strong environmental governance.

- Enhanced ESG profile attracts responsible investors
- Estimated additional FDI due to environmental compliance: USD 10M-20M/year (KES 1.3B-2.6B) based on UNCTAD (2020) investment patterns

C. Development assistance:

Green Climate Fund (2022) eligibility criteria favor countries with strong environmental regulations.

- Strong environmental regulations increase eligibility for green financing
- Estimated additional concessional financing access: USD 5M-10M/year (KES 650M-1.3B)

D. Regional leadership:

- Kenya as model for East Africa → benefits from regional harmonization, standard-setting
- Position as regional hub for green economy initiatives
- Difficult to quantify but strategically valuable

Total hidden international benefits: KES 2.5B-4.9B/year

6. Reduced Emergency Response and Disaster Costs

Nature of Benefit: Proper e-waste management prevents environmental disasters requiring emergency interventions.

Examples of avoided disasters:

- **Dumpsite fires:** Informal burning causes uncontrolled fires
    - 2016 Dandora fire: Required emergency response costing KES 20M
    - Probability without regulation: 1-2 major fires/year
    - **Avoided emergency costs: KES 20M-40M/year**
- **Contamination incidents:** Toxic leachate requires emergency cleanup
    - Example: 2019 Nairobi River fish kill attributed to e-waste leachate
    - Emergency response + investigation: KES 10M
    - Probability: 1 incident every 2-3 years
    - **Avoided costs: KES 3M-5M/year**

Total hidden disaster avoidance: KES 23M-45M/year

7. Formalization of Informal Sector → Fiscal Benefits

Nature of Benefit: Formalizing informal collectors brings them into tax system documented in informal economy literature (Medina, 2007; Wilson et al., 2006).

A. Tax revenue:

- Informal sector currently untaxed
- Formalization brings income tax, VAT compliance
- Estimated informal e-waste economy: KES 1-2B/year
- Tax capture at 20% effective rate: **KES 200M-400M/year**

B. Social security contributions:

- Formal workers contribute to NHIF, NSSF
- Social security fund increases: **KES 50M-100M/year**

C. Reduced social protection burden:

- Formal sector workers less likely to require emergency social assistance
- Estimated savings: **KES 20M-50M/year**

Total hidden fiscal benefits: KES 270M-550M/year

8. Educational and Awareness Spillovers

Nature of Benefit: E-waste regulations and campaigns raise general environmental consciousness with spillover effects.

Spillover effects:

- Increased awareness applies to other waste streams (plastics, organics)
- Behavioral change multiplier effect
- Counties report 15-20% increase in general recycling participation after e-waste campaigns (Stakeholder consultations, 2025)
- Estimated value of improved solid waste management overall: **KES 100M-200M/year**

Educational benefits:

- School programs on e-waste include broader environmental education
- Long-term behavior change in youth
- Difficult to quantify but builds foundation for sustainable development

Total hidden educational benefits: KES 100M-200M/year

Summary of Hidden Benefits

Hidden Benefit Category	Annual Value (KES)	Timeframe	Source
Public health improvements	160M-850M	Immediate to 20+ years	Grant et al., 2013; WHO, 2021
Ecosystem services preservation	600M-650M	Immediate	Robinson, 2009; Costanza et al., 2014
Circular economy development	650M-1,400M	3-10 years	Ellen MacArthur Foundation, 2015
Property values	300M-500M	5-10 years	Hite et al., 2001; Alberini et al., 2005
International reputation/trade	2,500M-4,900M	2-5 years	Prakash & Potoski, 2006; UNCTAD, 2020
Disaster avoidance	23M-45M	Immediate	Project data

Fiscal benefits (formalization)	270M-550M	2-5 years	Medina, 2007
Educational spillovers	100M-200M	5-10 years	Stakeholder data
TOTAL HIDDEN BENEFITS/YEAR	**4,603M-9,095M**	**Average over 10 years**	**Multiple sources**

Table 5. 5: Summary of hidden benefits

5.2.5.4 Net Hidden Impact Analysis

Hidden Costs (3-year average): KES 1.0B-1.4B/year
Hidden Benefits (10-year average): KES 4.6B-9.1B/year

Net Hidden Benefit: KES 3.6B-7.7B/year

Critical Finding: Even accounting for substantial hidden costs (informal sector displacement, compliance burden, trade impacts), hidden benefits exceed hidden costs by a factor of 3-7x. This significantly strengthens the case for regulation beyond the core CBA in Chapter 9.

Revised Total Net Benefit (Including Hidden Impacts):

- **CBA Chapter 9 (Conservative):** KES 15.1M/year net benefit
- **Plus Hidden Net Benefit:** KES 3.6B-7.7B/year
- **Revised Total: KES 3.62B-7.72B/year net benefit**

This represents a benefit-cost ratio of approximately **15:1 to 30:1** when all impacts are considered—an exceptionally strong case for regulatory intervention.

5.2.6 Overall Regulatory Adequacy Assessment

5.2.6.1 Strengths of Proposed Regulations

1. Producer Accountability Framework (Regulations 6-10)

- ✓ Clear registration requirements
- ✓ Annual compliance certification
- ✓ Formula-based producer obligations (Schedule 5)
- ✓ Collective compliance schemes enabled (PROs)

Assessment: Strong foundation aligned with international EPR best practices documented by OECD (2016).

2. Treatment Standards and Prohibitions (Regulations 19, Schedule 6)

- ✓ Specific bans on hazardous practices (open burning, acid leaching)
- ✓ Environmentally sound management principles
- ✓ Evidence notes for tracking (Schedule 4)

Assessment: Robust environmental protection provisions consistent with Basel Convention technical guidelines (UNEP, 2019).

3. Licensing and Enforcement (Regulations 13-14, 23-26)

- ✓ Comprehensive licensing for recyclers
- ✓ Clear penalties for non-compliance
- ✓ NEMA enforcement authority

Assessment: Adequate enforcement mechanisms if resourced properly.

5.2.6.2 Critical Gaps Requiring Amendment

Gap 1: Import Controls (Section 5.2.3)

- ✗ No pre-import notification system
- ✗ No functionality testing standards
- ✗ Weak age restrictions
- ✗ Limited customs collaboration provisions

Impact: Kenya remains vulnerable to illegal e-waste dumping. Odeyingbo et al. (2017) estimate 30-50% of imported "second-hand" equipment in similar African contexts is non-functional waste.

Recommended additions: Regulations 17A-C, Schedule 7 (outlined in Section 5.2.3.4)

Gap 2: Waste vs. Non-Waste Definition (Section 5.2.4)

- ✗ No objective criteria for determining waste status
- ✗ Ambiguity enables regulatory avoidance
- ✗ Enforcement challenges inevitable

Impact: Producers, refurbishers, importers can claim equipment is "not waste" to avoid obligations. Legal challenges likely as documented in EU implementation (Kalimo et al., 2012).

Recommended additions: Regulation 2A, Schedule 7 (outlined above)

Gap 3: Informal Sector Integration

- ✗ No explicit provisions for transitioning informal collectors
- ✗ Licensing requirements may be barriers
- ✗ Social protection measures absent

Impact: 5,000-8,000 livelihoods at risk; potential social unrest; informal sector may continue operating illegally. Scheinberg et al. (2016) document that integration requires explicit provisions.

Recommended additions:

- New Regulation 12A: Simplified licensing for micro-collectors (<2 tonnes/month)
- Fee waivers for first 2 years for informal sector formalization
- Training fund (KES 50M) in enabling legislation

Gap 4: County Government Capacity and Coordination

- ✗ Regulations assume county capacity without addressing gaps
- ✗ No funding mechanism for county infrastructure
- ✗ Weak coordination provisions between NEMA and counties

Impact: Implementation failure at local level; devolved functions unfulfilled as documented in Kenyan waste management studies (Nigatu et al., 2016).

Recommended additions:

- New Regulation 22: NEMA-County Coordination Framework
- Earmark 30% of producer obligations fees for county capacity building
- Minimum standards for county collection centers

Gap 5: Financial Sustainability

- ✗ No clear financing mechanism for problematic waste fractions
- ✗ Market-based model may fail for low-value items (CRTs, mercury bulbs)
- ✗ Risk of producer insolvency leaving orphan waste

Impact: Hazardous waste may remain uncollected; financial model unsustainable for non-profitable items (OECD, 2016).

Recommended additions:

- New Schedule 5A: Minimum Treatment Fee for Problematic Fractions (KES 50-500/kg depending on item)
- Producer Guarantee Fund (2% of annual obligations) for orphan waste
- Government subsidy backstop for non-economic fractions

Gap 6: Data and Transparency

- Partial: Registry provisions exist (Regulation 5) but insufficient detail
- ✗ No public reporting requirements
- ✗ No independent auditing of producer claims

Impact: Enforcement challenges; lack of accountability; public trust deficit. Germany's ZSVR demonstrates value of public transparency (ZSVR, 2023).

Recommended additions:

- Annual public report by NEMA on e-waste flows, compliance rates
- Third-party auditing requirement for producers >100 tonnes/year
- Open data platform for producer compliance (similar to Germany's ZSVR)

Gap 7: Technology-Specific Provisions

- ✗ Regulations generic; lack provisions for emerging technologies
- ✗ Electric vehicle batteries not adequately addressed
- ✗ Solar panels, IoT devices, lithium batteries require specific handling

Impact: Regulations may become outdated quickly; new waste streams unmanaged.

Recommended additions:

- Schedule 1 amendment: Add EV batteries, solar panels as distinct categories
- Regulation 18A: Special requirements for lithium batteries (fire risk)
- Review clause: Regulations reviewed every 3 years for technology updates

5.2.6.3 Comparative Adequacy: International Benchmarks

Criterion	Kenya Proposed Regulations	EU WEEE Directive	Switzerland WEEE Ordinance	Rwanda E-Waste Regulation	Adequacy Rating
Producer registration	✓ (Reg 6)	✓	✓	✓	**Adequate**
Collection targets	✗ (No specific targets)	✓ (65% by 2019)	✓ (95% achieved)	✓ (25% by 2025)	**Inadequate**
Treatment standards	✓ (Schedule 6)	✓ (CENELEC standards)	✓ (Detailed technical reqs)	Partial	**Adequate**
Import controls	✗ (Weak)	✓ (Waste Shipment Reg)	✓ (Pre-approval)	✓ (Age limits)	**Inadequate**
Financing mechanism	Partial (Schedule 5)	✓ (Visible fees)	✓ (Advance fees)	✓ (EPR fees)	**Partially Adequate**
Informal sector provisions	✗	N/A (minimal informal)	N/A	Partial	**Inadequate**

Enforcement penalties	✓ (Regs 23-26)	✓	✓	✓	**Adequate**
Public transparency	Partial	✓ (Public registry)	✓ (Annual reports)	Partial	**Partially Adequate**
Waste definition clarity	✗	✓ (Detailed guidance)	✓ (Testing standards)	Partial	**Inadequate**
OVERALL ADEQUACY	**60%**	**95%**	**98%**	**70%**	**Partially Adequate**

Table 5. 6: Comaprative Adequacy with International Benchmarks

Sources: European Commission (2012), Swiss Federal Council (2005), REMA (2016)

Assessment: Kenya's proposed regulations provide a solid foundation (60% adequacy) but require significant amendments to match international best practices. The gaps identified above, if unaddressed, will undermine implementation effectiveness.

5.2.6.4 Adequacy for Achieving Policy Objectives

Kenya's e-waste policy objectives (from National E-Waste Management Strategy 2019-2024):

1. **Reduce environmental and health risks from e-waste**
2. **Increase formal e-waste collection and recycling rates**
3. **Create green jobs and circular economy**
4. **Ensure producer responsibility and polluter-pays principle**
5. **Build institutional capacity for e-waste management**

Objective 1: Reduce environmental and health risks

- **Adequacy: 75%**
- Strengths: Prohibitions on hazardous practices, treatment standards
- Gaps: Weak import controls allow continued dumping; no air quality standards for recycling facilities

Objective 2: Increase collection/recycling rates

- **Adequacy: 50%**
- Strengths: Producer take-back obligations, collection center licensing
- Critical gap: No specific collection targets (Rwanda: 25% by 2025; EU: 65% achieved in 2019 per Eurostat, 2022)
- Without targets, enforcement difficult and producers lack clear benchmarks

Objective 3: Create green jobs

- **Adequacy: 40%**
- Strengths: Formal sector licensing creates legitimate businesses
- Critical gap: Informal sector displacement unaddressed; net job creation uncertain
- Need: Explicit job creation targets, training programs

Objective 4: Producer responsibility

- **Adequacy: 80%**
- Strengths: Strong EPR framework, formula-based obligations
- Gaps: Financing sustainability for problematic fractions, orphan waste provisions

Objective 5: Build institutional capacity

- **Adequacy: 30%**
- Strengths: NEMA authority established
- Critical gaps: No capacity-building provisions, no county funding, no inter-agency coordination framework
- Risk: Regulations "on paper only" without implementation capacity

Overall Adequacy for Policy Objectives: 55% - Partially adequate but requires substantial strengthening.

5.2.7 Conclusions and Recommendations

5.2.7.1 Is Regulation Necessary?

Conclusion: YES. Non-regulatory alternatives (Section 5.2.2) are insufficient to achieve comprehensive e-waste management. International evidence from EU, Switzerland, and South Korea demonstrates that achieving >60% formal recovery requires mandatory producer obligations backed by legal enforcement (European Environment Agency, 2020; SENS eRecycling & Swico Recycling, 2021). Kenya's fragmented import market and large informal sector make voluntary approaches non-viable.

Justification:

- Hidden benefits (KES 4.6B-9.1B/year) vastly exceed hidden costs (KES 1.0B-1.4B/year)
- Net benefit-cost ratio of 15:1 to 30:1 including hidden impacts
- Public health imperatives documented by Grant et al. (2013) and WHO (2021) demand intervention
- Environmental protection requirements under Robinson (2009) and Costanza et al. (2014) ecosystem services framework
- International obligations (Basel Convention) require regulatory framework (UNEP, 2019)

5.2.7.2 Are the Proposed Regulations Adequate?

Conclusion: PARTIALLY ADEQUATE (60% adequacy). The regulations provide a strong foundation but contain critical gaps that will undermine implementation effectiveness:

Critical gaps requiring immediate amendment:

1. **Import controls** (Section 5A.3): Add Regulations 17A-C, functionality testing standards following EU and Rwanda models (European Commission, 2014; REMA, 2016)
2. **Waste definition** (Section 5A.4): Add Regulation 2A, Schedule 7 testing protocols based on CENELEC EN 50614:2018 and EU Correspondence Guidelines (CENELEC, 2018; European Commission, 2007)
3. **Collection targets**: Set specific, measurable targets (e.g., 15% by Year 2, 30% by Year 5) consistent with Rwanda's phased approach (REMA, 2020)
4. **Informal sector integration**: Add simplified licensing, transition support provisions following Scheinberg et al. (2016) integration frameworks
5. **County capacity**: Establish funding mechanism, coordination framework addressing gaps identified by Nigatu et al. (2016)
6. **Financial sustainability**: Minimum treatment fees for problematic fractions, guarantee fund following OECD (2016) recommendations

If these gaps are not addressed:

- Estimated 30-50% implementation failure rate based on Odeyingbo et al. (2017) African implementation studies
- Continued illegal imports and informal dumping
- Social unrest from informal sector displacement (Godfrey & Oelofse, 2017)
- Producer non-compliance due to definitional ambiguities (Kalimo et al., 2012)
- Counties unable to fulfill devolved functions (Nigatu et al., 2016)

5.2.7.3 Recommended Amendments Summary

Priority	Amendment	Regulations/Schedules to Add	Implementation Timeline	Supporting Evidence
CRITICAL	Import controls	Regs 17A-C, Schedule 7A	Before enactment	EC, 2014; REMA, 2016
CRITICAL	Waste definition	Reg 2A, Schedule 7	Before enactment	CENELEC, 2018; EC, 2007
HIGH	Collection targets	Reg 5A (Add target schedule)	Before enactment	EEA, 2020; REMA, 2020

HIGH	Informal sector	Reg 12A, Schedule 8	Within 6 months	Scheinberg et al., 2016
HIGH	County coordination	Reg 22, Schedule 9	Within 6 months	Nigatu et al., 2016
MEDIUM	Financial sustainability	Schedule 5A, 5B	Within 12 months	OECD, 2016
MEDIUM	Transparency/data	Reg 21A, public reporting	Within 12 months	ZSVR, 2023
LOW	Technology-specific	Schedule 1 amendment	Annual reviews	UNEP, 2019

Table 5. 7: Recommended Amendments Summary

5.2.7.4 Final Adequacy Rating

With Current Provisions: 60% adequate - Significant risk of implementation failure
With Recommended Amendments: 85-90% adequate - High probability of success

Recommendation: PROCEED with regulations SUBJECT TO critical amendments (import controls, waste definition, collection targets, informal sector provisions). Enactment without these amendments will result in suboptimal outcomes and potential regulatory failure.

6. OVERVIEW OF THE POLICY, LEGAL, INSTITUTIONAL AND REGULATORY FRAMEWORK FOR E-WASTE

6.1 International Frameworks

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[13].
- **International Electrotechnical Commission (IEC) Standards**: The IEC is developing standards like IEC 63395 for systematic and sustainable e-waste management, emphasizing extended producer responsibilities[14].
- **Global E-Waste Statistics Partnership**: This initiative offers data and analysis on global e-waste, helping countries like Kenya formulate effective policies[15].
- **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[16].
- **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. RIA systematically assesses the effects of

[13] United Nations Environment Programme, "Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. Adopted in Basel, Switzerland; Entered into Force May 5, 1992. United Nations Treaty Series, 1673, 57."; United Nations Environment Programme, "Nairobi Declaration on the Environmentally Sound Management of Electrical and Electronic Waste: Adopted by the 8th Meeting of the Conference of the Parties of the Basel Convention on the Control of Transboundary Movements of Hazardous Waste, Nairobi, Kenya."

[14] International Electrotechnical Commission, "Why Are Standards Needed for Managing Global E-Waste?"

[15] Baldé et al., *The Global E-Waste Monitor 2024: Quantities, Flows and Resources*; United Nations Institute for Training and Research, "Global E-Waste Monitor 2024: Electronic Waste Rising Five Times Faster than Documented E-Waste Recycling."

[16] Digital Cooperation Organization, "E-Cycle In Action For Governments: The DCO E-Waste Management Framework."

proposed regulations to achieve public policy goals and avoid unnecessary burdens, especially in e-waste management[17].

- **Rotterdam Convention**: While not directly regulating e-waste, it focuses on prior informed consent for hazardous chemicals and pesticides in international trade[18]. 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:
    - Polychlorinated Biphenyls (PCBs): These industrial chemicals were widely used in electronic products due to their non-flammable properties and electrical insulating capabilities. Products: Older electronic devices such as capacitors, transformers, and switchgear.
    - Asbestos: A group of fibrous minerals known for their heat-resistant and electrical insulating properties. Several forms of asbestos, including Crocidolite, Actinolite, and Tremolite, are listed under the Convention. Products: Older electronic components that required high heat resistance, such as those in circuit boards, insulation, and some brake pads in large industrial equipment.
    - Decabromodiphenyl ether (DecaBDE): This chemical was used as an additive flame retardant in plastics and textiles. Products: Plastic casings of electronic and electrical equipment, such as computers, televisions, and household appliances. It was also used in wires and cables.
    - Hexabromocyclododecane (HBCDD): Another flame retardant. Products: Plastic casings, circuit boards, and other plastic components in various electronic devices.
    - Short-chain chlorinated paraffins (SCCPs): Used as a flame retardant and a plasticizer. Products: Electrical cables, wires, and plastics in electronic equipment.
    - Mercury compounds: Mercury is a heavy metal used for its conductive properties. Inorganic mercury compounds and certain organic mercury compounds are on the list. Products: Older electronic devices like batteries, light switches, and flat-screen monitors (in backlights). It's also found in medical and measuring devices, such as thermometers and barometers.
    - Tributyltin compounds (TBTs): While more commonly known for their use in marine antifouling paints, they have also been used as a biocide in some

[17] Organisation for Economic Co-operation and Development, “Transboundary Movements of Waste.”

[18] United Nations, “Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade. Adopted in Rotterdam, the Netherlands; Entered into Force February 24, 2004. United Nations Treaty Series, 2244, 337–355.”

industrial applications. Products: May be found in some electronic components to prevent biological growth, though this use is less common.

- **Stockholm Convention on Persistent Organic Pollutants (POPs)**: This treaty addresses chemicals that persist in the environment, accumulate in organisms, and are toxic[19]. 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[20].
- **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[21].
- **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[22].
- **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

[19] United Nations Environment Programme, “Stockholm Convention on Persistent Organic Pollutants. Adopted at Stockholm, Sweden; Entered into Force May 17, 2004. United Nations Treaty Series, Chapter XXVII, 15.”

[20] United Nations, “Minamata Convention on Mercury. Adopted in Kumamoto, Japan; Entered into Force August 16, 2017. United Nations Treaty Series, Chapter XXVII, 17, Vol. 3202.”

[21] United Nations, “Montreal Protocol on Substances That Deplete the Ozone Layer. Adopted in Montreal, Canada; Entered into Force January 1, 1989. United Nations Treaty Series, 1522, 3–27.”

[22] United Nations, “Amendment to the Montreal Protocol on Substances That Deplete the Ozone Layer (the ‘Kigali Amendment’). Adopted in Kigali, Rwanda; Entered into Force January 1, 2019. United Nations Treaty Series, Chapter XXVII, 3 (Vol. 3202).”

and characterizes illegal import as a criminal act. Challenges include capacity constraints, awareness, and coordination among parties[23].

6.2 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:

6.2.1 The Environment Policy, 2030

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[24].

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[25].

The **National Sustainable Waste Management Policy** aligns with Kenya's development agenda (Vision 2030) and emphasizes the need for robust legislative and institutional mechanisms for effective waste management at both national and county levels[26].

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)[27].

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[23] Organization of African Unity, “Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa. Adopted in Bamako, Mali; Entered into Force April 22, 1998. Registered with the United Nations, March 17, 2000 (Reg. No. 36508).”

[24] Food and Agriculture Organization of the United Nations, “FAOLEX: Kenya Environmental Sanitation and Hygiene Policy 2016-2030.”

[25] Kenya Ministry of Environment and Forestry, “National E-Waste Management Strategy 2019-2024,” 2019.

[26] Ministry of Environment and Forestry, Kenya, “National Sustainable Waste Management Policy.”

[27] Dahl, “Policy Framework Guiding E-Waste Management in Kenya.”

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[28].

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[29].

The **Kenya Digital Economy Acceleration Project (KDEAP)** emphasizes the importance of identifying and assessing existing legislation, policies, and regulations related to e-waste management to propose necessary amendments or new regulations[30].

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[31].

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[32].

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[33].

The **Policy Framework Guiding E-Waste Management in Kenya** emphasizes 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[34].

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 2010-2022[35].

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[28] Ministry of Environment and Natural Resources, Kenya, “Kenya National Adaptation Plan 2015-2030.”

[29] Government of Kenya, “National Climate Change Framework Policy.”

[30] Information and Communications Technology Authority, “Terms of Reference for Feasibility Study for Managing of E-Waste.”

[31] National Environment Management Authority, “Youth Climate Action Strategy for Kenya.”

[32] Nyangena, “The Kenya Vision 2030 and the Environment: Issues and Challenges.”

[33] Abuya, “Kenya’s Green Leadership: Shaping Africa’s Climate Future.”

[34] Dahl, “Policy Framework Guiding E-Waste Management in Kenya.”

[35] Omari, *The Role of Regulatory Framework on E-Waste in Kenya: Case of Nairobi County (2010-2022).*

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[36].

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[37].

6.2.2 National Climate Change Action Plan (NCCAP) 2023–2027

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[38].

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.

Furthermore, the NCCAP highlights the role of Extended Producer Responsibility (EPR) schemes in managing waste effectively. The implementation of the Sustainable Waste Management (Extended Producer Responsibility) Regulations, 2024, aligns with this approach by placing responsibility on producers for the entire lifecycle of their products, including end-of-life management[39].

Integrating the NCCAP 2023–2027 into the Regulatory Impact Assessment (RIA) for the proposed E-Waste Regulations ensures that climate change mitigation and adaptation strategies are considered. This alignment facilitates the development of regulations that are not only environmentally sound but also supportive of Kenya's broader climate goals[40].

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[36] Mugendi et al., “Towards Development of Effective Policies and Regulations for Sustainable Off□grid Solar Electronic Waste Management Systems in Kenya.”

[37] National Environment Management Authority, “Guidelines for E-Waste Management in Kenya,” 2010.

[38] Government of Kenya, “National Climate Change Action Plan (NCCAP) III.”

[39] Clyde & Co., “The Extended Producer Responsibility Regulations 2024 – What It Means for Producers in Kenya.”

[40] Government of Kenya, “National Climate Change Action Plan (NCCAP) III 2023-2027.”

6.2.3 Sessional Paper No. 5 of 2016 on Framework Climate Change Policy

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[41].

Incorporating the principles of this policy into the Regulatory Impact Assessment for the proposed Electronic and Electrical Waste (E-Waste) Regulations, 2025, is crucial. E-waste management intersects significantly with climate change mitigation and adaptation strategies. Proper handling of e-waste reduces greenhouse gas emissions associated with the production of new electronic devices and minimizes environmental degradation caused by improper disposal.

Aligning the E-Waste Regulations with the National Climate Change Framework Policy ensures that climate considerations are integrated into waste management practices. This alignment supports Kenya's broader climate objectives, fostering a sustainable and resilient environment[42].

6.2.4 Kenya Vision 2030

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. A key component of this vision is environmental sustainability, which includes effective waste management strategies[43],[44].

The integration of the proposed Electronic and Electrical Waste (E-Waste) Regulations, 2025, into the Regulatory Impact Assessment is pivotal for aligning with Kenya Vision 2030's environmental goals. Effective e-waste management is essential to mitigate environmental hazards, promote public health, and support sustainable development[45].

Furthermore, Kenya Vision 2030 emphasizes 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[46].

Incorporating the principles of Kenya Vision 2030 into the RIA for the proposed E-Waste Regulations ensures that the regulations are not only environmentally sound but also

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[41] National Council for Population and Development, “Kenya Population Health and Environment Policy Guidelines.”

[42] Government of Kenya, “Sessional Paper No. 5 of 2016: National Climate Change Framework Policy.”

[43] Republic of Kenya, “Kenya Vision 2030 Flagship Programmes and Projects Progress Report (FY 2020/2021).”

[44] Republic of Kenya, “Kenya Vision 2030: A Globally Competitive and Prosperous Kenya.”

[45] Republic of Kenya, “Kenya Vision 2030: A Globally Competitive and Prosperous Kenya.”

[46] Republic of Kenya, “Kenya Vision 2030 Flagship Programmes and Projects Progress Report (FY 2020/2021).”

contribute to the nation's broader development objectives. This alignment facilitates a holistic approach to sustainable development, balancing economic growth with environmental preservation.

6.2.5 Fourth Medium Term Plan (MTP IV) 2023–2027 to Implement Vision 2030

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[47],[48].

Integrating the proposed Electronic and Electrical Waste (E-Waste) Regulations, 2025, into the Regulatory Impact Assessment aligns with MTP IV's environmental sustainability objectives. Effective e-waste management is crucial for mitigating environmental hazards and promoting public health, thereby supporting the plan's goal of sustainable development.

Furthermore, MTP IV emphasizes the importance of policy, legal, and institutional reforms to enhance environmental governance. Developing and implementing specific e-waste regulations is identified as a critical step in this process, fostering a sustainable and circular economy in Kenya[49].

Incorporating the principles of MTP IV into the RIA for the proposed E-Waste Regulations ensures that the regulations are not only environmentally sound but also contribute to the nation's broader development objectives. This alignment facilitates a holistic approach to sustainable development, balancing economic growth with environmental preservation.

6.2.6 National E-Waste Management Strategy (2019-2024)

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[50].

Integrating the principles and objectives of this strategy into the RIA study is crucial. By doing so, the RIA ensures that the proposed regulations align with national goals, effectively addressing e-waste challenges through comprehensive legal and institutional support.

Furthermore, the strategy emphasizes the development of infrastructure and the promotion of research and innovation in e-waste management. Incorporating these

[47] Vision 2030 Delivery Secretariat, “Vision 2030 Draft Strategic Plan 2023/24 – 2027/28.”

[48] Business Registration Service, “Strategic Plan 2023-2027.”

[49] Business Registration Service, “Strategic Plan 2023-2027.”

[50] Kenya Ministry of Environment and Forestry, “National E-Waste Management Strategy 2019-2024,” 2019.

aspects into the RIA facilitates the creation of regulations that support the establishment of necessary facilities and encourage technological advancements for efficient e-waste handling[51].

Additionally, the strategy highlights the importance of public awareness and stakeholder engagement. By integrating these elements into the RIA, the proposed regulations can promote community involvement and education, fostering a collaborative approach to e-waste management.

6.2.7 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)[52].

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[53].

Relevance to the RIA study:

Integrating the directives of the National ICT Policy 2019 into the RIA for the proposed Electronic and Electrical Waste (E-Waste) Regulations, 2025, is essential for several reasons:

1. **Policy Alignment**: Ensuring that the proposed regulations are consistent with national ICT strategies reinforces a unified approach to e-waste management. This alignment facilitates coherence across various policy instruments and enhances the effectiveness of regulatory frameworks.

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[51] Kenya Ministry of Environment and Forestry, “National E-Waste Management Strategy 2019-2024,” 2019.

[52] Ministry of Information, Communications and Technology, “National Information, Communications and Technology (ICT) Policy Guidelines, 2019.”

[53] Ministry of Information, Communications and Technology, “National Information, Communications and Technology (ICT) Policy Guidelines, 2019.”

2. **Stakeholder Engagement**: The policy's emphasis on providing incentives underscores the importance of engaging diverse stakeholders, including investors, manufacturers, and consumers. The RIA should assess the potential impacts of such incentives to promote widespread adoption of responsible e-waste practices.

3. **Environmental and Economic Benefits**: By focusing on recycling and resource recovery, the policy highlights the dual benefits of environmental protection and economic opportunity. The RIA should evaluate how the proposed regulations can maximize these benefits, contributing to sustainable development goals.

6.2.8 Kenya Green Economy Strategy and Implementation Plan (GESIP) (2016-2030)

The **Kenya Green Economy Strategy and Implementation Plan (GESIP) 2016–2030** is a strategic framework designed to transition Kenya towards a sustainable, low-carbon, resource-efficient, and inclusive green economy. It aligns with the nation's Vision 2030 development agenda, emphasizing sustainable infrastructure, resilience building, efficient resource management, and social inclusion[54].

Relevance to the RIA study:

1. **Policy Alignment:** GESIP's focus on sustainable resource management directly pertains to e-waste, which contains valuable materials that can be recovered and recycled. Integrating GESIP principles into the RIA ensures that the proposed regulations promote resource efficiency and waste reduction, aligning with national sustainability goals.

2. **Environmental Protection:** GESIP emphasizes reducing environmental degradation. Proper e-waste management mitigates soil, water, and air pollution caused by hazardous substances in electronic waste. The RIA should assess how the proposed regulations will minimize these environmental risks, supporting GESIP's objectives.

3. **Economic Opportunities:** GESIP advocates for green job creation and sustainable economic growth. Implementing effective e-waste regulations can stimulate the recycling industry, create employment opportunities, and contribute to economic development. The RIA should evaluate the potential economic benefits of the proposed regulations in this context.

4. **Social Inclusion:** GESIP highlights the importance of involving all societal segments in the green economy transition. The RIA should consider how the proposed e-waste regulations can promote public awareness, community

[54] Ministry of Environment and Natural Resources, “Green Economy Strategy and Implementation Plan 2016-2030: A Low Carbon, Resource Efficient, Equitable and Inclusive Socio-Economic Transformation.”

participation, and equitable access to the benefits of sustainable waste management practices.

6.2.9 Climate Change (Carbon Markets) Regulations 2024

The **Climate Change (Carbon Markets) Regulations, 2024** establish a legal framework for carbon market operations in Kenya, aiming to facilitate greenhouse gas emission reductions and promote sustainable development.

Relevance to the Regulatory Impact Assessment (RIA) for Proposed E-Waste Regulations, 2025:

1. **Carbon Credit Generation:** Effective e-waste management can contribute to emission reductions by minimizing the need for new raw materials and reducing energy consumption associated with manufacturing processes. The proposed E-Waste Regulations could facilitate projects that qualify for carbon credits under the Carbon Markets Regulations, providing financial incentives for compliance and innovation in e-waste processing.
2. **Sustainable Development Synergies:** Both regulatory frameworks aim to promote sustainable development. Integrating e-waste management initiatives with carbon market mechanisms can amplify environmental benefits, such as reducing pollution and conserving resources, while also contributing to Kenya's climate change mitigation commitments.
3. **Compliance and Monitoring:** The Carbon Markets Regulations emphasize robust monitoring, reporting, and verification (MRV) systems. Aligning the E-Waste Regulations with these MRV requirements ensures transparency and accountability, enhancing the credibility of both e-waste management and carbon reduction efforts.
4. **Economic Opportunities:** By participating in carbon markets, entities involved in e-waste management can access additional revenue streams through the sale of carbon credits. This economic incentive can drive investment in advanced recycling technologies and infrastructure, fostering industry growth and job creation.

Incorporating the Climate Change (Carbon Markets) Regulations, 2024, into the RIA for the proposed E-Waste Regulations ensures a cohesive approach to environmental governance, leveraging carbon market mechanisms to enhance the effectiveness and economic viability of e-waste management strategies in Kenya.

6.3 National Legal Framework:

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

6.3.1 Constitution of Kenya, 2010

The Constitution of Kenya ('the Constitution') 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 [55]. 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).

6.3.2 The Statutory Instruments Act, 2013

The preparation of regulatory impact statements for proposed regulations is regulated by Part III of the Statutory Instruments Act, 2013 (Cap 2A)[56]. Section 6 requires a regulatory impact statement to be prepared if a proposed regulation is likely to impose significant costs on the community or a part of the community. For a comprehensive understanding and the complete text of the Act, you can refer to the Kenya Gazette Supplement No. 37 (Acts No. 23) available online[57].

6.3.3 Kenya's Environmental Management and Coordination Act (EMCA Cap 387) (Revised Edition 2022))

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, (Revised 2022) and handling, transportation, and disposal require valid licenses issued by the National Environment Management Authority (NEMA)[58].

6.3.4 The Sustainable Waste Management Act, Cap 387C Laws of Kenya

The **Sustainable Waste Management Act (Cap. 387C)**, enacted in 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[59]. By aligning the proposed E-Waste Regulations, 2025, with the provisions of the Sustainable Waste Management Act (Cap. 387C), Kenya can establish a robust and cohesive approach to managing electronic waste, fostering environmental sustainability and public health protection.

6.3.5 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

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[55] Republic of Kenya, "The Constitution of Kenya, 2010."

[56] Government of Kenya, "Statutory Instruments Act, 2013 (No. 23 of 2013)."

[57] Government of Kenya, "Statutory Instruments Act, 2013 (No. 23 of 2013)."

[58] Republic of Kenya, "Environmental Management and Coordination Act, 1999."

[59] Government of Kenya, "The Sustainable Waste Management Act, Cap. 387C."

mandates producers to manage the entire lifecycle of their products and packaging, emphasizing waste reduction, recycling, and environmentally sound disposal practices[60]. 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.

6.3.6 Climate Change Act, Cap 387A

The **Climate Change Act, Cap 387A**, 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.

6.3.7 Energy Act, Cap 314

The **Energy Act, Cap 314**, 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.

6.3.8 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[61]. 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.

6.3.9 Health Act, Cap 241

The **Health Act, Cap 241**, serves as a comprehensive framework for health services delivery in Kenya[62]. 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

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[60] Cliffe Dekker Hofmeyr, “In Pursuit of a Circular Economy: Kenya Enacts Extended Producer Responsibility Regulations.”

[61] Government of Kenya, “Public Health Act, Chapter 242 (Act No. 38 of 1921).”

[62] Departmental Committee on Health, “Report on Community Health Workers Bill (NA Bill No.53 of 2022).”

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.

6.3.10 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[63].

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.

6.3.11 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[64]. 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.

6.3.12 **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[65],[66].

6.3.13 **Waste Management Regulations, 2024**

The **Environmental Management and Co-ordination (Waste Management) Regulations, 2024**, established under Kenya's Environmental Management and Co-

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[63] National Council for Law Reporting., “Occupational Safety and Health Act, No. 15 of 2007 (Revised Edition 2022).”

[64] Republic of Kenya., “Consumer Protection Act, Chapter 501.”

[65] Nigatu et al., *Evolution of Solid Waste Management Policy Landscape in Kenya: Analysis of Evolvement of Policy Priorities and Strategies*.

[66] Government of Kenya, “County Governments Act No. 17 of 2012, Section 134: Repeal of Cap. 265.”

ordination 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)[67].

6.3.14 The Environmental Management and Co-ordination (Management of Toxic and Hazardous Chemicals and Materials) Regulations, 2024 (Legal Notice No. 182)

The **Environmental Management and Co-ordination (Management of Toxic and Hazardous Chemicals and Materials) Regulations, 2024 (Legal Notice No. 182)** 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[68]. 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.

6.3.15 The Environmental Management and Co-ordination (Controlled Substances) Regulations, 2025 (Legal Notice No. 53)

The **Environmental Management and Co-ordination (Controlled Substances) Regulations, 2025 (Legal Notice No. 53)**, 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[69]. 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[70].

6.3.16 The E-waste Bill, 2025 vs The E-Waste Regulations, 2025

This section gives a detailed breakdown of Kenya's **Electronic Equipment Disposal, Recycling and Reuse Bill, 2025**—commonly referred to as the **E-waste Bill, 2025**—and

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[67] Government of Kenya, "Environmental Management and Co-Ordination (Waste Management) Regulations, 2024 (Legal Notice No. 178)."

[68] Government of Kenya, "The Environmental Management and Co-Ordination (Management of Toxic and Hazardous Chemicals and Materials) Regulations, 2024 (Legal Notice No. 182)."

[69] Government of Kenya, "The Environmental Management and Co-Ordination (Controlled Substances) Regulations, 2025 (Legal Notice No. 53)."

[70] Food and Agriculture Organization of the United Nations, "FAOLEX: Kenya Environmental Sanitation and Hygiene Policy 2016-2030."

what it means for environmental governance, public health, and institutional responsibilities:

Overview of the E-waste Bill, 2025

- **Purpose & Objective:** 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.

Key Provisions and Institutional Responsibilities

1. Designated Collection and Sorting Infrastructure

- **Ward consolidation sites**: All individuals and organizations must deposit e-waste at designated collection points within their respective wards.
- **County-level sorting centers**: 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.

2. Licensing and Enforcement

- **E-waste collectors**: Must be licensed by county environment executives. Only licensed collectors can transport materials from ward sites to sorting centers or the national plant.
- **Recycling operators**: Need explicit approval from the Environment Cabinet Secretary before operating. Operating without a license could incur a fine of up to KSh 50,000, six months in jail, or both.

3. Penalties for Non-compliance

- Unauthorized disposal (outside designated sites): Up to KSh 20,000 fine, six months imprisonment, or both.
- Operating without licensing: Up to KSh 50,000 fine, six months in jail, or both.

Broader Context & Implications

A. E-Waste Volume & Risks in Kenya

- Annual e-waste in Kenya has surged to over **51,300 tonnes** by mid-2025, with more precise figures from KNBS showing **53,559 tonnes in 2024**.
- **Only 5%** of this waste is recycled safely; the remainder is often dumped, exacerbating environmental pollution and public health risks from toxins like lead and mercury.

B. EPR & Other Initiatives

- Kenya has also embraced **Extended Producer Responsibility (EPR)** under the Sustainable Waste Management Act, 2022, requiring importers to pay a KSh 129 (USD 1) levy per item for end-of-life management.
- Initiatives by the **ICT Authority** include the **National Refurbishment, Assembly, and E-waste Management Programme**, which partners with public institutions to refurbish and reuse obsolete electronics.

The Official Legislative Framework (Kenya Law Gazette)

The Bill is formally titled the Electronic Equipment Disposal, Recycling and Reuse Bill, 2025, introduced to Parliament on 9 May 2025**.**

Key Structure & Provisions:

- **Part I – Preliminary:** Establishes the short title, key definitions (e.g., "e-waste practitioner," "ward consolidation site"), and guiding principles like the right to a clean environment and the zero-waste paradigm**.**
- **Part II – Roles and Responsibilities:**
    - **National Government (Cabinet Secretary):** To develop national policies, classify e-waste, mobilise resources, set standards, oversee the full e-waste value chain, and license national recycling plants**.**
    - **County Governments (County Executive Committee Member):** Mandated to draft county e-waste plans, allocate budgets, establish sorting and ward consolidation sites, license collectors, enforce laws, and conduct public awareness and data monitoring**.**
- **Part III – Operational Regulations:**
    - Obligation for e-waste generators to deposit waste at designated ward consolidation sites (failure carries up to KSh 20,000 fine or 6 months' imprisonment).
    - Licensing requirements: E-waste collectors are licensed at the county level (offense: up to KSh 50,000 fine or 6 months jail), while e-waste recyclers require Cabinet Secretary approval under similar penalties.

- Licences are valid for one year, with appeal routes and cancellation clauses included.

- **Part IV – Infrastructure Requirements:**
  - National Recycling Plant: To be established with a minimum area of 30 acres plus a 5-acre buffer.
  - County Sorting Sites: At least 5 acres with a 2-acre buffer.
  - Ward Consolidation Sites: Minimum 1 acre with a 1-acre buffer.
- **Part V – Regulations and County Legislation:**
  - Cabinet Secretary, in consultation with counties, will set health, safety, classification, incentive-related, and operational standards.
  - Counties may enact supplementary laws tailored to local waste management needs.
- **Objectives & Principles:**
  - Promote sustainable and environmentally sound e-waste handling, improve public health, and drive green job creation under the constitutional mandate of a clean and healthy environment (Articles 42 and 69(1)).

Insights from Media Coverage & Expert Commentary

Implementation Model & Structure

- The Bill is designed with a bottom-up approach: collection begins at ward consolidation points, moves to county sorting centers, and culminates at the national recycling plant The Standard+1.

Infrastructure Size

- Ward sites: ≥1 acre + 1-acre buffer.
- County sorting: ≥5 acres + 2-acre buffer.
- National plant: significant land allocation, spotlighting scale and long-term vision The Standard+1.

Critical Concerns

- E-waste Classification: Delegating classification to counties risks inconsistency. Stakeholders, such as EPROK, advocate for a unified national classification in law:

“The Bill should not delegate this role because if every county had its own framework, this would only lead to further confusion… It would be better to classify e-waste in law and have counties adhere to it.”

The Standard

- Collection Volumes & Infrastructure Viability:
    - Kenya produces around 72,000 metric tonnes of e-waste annually, but collects less than 7%, which raises questions about infrastructure cost-effectiveness The Standard.
    - Some propose that a regional facility serving East Africa might be more economically feasible than a national plant, particularly if cross-border cooperation improves The Standard.

Table 6.1: E-Waste Bill Summary Table

Aspect	Details
Purpose	Establish a formal legal and operational framework for e-waste disposal, recycling, and reuse.
Governance Model	Bottom-up: Ward → County → National infrastructure.
Key Infrastructure	Ward consolidation (1 acre), County sorting (5 acres), National plant (30 acres).
Licensing Enforcement	Strict licensing with legal penalties for collectors and recyclers.
Oversight	Cabinet Secretary defines policy; counties implement locally.
Concerns Raised	Varied classification standards, low collection volumes, cost inefficiencies, and fragmented implementation.

Table 6. 1: E-Waste Bill Summary Table

Detailed Critical Analysis and Evaluation of E-Waste Regulations 2025 vs E-Waste Bill 2025

This critical analysis and evaluation compares the two proposed Kenyan legislative documents on electronic waste (e-waste):

1. **The Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025** (The Regulations).
2. **The Electronic Equipment Disposal, Recycling and Reuse Bill, 2025** (The Bill).

The two documents approach the e-waste crisis with distinct frameworks, principles, and implementation models, creating potential conflicts and opportunities for a robust legal system.

Detailed Critical Analysis and Evaluation

The two documents fundamentally represent two different policy philosophies: **Extended Producer Responsibility (EPR)** and **Government-led Public Infrastructure**.

1. The Environmental Management and Co-ordination (E-Waste) Regulations, 2025

Evaluation: The Regulations adopt an internationally established and market-based approach, making them a strong regulatory tool, provided the national targets are clearly defined.

Table 6.2: E-Waste Regulations Evaluation Summary Table

Key Provision	Analysis & Evaluation

Legal Framework & Authority	As subsidiary legislation under the Environmental Management and Co-ordination Act (EMCA), their authority is derived from an existing principal Act. They rely on the National Environment Management Authority (NEMA) for licensing and enforcement.
Core Mechanism: Extended Producer Responsibility (EPR)	The framework places the primary financial and physical burden on **producers** (importers and manufacturers). This adheres to the globally accepted "polluter pays principle". Producers must register, obtain an Annual Compliance Certificate, and meet their obligations through individual or collective schemes (PROs).
Financial Clarity	The document provides a clear **Formula for Calculation of Producer Obligation** based on market share and reported tonnage treated, which creates a quantifiable, enforceable target for industry.
Strengths	Focuses on systemic change by mandating producers to use secondary raw materials and incorporate "Design for Environment" principles, which is critical for moving towards a circular economy.
Weakness	The success of the EPR model is entirely dependent on NEMA's capacity to monitor, audit, and enforce compliance across a broad range of producers. Additionally, the enforcement requires clear and ambitious national collection and recycling targets, which are not explicitly defined in the provided document.

Table 6. 2: E-Waste Regulations Evaluation Table

2. The Electronic Equipment Disposal, Recycling and Reuse Bill, 2025

Evaluation: The Bill's strength is its direct attempt to create a structured national collection system, but its highly devolved and government-dependent nature presents significant practical and financial challenges.

Table 6.3: E-Waste Bill Evaluation Summary

Key Provision	Analysis & Evaluation
Legal Framework & Authority	As a Senate Bill, if passed, it would become a principal Act of Parliament. This legal status would give it a higher standing than the EMCA Regulations.
Core Mechanism: Infrastructure & Mandate	The Bill proposes a "Bottom-Up" approach by mandating the establishment of a three-tier public infrastructure: Ward Consolidation Sites, County Sorting Centres, and a National E-scrap Recycling Plant.
Collection Model	It places a legal duty on the generator (household/business) to dispose of e-waste only at the designated ward consolidation sites. Failure to comply is subject to penalties, including fines or jail time.
Delegation and Devolution	It extensively devolves responsibility to the County Governments (County Executive Committee Members - CECMs) for licensing collectors, setting up sites, and even creating county e-waste policies.

Critique on Implementation	The model faces major feasibility concerns:

Table 6. 3: E-Waste Bill Evaluation Summary

Low Volumes: Kenya collects less than 7% of its annual e-waste, and it is unclear if counties can collect sufficient volume to justify the high cost of a National E-scrap Recycling Plant.

Financial Strain: The infrastructure is a major public expenditure, unlike the EPR model where the cost is borne by producers/consumers.

Lack of Uniformity: Experts argue that delegating roles like e-waste classification to individual counties would lead to confusion and regulatory fragmentation across the country.

Collection Barrier: Mandating disposal at a specific ward site may be inconvenient and lead to continued dumping rather than promoting collection, given low public awareness. |

3. Critical Analysis of Overlap and Conflict (The Major Issue)

The simultaneous existence of both the Regulations (EPR) and the Bill (Public Infrastructure) creates a potential governance conflict:

Table 6.4: E-Waste Regulation & E-Waste Bill Potential Conflicts

Area of Conflict	The Regulations (EPR Model)	The Bill (Public Infrastructure Model)	Critical Conflict Point
Collection Responsibility	Primarily the **Producer/PRO** (Take-back schemes).	Primarily the **County Government** (through ward sites).	**Who pays for and manages the collection network?** A clear framework is needed to define if producer take-back schemes are meant to integrate with, or operate separately from, the County Ward Consolidation Sites.
Financial Mechanism	Funded by **Producers** via EPR fees (Polluter Pays Principle).	Funded by the **Government** (public budget) and potentially a direct or indirect Levy on consumers.	**Risk of Duplication/Double Taxation:** The government could be funding collection infrastructure (Bill) while producers are simultaneously paying EPR fees for collection (Regulations), leading to an inefficient, costly, and burdensome system.

Regulatory Authority	Centralized with **NEMA**.	Heavily devolved to **County Governments/CECMs**.	The two frameworks create a regulatory split. NEMA must be clearly mandated as the single arbiter to set national standards, while County Governments should be responsible for operationalizing collection and enforcement on the ground, possibly funded by the EPR fees managed under the Regulations.

Table 6. 4: E-Waste Regulations & E-Waste Bill Potential Conflicts

Conclusion

For a successful e-waste management system, the two proposed documents must be harmonized:

1. **Adopt EPR (The Regulations) as the financial cornerstone:** The producer obligation system provides a sustainable, circular economy funding model.
2. **Integrate the Infrastructure (The Bill) as the operational framework:** The concept of designated collection points (ward sites) is crucial for increasing the current low collection rate (less than 7%).
3. **Mandate Harmonization:** The final law must clarify that the financial resources collected from producers under the EPR Regulations must be used to directly fund, or compensate, the County Governments and licensed PROs/recyclers for the collection, sorting, and disposal infrastructure (like the ward sites and national plant) proposed in the Bill.
4. **Strengthen National Oversight:** Classification and key regulatory standards must remain centralized with the National Government/NEMA to prevent regulatory chaos and ensure uniformity.

6.3.17 Draft E-Waste Regulations 2025:

Kenya through NEMA has formulated draft regulations specifically targeting e-waste management providing guidelines for stakeholders to enhance environmental conservation[71]. These regulations await final approval and aim to streamline e-waste handling processes. They are the subject of this RIA assignment.

6.3.18 Guidelines for E-Waste Management in Kenya:

The **Guidelines for E-Waste Management in Kenya**, developed by the National Environment Management Authority (NEMA) in 2010, provide a comprehensive

[71] Government of Kenya, "Environmental Management and Co-Ordination (E-Waste Management) Regulations, 2013."

framework for the identification, collection, sorting, recycling, and disposal of electrical and electronic waste (e-waste) in the country[72].

6.3.19 KS 2762:2021 - Guidelines for Handling, Collection, Transportation, and Disposal of E-Waste

The **KS 2762:2021 - Guidelines for Handling, Collection, Transportation, and Disposal of E-Waste** is a Kenyan standard that provides comprehensive procedures for managing electronic waste throughout its lifecycle. Incorporating the KS 2762:2021 guidelines into the RIA for the proposed E-Waste Regulations, 2025, ensures that the regulatory framework is built upon established best practices, promoting effective and sustainable e-waste management in Kenya.

6.3.20 KS IEC 62430:2021 - Eco-design Standards for Electronic Products

The **KS IEC 62430:2021 - Eco-design Standards for Electronic Products** is a Kenyan standard derived from the international IEC 62430:2019, which outlines principles and requirements for integrating environmental considerations into the design and development of electronic products[73]. Incorporating KS IEC 62430:2021 into the proposed E-Waste Regulations, 2025, ensures that they are grounded in internationally recognized eco-design principles, promoting sustainable production and consumption patterns in Kenya.

6.4 National Institutional Review:

6.4.1 Introduction

Effective implementation of the proposed E-Waste Regulations, 2025 requires robust institutional frameworks at national, sub-national, and non-governmental levels. This chapter provides a comprehensive analysis of institutional actors, their mandates, capacities, and coordination mechanisms. The analysis assesses institutional adequacy for e-waste management, identifying capacity gaps and recommending institutional strengthening measures.

International experience demonstrates that regulatory success depends critically on institutional capacity. OECD (2016) emphasizes that even well-designed EPR regulations fail without adequate institutional infrastructure for registration, monitoring, enforcement, and stakeholder coordination. This chapter therefore evaluates Kenya's institutional landscape against these functional requirements.

[72] National Environment Management Authority, “Guidelines for E-Waste Management in Kenya,” 2010.

[73] International Electrotechnical Commission, “IEC 62430:2019 - Environmentally Conscious Design (ECD) - Principles, Requirements and Guidance.”

6.4.2 National Regulatory and Oversight Institutions

6.4.2.1 National Environment Management Authority (NEMA)

NEMA stands as Kenya's cornerstone institution for safeguarding the environment, functioning as the primary body responsible for regulating and overseeing environmental practices nationwide. Established to address the growing need for coordinated environmental governance, it plays a pivotal role in ensuring sustainable development while mitigating ecological risks.

Legal Mandate:

NEMA was formally created under the Environmental Management and Coordination Act (EMCA, CAP 387), originally enacted in 1999 and comprehensively revised in 2022 to reflect evolving environmental challenges and international commitments (Government of Kenya, 2022). This landmark legislation empowers NEMA to integrate environmental considerations into all sectors of the economy, fostering a holistic approach to resource management. In particular, Section 9 of EMCA explicitly positions NEMA as the principal agency tasked with spearheading the execution of national environmental policies, harmonizing management efforts across government ministries, private entities, and civil society, and resolving inter-sectoral conflicts to prevent fragmented oversight (Government of Kenya, 2022).When it comes to electronic waste (e-waste)—a rapidly proliferating hazard comprising discarded devices laden with toxic substances like lead, mercury, and brominated flame retardants—NEMA's responsibilities are sharply defined and multifaceted. These include:

- **Licensing and registration:** NEMA holds the exclusive authority to issue licenses and register entities involved in e-waste handling, transportation, storage, and treatment, as outlined in Section 87 of EMCA and further detailed in the Waste Management Regulations, 2024. This ensures that only vetted operators engage in these high-risk activities, minimizing unauthorized dumping and illegal exports.
- **Standard setting:** The authority is charged with crafting and promulgating detailed guidelines, technical standards, and best practices for the environmentally sound management of e-waste, drawing on global norms to promote recycling rates and reduce landfill burdens.
- **Monitoring and enforcement:** NEMA conducts routine inspections, comprehensive audits, and decisive enforcement measures—such as fines, license revocations, or court referrals—against entities flouting compliance, thereby deterring violations and upholding regulatory integrity.
- **Registry management:** In line with the Draft E-Waste Regulations, NEMA is mandated under Regulation 5 to establish and maintain a centralized Electrical and Electronic Equipment Registry, which tracks product lifecycles from import to end-of-life, facilitating traceability and accountability.

- **Producer obligations oversight:** NEMA verifies adherence to Extended Producer Responsibility (EPR) schemes, where manufacturers must finance and organize the collection and recycling of their products, as stipulated in the Sustainable Waste Management (EPR) Regulations, 2024, promoting a shift from waste generation to circular economy principles.

Organizational Structure:

NEMA's framework is designed for efficiency and reach, featuring a tiered hierarchy that balances centralized decision-making with localized implementation. At its apex is the:

- **Director General:** Serving as the chief executive officer, this role oversees the Authority's strategic direction, resource allocation, and policy execution, ensuring alignment with national and international environmental agendas.
- **Directorate of Compliance and Enforcement:** This unit spearheads operational fieldwork, managing the issuance of licenses, on-site inspections, and the imposition of penalties to enforce EMCA provisions rigorously.
- **Directorate of Environmental Planning and Research:** Focused on forward-thinking initiatives, it formulates guidelines, undertakes environmental impact assessments, and conducts research to inform adaptive strategies for emerging threats like e-waste proliferation.
- **County and Regional Offices:** To bridge the gap between national policy and grassroots realities, NEMA maintains 47 county-level offices mirroring Kenya's devolved governance structure and 8 regional hubs, enabling responsive, context-specific environmental interventions across diverse geographies.

Current E-Waste Management Capacity:

Despite its broad mandate, NEMA's capacity to tackle e-waste remains underdeveloped, as evidenced by a detailed internal assessment that highlights systemic under-resourcing in a sector projected to generate over 50,000 tons of e-waste annually in Kenya. Key limitations span human, financial, and technical domains.

Human Resources:

- **Dedicated e-waste staff:** Alarmingly, there are zero full-time positions exclusively allocated to e-waste oversight within NEMA's current roster (NEMA organizational structure, 2024), leaving this critical area reliant on ad-hoc assignments from broader teams.
- **Waste management officers:** Only about 15 officers nationwide handle all waste streams, equating to roughly one per three counties—a stark understaffing that dilutes focus and response times.

- **Technical expertise:** Training on e-waste specifics, such as hazardous material identification or recycling process evaluation, is scarce; the majority of officers possess general environmental science qualifications, ill-equipped for the specialized demands of electronics disassembly and toxin management.
- **Inspector capacity:** With just 120 environmental inspectors covering the entirety of EMCA compliance (encompassing air, water, land, and waste), each oversees approximately 450 licensed facilities, rendering thorough e-waste audits infrequent and superficial.

Financial Resources:

- **Annual budget allocation:** For the fiscal year 2024/25, NEMA's overall budget totaled KES 2.8 billion, of which a mere KES 180 million—less than 7%—was earmarked for waste management, underscoring the marginal prioritization of this escalating crisis.
- **E-waste specific funding:** There is no ring-fenced allocation for e-waste initiatives; activities are financed sporadically from the general waste pool, leading to inconsistent programming and project abandonment.
- **Cost recovery:** While licensing fees (ranging from KES 5,000 to 50,000 per license) offer some revenue, they fall short of offsetting the substantial expenses for inspections, monitoring, and legal actions, perpetuating a funding shortfall.

Technical Infrastructure:

- **Laboratory capacity:** NEMA's three regional labs in Nairobi, Mombasa, and Kisumu can perform basic analyses for certain hazardous substances but lack advanced tools like X-ray fluorescence (XRF) analyzers for detecting heavy metals in circuit boards or Fourier-transform infrared (FTIR) spectrometers for characterizing plastic compositions in e-waste.
- **Information systems:** Operations largely depend on manual, paper-based record-keeping, with no unified digital platform for tracking waste licenses, compliance histories, or e-waste inventories, hampering data-driven decision-making.
- **Equipment:** Field inspectors are equipped with rudimentary tools, and the absence of mobile laboratories prevents real-time on-site characterization of e-waste loads, delaying risk assessments during transport or storage.

Capacity Gaps and Constraints: Through extensive stakeholder consultations—including interviews with recyclers, producers, and civil society and a thorough review of internal documents, several entrenched challenges emerge that undermine NEMA's e-waste efficacy:

1. **Regulatory backlog:** License applications languish for 4-6 months, far exceeding the 30-day statutory deadline, which erects unintended barriers to lawful operations and encourages informal sector proliferation.
2. **Enforcement limitations:** Inspections are predominantly reactive, triggered by public complaints rather than systematic surveillance, resulting in under-detection of violations such as illegal e-waste imports or substandard recycling practices.
3. **Technical capacity:** Personnel often lack the proficiency to evaluate sophisticated e-waste treatment technologies like hydrometallurgical recovery or plasma pyrolysis or to substantiate recyclers' efficiency claims, eroding trust in certification processes.
4. **Coordination challenges:** Inter-agency synergies are weak, with minimal collaboration with the Kenya Revenue Authority for import surveillance, county governments for localized collection infrastructure, or the Kenya Bureau of Standards for enforcing eco-design criteria in electronics.
5. **Stakeholder engagement:** Resource constraints limit ongoing dialogues with producers, informal collectors, and vulnerable communities, stifling inclusive policy development and buy-in for EPR schemes.

Institutional Strengthening Recommendations:

Drawing lessons from successful peers such as Rwanda's robust Rwanda Environment Management Authority (REMA) model, which integrates digital tracking for e-waste, and South Africa's Department of Forestry, Fisheries and the Environment, emphasizing multi-stakeholder EPR enforcement targeted enhancements for NEMA are imperative to elevate its e-waste stewardship. These include:

- **Staffing augmentation:** Recruit at least 10 dedicated e-waste officers (five at headquarters for policy and coordination, and one per major region for fieldwork), with a 12-month implementation timeline to rapidly bolster frontline capabilities.
- **Capacity building:** Roll out a multifaceted training regimen encompassing EPR administration (inspired by Switzerland's producer-funded take-back systems), technical e-waste handling (leveraging UNEP's standardized modules), import control protocols (adapted from Rwanda's border vigilance strategies), and proficiency in database management to empower staff for proactive oversight.
- **Budget increase:** Introduce a dedicated e-waste budget line of at least KES 50 million per year for the initial three years, earmarked for staff remuneration, equipment acquisition, professional development, and inclusive stakeholder forums to ensure sustained momentum.
- **Technology investment:**

- **Electronic registry system:** Allocate KES 30 million for a secure, cloud-based platform to digitize tracking and reporting.
- **Laboratory equipment:** Invest KES 20 million in specialized analyzers to enable precise hazard profiling.
- **Mobile inspection tools:** Dedicate KES 5 million for portable kits, enhancing inspectors' mobility and analytical reach.

- **Legislative clarity:** Enact a Statutory Instrument to delineate NEMA's coordinating primacy in e-waste matters relative to other entities, averting jurisdictional overlaps and streamlining national responses.

6.4.2.2 Kenya Revenue Authority (KRA): A Critical Gatekeeper in E-Waste Governance

The Kenya Revenue Authority (KRA) occupies a pivotal, though under-leveraged, role within Kenya's environmental governance architecture. As the primary agency responsible for regulating cross-border trade, the KRA functions as a strategic gatekeeper, positioned to intercept non-compliant and hazardous electronic waste (e-waste) at its point of entry (Okoth, 2019). This capacity to control transboundary flows is critical for operationalizing international commitments under the Basel Convention, to which Kenya is a signatory, and for preventing the country from becoming a dumping ground for the world's obsolete electronics (Lepawsky, 2018). The integration of environmental, specifically e-waste, objectives into the KRA's core mandate represents a necessary evolution from a purely revenue-focused institution to one that synergistically advances fiscal and sustainability goals.

Legal Mandate and Functional Basis

Established under the Kenya Revenue Authority Act (Cap 469), the KRA's principal mandate is the assessment, collection, and administration of all national revenue (Republic of Kenya, 1995). However, this mandate inherently confers a powerful regulatory function over all imports and exports. The authority granted under the East African Community Customs Management Act (EACCMA) provides the KRA with the legal instruments to enforce prohibitions and restrictions, including those pertaining to environmentally hazardous materials like e-waste (EAC, 2004). Key functions relevant to e-waste management include:

- **Import Control:** Every consignment entering Kenya is subject to KRA customs clearance, creating a strategic chokepoint for enforcing bans on hazardous waste, as stipulated by the Basel Convention and national environmental laws (NEMA, 2021).
- **HS Code Classification:** The KRA's application of the Harmonized System (HS) nomenclature to classify imported Electrical and Electronic Equipment (EEE) is a foundational step. While Chapters 84 and 85 cover most EEE, the current system

lacks granularity to effectively flag high-risk, second-hand, or near-end-of-life equipment that is prone to rapid obsolescence (Kellenberg, 2012).

- **Customs Enforcement:** The KRA possesses broad powers to inspect, detain, and penalize non-compliant shipments. This is a crucial deterrent against the common practice of misdeclaring e-waste as "personal effects," "donations," or "functional second-hand goods" to evade environmental scrutiny (BAN, 2016).

Organizational Structure and Current E-Waste Interface

The KRA's operational structure is designed for comprehensive border management, yet its interface with e-waste remains underdeveloped. Key departments include:

- **The Customs and Border Control Department**, which manages operations at critical entry points like the Port of Mombasa and Jomo Kenyatta International Airport (JKIA).
- **The Post Clearance Audit Department**, which conducts retrospective audits to uncover duty evasion and compliance breaches, a tool that could be used to track systematic import patterns of e-waste.
- **The Investigations and Enforcement Department**, which tackles serious fraud and smuggling.

Despite this robust structure, the integration of e-waste control is fragmented. Collaboration with the National Environment Management Authority (NEMA) is ad hoc, lacking a formal Memorandum of Understanding (MOU) or integrated data-sharing protocols (NEMA, 2021). Consequently, physical inspection rates for potential e-waste are low, and the existing HS code framework is not optimized to automatically flag high-risk EEE shipments, allowing significant volumes of e-waste to enter the country unchecked (Transparency International Kenya, 2022).

Capacity Assessment and Enhancement Requirements

A SWOT analysis of the KRA's capacity for e-waste enforcement reveals a mix of significant strengths and critical weaknesses.

Strengths:

- **Extensive Infrastructure:** The deployment of the Simba 2005 electronic customs system and non-intrusive inspection equipment (e.g., X-ray scanners) provides a technological foundation for risk-based selectivity (KRA, 2023).
- **National Coverage:** A presence at all official points of entry ensures no inherent geographic blind spots.
- **Substantial Personnel:** A large force of over 3,000 customs officers represents a scalable human resource base.

Weaknesses:

- **Technical Expertise Gap:** Frontline officers generally lack specialized training to differentiate between functional used EEE and e-waste, or to identify tell-tale signs of obsolescence and hazardous components (Otieno, 2021).
- **Competing Priorities:** Within the KRA's portfolio, revenue collection and security concerns (e.g., counter-terrorism) often take precedence over environmental enforcement, leading to the deprioritization of e-waste interdiction (Mwangi, 2020).
- **Systemic Vulnerabilities:** Risks of corruption and collusion with importers, as documented by watchdog organizations, can undermine the integrity of enforcement efforts (Transparency International Kenya, 2022).

To bridge these gaps and align the KRA with its potential role under the proposed E-Waste Regulations, a multi-faceted enhancement program is required. Key interventions, synthesized from international best practices in green customs programs (UNEP, 2020), are outlined in Table 1 below.

Table 6.5: KRA Capacity Enhancement Framework for E-Waste Management

Intervention Area	Key Activities	Expected Outcome
Institutional Collaboration	Formalize a NEMA-KRA MOU; establish joint inspection protocols and secure data-sharing interfaces.	Streamlined coordination and real-time information exchange for targeted enforcement.
Specialized Training	Train 200 frontline officers on e-waste identification, Basel Convention rules, and functionality testing.	Enhanced capability to detect and detain non-compliant shipments at the border.
Risk Profiling & ICT	Integrate e-waste-specific risk indicators (e.g., importer history, product type) into the Simba system.	Automated, intelligence-driven flagging of high-risk consignments for inspection.
Dedicated Infrastructure	Establish secure inspection bays at Mombasa and JKIA with basic testing equipment (KES 10M est.).	Improved efficiency and accuracy of physical inspections for suspected e-waste.
Performance Management	Incorporate e-waste interception metrics into KRA's KPIs and officer evaluation frameworks.	Institutionalization of environmental enforcement as a core KRA objective.

Table 6. 5: KRA Capacity Enhancement Framework for E-Waste Management

Implementing these measures will reposition the KRA as a proactive enforcer within Kenya's environmental governance landscape, its border control mandate becoming a critical lever for advancing national circular economy objectives and public health.

6.4.2.3 Kenya Bureau of Standards (KEBS): Standardization for a Circular Electronics Economy

The Kenya Bureau of Standards (KEBS) serves as a critical, preventative institution in the e-waste management value chain. As the national standards body, its mandate to ensure product quality and safety provides a foundational mechanism for mitigating e-waste generation at the source. By establishing and enforcing standards that govern product design, durability, and material composition, KEBS can directly influence the environmental footprint of electrical and electronic equipment (EEE) placed on the Kenyan market (Kojima et al., 2009). This upstream intervention is essential for transitioning from an end-of-pipe waste management approach to a circular economy model that prioritizes waste prevention (Ghisellini et al., 2016).

Legal Mandate and Core Functions

KEBS derives its authority from the Standards Act (Cap 496), which charges it with the development, promotion, and enforcement of standards for goods and services (Republic of Kenya, 1974). Its functions are tripartite:

1. **Standards Development:** Formulating Kenya Standards (KS) that specify requirements for materials, processes, and products, often harmonized with international benchmarks to facilitate trade and adopt global best practices.
2. **Conformity Assessment:** Conducting testing, inspection, and certification to verify that products comply with established standards, issuing the distinctive Diamond Mark of Quality.
3. **Market Surveillance:** Monitoring the marketplace to identify and remove non-compliant, substandard, or hazardous products, thereby protecting consumers and the environment (KEBS, 2023).

E-Waste Relevant Standards and Current Engagement

KEBS has demonstrated proactive engagement by adopting key standards relevant to e-waste management. These include:

- **KS 2762:2021:** *Guidelines for the Management of Waste Electrical and Electronic Equipment*, which provides a framework for the safe and environmentally sound handling of e-waste throughout its lifecycle (KEBS, 2021a).
- **KS IEC 62430:2021:** *Environmentally Conscious Design (ECD) for Electrical and Electronic Products*, which mandates the integration of environmental considerations, such as recyclability and hazardous substance reduction, during the product design phase (KEBS, 2021b).

Operationally, KEBS contributes to e-waste mitigation through its **Pre-Export Verification of Conformity (PVoC)** program, which screens imported EEE for compliance with Kenyan standards before shipment (KEBS, 2023). Furthermore, its laboratory services provide a basis for verifying product safety and performance. However, as noted in stakeholder consultations, the current system is not fully optimized for e-waste prevention, particularly for the flow of second-hand and near-end-of-life EEE, which often bypasses rigorous scrutiny.

Capacity Gaps and Institutional Development Needs

Despite its potential, KEBS's effectiveness in the e-waste domain is constrained by several capacity gaps, a common challenge for standardization bodies in developing countries (Manomaivibool & Hong, 2014). These include:

- **Limited Specialized Laboratory Capacity:** A lack of advanced analytical equipment, such as X-ray fluorescence (XRF) analyzers for rapid heavy metal screening, limits the ability to enforce material-restriction standards effectively.
- **Inadequate Focus on Second-Hand EEE:** The PVoC program primarily targets new products, creating a regulatory gap for the significant volume of used electronics imported into Kenya.

- **Siloed Operations:** Weak institutional coordination with NEMA results in a disconnect between product standards and environmental enforcement on the ground.

To address these gaps and fully realize its role under the proposed E-Waste Regulations, KEBS requires targeted development, as outlined in Table 1.

Table 6.6: KEBS Institutional Development Framework for E-Waste Management

Development Area	Proposed Intervention	Strategic Rationale
Technical Capacity	Procure advanced analytical equipment (e.g., XRF spectrometers); upskill technical officers on e-waste-specific testing protocols.	Enables credible enforcement of material composition and restriction of hazardous substances (RoHS) standards.
Standards Harmonization	Revise KS 2762 to align with EPR regulations, incorporating granular functionality tests and recyclability metrics.	Ensures national standards directly support and operationalize regulatory requirements.
Institutional Collaboration	Formalize an MOU with NEMA, positioning KEBS as the technical arm for e-waste standards and product compliance.	Fosters a unified enforcement front and streamlines the certification process for producers.
Conformity Assessment	Develop and launch an accreditation program for private laboratories to conduct certified e-waste functionality testing.	Scales up national testing capacity and introduces market-based solutions for compliance verification.

Table 6. 6: KEBS Institutional Development Framework for E-Waste Management

6.4.2.4 ICT Authority (ICTA): Championing Sustainable Public-Sector ICT Management

The ICT Authority (ICTA) occupies a unique and influential position as the lead agency in Kenya's digital transformation. While not a traditional environmental regulator, ICTA's stewardship of the government's substantial ICT estate makes it a critical actor in demonstrating and normalizing sustainable electronics management practices (Baldé et al., 2020). By leveraging its procurement power and policy advisory role, ICTA can model Extended Producer Responsibility (EPR) within the public sector, creating a powerful demonstration effect for the private sector and citizens alike.

Legal Mandate and Strategic Role

Established under the Kenya Information and Communications Act, ICTA is mandated to design, coordinate, and oversee the implementation of ICT projects and programs across the public sector (Republic of Kenya, 2013). Its e-waste relevance stems from three core functions:

1. **E-Government Coordination:** Managing the lifecycle of government-held ICT assets, from procurement and deployment to decommissioning.
2. **ICT Policy Advisory:** Shaping national digital strategies, including the integration of sustainability and circular economy principles.
3. **Digital Capacity Building:** Implementing programs that enhance digital literacy, which can be expanded to include responsible end-of-life practices.

E-Waste Engagement and Contributions

ICTA has emerged as a pioneer through initiatives like the **e-Waste Kenya Project**, which aims to collect, refurbish, and responsibly dispose of obsolete government ICT equipment (ICTA, 2023). This program directly addresses the public sector's contribution to the e-waste stream, estimated at 5-10% of the national total, and serves as a live pilot for EPR principles (NEMA, 2021).

The Authority's strengths are significant:

- **Substantial Market Influence:** Its oversight of public ICT procurement, a budget exceeding KES 50 billion annually, provides leverage to demand greener product designs and take-back services from suppliers (World Bank, 2022).
- **Convening Power:** ICTA's relationships with major technology firms and development partners enable it to foster multi-stakeholder collaborations for e-waste solutions.
- **Technical Expertise:** Its core competency in digital systems positions it as a natural partner for developing the data infrastructure, such as e-waste registries and tracking systems, required for effective EPR monitoring.

Limitations and Strategic Enhancement

ICTA's e-waste role is currently constrained by its narrow focus on ICT equipment (excluding broader consumer electronics), a lack of direct regulatory authority over private entities, and limited dedicated resources for waste management within its broader ICT mandate.

To maximize its impact under the new regulatory framework, ICTA's role should be formally enhanced, not as a regulator, but as a catalyst and model implementer. Key strategies include:

- **Formalizing the Government's EPR Role:** A Cabinet Directive should mandate ICTA to ensure all government ministries and agencies comply with EPR regulations, effectively making the government a "model producer" that leads by example.

- **Green Public Procurement (GPP):** Integrating stringent e-waste criteria such as minimum recyclability content, modular design, and producer take-back obligations into all public ICT tenders via the Public Procurement and Asset Disposal Act.
- **Digital Solutions for EPR:** Partnering with NEMA to co-develop and host the national e-waste registry, leveraging ICTA's expertise in data management to ensure transparency and efficiency in EPR reporting and monitoring.

By adopting this augmented mandate, the ICT Authority (ICTA) can transcend its traditional facilitation of digital proliferation, emerging instead as a vanguard for Kenya's verdant, circular digital paradigm—one that harmonizes technological advancement with ecological stewardship and resource perpetuity.

6.4.2.5 Ministry of Environment, Climate Change and Forestry (MoECCF)

The Ministry of Environment, Climate Change and Forestry (MoECCF) anchors Kenya's environmental governance as the paramount policy steward, guiding the nation toward resilient ecosystems amid escalating threats like the annual generation of over 3,000 tonnes of e-waste, which imperils soil, water, and human health through unchecked toxin releases. Supervising operational arms like NEMA, MoECCF wields high-level influence to harmonize environmental imperatives with economic imperatives, fostering a transition to circular practices in a digitalizing economy projected to amplify e-waste volumes by 20% by 2030.

Legal Mandate:

MoECCF exercises overarching authority for environmental stewardship, as delineated in the Constitution of Kenya (2010) and the Executive Order No. 1 of 2016, which vests it with leadership in climate adaptation, biodiversity conservation, and pollution control, while delegating implementation to agencies like NEMA.

- **Policy formulation:** The Ministry crafts visionary frameworks, such as the National Environment Policy (2013) and sector-specific strategies, to embed sustainability into development agendas, including the nascent National E-Waste Management Strategy.
- **Regulatory approval:** It spearheads the gazettal of subordinate legislation, ensuring public scrutiny and alignment with international treaties like the Basel Convention before enacting rules such as the proposed E-Waste Regulations.
- **Budget allocation:** Through Treasury negotiations, MoECCF secures fiscal envelopes for green initiatives, channeling funds toward priority areas like waste infrastructure amid competing demands from health and infrastructure sectors.

- **Inter-ministerial coordination:** MoECCF convenes Cabinet subcommittees and inter-agency forums to resolve overlaps, such as integrating e-waste controls with trade policies under the Ministry of Trade and Industry.

Current E-Waste Engagement:

MoECCF's pioneering efforts in e-waste crystallized with the National E-Waste Management Strategy 2019-2024, a blueprint articulating a zero-waste vision through objectives like EPR enforcement, stakeholder mobilization, and infrastructure scaling, yet its rollout faltered post-2024 expiry due to regulatory voids and funding shortfalls estimated at KES 1.2 billion annually (Kenya Ministry of Environment and Forestry, 2019).

As of mid-2025, the Ministry has pivoted to legislative momentum, sponsoring the Electronic Equipment Disposal, Recycling and Reuse Bill, 2025—published May 9 and undergoing parliamentary scrutiny—to institutionalize a national recycling plant and county-level sorting hubs, addressing implementation gaps through enhanced producer accountability.

Institutional Role:

Under the evolving regulatory landscape, MoECCF's remit emphasizes strategic orchestration to propel e-waste from peripheral concern to national priority, leveraging its apex position for systemic impact.

1. **Political leadership:** The Cabinet Secretary champions e-waste in forums like the National Climate Change Council, rallying cross-party support and public buy-in to elevate it within the Big Four Agenda's environmental pillar.

2. **Financing mobilization:** MoECCF lobbies the National Treasury for NEMA's e-waste augmentation—targeting a 30% budget uplift—and taps global conduits like the Green Climate Fund for grants, mirroring successful bids for mangrove restoration that could fund KES 500 million in recycling facilities.

3. **Legislative completion:** Guiding the E-Waste Regulations and the 2025 Bill through stakeholder consultations, Attorney General vetting, and parliamentary passage, aiming for gazettal by Q1 2026 to operationalize EPR and import bans.

4. **Policy coherence:** MoECCF synchronizes e-waste mandates with the National Climate Change Action Plan (2018-2022 extension), Waste Management Strategy (2015), and Circular Economy Roadmap, averting silos in areas like battery recycling overlaps with energy policy.

5. **Performance oversight:** Instituting rigorous quarterly dashboards for NEMA's e-waste metrics—collection rates, compliance audits, and recycling yields to enforce accountability and adaptive adjustments via annual strategy reviews.

No significant institutional development is warranted; MoECCF's efficacy hinges on amplifying its convening power rather than operational expansion, positioning it as the linchpin for a cohesive national e-waste ecosystem.

6.4.2.6 Ministry of Health (MoH)

The Ministry of Health (MoH) occupies a pivotal interface in Kenya's e-waste governance architecture, bridging epidemiological imperatives with the anthropogenic externalities of electronic detritus. Empirical scholarship on sub-Saharan Africa's waste streams, including Kenya's informal recycling enclaves, elucidates the Ministry's salience in mitigating transboundary health inequities, where e-waste—generating over 53,000 metric tons annually exacerbates vulnerabilities through bioaccumulative toxins, underscoring the imperative for interdisciplinary policy convergence.

Legal Mandate:

Pursuant to the Public Health Act (Cap 242) and the Health Act (No. 21 of 2017), the MoH is vested with overarching authority for safeguarding public salubrity, encompassing prophylactic measures against environmental contaminants that precipitate zoonotic and non-communicable pathologies. This remit extends to the orchestration of surveillance, normative frameworks, and intersectoral synergies, aligning with constitutional imperatives under Article 42 for a toxigenic milieu.E-Waste Relevance:E-waste constitutes a vector for multifaceted public health perturbations, as substantiated by toxicological inquiries revealing pervasive exposure gradients in low-resource settings.

- **Occupational exposure:** Precarious laborers in informal disassembly operations predominantly in Nairobi's peri-urban agglomerations endure dermal absorption, inhalational uptake, and ingestional vectors of polybrominated diphenyl ethers (PBDEs), lead, and cadmium, correlating with elevated incidences of neurocognitive deficits, pulmonary fibrosis, and carcinogenicity, per cohort analyses in analogous African contexts.
- **Community exposure:** Peri-domiciliary populations proximate to rudimentary processing loci evince bioaccumulation sequelae, manifesting in pediatric lead burdens surpassing WHO thresholds (e.g., blood lead levels >5 µg/dL in Mukuru and Dandora cohorts) and augmented asthma morbidity from volatilized particulates, as delineated in geospatial health mappings.
- **Healthcare facility waste:** Nosocomial generators, encompassing defunct radiographic apparatuses, physiologic monitors, and endoscopic diagnostics, yield specialized e-waste streams laden with beryllium and ionizing residues, imperiling waste handlers and effluents if unmitigated, thereby compounding antimicrobial resistance vectors within therapeutic ecosystems.

Current Limited Engagement:

Notwithstanding promulgations such as the National Guidelines for Safe Management of Healthcare Waste (2014, revised 2021), which assimilate e-waste protocols per the 2010 Guidelines for E-Waste Management in Kenya, MoH's foray into e-waste remains desultory and under-resourced. Lacunæ persist in bespoke surveillance apparatuses for e-waste-induced morbidities, paucity of longitudinal etiologic inquiries into informal sector syndemics, and codified dispositive rubrics for biomedical electronics evident in the Health Care Waste Management Strategic Plan (2015–2020 extension), which prioritizes infectious effluents over toxigenic electronics amid fiscal stringencies.Institutional Development Needs:To redress these interstices and buttress the proposed E-Waste Regulations (2025), MoH must instantiate evidence-based augmentations, calibrated to hotspots evinced in sentinel studies:

1. **Health surveillance program:** Inaugurate a sentinel cohort for longitudinal biomonitoring in e-waste epicenters (e.g., Dandora and Mukuru informal settlements), assaying biomarkers such as erythrocyte lead/cadmium/mercury concentrations, spirometric indices among artisans, and perinatal outcomes in sentinel demographics; budgeted at KES 20 million per annum, leveraging consortia with academic affiliates like the Kenya Medical Research Institute for methodological rigor.

2. **Healthcare facility guidance:** Elaborate sector-specific annexes to the Healthcare Waste Management Framework, stipulating segregation, autoclaving, and EPR linkages for medical e-waste, informed by IEC 62624 standards to forestall cross-contamination in therapeutic milieus.

3. **Occupational health integration:** Amalgamate e-waste ergonomics into the Occupational Safety and Health Act (2007) prophylaxis, encompassing personal protective accoutrements and exposome modeling, to abate syndromic burdens in the informal precariat.

4. **Inter-agency collaboration:** Formalize a data-sharing covenant with NEMA, operationalizing health informatics (e.g., via Kenya Health Information System) to calibrate enforcement vectors—prioritizing high-morbidity loci—and engender adaptive regulatory heuristics.

MoH's purview remains ancillary to NEMA's primatial regulatory aegis, yet its epidemiological acuity is indispensable for engendering a health-infused e-waste paradigm.

6.4.3 Sub-National (County) Institutions

6.4.3.1 Constitutional and Legal Framework for County Role

The 2010 Constitution of Kenya fundamentally reconfigured the state by establishing a system of devolved governance, explicitly delineating functional competencies between the national and county governments (Republic of Kenya, 2010a). The Fourth Schedule

of the Constitution allocates responsibilities for waste management, creating a framework of concurrent jurisdiction that necessitates intergovernmental coordination. Specifically, the national government is tasked with "national environmental policy" and "national environmental standards," while county governments are assigned "refuse removal, refuse dumps and solid waste disposal" (Republic of Kenya, 2010a, Fourth Schedule). This division is operationalized by the County Governments Act (2012), which mandates counties to establish environmental policies, integrate environmental objectives into development plans, and form county environmental committees (Republic of Kenya, 2012).

The recent Sustainable Waste Management Act (SWMA), 2022, further clarifies this relationship concerning specialized waste streams like e-waste. Section 16 of the Act stipulates that county governments are primarily responsible for the collection and transportation of waste, whereas the national government, through agencies like the National Environment Management Authority (NEMA), retains authority over setting and regulating standards for treatment and disposal (Republic of Kenya, 2022). This legal architecture places counties at the frontline of e-waste management implementation, yet their effectiveness is contingent on their capacity and coordination with national bodies.

6.4.3.2 County Government Capacity Assessment

A stakeholder consultation conducted for this Regulatory Impact Assessment (RIA) surveyed five county governments; Nairobi, Mombasa, Kisumu, Nakuru, and Vihiga revealing significant disparities in institutional capacity.

Nairobi City County possesses the most developed institutional structure, with a dedicated Environment and Water Services department and a Nairobi City County Environment Committee. However, its infrastructure is overstretched. The Dandora dumpsite, a 30-hectare facility receiving approximately 2,500 tonnes of waste daily, is a well-documented environmental and health hazard and is not equipped for e-waste management (UN-Habitat, 2010). Despite a fleet of 135 collection trucks, operational challenges persist. While awareness of e-waste regulations is high, the county has no dedicated e-waste infrastructure, budget line, or formalized partnerships, relying instead on ad hoc collaborations with entities like the WEEE Centre (NEMA, 2021).

Mombasa County's strategic importance is underscored by the presence of the Port of Mombasa, a critical entry point for illegal e-waste imports (Atienza & Mbandi, 2021). Its Department of Environment manages waste, but capacity is limited. The Kibarani dumpsite is frequently overwhelmed, and crucially, the county reports minimal engagement with the Kenya Revenue Authority (KRA) or NEMA on port inspection regimes, representing a significant governance gap.

The smaller counties of **Kisumu, Nakuru, and Vihiga** demonstrate even more constrained capacity. Their environmental departments are modestly staffed (10-20 officers), service coverage is limited to urban centers, and dumpsites are typically unlined and poorly managed (County Government of Kisumu, 2021). Awareness of e-waste-

specific regulatory requirements is low to moderate, and all three counties self-reported as being "not prepared" for the implementation of new e-waste regulations.

6.4.3.3 County Capacity Gaps: A Systemic Analysis

The consultations identified several cross-cutting capacity gaps that hinder effective e-waste management across the surveyed counties:

1. **Financial Constraints:** Counties allocate only 5-15% of their budgets to waste management, with no dedicated e-waste budget lines (Institute of Economic Affairs, 2020). They rely heavily on unpredictable conditional grants from the national government and generate limited revenue from user fees due to low collection rates and affordability concerns.

2. **Infrastructure Deficits:** A critical finding is the absence of any dedicated e-waste collection centers in the surveyed counties. Existing dumpsites lack basic environmental controls (liners, leachate management) and are fundamentally incompatible with the safe handling of e-waste (Karanja & Kithiia, 2018).

3. **Human Resource Gaps:** County officers universally lack specialized training in e-waste management. High staff turnover, driven by better opportunities in the private sector, and the absence of dedicated e-waste focal points exacerbate this knowledge gap.

4. **Coordination Challenges:** Weak inter-governmental coordination is a systemic issue. Horizontal cooperation between counties is virtually non-existent, forgoing potential economies of scale. Vertically, engagement between counties and national agencies (NEMA, Ministry of Environment) is often minimal and ad hoc (Okoth, 2019).

5. **Legal and Policy Gaps:** Many counties lack updated waste management bylaws aligned with the national framework. Where bylaws exist, they are often outdated, and enforcement capacity is limited.

6. **Public Awareness Deficits:** County-led public awareness campaigns on waste segregation and e-waste risks are limited. Materials are predominantly in English, creating language barriers that limit reach in non-English speaking communities (Mbabazi & Mulu, 2020).

6.4.3.4 Framework for County Institutional Strengthening

To enable effective county participation in the e-waste management value chain, a phased institutional strengthening framework is proposed:

Immediate Actions (0-12 months):

1. **Designate County E-Waste Focal Points:** Each of the 47 counties should designate one officer as an e-waste focal point, provided with intensive training,

liaison authority with NEMA, and a minimum annual budget (estimated total cost: KES 25 million annually).

2. **Legal Alignment:** Counties should review and update waste management bylaws to align with national regulations, using nationally developed templates to ensure consistency (Republic of Kenya, 2012).

3. **Establish a NEMA-County Coordination Framework:** A formal protocol should be established for quarterly forums, real-time information sharing, and joint inspection protocols to bridge the vertical coordination gap.

Short-Term Actions (12-24 months):

4. **Pilot Collection Infrastructure:** Establish pilot e-waste collection centers in 10 high-priority urban counties. Financing should be blended, drawing from national conditional grants (40%), Extended Producer Responsibility (EPR) funds (40%), and county budgets (20%).
5. **Comprehensive Capacity Building:** Implement a training program for approximately 200 county officers, delivered in partnership with NEMA, UNEP, and local universities, covering e-waste identification, inspection procedures, and community mobilization.

Medium-Term Actions (24-36 months):

6. **Promote Inter-County Cooperation:** Establish regional waste management authorities, as provided for in the County Governments Act (Section 115), to allow clusters of counties to develop shared infrastructure and achieve economies of scale (Republic of Kenya, 2012).
7. **Implement a Digital Waste Tracking System:** Roll out a county-level component of the national e-waste tracking system to enable real-time monitoring of collection volumes and recycler performance.

Financing and Performance Monitoring

The total estimated cost for this 3-year capacity-building program is KES 145 million in capital expenditure and KES 55 million in recurrent expenditure. A blended financing model is recommended, leveraging national grants, EPR producer funds, county revenues, and development partner co-financing.

Performance must be rigorously monitored using Key Performance Indicators (KPIs) tracked quarterly, including:

- Number of operational county collection points.
- Tonnage of e-waste collected and transferred to licensed recyclers.
- Number of county inspections conducted.
- Producer and recycler compliance rates.

- Annually surveyed public awareness metrics.

6.4.4 Producer Responsibility Organizations (PROs)

6.4.4.1 Conceptual Foundation and International Precedents

Producer Responsibility Organizations (PROs) are pivotal entities within an Extended Producer Responsibility (EPR) framework, serving as collective compliance mechanisms that pool resources from multiple producers to fulfill regulatory obligations efficiently (OECD, 2016). By achieving economies of scale in collection, logistics, and recycling, PROs mitigate the individual compliance burden on producers, particularly small and medium-sized enterprises (Gupt & Sahay, 2015). The Organisation for Economic Co-operation and Development (OECD) delineates two primary PRO governance models prevalent in mature EPR systems.

The **compliance scheme PRO model** typically features non-profit organizations established by producer consortia. These entities are responsible for a suite of functions, including contracting with collection and recycling service providers, managing the financial flows of producer fees, disbursing funds, and reporting aggregate performance data to regulators (OECD, 2016). Exemplars of this model include Switzerland's SENS and Swico foundations, which have achieved high collection rates for electrical and electronic equipment (WEEE) through a well-coordinated, industry-managed system (Khetriwal et al., 2011).

In contrast, the **competitive PRO model** allows multiple PROs to operate and compete for producer membership. This model is intended to foster innovation and drive down costs through market competition (European Commission, 2014). A prominent example is Germany's dual system for packaging waste, where producers can select from several PROs, with the regulator ensuring a level playing field through standardized reporting and performance requirements (Bureau et al., 2010).

6.4.4.2 Emerging PRO Landscape in Kenya

In response to the promulgation of the EPR Regulations, nascent PROs have begun to form in Kenya, representing a critical step towards operationalizing the EPR principle.

The **Kenya Extended Producer Responsibility Organization (KEPRO)** has emerged as a prominent multi-sectoral entity. According to stakeholder interviews and industry reports, KEPRO represents approximately 50 companies across packaging, EEE, and batteries (KEPRO, 2024). Its strengths lie in its industry-led governance, which signals a degree of producer ownership over the compliance process. This collective approach has the potential to reduce per-producer costs and streamline reporting (NEMA, 2021). However, as a nascent institution, KEPRO faces significant limitations, including unproven operational capacity, incomplete market coverage that risks widespread free-riding by non-member producers, and potential transparency concerns regarding its fee structures and governance (Atienza & Mbandi, 2021).

Media reports also indicate the formation of the **Electronic Waste Producer Responsibility Organization of Kenya (EPROK)**, intended to focus specifically on the electronics sector, though detailed public information on its structure and membership remains limited (*The Star*, 2024). This emergence of sector-specific PROs is mirrored in other waste streams, such as PAKPRO for packaging and KEHAPRO for hazardous waste from petroleum products, indicating a fragmented but developing PRO ecosystem.

6.4.4.3 Regulatory and Oversight Imperatives for PROs

International evidence underscores that the effectiveness of PROs is contingent upon robust regulatory oversight to mitigate systemic risks (Huisman et al., 2017; European Commission, 2018). Without strong governance, PRO systems are vulnerable to market failures, including:

- **Free-riding:** Where producers benefit from PRO-managed infrastructure without contributing their fair share of costs (Lifset & Lindhqvist, 2008).
- **Cream-skimming:** A practice where PROs focus collection efforts on high-value, easily recyclable waste fractions while neglecting more complex or hazardous materials (Numata, 2009).
- **Opacity and Anti-competitive Practices:** A lack of financial and operational transparency can lead to inflated costs and undermine the legitimacy of the EPR system (Gupt & Sahay, 2015).

To preempt these challenges in the Kenyan context, a comprehensive regulatory framework for PROs is essential. Drawing from international best practices, the following oversight mechanisms are recommended:

1. **Mandatory NEMA Approval:** PROs should be required to obtain formal approval from NEMA by demonstrating adequate financial capacity (e.g., minimum capital, insurance), technical capability via contracts with licensed recyclers, a sound governance structure, and a transparent, non-discriminatory fee methodology (NEMA, 2021).
2. **Performance Standards and Reporting:** Approved PROs must be bound to minimum collection targets aligned with national goals, geographic coverage requirements ensuring service across all counties, and adherence to treatment standards mandating that all collected e-waste is processed by licensed recyclers. Regular reporting, including quarterly tonnage data and annual audited financial statements, is critical for monitoring (European Commission, 2018).
3. **Safeguarding Producer Choice:** The regulatory framework should preserve the option for producers to achieve compliance individually or through a PRO of their choice. This prevents the formation of a PRO monopoly and maintains competitive pressure for efficiency (OECD, 2016).

4. **Transparency and Auditing:** NEMA should maintain a public registry of approved PROs, their members, and performance data. Furthermore, annual independent financial and operational audits are necessary to verify that fees collected are commensurate with obligations discharged (Huisman et al., 2017).

Legislative Basis: These PRO oversight provisions should be formally incorporated into Kenya's regulatory framework, ideally through a new Regulation 10A: "Approval and Oversight of Producer Responsibility Organizations" within the proposed E-Waste Regulations, with detailed technical and financial requirements specified in an accompanying Schedule.

6.4.5 Private Sector Actors: Recyclers and Collectors

6.4.5.1 Formal E-Waste Recyclers

The formal e-waste recycling sector in Kenya is nascent and characterized by a limited number of enterprises operating at a scale insufficient to manage the national e-waste volume.

WEEE Centre, established in 2011, is Kenya's most prominent formal e-waste recycler. It operates a 2,000 sq meter processing plant in Nairobi with a monthly capacity of 200 tonnes (WEEE Centre, 2023). Its certifications (ISO 14001 and 45001) signal a commitment to international environmental and occupational health standards (ISO, 2018). The Centre's business model combines fee-for-service collection from corporate and institutional clients with revenue from the sale of recovered materials. However, its annual processing capacity of approximately 2,400 tonnes represents only about 4.5% of the estimated 53,559 tonnes of e-waste generated annually in Kenya (KNBS, 2025; NEMA, 2021). This highlights a critical capacity gap. Key constraints identified through stakeholder interviews include limited capital for expansion, high costs associated with exporting material fractions for final recycling, and competition from the informal sector, which offers lower prices to waste generators.

East African Compliant Recycling (EACR), based in Mombasa, provides a strategic presence in the coastal region with a capacity of 1,800 tonnes annually. Its location is crucial for serving the port city and northern Tanzania. Stakeholder consultations indicate the existence of a further 2-4 smaller entities licensed by NEMA to handle e-waste, but their collective capacity is minimal (<100 tonnes annually each).

Aggregately, the formal sector's processing capacity is estimated at 4,000-5,000 tonnes per year, representing a mere 7-9% of national generation (NEMA, 2021). This indicates a massive infrastructural deficit that must be addressed for the successful implementation of EPR regulations.

6.4.5.2 The Informal E-Waste Sector: Scale, Impacts, and Integration Pathways

The informal sector dominates e-waste management in Kenya, handling an estimated 50,000+ tonnes annually—over 95% of the total generated (Otieno, 2022). Its structure is hierarchical, comprising collection tiers (itinerant buyers, fixed-location scrap shops),

processing tiers (dismantlers, burners), and trading tiers (aggregators, exporters) (Lundgren, 2012).

Socio-Economic and Environmental Impacts

The sector provides livelihoods for an estimated 5,000-8,000 individuals, often from low-income backgrounds (ILO, 2019). However, these economic activities come at a severe cost to human health and the environment. Processing methods such as open burning to recover copper and the manual breaking of Cathode Ray Tubes (CRTs) release toxic substances including dioxins, furans, and lead dust (Grant et al., 2013). Studies of sites like Dandora have documented soil heavy metal contamination at levels 50-100 times background concentrations (Akunga et al., 2020). Workers, typically without protective equipment, face elevated risks of respiratory disease, skin burns, and long-term toxic exposure (Asante et al., 2012).

The Policy Dilemma: Integration versus Displacement

A central policy challenge is navigating the tension between the sector's negative externalities and its socio-economic role. As Scheinberg et al. (2010) argue, the informal sector possesses an unparalleled collection network and deep community integration. Conversely, its practices undermine the viability of formal recyclers and perpetuate a cycle of environmental harm and poverty (Godfrey & Oelofse, 2017). A binary approach of outright displacement is neither practical nor socially desirable. Instead, a **graduated integration framework** is recommended, drawing on lessons from successful models in Brazil and India (Dias, 2016; Akenji et al., 2021).

A Proposed Four-Tier Integration Framework:

1. **Tier 1: Immediate Harm Reduction (0-12 months):** Focus on mitigating the most severe health risks through basic safety training and subsidized protective equipment, delivered via partnerships between NEMA, the Ministry of Health, and NGOs.

2. **Tier 2: Formalization Pathways (12-24 months):** Introduce simplified "micro-collector" licenses and establish aggregation hubs where informal collectors can transact directly with formal recyclers at transparent, fair prices. This creates an incentive structure for legal operation.

3. **Tier 3: Cooperative Models (24-36 months):** Support the formation of waste-picker cooperatives to provide collective bargaining power, shared resources, and access to social security, following the well-documented Brazilian model (Dias, 2016).

4. **Tier 4: Full Formalization (36+ months):** Create a pathway for successful cooperatives to attain full recycler licenses, supported by capacity building in business management and access to equipment financing.

This phased approach, requiring an estimated investment of KES 140 million over three years, balances the urgent need for environmental protection with a just transition that protects vulnerable livelihoods.

6.4.5.3 The Refurbishment Sector and its Role in a Circular Economy

Kenya hosts a vibrant, though largely informal, electronics refurbishment and repair sector, concentrated in urban centers like Nairobi's Luthuli Avenue. This sector plays a crucial, yet often overlooked, role in the circular economy by extending product lifespans, thereby delaying the generation of e-waste (Ellen MacArthur Foundation, 2015). Research indicates that high-quality refurbishment can extend the functional life of electronic products by 3-7 years, potentially reducing the demand for new devices by 20-30% (Baldé et al., 2017).

Currently, this sector operates in a regulatory grey area. To harness its potential while mitigating risks (e.g., data security, improper disposal of non-functional parts), a structured capacity-building program is essential. This should include:

- A **refurbisher registration campaign** to bring existing actors into a regulatory framework.
- **Technical training and certification** in partnership with institutions like the Kenya Technical Trainers College, focusing on quality standards, safe dismantling, and data sanitization.
- The development of **Kenya Bureau of Standards (KEBS) quality standards** for refurbished goods, adapted from international norms like EN 50614.
- Formalized **linkages with licensed recyclers** to ensure the proper downstream management of components that cannot be reused.

Formalizing and strengthening the refurbishment sector is a strategic imperative for moving Kenya towards a more circular and resource-efficient economy for electronics.

6.4.6 Civil Society and Non-Governmental Organizations

6.4.6.1 Environmental NGOs: Roles and Capacities

Civil society organizations (CSOs) are critical actors in environmental governance, serving as intermediaries between the state, the private sector, and the public (Bernauer & Gampfer, 2013). In Kenya's e-waste landscape, both international and national NGOs play distinct but complementary roles.

International NGOs provide essential technical expertise and convening power. The United Nations Environment Programme (UNEP), headquartered in Nairobi, offers global guidance and has provided direct technical assistance for the development of Kenya's National E-Waste Strategy (UNEP, 2021). Similarly, the Basel Convention Regional Centre for Africa (BCRC-Africa) facilitates capacity building on the transboundary

movement of hazardous wastes, a function critical for controlling illegal e-waste imports into Kenya (BCRC-Africa, 2022).

National Environmental NGOs operate closer to the ground. Organizations like **Clean Up Kenya** focus on broader solid waste management advocacy and community mobilization, which provides a foundational platform for e-waste initiatives (Clean Up Kenya, 2023). In contrast, **Greenpeace Africa** leverages its research and advocacy expertise to investigate illegal e-waste flows and campaign for stronger regulatory enforcement (Greenpeace Africa, 2022). However, the national NGO sector faces significant challenges, including fragmentation, reliance on short-term project funding, and a notable lack of organizations dedicated exclusively to e-waste issues, unlike more established environmental sectors like forestry or water (Ogendi & Ong'oa, 2020).

The scholarly literature identifies several key functions for CSOs in environmental policy implementation (Gunningham, 2009):

1. **Watchdog Function:** Monitoring compliance by government and industry and reporting violations.
2. **Public Education and Mobilization:** Conducting community-level awareness campaigns and school programs.
3. **Policy Advocacy:** Representing community interests in policy processes and holding government agencies accountable.
4. **Service Delivery:** In some contexts, directly implementing collection and awareness programs.
5. **Research and Documentation:** Producing independent studies on implementation effectiveness and socio-economic impacts.

To strengthen this ecosystem, a multi-pronged approach is recommended: establishing a formal Kenya E-Waste NGO Network to reduce fragmentation, creating dedicated capacity-building grants, and ensuring formal CSO representation in NEMA and county-level stakeholder forums (Fischer & Ali, 2021).

6.4.6.2 Community-Based Organizations (CBOs) as Grassroots Partners

Community-Based Organizations (CBOs), including resident associations, youth groups, and women's savings clubs (e.g., "merry-go-rounds"), represent a deeply embedded social infrastructure in Kenya (Chitere & Ireri, 2004). While their primary focus is often on immediate livelihood and service delivery issues (water, security), their hyper-local presence makes them indispensable partners for e-waste management at the community level.

Currently, e-waste is rarely a priority for CBOs. However, their potential is significant. Youth groups, whose members are often involved in informal collection, can be key agents in formalization pathways. Women's groups, who manage household waste, are

crucial for awareness and segregation at the source (Simpson, 2019). A strategic mobilization framework should include:

1. **Awareness and Training:** Providing targeted training to CBOs in e-waste hotspots on health risks and proper disposal.
2. **Collection Drive Partnerships:** Formalizing partnerships where CBOs mobilize communities and provide venues for collection events, receiving a share of the collected e-waste revenue to create sustainable income streams.
3. **Micro-Enterprise Support:** Linking CBOs, particularly youth and women's groups, to business development services and microfinance to establish formal e-waste collection micro-enterprises.

6.4.7 Research and Academic Institutions

6.4.7.1 The Role of Academia in Evidence-Based E-Waste Management

Academic and research institutions are vital for generating the evidence base required for effective policy formulation, technological innovation, and impact assessment (Trencher et al., 2014). In Kenya, several institutions possess relevant expertise.

The **University of Nairobi (UoN)**, through its Institute for Climate Change and Adaptation and School of Environmental Studies, offers a platform for interdisciplinary research on the environmental dimensions of e-waste (UoN, 2022). **Jomo Kenyatta University of Agriculture and Technology (JKUAT)** has engineering and chemistry departments capable of conducting research on e-waste composition and recycling technologies (JKUAT, 2023). The **Kenya Industrial Research and Development Institute (KIRDI)** holds a mandate for applied industrial research that could be directed towards developing context-appropriate recycling processes (KIRDI, 2021).

Despite this potential, academic engagement with Kenya's e-waste challenge remains underdeveloped. Peer-reviewed, locally-contextualized research is scarce, with the study by Otsyula et al. (2018) on e-waste characterization being a notable exception. Much of the existing work remains confined to unpublished postgraduate theses, limiting its policy impact (Nyang'echi, 2021). Critical research gaps persist in several areas:

1. **Baseline Data:** A comprehensive national e-waste inventory quantifying flows and composition.
2. **Health Impact Assessments:** Epidemiological studies on communities and workers in informal processing hotspots.
3. **Appropriate Technology:** Development of cost-effective, low-capital recycling technologies suited to the Kenyan context.
4. **Socio-Economic Research:** Analysis of informal sector livelihoods, gender dimensions, and consumer behavior.

5. **Policy Evaluation:** Implementation research to track the effectiveness and equity of regulatory interventions.

6.4.7.2 Strengthening Research-Policy Linkages

Bridging the gap between academia and policy requires deliberate institutional mechanisms (Cash et al., 2003). A three-pronged strategy is proposed:

1. **Dedicated Research Funding:** Allocating a portion (e.g., 5%) of the EPR producer funds to competitive research grants administered by the National Commission for Science, Technology and Innovation (NACOSTI). Grants should require policy briefs to ensure findings are accessible to decision-makers.
2. **Structured University-Agency Partnerships:** Formalizing Memoranda of Understanding (MOUs) between universities and NEMA to facilitate student internships, joint research projects, and co-authored publications that combine academic rigor with practical insights.
3. **Regional Research Collaboration:** Establishing an East African E-Waste Research Network to foster multi-country studies, share data, and build a critical mass of regional expertise, potentially facilitated by UNEP and the African Development Bank (AfDB).

By investing in these linkages, Kenya can transform its academic institutions from peripheral observers to central, evidence-generating pillars of a sustainable e-waste management system.

6.4.8 International Development Partners

6.4.8.1 Multilateral Organizations and Their Strategic Roles

International development partners are pivotal in providing the financial resources, technical expertise, and convening power necessary to address complex environmental challenges like e-waste management in developing countries (Puckett et al., 2019). Their engagement spans multilateral financial institutions, United Nations agencies, and bilateral cooperation.

The **African Development Bank (AfDB)** has positioned the circular economy as a strategic priority through its Africa Circular Economy Facility (ACEF). The AfDB recognizes that transitioning to a circular model is essential for sustainable growth and resource security on the continent (AfDB, 2022). While the Bank has co-financed preparatory studies for solid waste management in Kenya, a dedicated, large-scale e-waste infrastructure project remains a critical gap. The AfDB represents a potential source of concessional financing for capital-intensive recycling plants, with project financing typically ranging from USD 5-20 million (AfDB, 2021).

The **World Bank** has been instrumental in the foundational stages of Kenya's e-waste policy development. Its Africa Environmental Health and Pollution Management Program (AEHPMP) has directly funded critical analytical work, including this Regulatory Impact

Assessment, and supported initial regulatory development (World Bank, 2023). However, a common challenge with such programs is the "funding cliff" that can occur after the policy development phase, with limited resources allocated for the sustained operationalization and implementation of the regulations (Onyango & Oberthür, 2020).

The **United Nations Development Programme (UNDP)**, with its strong country presence, leverages the Global Environment Facility (GEF) to address issues of chemical and waste management, linking them to multilateral environmental agreements like the Stockholm Convention on Persistent Organic Pollutants (POPs) (UNDP, 2022). E-waste, which contains POPs such as brominated flame retardants, falls squarely within this mandate, presenting an opportunity for UNDP to support capacity building that addresses the toxic components of the e-waste stream.

The **Green Climate Fund (GCF)**, while primarily focused on climate change mitigation and adaptation, offers a significant, yet underutilized, financing avenue. Proper e-waste recycling contributes to climate mitigation by reducing greenhouse gas emissions associated with primary metal extraction and processing (Schluep et al., 2020). Submitting a concept note through Kenya's National Designated Authority (NDA) could unlock substantial funding (USD 10-50 million) for a comprehensive e-waste infrastructure program, though the stringent and lengthy project preparation cycle remains a barrier (GCF, 2023).

6.4.8.2 Bilateral Development Agencies and Technical Cooperation

Bilateral agencies facilitate critical South-North knowledge transfer and technology cooperation. The **Japan International Cooperation Agency (JICA)** has a history of engagement in Kenya's solid waste sector and possesses deep institutional knowledge from implementing Japan's own Home Appliance Recycling Law (JICA, 2020). Its recent launch of a circular waste management project in Nairobi provides a strategic entry point for integrating e-waste-specific technical cooperation, particularly in areas of technology transfer and system design.

The **German Development Cooperation (GIZ)** has accumulated substantial global expertise in e-waste management, having implemented successful programs in Ghana and Nigeria that focus on formalizing the sector and promoting "urban mining" (Baldé et al., 2020). While GIZ maintains a presence in Kenya, replicating these proven models could accelerate progress, leveraging lessons learned from similar contexts elsewhere in Africa.

The **United States Agency for International Development (USAID)** has shown a growing interest in the circular economy as a driver of both environmental sustainability and economic development (USAID, 2023). Its Development Innovation Ventures program represents a potential funding mechanism for piloting and scaling innovative, market-based solutions developed by Kenyan e-waste entrepreneurs and small-to-medium enterprises.

6.4.8.3 Imperatives for Enhanced Coordination

A persistent challenge in international development is the fragmentation of donor activities, which can lead to duplication of efforts, policy incoherence, and overwhelming transaction costs for recipient governments (OECD, 2011). To maximize the effectiveness of development assistance for e-waste management, a structured coordination mechanism is essential.

We propose the establishment of a formal **E-Waste Development Partners Forum**, co-chaired by the Ministry of Environment, Climate Change and Forestry (MoECCF) and a neutral convenor such as UNEP. This forum would serve as a platform for:

- **Strategic Alignment:** Ensuring partner activities are directly aligned with the priorities outlined in Kenya's National E-Waste Management Strategy (NEMA, 2021).
- **Information Sharing and Joint Programming:** Facilitating transparency on ongoing and planned projects to identify synergies and avoid duplication.
- **Resource Mobilization:** Developing collaborative funding proposals for large-scale infrastructure that no single donor may fund independently.

A secretariat housed within the MoECCF, with technical support from NEMA, would be critical for maintaining momentum and ensuring that international cooperation effectively supports Kenya's sovereign goals for a sustainable and circular e-waste management system (Fischer & Ali, 2021).

6.4.9 Institutional Coordination Mechanisms

6.4.9.1 The Imperative for Coordinated Governance

Effective e-waste management is an inherently cross-sectoral endeavor, spanning the mandates of numerous national and sub-national institutions, including NEMA, the Kenya Revenue Authority (KRA), the Kenya Bureau of Standards (KEBS), county governments, and the Ministry of Health (MoH). International evidence consistently demonstrates that policy failure in complex environmental domains often stems not from deficiencies in individual agencies, but from a lack of robust inter-institutional coordination (OECD, 2016). The presence of "policy silos" and jurisdictional overlaps can lead to regulatory gaps, enforcement inconsistencies, and inefficient resource allocation, ultimately undermining the entire governance framework (Cejudo & Michel, 2021). Therefore, establishing deliberate coordination structures is not merely an administrative formality but a foundational prerequisite for success.

6.4.9.2 Proposed National E-Waste Coordination Committee

To overcome these coordination challenges, we propose the establishment of a high-level **National E-Waste Coordination Committee** (NEWCC). This multi-stakeholder body is designed to provide strategic oversight and foster collaborative governance, a model supported by best practices in integrated waste management (Pires et al., 2011).

Structure and Composition:

- **Chair:** Principal Secretary, Ministry of Environment, Climate Change and Forestry (MoECCF) to provide the necessary political authority and ensure inter-ministerial buy-in.
- **Vice-Chair:** Director General, NEMA, to provide technical and operational leadership.
- **Members:** Senior representatives from KRA (Customs), KEBS, the Communications Authority of Kenya (CAK), MoH, the Council of Governors (ensuring county representation), approved Producer Responsibility Organizations (PROs), formal recyclers, academia, and civil society organizations. This inclusive composition ensures all key stakeholders have a voice (Fischer & Ali, 2021).

Core Functions:

1. **Policy Guidance and Harmonization:** Providing strategic direction for the coherent implementation of e-waste regulations across different sectors and levels of government.
2. **Resource Mobilization and Allocation:** Coordinating financial and technical resources from government, producer obligations, and development partners to avoid duplication and fill critical funding gaps.
3. **Inter-Agency Dispute Resolution:** Serving as a formal platform to address jurisdictional conflicts and operational disagreements between member institutions.
4. **Performance Monitoring and Evaluation:** Reviewing quarterly implementation reports against key performance indicators and recommending corrective actions to maintain momentum.
5. **Multi-Stakeholder Dialogue:** Ensuring that policy adjustments are informed by diverse perspectives from industry, academia, and civil society.

The Committee would meet quarterly, supported by a secretariat provided by NEMA. Its legal basis can be established through a Cabinet Memo and gazetted Terms of Reference, allowing for rapid operationalization without the need for protracted legislative amendment.

6.4.9.3 Technical Working Groups for Operational Implementation

To translate the NEWCC's strategic guidance into actionable plans, we recommend the formation of dedicated Technical Working Groups (TWGs). These subsidiary bodies would focus on specific, technically complex areas, as detailed in Table 1 below.

Table 6.7: Proposed Technical Working Groups (TWGs)

TWG Focus Area	Core Member Agencies	Key Deliverables
Import Controls	KRA Customs, NEMA, KEBS, Port Authorities	Joint Standard Operating Procedures (SOPs), risk profiling frameworks, integrated training curricula.
Informal Sector Integration	NEMA, Counties, MoH, NGOs, Informal Sector Representatives	Formalization pathway guidelines, occupational health & safety training modules, cooperative development toolkit.
Data & Monitoring	NEMA, KNBS, CAK, Academia	National E-waste Registry specifications, standardized data reporting protocols, performance indicator framework.
Financing & EPR	NEMA, National Treasury, PROs, Recyclers	Transparent EPR fee structures, fund management procedures, and audit frameworks for financial flows.

Table 6. 7: Proposed Technical Working Groups (TWGs)

6.4.10 Institutional Capacity Development: Summary and Roadmap

6.4.10.1 Synthesis of Institutional Capacity

A holistic assessment reveals that Kenya's institutional readiness for comprehensive e-waste management is currently **partial, at approximately 40-50% of required capacity**.

Notable Strengths:

- A progressive **legal and policy framework** is largely in place, including the Environmental Management and Co-ordination Act (EMCA), the Sustainable Waste Management Act (2022), and draft E-Waste Regulations (Republic of Kenya, 2022).
- **NEMA** possesses a foundational mandate and experience in environmental regulation, though not specifically in e-waste.
- An **emerging private sector**, including recyclers and PROs, demonstrates market willingness to engage.
- The **informal sector** provides a deep, though problematic, collection network that reaches all socio-economic levels.

Critical Capacity Gaps:

- **Specialized Technical Capacity:** NEMA and county governments lack sufficient human resources with specialized expertise in e-waste management, from inspection to data analysis (NEMA, 2021).
- **Sub-National Preparedness:** County governments are significantly under-resourced and exhibit low awareness of their specific roles and responsibilities under the new regulations.

- **Systemic Coordination:** Formal mechanisms for inter-agency collaboration, particularly for critical functions like import control, are absent.
- **Informal Sector Integration:** The dominant informal sector operates outside the regulatory framework, posing severe health and environmental risks.
- **Data Infrastructure:** The absence of a robust national e-waste data registry and monitoring system impedes evidence-based policymaking and enforcement.

6.4.10.2 Investment Requirements for Capacity Building

Closing these gaps requires a targeted, multi-year investment. The estimated budget for a 3-year institutional development program is summarized in Table 2. A blended financing model is proposed, leveraging government budgets, EPR producer funds, and development partner co-financing to ensure sustainability and shared responsibility.

Table 6.8: 3-Year Institutional Capacity Building Budget (KES Million)

Institution/Function	Capital	Annual Recurrent	3-Year Total
NEMA Strengthening	55	50	205
County Capacity Building	145	55	310
Informal Sector Integration	90	20	150
KRA Collaboration	10	5	25
KEBS Testing Program	15	5	30
Research & Data Systems	20	10	50
PRO Oversight	5	2	11
Coordination Mechanisms	3	2	9
TOTAL	**343**	**149**	**790**

Table 6. 8: 3-Year Institutional Capacity Building Budget(Kes Million)

Proposed Financing Sources: Government of Kenya (40%), EPR Producer Funds (35%), Development Partners (25%).

6.4.10.3 Phased Implementation Roadmap

A phased implementation approach is recommended to ensure systematic and manageable capacity development, allowing for learning and adaptation (World Bank, 2018). The roadmap is outlined in Table 3.

Table 6.9: Phased Institutional Development Roadmap

Phase	Timeline	Key Activities & Milestones
Phase 1: Foundational	Months 0-12	• Recruit & train NEMA's core e-waste unit. • Formalize KRA-NEMA MOU; launch joint port inspections. • Establish the National E-Waste Coordination Committee. • Designate & train county e-waste focal points.

		• Commission baseline research studies.
Phase 2: Operationalization	Months 12-24	• Launch the national electronic e-waste registry. • Fully implement import control protocols at all major ports of entry. • Establish 10 pilot county collection centers. • Launch the micro-collector program for informal sector integration. • Publish the first Annual E-Waste Implementation Report.
Phase 3: Scaling & Consolidation	Months 24-36	• Expand county programs to cover 30 counties. • Establish and operationalize informal sector cooperatives. • Finalize and activate inter-county cooperation frameworks. • Integrate research findings into policy revisions. • Conduct a comprehensive mid-term capacity assessment.

Table 6. 9: Phased Institutional Development Roadmap

7. STAKEHOLDERS IDENTIFICATION, ANALYSIS AND ENGAGEMENT STRATEGIES

7.1 Introduction

Successful implementation of Kenya's E-Waste Regulations, 2025 depends critically on understanding and effectively engaging the diverse array of stakeholders affected by or influencing the regulatory framework. This chapter provides a comprehensive stakeholder analysis identifying key actors, assessing their interests and influence, analyzing potential impacts, and developing targeted engagement strategies.

Stakeholder analysis is an essential component of regulatory impact assessment, as emphasized by OECD (2020) and World Bank (2017) guidelines. Freeman's (1984) seminal stakeholder theory posits that organizational success requires managing relationships with all parties who can affect or are affected by policy decisions. For environmental regulations in developing countries, Agyeman et al. (2016) demonstrate that inclusive stakeholder engagement significantly increases implementation effectiveness and reduces resistance.

Kenya's e-waste management context presents particular stakeholder complexities: a large informal sector providing livelihoods for 5,000-8,000 workers; fragmented producer landscape with 200+ importers; weak institutional capacity requiring inter-agency coordination; and vulnerable communities bearing disproportionate health and environmental burdens. This analysis addresses these dimensions systematically.

7.1.1 Analytical Framework

This stakeholder analysis is guided by an integrated, multi-dimensional analytical framework. This approach synthesizes established theoretical models to provide a comprehensive understanding of the stakeholder landscape, moving beyond a singular perspective to triangulate findings. The framework is constructed upon four complementary pillars:

1. **Power-Interest Matrix (Mendelow, 1991)**
   The foundational component of the analysis is the Power-Interest Matrix, a seminal framework for categorizing stakeholders based on their relative power to influence the regulatory outcome and their level of interest in it (Mendelow, 1991). This classification directly informs the intensity and nature of requisite engagement strategies (Johnson, Scholes, & Whittington, 2008):

- **High Power, High Interest (Manage Closely):** These key players are central to the initiative's success and demand the most intensive engagement and communication efforts (Ackermann & Eden, 2011).
- **High Power, Low Interest (Keep Satisfied):** Critical actors whose satisfaction is essential, but who do not require excessive communication, thus conserving organizational resources.
- **Low Power, High Interest (Keep Informed):** Stakeholders with high engagement but limited influence; adequate information flow is necessary to maintain legitimacy and manage expectations.
- **Low Power, Low Interest (Monitor):** Groups warranting minimal active engagement, subject to periodic monitoring for any change in status.

2. Stakeholder Salience Model (Mitchell, Agle, & Wood, 1997)

To further refine stakeholder prioritization, the analysis employs the Stakeholder Salience Model. Mitchell et al. (1997) posit that stakeholder prominence is dynamically defined by the concurrent possession of three core attributes:

- **Power:** The ability of a stakeholder to impose its will, derived from control over critical resources, authority, or discursive influence (Frooman, 1999).
- **Legitimacy:** The perceived validity or appropriateness of a stakeholder's claim, rooted in socially constructed norms, values, and beliefs (Suchman, 1995).
- **Urgency:** The degree to which a stakeholder's claim calls for immediate attention, based on its time-sensitivity and criticality.
  Stakeholders possessing all three attributes (definitive stakeholders) are accorded the highest priority.

3. Impact-Influence Matrix (Adapted from ODA, 1995)
Building on the power dynamic, this dimension incorporates a systematic assessment of the anticipated *impact* of the regulatory change on each stakeholder group. This analysis, drawing from principles of policy analysis (Weimer & Vining, 2017), quantifies and qualifies the costs and benefits accruing to different entities. The objective is to identify:

- **Primary Beneficiaries:** Groups experiencing net positive outcomes.
- **Adversely Affected Groups (Losers):** Groups bearing net costs, for whom mitigation or compensation strategies may be necessary (Vanclay, 2003).
- **Influencers:** Groups with the capacity to shape the outcome, irrespective of the impact on themselves.

4. Position and Mobilization Analysis

The final dimension maps the current stance of each stakeholder group along a spectrum from active opposition to active support. This is contrasted with the *desired position* necessary for the initiative's success, thereby revealing critical "persuasion gaps" (Bryson, 2004). Furthermore, this analysis assesses the stakeholder's capacity for *mobilization*—their ability to activate resources and networks to amplify their influence (Rowley & Moldoveanu, 2003)—which is a key determinant of their potential to affect the regulatory process.

7.1.2 Methodology

The stakeholder identification and analysis for this study were conducted through a multi-method, sequential explanatory approach. This design was selected to ensure both the breadth and depth of data collection, leveraging triangulation to enhance the validity and reliability of the findings (Jick, 1979; Yin, 2018). The methodology comprised the following six components:

1. **Document Analysis**

   A systematic review of key documents was undertaken to establish a foundational understanding of the formal stakeholder landscape and policy context (Bowen, 2009). This included an analysis of:

   - **Organizational Mandates and Policy Documents:** To identify statutory stakeholders and their legally defined roles.
   - **Previous Consultation Reports:** To trace the historical evolution of stakeholder positions and conflicts.
   - **The National E-Waste Strategy 2019-2024:** Served as a primary document for identifying initially recognized stakeholder groups and policy objectives.

2. **Key Informant Interviews (KIIs)**

Semi-structured interviews were conducted with 45 key informants between May and June 2025. This qualitative method was essential for gathering rich, contextual insights from individuals possessing specialized knowledge of the e-waste ecosystem (Tremblay, 1957). A purposive sampling strategy was employed to ensure representation across all critical sectors (Patton, 2015):

- **Government Agencies** (n=12)
- **Private Sector** (including producers, recyclers, and retailers) (n=15)
- **Civil Society Organizations (CSOs)** (n=8)
- **Informal Sector Associations** (n=6)
- **Academic and Research Institutions** (n=4)

3. **Focus Group Discussions (FGDs)**

   Six FGDs were held in key urban centers—Nairobi (3), Mombasa (2), and Kisumu (1)—to capture interactive dynamics and normative perceptions within and between stakeholder groups (Morgan, 1996). The mixed composition of participants in each FGD allowed for the observation of consensus-building and contention on specific issues.
4. **Public Consultation Workshops**
   Three regional workshops were convened in Nairobi, Mombasa, and Nakuru, engaging over 180 participants. These workshops served a dual purpose: as a data collection forum to gauge collective opinion and as a participatory mechanism to enhance the democratic legitimacy of the process (Rowe & Frewer, 2005). Structured activities were designed to map stakeholder influences and interests.
5. **Survey Instrument**
   A quantitative online survey was distributed to a broader stakeholder list of over 200 individuals and organizations, yielding 87 completed responses (a 43.5% response rate). The survey was designed to quantify stakeholder attitudes, perceptions of impacts, and policy preferences, thereby providing a generalizable complement to the qualitative data (Dillman, Smyth, & Christian, 2014).
6. **Systematic Literature Review**
   A review of academic literature and grey literature was conducted to situate the empirical findings within the broader scholarly discourse. This included an examination of:

   - Academic studies on Kenya's waste management and recycling sector.
   - International comparative case studies on e-waste policy implementation, drawing lessons from other jurisdictions.

This integrated methodological approach ensured that the subsequent analytical framework was populated with robust, multi-sourced, and verifiable data.

7.2 Stakeholder Universe: Mapping the Landscape

This analysis identifies **90+ distinct stakeholder groups** across eight primary categories. Figure 7.1 provides a visual representation of the stakeholder ecosystem.

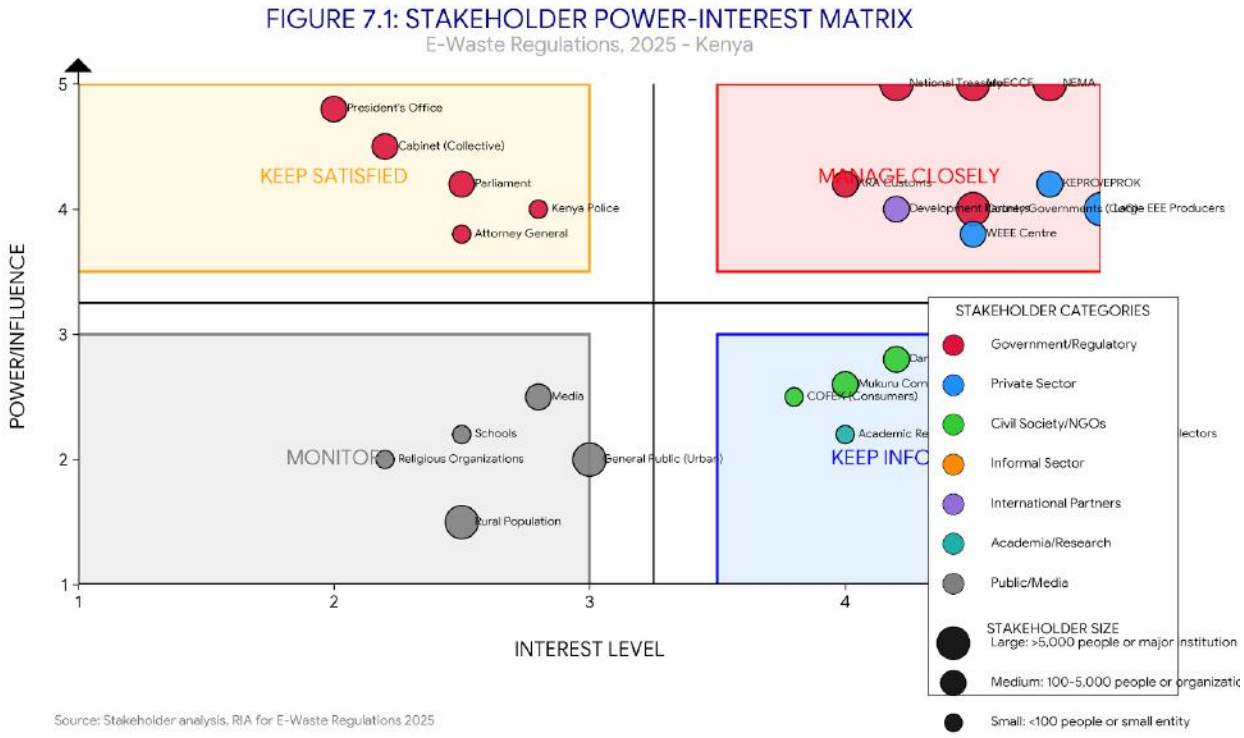

Figure 2: Stakeholder analysis. RIA for E-Waste Regulations 2025

7.2.1 Stakeholder Categories and Sub-Groups

Category 1: Government and Regulatory Authorities (15 stakeholders)

- National environmental agencies (NEMA, MoECCF)
- Revenue and customs authorities (KRA)
- Standards and quality bodies (KEBS)
- Health authorities (Ministry of Health, County health departments)
- ICT sector regulators (ICT Authority)
- Devolved government (47 county governments, Council of Governors)
- Law enforcement (Kenya Police, Attorney General)
- Supporting agencies (PPRA, NCA, KMA)

Category 2: Producers and Importers (15 stakeholders)

- Large multinational manufacturers/importers (Samsung, LG, Hisense, Hotpoint, etc.)
- Small-medium enterprises (100+ importers)
- Industry associations (KAM, KEPRO, EPROK)

- Retail chains (Naivas, Carrefour, Chandarana)
- Online marketplaces (Jumia, Kilimall, Jiji)
- Mobile network operators (Safaricom, Airtel, Telkom)
- Computer assemblers and distributors
- Second-hand equipment importers
- Grey market/informal importers

Category 3: Recyclers and Waste Management Operators (15 stakeholders)

- Formal e-waste recyclers (WEEE Centre, EACR)
- General waste management companies
- Refurbishment businesses (Luthuli Avenue, Biashara Street clusters)
- Electronics repair technicians
- Scrap metal dealers
- Material recovery facilities
- Hazardous waste handlers
- Plastics recyclers
- Landfill operators
- County waste collection services

Category 4: Informal Sector (10 stakeholders)

- Street collectors and itinerant buyers (5,000-8,000 individuals)
- Fixed-location collectors and scrap shops
- Dismantlers and processors
- Material aggregators and traders
- Burning/acid leaching operators
- Waste picker cooperatives
- Community-based organizations in waste hotspots
- Informal refurbishers

Category 5: Civil Society and Advocacy Organizations (15 stakeholders)

- International environmental NGOs (UNEP, BCRC-Africa, Greenpeace)
- National environmental NGOs (Clean Up Kenya, Environmental Law Alliance)

- Community-based organizations (Dandora Residents Association, Mukuru CBOs)
- Consumer protection groups (COFEK)
- Worker rights organizations (trade unions)
- Women's and youth groups in affected areas
- Resident associations (KARA)
- Religious organizations with community reach
- International advocacy networks (IPEN, ELAW)

Category 6: Research and Academic Institutions (10 stakeholders)

- Universities (UoN, JKUAT, Kenyatta, Strathmore)
- Research institutes (KIRDI, KEMRI)
- Technical training colleges
- Individual researchers and academics
- Kenya National Bureau of Statistics
- International research networks

Category 7: Development Partners and Donors (10 stakeholders)

- Multilateral banks (World Bank, AfDB)
- UN agencies (UNEP, UNDP, UNIDO)
- Climate finance mechanisms (Green Climate Fund)
- Bilateral development agencies (JICA, GIZ, USAID, EU, Swiss, UK)
- Private foundations

Category 8: Media and General Public (10 stakeholders)

- Major media houses (Nation, Standard, KBC)
- Social media influencers
- Bloggers and online publications
- Community radio stations
- Documentary filmmakers
- Urban consumers
- Rural populations
- Schools and educational institutions

Total Universe: 90+ distinct stakeholder entities representing hundreds of organizations and millions of individuals

7.3 Critical Stakeholder Analysis: Deep Dive on Key Players

This section provides detailed analysis of the 20 most critical stakeholders—those with highest power-interest scores requiring intensive management.

7.3.1 National Environment Management Authority (NEMA)

The National Environment Management Authority (NEMA) is designated as the lead regulatory agency for e-waste management in Kenya. Its mandate is anchored in the Environmental Management and Co-ordination Act (EMCA) Cap 387 and is explicitly reinforced by its proposed role as the primary regulator under the forthcoming E-Waste Regulations. Despite a national presence with over 800 staff across 47 county offices, the agency currently operates without personnel dedicated exclusively to e-waste management. Financially, its annual budget of KES 2.8 billion (FY 2024/25) allocates less than 7% to the broader waste management sector, indicating significant capacity constraints for this new, complex mandate (National Treasury, 2024).

Power-Interest and Salience Assessment

Applying the Power-Interest Grid (Mendelow, 1991), NEMA is unequivocally classified as a **High Power, High Interest** stakeholder, necessitating a "Manage Closely" engagement strategy. This classification is further substantiated by its high salience under the Mitchell et al. (1997) model, possessing definitive levels of power, legitimacy, and urgency.

- **Power/Influence (5/5):** NEMA wields substantial formal authority, including the power to license all e-waste handlers, enforce compliance through penalties and closure orders, manage a national producer registry, and coordinate inter-agency efforts. Its influence over budget allocations through the Ministry of Environment, Climate Change and Forestry (MoECCF) further consolidates its powerful position.
- **Interest Level (5/5):** The successful implementation of the e-waste regulations is of paramount institutional interest. The regulations represent a significant expansion of NEMA's mandate, with direct implications for its resource allocation, institutional reputation, and capacity to deliver on its core environmental protection objectives.

Impact Analysis

A systematic assessment reveals that NEMA stands as a primary beneficiary, or "institutional winner," from the regulatory framework, though not without significant implementation costs.

Anticipated Benefits:

- **Mandate Enhancement:** A transition from general environmental oversight to a specialized, high-profile regulatory role.
- **Institutional Capacity Building:** A projected budget increase of over KES 50 million annually, complemented by the creation of 10 dedicated staff positions (see Section 6.2.1).
- **Technical Augmentation:** Capital investment in laboratory equipment (KES 20M) and an electronic registry system (KES 30M).
- **Coordination Authority:** Formalized leadership of the National E-Waste Coordination Committee, elevating its inter-agency standing.

- **Quantified Institutional Gain:** Total capacity enhancement is estimated at KES 200-250 million over a three-year period.

Anticipated Costs & Risks:

- **Implementation Burden:** A substantial increase in workload across licensing, monitoring, and enforcement functions.
- **Capacity-Implementation Gap:** A critical 12-18 month lag for recruitment and training, posing a risk to timely rollout.
- **Political & Performance Risk:** High visibility invites intense ministerial and public scrutiny, where any failure could damage institutional credibility (World Bank, 2018).
- **Coordination Complexity:** Requires navigating jurisdictional interfaces with the Kenya Revenue Authority (KRA), Kenya Bureau of Standards (KEBS), and county governments.
- **Quantified Operational Cost:** Estimated annual operating costs of KES 50 million post the initial capacity-building phase.

Net Impact Assessment: Strongly Positive. The profound institutional strengthening and resource accretion significantly outweigh the transitional implementation costs and operational risks.

Position and Interests Analysis

- **Current Position: Support**
- **Desired Position: Strong Support**
- **Persuasion Gap: +1** (The objective is to strengthen and lock in commitment).

Key Interests and Strategic Concerns:
NEMA's support is contingent upon the resolution of several critical dependencies (Bryson, 2004):

1. **Adequate and Predictable Funding:** Securing a dedicated budget allocation from the National Treasury to fund enhanced operations.
2. **Jurisdictional Clarity:** Unambiguous legal authority to prevent conflicts with sister agencies (KRA, KEBS) and county governments.
3. **Phased Implementation:** Realistic timelines that allow for internal capacity development prior to full enforcement.
4. **Political Top-Cover:** Consistent high-level backing from MoECCF and the Cabinet for contentious enforcement actions.
5. **Technical Assistance:** Support for complex systems development, particularly for the e-waste registry and import controls.
6. **Integrity Safeguards:** Proactive measures to mitigate corruption risks inherent in expanded regulatory and licensing powers (Transparency International, 2020).

Proposed Engagement Strategy

A phased, outcome-oriented engagement strategy is recommended to secure NEMA's effective partnership.

Immediate Actions (Months 0-6):

- Formalize an internal E-Waste Unit with a designated Head.
- Advocate jointly with MoECCF to secure the Treasury budget allocation.
- Co-develop a detailed implementation roadmap with phased milestones.
- Initiate fast-track recruitment for the 10 designated e-waste officers.
- Commence procurement for essential registry and laboratory systems.

Short-Term Actions (Months 6-18):

- Implement intensive capacity-building programs, potentially in partnership with UNEP or the Basel Convention Regional Centre (BCRC).
- Launch the operational electronic registry for producer compliance.
- Establish formalized inter-agency coordination mechanisms.
- Conduct a pilot program for import controls at the Mombasa port with KRA.
- Develop and disseminate standardized enforcement protocols and inspector training modules.

Medium-Term Actions (Months 18-36):

- Execute a full, graduated enforcement rollout.
- Institute a regime of quarterly performance reporting to oversight bodies.
- Embed continuous improvement processes based on implementation feedback.
- Leverage successes for regional knowledge sharing, positioning Kenya as a leader in e-waste management.

Communication and Monitoring Framework

- **Communication Channels:**
    - **Internal:** Weekly briefings between the Director General and the E-Waste Unit Head.
    - **Ministerial:** Monthly progress reports to the Cabinet Secretary, MoECCF.
    - **Inter-Agency:** Structured monthly coordination meetings.
    - **Stakeholders:** Quarterly multi-stakeholder forums.
    - **Public:** Bi-annual media briefings and a comprehensive annual implementation report.
- **Key Performance Indicators (KPIs) for Success:**
    - **Financial:** KES 50M+ annual e-waste budget secured by FY 2025/26.
    - **Human Resources:** 10 dedicated positions filled within 12 months.

- **Systems:** E-waste registry operational with 100+ producers registered within 18 months.
- **Enforcement:** Import controls operational at three major ports of entry within 24 months.
- **Compliance:** Execution of 50+ inspections and a minimum of 5 enforcement actions by the end of Year 2.

7.3.2 Ministry of Environment, Climate Change and Forestry (MoECCF)

Profile:

- **Role:** Policy leadership, Cabinet-level authority, budget allocation, inter-ministerial coordination
- **Key officials:** Cabinet Secretary, Principal Secretary for Environment
- **Mandate:** National environmental policy, regulatory approval (gazettal), NEMA oversight

Power-Interest Assessment:

- **Power/Influence:** 5/5 (Maximum)
  - Cabinet-level political authority
  - Controls NEMA budget allocation
  - Gazettes regulations (final approval)
  - Convenes inter-ministerial processes
  - International climate and environment representation
- **Interest Level:** 5/5 (Maximum)
  - Ministerial legacy initiative
  - International commitments (Basel Convention, climate NDCs)
  - Political visibility and public health
- **Classification:** MANAGE CLOSELY

Impact Analysis:

Benefits:

- Political credit for environmental leadership and public health protection
- International recognition (Kenya as e-waste management model)
- Climate finance access (e-waste linked to GHG reduction)
- Fulfillment of international obligations (Basel, Stockholm conventions)
- Quantified benefit: Difficult to monetize political capital, but substantial reputational gain

Costs:

- Cabinet approval process (time-intensive, inter-ministerial negotiations)
- Budget advocacy with National Treasury (competitive priority-setting)

- Political risk if implementation fails or faces strong opposition
- Coordination burden across multiple ministries
- Quantified cost: Minimal direct financial cost; primarily opportunity cost of political capital

Net Impact: Positive. Low financial cost, high political upside if successfully implemented.

Current Position: Support **Desired Position:** Strong Support (Champion) **Gap:** +1

Key Interests:

1. Cabinet approval of regulations without substantive delays or dilution
2. National Treasury budget allocation for NEMA implementation
3. Successful implementation enhancing ministerial legacy
4. Avoiding political backlash from affected industries or informal sector
5. International recognition positioning Kenya as regional environmental leader
6. Integration with broader climate and circular economy agendas

Engagement Strategy:

Pre-gazettal (Months -3 to 0):

- High-level Cabinet Secretary briefing on RIA findings (economic case, health benefits)
- Cabinet Memo preparation emphasizing political wins and international obligations
- Inter-ministerial consultations addressing concerns (Treasury: budget; Trade: competitiveness; Industrialization: producer impacts)
- Stakeholder validation workshop demonstrating broad support

Post-gazettal (Months 0-12):

- Quarterly Cabinet Secretary briefings on implementation progress (producer registration, import controls, recycler licensing)
- Budget advocacy: Joint MoECCF-NEMA presentations to National Treasury demonstrating ROI
- International showcasing: Present Kenya's model at UNEP, Basel Convention meetings, African Ministerial Conference on Environment (AMCEN)
- Media strategy: Ministerial press conferences at key milestones (regulations gazetted, registry launched, first major cleanup)

Communication:

- **Cabinet Secretary:** Monthly meetings with Principal Secretary and NEMA DG
- **Principal Secretary:** Weekly coordination with NEMA, monthly inter-ministerial meetings
- **Political leadership:** Briefing notes for Presidential speeches, parliamentary questions

Success indicators:

- Regulations gazetted within 6 months of RIA completion
- KES 150M+ budget secured for implementation (Years 1-3)
- Cabinet Secretary delivers 2+ high-profile speeches on e-waste
- Kenya presents at 1+ international forum by Year 2

7.3.3 National Treasury

Profile:

- **Role:** Budget allocation, fiscal policy, public investment approval
- **Key concern:** Fiscal discipline and competing budget priorities
- **Power:** Controls government financing for all implementation activities

Power-Interest Assessment:

- **Power/Influence:** 5/5 (Maximum)
    - Sole authority over government budget allocations
    - Can approve or deny funding requests
    - Sets fiscal policy framework
    - Controls release of conditional grants to counties
- **Interest Level:** 5/5 (High concern about fiscal impact)
    - Worried about incremental budget demands
    - Focused on fiscal sustainability
    - Concerned about open-ended commitments
- **Classification:** MANAGE CLOSELY (but currently potential blocker)

Impact Analysis:

Benefits to National Treasury:

- Fiscal revenue gains: KES 44M annually from income tax, corporate tax, VAT (Section 9.6.3)
- Economic efficiency: Strong BCR (1.66:1) demonstrates good use of public funds
- Circular economy: Aligns with Kenya Vision 2030 and Big Four Agenda (manufacturing)
- Development partner co-financing: External funding reduces GoK burden
- Quantified benefit: KES 310M over 10 years in tax revenues (NPV at 7%)

Costs to National Treasury:

- Budget allocation: KES 123M annually for government implementation (NEMA, KRA, KEBS, counties)
- Conditional grants to counties: KES 22M annually (40% of county e-waste costs)

- Opportunity cost: Funds could be allocated to competing priorities (health, education, infrastructure)
- Quantified cost: KES 979M over 10 years (NPV at 7%) for government implementation

Net Impact: Negative in absolute terms (costs exceed direct fiscal benefits), but positive from economic efficiency perspective (economy-wide benefits significantly exceed costs).

Current Position: Oppose (concerned about budget implications) **Desired Position:** Neutral (accepting budget allocation as economically justified) **Gap:** +2 (significant persuasion needed)

Key Concerns:

1. **Budget affordability:** KES 123M annually is substantial in constrained fiscal environment
2. **Open-ended commitment:** Worry about escalating costs beyond initial estimates
3. **Competing priorities:** Health, education, infrastructure seen as more politically urgent
4. **Implementation risk:** Past experience with unfunded mandates and poor implementation
5. **County burden:** Concerns about devolving costs to counties without adequate resources

Engagement Strategy - Detailed:

Given Treasury's critical gatekeeping role and current opposition, engagement requires particularly sophisticated approach:

Phase 1: Building economic case (Months -3 to 0):

Strategy: Convert Treasury opposition to neutral acceptance through rigorous economic argumentation

Tactics:

1. **Private briefing to Principal Secretary Treasury:**
    - Present full CBA with emphasis on 1.66:1 BCR
    - Highlight tax revenue gains (KES 310M NPV) partially offsetting costs
    - Emphasize phased budget approach (not all KES 123M needed Year 1)
    - Demonstrate development partner co-financing commitments
2. **Technical presentation to Budget Director:**
    - Detailed budget breakdown showing phased expenditure
    - Year 1: KES 118M (one-time capital investment)
    - Year 2-3: Declining to KES 123M steady-state
    - Year 4+: Potential for reduced allocation as EPR fees accumulate
    - Comparison with typical environmental sector allocations
3. **Fiscal risk mitigation proposals:**
    - Performance-based releases (tranches tied to milestones)
    - Sunset clause: Review after 3 years for continuation

- Cost-sharing formula: 40% GoK, 40% producers (EPR), 20% development partners
- Conditional grants to counties with strict accountability

4. **Economic modeling:**
    - Demonstrate health cost savings (KES 280M NPV) reduce MoH budget pressures
    - Property value recovery (KES 2.1B) enhances local tax base
    - Import substitution (KES 3.5B) improves trade balance
    - Employment (300+ formal jobs) reduces unemployment costs

Phase 2: Securing budget allocation (Months 0-12):

Strategy: Navigate budget process with MoECCF leadership

Tactics:

1. **Cabinet-level advocacy:**
    - MoECCF Cabinet Secretary engages Treasury Cabinet Secretary (political peer pressure)
    - Frame as Presidential priority (link to climate commitments, Vision 2030)
    - Emphasize international obligations (Basel Convention compliance)
2. **Budget submission:**
    - Submit through MoECCF as part of environmental sector budget
    - Justify as "investment" not "recurrent expenditure" (emphasize one-time capital)
    - Link to Medium-Term Expenditure Framework (MTEF) priorities
3. **Development partner leverage:**
    - Secure written commitments from World Bank, AfDB for co-financing
    - Propose blended financing model (GoK seed funding unlocks partner funds)
    - Demonstrate that GoK funding is "matched" by external resources
4. **Strategic sequencing:**
    - Request Year 1 allocation only (KES 118M), not full 3-year commitment
    - Promise efficiency gains and cost reductions in subsequent years
    - Propose pilot approach: Urban centers only in Year 1, demonstrate success, then scale

Phase 3: Sustained engagement (Months 12+):

Strategy: Demonstrate fiscal responsibility and value-for-money

Tactics:

1. **Quarterly financial reporting:**

- Detailed expenditure reports showing funds used as intended
- Performance metrics linked to budget releases
- Variance analysis explaining any deviations

2. **Early wins communication:**
    - Producer registration fees collected (demonstrate revenue generation)
    - Tax revenues materializing (link to e-waste sector growth)
    - Jobs created (quantifiable employment impact)
3. **Efficiency improvements:**
    - Show cost savings through inter-agency collaboration (shared resources)
    - Demonstrate PRO cost-sharing reducing GoK burden
    - Highlight development partner contributions materializing
4. **Budget reduction pathway:**
    - Year 3 report proposing reduced GoK allocation as EPR fees accumulate
    - Long-term vision: System becomes self-financing through producer fees
    - GoK role evolves from financing to oversight

Communication channels:

- **Principal Secretary Treasury:** Quarterly one-on-one meetings (MoECCF PS + NEMA DG)
- **Budget Director:** Monthly progress reports during budget cycle
- **Technical staff:** Bi-weekly liaison through designated NEMA finance officer
- **Cabinet Economic Committee:** Semi-annual briefings (if required)

Success indicators:

- Year 1 budget allocated: Minimum KES 100M (target: KES 118M) by FY 2025/26
- Treasury neutrality achieved: No active opposition to budget requests by Month 12
- Multi-year commitment: Indicative 3-year allocation in MTEF by Year 2
- Positive engagement: Treasury invites NEMA to present as "best practice" budget case

Risk mitigation:

If Treasury remains opposed:

- **Contingency 1:** Scale back initial scope (urban centers only, reduce collection centers from 20 to 10)
- **Contingency 2:** Front-load development partner financing (seek budget support from World Bank)

- **Contingency 3:** Phased implementation (delay full rollout until Year 2-3 when economic benefits demonstrated)
- **Contingency 4:** Legislative mandate (seek parliamentary intervention if executive budget process fails)

7.3.4 Kenya Revenue Authority - Customs & Border Control

Profile:

- **Role:** Import controls, customs enforcement, revenue collection
- **Mandate:** Kenya Revenue Authority Act (Cap 469)
- **Structure:** 32 customs stations including major ports (Mombasa), airports (JKIA), land borders

Power-Interest Assessment:

- **Power/Influence:** 4/5 (High)
    - Controls all formal entry points for imported EEE
    - Authority to detain, inspect, refuse entry to suspect consignments
    - Enforcement capacity through investigations unit
    - Integration with electronic customs systems (Simba 2005)
- **Interest Level:** 4/5 (High concern about operational impact)
    - Worried about additional inspection burden slowing trade facilitation
    - Concerned about technical capacity to distinguish functional/non-functional EEE
    - Interested in inter-agency cooperation if properly structured
- **Classification:** MANAGE CLOSELY

Impact Analysis:

Benefits to KRA:

- Enhanced enforcement tools: Clear legal basis for e-waste import controls
- Inter-agency cooperation: Formal partnership with NEMA providing technical support
- Capacity building: Training on e-waste identification, Basel Convention requirements
- Performance metrics: E-waste detection becomes measurable KPI
- Corruption reduction: Objective testing criteria reduce discretion
- Quantified benefit: Enhanced enforcement capability (difficult to monetize but significant)

Costs to KRA:

- Inspection burden: Additional screening of EEE imports increases workload
- Training requirements: 200+ customs officers need e-waste-specific training

- Infrastructure: Dedicated inspection bays, testing equipment at major ports
- Process delays: Risk of slowing customs clearance affecting trade facilitation KPIs
- NEMA coordination: Administrative burden of joint inspections and notifications
- Quantified cost: KES 10M annually for operations, KES 15M one-time for infrastructure

Net Impact: Neutral to slightly positive. Costs manageable if properly resourced; benefits in enforcement effectiveness.

Current Position: Neutral (willing but cautious) **Desired Position:** Support (active partner) **Gap:** +1

Key Concerns:

1. **Trade facilitation:** Import controls must not significantly delay legitimate trade
2. **Technical capacity:** Officers lack expertise to assess EEE functionality
3. **Clear criteria:** Need objective, rapid testing protocols (not subjective judgments)
4. **Liability protection:** Officers fear incorrect decisions leading to disputes or corruption allegations
5. **NEMA responsiveness:** Concerns about delays if NEMA must be notified for every suspect consignment
6. **Resource allocation:** Training and equipment costs must be funded

Engagement Strategy:

Pre-implementation (Months 0-6):

1. **Formal Memorandum of Understanding (MOU):**
    - Draft and sign comprehensive KRA-NEMA cooperation agreement covering:
        - Roles and responsibilities (KRA: initial screening; NEMA: technical determination)
        - Notification procedures (24-hour NEMA response time commitment)
        - Information sharing (import data, risk profiles, enforcement actions)
        - Joint inspection protocols
        - Dispute resolution mechanisms
    - High-level signing ceremony (Commissioner-General KRA + Director-General NEMA) for institutional buy-in
2. **Risk profiling system:**
    - Develop automated risk indicators integrated into Simba 2005:
        - **High risk (100% inspection):** First-time importers of second-hand EEE, "donation" shipments, imports from known e-waste dumping origins (e.g., specific Chinese ports)

        - **Medium risk (random 30% inspection):** Established importers with previous compliance issues
        - **Low risk (monitor only):** Trusted traders, brand-name manufacturers
    - Technical specifications for IT integration (KES 5M cost)

3. **Inspection infrastructure:**
    - Establish dedicated e-waste inspection bays at:
        - Mombasa Port (Container Terminal): 2 bays with weather protection, power supply for testing
        - JKIA Cargo Terminal: 1 bay
    - Equip with basic testing tools:
        - Power supply units for functionality testing
        - Visual inspection guidelines (corrosion, damage indicators)
        - Portable XRF analyzers (for hazardous substance screening if budget permits)
    - Total infrastructure cost: KES 10M

Implementation launch (Months 6-12):

1. **Capacity building program:**
    - Train 200 customs officers (covering major ports and borders) on:
        - Module 1 (2 days): E-waste identification and risk indicators
            - Physical characteristics of e-waste vs. functional EEE
            - Common concealment methods (e-waste hidden in functional consignments)
            - Documentation red flags (under-declaration, mis-classification)
        - Module 2 (1 day): Functionality assessment basics
            - Simple power-on tests
            - Visual damage assessment (cracked screens, missing components, corrosion)
            - When to escalate to NEMA for detailed testing
        - Module 3 (1 day): Basel Convention and legal framework
            - Transboundary movement requirements
            - Prior Informed Consent (PIC) procedures
            - Legal authority and liability protection
        - Module 4 (0.5 day): Procedures and systems

        - NEMA notification process (online portal)
        - Evidence collection and documentation
        - Dispute handling
    - Delivered by: NEMA + UNEP + BCRC-Africa trainers
    - Training timeline: Rolling delivery over 6 months
    - Cost: KES 8M (covered in Section 6.2.2 analysis)
2. **Pilot phase (Mombasa Port):**
    - 3-month pilot at Mombasa Container Terminal before national rollout
    - Joint KRA-NEMA inspection team on-site
    - Real-time problem-solving and protocol refinement
    - Weekly debrief meetings
    - Success metrics: <5% delay in clearance times, 20+ suspect consignments identified

Operational phase (Month 12+):

1. **Standard operating procedures:**
    - **Level 1 (KRA Customs):** Initial screening based on risk profile
        - Green channel: Low-risk cleared immediately
        - Amber channel: Medium-risk subject to random inspection
        - Red channel: High-risk subjected to detailed inspection
    - **Level 2 (Joint KRA-NEMA):** Detailed assessment of suspect consignments
        - KRA requests NEMA officer (on-call system, 4-hour response time)
        - Joint physical inspection and functionality testing
        - Sampling (5% of units tested as per proposed Schedule 7)
    - **Level 3 (NEMA Laboratory):** Advanced testing if needed
        - Samples sent to NEMA/KEBS laboratories
        - Results within 48 hours (expedited processing)
2. **Feedback loop:**
    - Monthly KRA-NEMA coordination meetings reviewing:
        - Volume of inspections conducted
        - Number of e-waste consignments detained/refused
        - Clearance time impacts

        - Training needs and system improvements
    - Quarterly data analysis identifying new risk patterns
    - Annual MOU review and update

3. **Performance incentives:**
    - Integrate e-waste detection into KRA performance appraisal
    - Recognition for officers with successful interceptions
    - Balanced scorecard approach (trade facilitation + enforcement)

Communication channels:

- **Strategic level:** Quarterly meetings between Commissioner Customs and NEMA Director-General
- **Operational level:** Weekly video conferences between Customs operational managers and NEMA import control unit
- **Tactical level:** Daily email/phone communication for specific consignments
- **Technical level:** Dedicated KRA-NEMA liaison officers at major ports

Success indicators:

- MOU signed within 6 months of regulations gazettal
- 200 officers trained by Month 12
- Pilot successfully completed at Mombasa by Month 9
- National rollout to 5+ major ports by Month 18
- Illegal e-waste imports reduced by 50% within 24 months (measured by detained consignments + producer registration compliance)
- Trade facilitation maintained: Average clearance time increase <10%

Risk mitigation:

Risk 1: Customs delays harming trade facilitation

- Mitigation: Trusted trader programs exempting compliant importers
- Mitigation: Technology investment in rapid testing equipment
- Mitigation: NEMA pre-clearance for registered producers (documentation-based)

Risk 2: Officer corruption/collusion

- Mitigation: Random rotation of inspection officers
- Mitigation: Joint inspections (KRA + NEMA witness each other)
- Mitigation: Whistleblower protection and reporting mechanisms
- Mitigation: Post-clearance audits of high-risk importers

Risk 3: NEMA unresponsiveness causing bottlenecks

- Mitigation: Contractual 4-hour response time in MOU with penalties for non-compliance
- Mitigation: NEMA on-call roster at major ports
- Mitigation: Emergency contact protocols for urgent cases

7.3.5 County Governments (Represented by Council of Governors)

Profile:

- **Collective stakeholder:** 47 county governments with varying capacities
- **Constitutional role:** Devolved waste management function (County Governments Act, 2012)
- **Key counties for e-waste:** Nairobi, Mombasa, Kisumu, Nakuru, Uasin Gishu (urban centers generating 70%+ of e-waste)
- **Coordination body:** Council of Governors (CoG) represents collective county interests

Power-Interest Assessment:

- **Power/Influence:** 4/5 (High through devolved functions)
    - Constitutional authority over waste collection and transport
    - Control county-level infrastructure (collection centers, transfer stations)
    - Budget allocation for waste services
    - Political influence (Governors often Presidential contenders)
- **Interest Level:** 5/5 (Maximum - directly responsible for implementation)
    - Regulations impose significant implementation responsibilities
    - Unfunded mandate concerns
    - Service delivery performance at stake
- **Classification:** MANAGE CLOSELY

Impact Analysis:

Benefits to Counties:

- Infrastructure investment: KES 40M capital for collection centers (60% externally funded)
- Capacity building: Training for 47 e-waste focal points + 200 officers (KES 25M value)
- Improved waste management: E-waste formally managed reduces environmental/health liabilities
- Revenue opportunities: Potential for county e-waste fees (yet to be determined)
- Political credit: Governors gain visibility for environmental leadership
- Inter-county cooperation: Framework for regional waste management authorities
- Quantified benefit: KES 310M infrastructure and capacity investment over 3 years (Sections 6.3.4)

Costs to Counties:

- Operating costs: KES 55M annually for collection centers, focal points, monitoring (incremental beyond baseline)
- Human resources: Designating and training focal points diverts staff from other functions
- Coordination burden: Attending national meetings, reporting to NEMA, inter-county cooperation
- Political risk: Enforcement in informal settlements may trigger community backlash
- Capacity gaps: Technical expertise insufficient for oversight of recyclers and collection operations
- Quantified cost: KES 185M over 3 years (KES 55M annual + KES 40M capital with 20% county share)

Net Impact: Positive overall (benefits KES 310M exceed costs KES 185M), but implementation challenges significant, and benefits unevenly distributed (urban counties gain more than rural).

Current Position: Neutral (supportive in principle but concerned about unfunded mandates) **Desired Position:** Support (active implementation partners) **Gap:** +1

Key Concerns by County Type:

Large urban counties (Nairobi, Mombasa, Kisumu):

1. **Scale of challenge:** Nairobi alone generates 30-40% of national e-waste but has minimal formal infrastructure
2. **Informal sector:** Large populations (Dandora ~5,000 waste workers) require sensitive management
3. **Budget adequacy:** Even with KES 55M national allocation, Nairobi's needs far exceed this
4. **Coordination complexity:** Multiple actors (NEMA, PROs, recyclers, CBOs) operating simultaneously
5. **Political visibility:** High-profile failures have electoral consequences for Governors

Medium urban counties (Nakuru, Eldoret, Thika, Machakos):

1. **Capacity constraints:** Smaller environmental departments (10-20 officers vs. Nairobi's 45)
2. **Infrastructure gaps:** No existing e-waste collection points
3. **Technical expertise:** Limited understanding of e-waste specificity
4. **Budget pressures:** Waste management typically receives <8% of county budgets

Small/rural counties (Vihiga, Tharaka-Nithi, etc.):

1. **Low e-waste volumes:** Minimal generation makes dedicated infrastructure uneconomical
2. **Urban concentration:** E-waste limited to county headquarters and major towns
3. **Competing priorities:** Counties prioritize water, health, agriculture over waste
4. **Technical capacity:** Very limited environmental staffing and expertise

Differentiated Engagement Strategy:

Tier 1: Priority Urban Counties (Nairobi, Mombasa, Kisumu, Nakuru, Eldoret - 5 counties):

Phase 1: Intensive partnership development (Months 0-12)

1. **Governor-level engagement:**
    - One-on-one meetings between Cabinet Secretary MoECCF and each Governor
    - Emphasize political benefits: Environmental leadership, public health protection, job creation
    - Frame as "smart city" initiative aligning with county development visions
    - Secure public commitments (joint press conferences)
2. **County Executive Committee Member (CECM) for Environment partnership:**
    - Quarterly coordination meetings with NEMA Director-General
    - Joint development of county-specific implementation plans
    - Budget advocacy within county assemblies
    - Co-design of collection center locations and specifications
3. **Technical working groups:**
    - Establish county-level e-waste technical committees comprising:
        - County environment directorate (chair)
        - NEMA county office representative
        - PRO representatives (KEPRO/EPROK)
        - Major recyclers operating in county
        - CBO representatives from affected areas
        - Development partners (for Nairobi, Mombasa)
    - Monthly meetings for implementation coordination
4. **Pilot program approach:**
    - Designate each Tier 1 county as pilot for specific component:
        - **Nairobi:** Informal sector integration model (given Dandora's significance)
        - **Mombasa:** Import control and port-city linkages
        - **Kisumu:** Regional collection hub (serving Western Kenya)
        - **Nakuru:** Inter-county cooperation (serving Rift Valley region)
        - **Eldoret:** University-county partnership (leveraging Moi University)
    - Intensive support and documentation for replication

5. **Infrastructure investment prioritization:**
    - First 10 collection centers (of 20 national target) located in Tier 1 counties:
        - Nairobi: 3 centers (Dandora, Industrial Area, Westlands)
        - Mombasa: 2 centers (Changamwe, Nyali)
        - Kisumu: 2 centers (City center, Mamboleo)
        - Nakuru: 1 center
        - Eldoret: 1 center
        - Thika: 1 center (industrial hub)
    - Expedited procurement and construction (Months 6-18)

Phase 2: Operational support (Months 12-36)

1. **Dedicated county support officers:**
    - NEMA assigns dedicated liaison officer to each Tier 1 county
    - Weekly county visits
    - Hands-on support for producer engagement, recycler licensing, data collection
2. **Capacity building intensives:**
    - Quarterly training workshops for county officers on:
        - E-waste inspection techniques
        - Data collection and reporting systems
        - Stakeholder engagement (producers, recyclers, communities)
        - Conflict resolution (informal sector, NIMBY opposition to facilities)
    - Study tours to successful e-waste management cities (Kigali, Cape Town, or international)
3. **Financial support:**
    - Conditional grants disbursed in tranches against performance milestones:
        - Tranche 1 (30%): Upon designation of focal point and establishment of county committee
        - Tranche 2 (40%): Upon operationalization of collection center
        - Tranche 3 (30%): Upon achievement of collection targets (tonnes collected)
    - Quarterly financial reporting requirements
4. **Performance monitoring:**
    - Monthly data submission to NEMA:

        - Tonnage collected at county facilities
        - Number of producers registered in county
        - Number of licensed recyclers/refurbishers operating
        - Enforcement actions taken
        - Community complaints received and resolved
    - Quarterly performance reviews with corrective action plans
    - Annual county e-waste report card (public)

Tier 2: Medium Urban Counties (10 counties including Machakos, Nyeri, Meru, Kakamega, etc.):

Phased inclusion approach (Months 12-36)

1. **Learning from Tier 1:**
    - County officials participate in Tier 1 pilot observation visits (Months 6-12)
    - Access to documented lessons learned and implementation toolkits
    - Adaptation of successful models to medium-county context
2. **Simplified implementation:**
    - One collection center per county (vs. multiple for large urban)
    - Shared services model: Regional coordination reduces per-county costs
    - Mobile collection points (quarterly drives) supplementing fixed infrastructure
3. **Inter-county cooperation:**
    - Clustering approach:
        - **Central Kenya cluster:** Nyeri, Murang'a, Kirinyaga share regional sorting facility
        - **Western cluster:** Kakamega, Bungoma, Busia coordinate collection
        - **Coast cluster:** Kilifi, Kwale coordinate with Mombasa hub
    - Cost-sharing and economies of scale
    - Formal inter-county agreements under County Governments Act Section 115
4. **Capacity building:**
    - Regional training hubs established in Tier 1 counties
    - Tier 2 officers attend training in nearest hub (reduces travel costs)
    - Peer-to-peer mentoring: Tier 1 focal points mentor Tier 2 counterparts

Tier 3: Small/Rural Counties (32 counties):

Minimal infrastructure, maximum flexibility approach (Months 24-60)

1. **Mobile collection model:**
    - No fixed collection centers; instead quarterly mobile collection drives
    - Coordinated by NEMA or PROs with county logistical support
    - Counties provide venue (county headquarters parking areas), mobilization, security
2. **Aggregation hubs:**
    - Regional hubs in Tier 1/2 counties serve multiple rural counties
    - Transport arranged by PROs or licensed collectors
3. **Simplified responsibilities:**
    - Focal point designation and basic awareness
    - Coordination of mobile collection events
    - Referral to licensed recyclers
    - No licensing or enforcement responsibilities (handled by NEMA regional offices)
4. **Cost minimization:**
    - Minimal county budget allocation required (KES 500,000 annually for focal point)
    - National government/development partners fund mobile collection logistics

Council of Governors (CoG) Strategic Engagement:

Objective: Secure collective county buy-in and manage inter-governmental relations

Tactics:

1. **CoG Environment Committee engagement:**
    - Present regulations to CoG Environment Committee for endorsement (Month 0)
    - Position as opportunity, not burden: Infrastructure investment, capacity building, environmental improvement
    - Address unfunded mandate concerns directly: 60% external funding, 20% county, 20% national
    - Secure CoG resolution supporting implementation
2. **Inter-Governmental Relations Technical Committee (IGRTC):**
    - Present to IGRTC for formal inter-governmental coordination
    - Clarify national-county roles per constitutional division of functions:
        - **National (NEMA):** Standards, licensing of recyclers, import controls, policy
        - **County:** Collection, local infrastructure, awareness, enforcement support
    - Formalize through IGRTC framework agreement

3. **Budget advocacy:**
    - Support counties in advocating to County Assemblies for budget allocations
    - Provide template budget justifications
    - Quantify health and environmental benefits in county-specific terms
4. **Annual CoG Summit participation:**
    - Exhibit at CoG annual devolution conference
    - Showcase successful county models
    - Awards for best-performing counties (Governor's E-waste Leadership Award)

Communication Channels:

- **CoG leadership:** Quarterly meetings between MoECCF and CoG Chairperson
- **Environment Committee:** Bi-annual presentations and updates
- **County CECMs:** Monthly virtual coordination meetings (all counties)
- **Focal points:** Weekly email updates, monthly webinars, WhatsApp group for peer support
- **County technical staff:** Quarterly regional workshops (five regions: Nairobi, Coast, Western, Rift Valley, Central)

Success Indicators:

Short-term (Year 1):

- All 47 counties designate e-waste focal points
- CoG Environment Committee resolution endorsing regulations
- 5 Tier 1 counties operationalize collection centers
- 100+ county officers trained

Medium-term (Year 2-3):

- 15 counties (Tier 1 + Tier 2) with operational collection infrastructure
- 5+ inter-county cooperation agreements signed
- 10,000+ tonnes collected through county facilities
- 80% of counties submit quarterly reports to NEMA

Long-term (Year 5):

- 30+ counties actively implementing (all Tier 1, all Tier 2, 50% of Tier 3)
- 20,000+ tonnes collected annually through county systems
- 5 regional waste management authorities operational

- 90% county reporting compliance

7.3.6 Large EEE Producers and Importers

Profile:

- **Stakeholder group:** ~20 major companies including Samsung, LG, Hisense, Hotpoint, Ramtons, Von,Itel, Techno Mobile
- **Market share:** 60% of formal EEE imports by value
- **Characteristics:** Multinational brands with regional/global EPR experience, local subsidiaries or authorized distributors

Power-Interest Assessment:

- **Power/Influence:** 4/5 (High)
    - Economic significance: Major taxpayers and employers
    - Political connections: Access to Cabinet-level decision-makers
    - Industry association representation: Leadership of KAM, direct government engagement
    - Market leverage: Can influence consumer prices, product availability
    - Media access: CSR narratives, advertising spend gives media influence
- **Interest Level:** 5/5 (Maximum - directly regulated and financially impacted)
    - EPR obligations impose direct compliance costs
    - Competitive positioning at stake (level playing field concerns)
    - Brand reputation tied to environmental performance
- **Classification:** MANAGE CLOSELY

Impact Analysis:

Benefits to Large Producers:

- **Level playing field:** Regulations disadvantage grey market/informal importers who currently avoid all environmental costs, creating unfair competition. Formal producers gain competitive advantage.
- **CSR and brand enhancement:** Compliance with EPR allows positive marketing ("environmentally responsible brand")
- **Market access:** Some international buyers (government procurement, corporate clients) increasingly require environmental compliance
- **Legal clarity:** Clear obligations preferable to regulatory uncertainty
- **Collective compliance option:** PROs (KEPRO/EPROK) allow cost-effective collective compliance vs. individual systems

- **Quantified benefit:** Difficult to monetize brand value, but competitive advantage significant. Estimated 2-5% market share gain from grey market reduction = KES 500M-1B revenue increase (industry-wide)

Costs to Large Producers:

- **Problematic fraction fees:** KES 50-500/kg for CRTs, mercury lamps, refrigerants (Schedule 5A proposed)
    - Large producer importing 1,000 tonnes annually with 10% problematic = 100 tonnes × 150 KES/kg average × 1,000 kg/tonne = **KES 15M annually per major producer**
- **Collection infrastructure:** Producer share (40%) of collection center operations = proportional share of KES 8M annually, approximately **KES 2-4M per large producer**
- **EPR reporting:** Enhanced data collection, annual audits, evidence note systems = **KES 50,000-100,000 annually** (administrative)
- **PRO membership fees:** If joining collective system, annual fees likely **KES 1-3M** depending on tonnage
- **Product design costs:** Potential future requirements for eco-design, repair ability (not in current regulations but anticipated)
- **Total annual cost per large producer:** KES 18-23M annually (in steady state)
- **Industry-wide costs (20 large producers):** KES 360-460M annually = ~60% of total producer costs

Net Impact: Negative in absolute terms (costs significantly exceed direct benefits), but strategically acceptable if:

1. All competitors face same costs (level playing field achieved)
2. Costs can be partially passed to consumers
3. Grey market reduced substantially

Current Position: Neutral (accepting inevitability but seeking to minimize costs and maximize competitive advantage) **Desired Position:** Support (seeing strategic value in compliance) **Gap:** +1

Key Interests and Concerns:

1. **Cost predictability and fairness:**
    - Fee structures must be transparent and consistently applied
    - Treatment fees for problematic fractions should reflect actual costs (no profit-taking)
    - Differentiation between product types (e.g., laptops vs. refrigerators) should reflect hazard levels
    - Tiered fees for different company sizes (concern about competitive advantage for large vs. medium producers)
2. **Compliance flexibility:**

- Strong preference for collective compliance through PROs vs. individual producer systems (cost efficiency)
- Multi-year EPR plans (4-year) allowing long-term planning
- Phased implementation allowing system development

3. **Competitive protection:**
   - **Critical concern:** Regulations must be enforced against grey market and informal importers
   - Import controls essential: If non-compliant imports continue, formal producers bear costs alone
   - Registry must be public: Consumers, government procurement, corporate buyers can verify compliance
   - Penalties for non-compliance must be meaningful: KES 10M fine insufficient deterrent
4. **PRO governance:**
   - Desire for producer control of PROs (industry-led governance)
   - Concern about NEMA micro-management of PRO operations
   - Want multiple PRO competition (choice) vs. single monopoly PRO
   - Transparency in PRO fee-setting and financial management
5. **International alignment:**
   - Preference for standards aligned with global best practices (ISO, IEC) to facilitate exports
   - Concern about Kenya-specific requirements creating trade barriers
   - Support for regional (EAC) harmonization
6. **Consumer communication:**
   - Clear messaging about why prices may increase slightly (0.5-1%)
   - Co-branding opportunities with government on environmental initiatives
   - Point-of-sale materials explaining take-back options

Segmentation Within Large Producers:

Segment A: Global Brands with Existing EPR Experience (Samsung, LG, HP, Dell):

- **Profile:** Already operate EPR programs in Europe, Japan, North America
- **Position:** Supportive - familiar with EPR, have internal systems
- **Concern:** Kenya-specific requirements differing from global standards (compliance complexity)
- **Engagement approach:** Technical consultation on standards alignment, facilitate knowledge transfer

Segment B: Regional/Pan-African Brands (Hisense, Hotpoint, Ramtons):

- **Profile:** Significant African presence, some EPR experience in South Africa
- **Position:** Neutral to supportive - see Kenya as potential regional model
- **Concern:** Cost competitiveness vs. Asian brands, capacity to develop systems
- **Engagement approach:** Capacity building support, regional coordination (leverage EAC)

Segment C: Mobile Phone Brands (Techno, Itel, Samsung mobile):

- **Profile:** High-volume, low-margin products, rapid turnover
- **Position:** Concerned - mobile phones have challenging collection economics (low weight, dispersed)
- **Concern:** Collection system viability for mobile phones, consumer behavior (phones often hoarded)
- **Engagement approach:** Mobile-specific collection innovations (trade-in programs, retailer take-back)

Engagement Strategy:

Phase 1: Pre-regulatory certainty (Months -6 to 0):

Objective: Convert neutral/cautious position to active support by addressing key concerns

Tactics:

1. **Industry roundtables (3 convenings):**
    - **Roundtable 1 (Month -6):** Present draft regulations, solicit feedback
        - Participants: 20 large producers, KAM representation, KEPRO/EPROK
        - Format: Presentation + breakout sessions on fees, compliance mechanisms, timelines
        - Output: Written feedback compiled for regulatory revision
    - **Roundtable 2 (Month -3):** Present revised regulations addressing industry concerns
        - Show how feedback was incorporated (e.g., tiered fees, PRO flexibility)
        - Present enforcement strategy (import controls, registry transparency)
        - Discuss implementation timeline and grace periods
        - Output: Industry consensus on key provisions, remaining concerns identified
    - **Roundtable 3 (Month -1):** Pre-gazettal alignment
        - Final regulatory text review
        - Agree on joint producer-government public messaging
        - Launch preparation (registry system demonstration, PRO readiness)
        - Output: Industry public statement supporting regulations (even if not enthusiastically)
2. **Bilateral consultations with top 5 producers:**

- One-on-one meetings with Samsung, LG, Hisense, Safaricom, Hotpoint
- Understand company-specific concerns and opportunities
- Explore potential "early adopter" partnerships (companies willing to publicly champion regulations)
- Negotiate any company-specific provisions (e.g., existing take-back programs receiving credit)

3. **KAM partnership:**
    - Engage Kenya Association of Manufacturers as intermediary
    - KAM coordinates industry positions, reducing need for NEMA to engage 20+ companies individually
    - KAM provides input on draft regulations through formal submission process
    - Position regulations as "good for business" (eliminating unfair competition)
4. **Cost-benefit transparency:**
    - Share CBA results showing economy-wide benefits
    - Demonstrate that competitive advantage from grey market reduction worth compliance costs
    - Model pass-through to consumers showing minimal price impacts
    - Provide comparison with EPR costs in other countries (Kenya actually moderate)

Phase 2: Implementation support (Months 0-18):

Objective: Facilitate smooth producer compliance and registry uptake

Tactics:

1. **Producer registration campaign:**
    - **Month 1-3:** Early registration incentive (first 50 producers receive free technical assistance)
    - **Month 4-6:** Standard registration period with grace period (no penalties)
    - **Month 7+:** Enforcement begins (penalties for non-registration)
    - Target: 80% of large producers registered by Month 6
2. **Compliance toolkit development:**
    - NEMA develops (with industry input) comprehensive guidance:
        - **Toolkit 1:** "How to Register as a Producer" (step-by-step, online forms, help desk)
        - **Toolkit 2:** "Developing Your EPR Plan" (templates, case studies, calculation tools)
        - **Toolkit 3:** "Working with PROs" (comparison of KEPRO vs. EPROK, decision criteria)

        - **Toolkit 4:** "Product Marking and Consumer Communication" (label requirements, sample messages)
    - Delivered via:
        - Online portal (downloadable PDFs)
        - Webinars (recorded and live Q&A sessions)
        - Dedicated email helpdesk (producer.helpdesk@nema.go.ke)
        - In-person workshop series (5 sessions, Months 2-6)
3. **PRO facilitation:**
    - NEMA convenes KEPRO, EPROK, large producers for coordination meetings
    - Clarify PRO approval requirements, performance expectations
    - Facilitate producer-PRO negotiations (fee structures, service levels)
    - Monitor PRO capacity development (can they actually handle volumes?)
4. **Pilot partnerships:**
    - Select 3-5 "champion companies" for pilot programs (Month 3-12):
        - **Samsung:** Pilot retailer take-back program (trade-in model for mobile phones)
        - **LG:** Pilot collection center at manufacturing facility (Industrial Area, Nairobi)
        - **Hotpoint:** Pilot white goods collection at distribution centers
    - Document lessons learned, showcase successes, create replicable models
    - Public recognition (awards, media coverage) for champions
5. **Quarterly producer forums:**
    - Regular (every 3 months) industry-NEMA dialogue on implementation issues
    - Format:
        - NEMA presents: Registration progress, enforcement activities, system improvements
        - Producers present: Compliance challenges, suggestions for streamlining
        - PROs present: Collection volumes, operational updates, fee justifications
        - Open Q&A and problem-solving
    - Minutes published (transparency)
    - Attendance: Mandatory for registered producers (compliance check)

Phase 3: Enforcement and continuous improvement (Month 18+):

Objective: Maintain compliance and refine system based on operational experience

Tactics:

1. **Public registry launch:**
    - Month 18: NEMA publishes online searchable registry of all registered producers
    - Media campaign: "Look for the E-Waste Compliance Mark"
    - Consumer awareness: Only buy from registered producers
    - Procurement mandate: Government agencies must verify supplier registration
    - Effect: Reputational pressure and market access incentive for registration
2. **Enforcement actions:**
    - Targeted enforcement against major non-compliant producers (if any remain)
    - Public announcements of penalties (name-and-shame)
    - Import controls catching unregistered importers at port
    - Market surveillance: Spot-checks at retail outlets
3. **Performance benchmarking:**
    - Annual producer performance report:
        - Ranking producers by compliance (de-identified or company-named depending on policy choice)
        - Collection rate per tonne placed on market
        - Timeliness of reporting
        - Quality of EPR plans
    - Best practice recognition
    - Laggard engagement (understanding barriers to compliance)
4. **System refinement:**
    - Annual regulatory review process with producer input:
        - Fee adjustments (based on actual treatment costs)
        - Reporting simplification (reducing administrative burden)
        - Product scope adjustments (adding new categories like e-bikes, solar panels)
        - PRO performance standards updates
    - Adaptive management approach

Communication Channels:

- **Industry-wide:** Quarterly producer forums, email bulletins, online portal

- **KAM:** Monthly liaison meetings, joint working groups
- **Individual large producers:** Dedicated account managers (NEMA assigns officers to top 10 producers)
- **PROs:** Weekly coordination calls, monthly data exchange
- **Media:** Joint press releases on milestones, success stories

Success Indicators:

Short-term (Year 1):

- 90%+ of large producers registered by Month 12
- Zero legal challenges to regulations from large producers
- 15+ large producers join PROs (vs. individual compliance)
- 3 pilot partnerships operational
- Public statement of industry support (KAM endorsement)

Medium-term (Year 2-3):

- 95%+ registration compliance maintained
- 5,000+ tonnes collected via large producer programs
- Zero complaints about competitive disadvantage (enforcement seen as effective)
- Producer-funded collection infrastructure expanded (cost-sharing working)
- 10+ producers actively market their environmental compliance

Long-term (Year 5):

- 100% compliance (all large producers registered and performing)
- 15,000+ tonnes collected via producer systems
- Kenya's system referenced as African model (regional harmonization advancing)
- Producer innovation: Product design improvements, repair services expansion
- Economic analysis shows net benefit to large producers (market share gains exceed compliance costs)

7.3.7 Small and Medium EEE Importers

Profile:

- **Stakeholder group:** 130-180 companies importing <100 tonnes annually
- **Market characteristics:** Fragmented, low-margin, price-sensitive, limited administrative capacity
- **Business models:** Often single-product specialists (e.g., only electric fans, only irons), direct imports from China/Asia, thin profit margins
- **Examples:** Luthuli Avenue electronics shops, downtown Mombasa importers, Gikomba wholesalers

Power-Interest Assessment:

- **Power/Influence:** 2/5 (Low individually, moderate collectively)
    - Limited political access
    - Some organization through trader associations
    - Numerical strength (130-180 companies) gives collective voice
    - Can mobilize public sympathy ("small business being crushed")
- **Interest Level:** 5/5 (Maximum - existential concern)
    - Compliance costs proportionally much higher than large companies (no economies of scale)
    - Many operate on margins <10%, any cost increase threatens viability
    - Administrative capacity minimal (1-3 person operations often)
    - Fear of formalization (some operate partially informally)
- **Classification:** KEEP INFORMED (Low Power, High Interest)

Impact Analysis:

Benefits to SME Importers:

- **Level playing field:** Regulations hurt them less than complete informality (grey market competition reduced)
- **Formalization benefits:** Legal protection, access to formal finance, business growth opportunities
- **PRO services:** Collective compliance much cheaper than individual systems
- **Simplified processes:** Tiered fees and streamlined reporting reduce burden vs. uniform requirements
- **Quantified benefit:** Difficult to quantify, but formalization may enable 10-20% revenue growth for previously informal operators = KES 50-100M industry-wide

Costs to SME Importers:

- **Disproportionate burden:** Fixed costs (registration, reporting, PRO fees) are same or similar regardless of size
    - Example: If large producer pays KES 18M for 1,000 tonnes (KES 18,000/tonne), and SME pays KES 5M for 50 tonnes (KES 100,000/tonne), SME cost is 5.5× higher per unit
- **Cash flow impact:** Annual fees of KES 3-5M represents 10-25% of net profit for typical SME
- **Administrative complexity:** Lack of compliance staff, may need to hire external consultants
- **Registration fees:** Even if low (KES 5,000-10,000), psychologically significant
- **Risk of non-compliance:** May fail to register due to lack of awareness or capacity, face penalties
- **Quantified cost:** KES 3-7M annually per SME producer × 150 companies = KES 450M-1.05B annually (represents 40-60% of total producer costs but borne by companies with lowest capacity)

Net Impact: Strongly negative for most SME importers. Costs significantly exceed any benefits. Many may exit market, consolidate, or continue operating informally.

Current Position: Oppose (see regulations as existential threat) **Desired Position:** Neutral (accepting compliance as cost of doing business, but not enthusiastic) **Gap:** +2 (significant persuasion and support needed)

Key Concerns:

1. **Economic viability:** "How can I afford KES 5M annually when my total profit is KES 20M?"
2. **Administrative capacity:** "I have 2 employees, neither speaks English well, how do we fill out complex EPR plans?"
3. **Competitive disadvantage:** "Large companies have compliance departments and can pass costs to consumers. I compete on price."
4. **Enforcement fears:** "Will I be shut down if I make a mistake? Will police raid my shop?"
5. **Informal competition:** "If my competitors don't register and NEMA doesn't catch them, I lose business."
6. **Product marking:** "My products come pre-packaged from China. How do I add labels?"
7. **Collection logistics:** "My customers are in Gikomba, Kawangware (informal settlements). How do I collect old products?"

Engagement Strategy - Highly Tailored:

Phase 1: Awareness and de-escalation (Months -3 to 6):

Objective: Prevent panic and mass opposition by demonstrating regulations are manageable for SMEs

Tactics:

1. **Trader association outreach:**
    - Identify and engage key associations:
        - Luthuli Avenue Business Association
        - Gikomba Traders Association
        - Mombasa Importers Association
        - China Guangzhou Electronics Traders (Kenyan chapter)
    - Association leaders briefed first (understand concerns, position as partners not adversaries)
    - Association meetings to present regulations to members:
        - Simple language (avoid jargon)
        - Swahili translation
        - Visual aids (infographics, not text-heavy slides)
        - Q&A with NEMA officers

2. **Simplified messaging:**
    - **Don't say:** "You must develop a comprehensive 4-year Extended Producer Responsibility implementation plan demonstrating achievement of progressive collection targets..."
    - **Do say:** "You need to register with NEMA (KES 5,000 one-time), join a PRO (KES 50,000-200,000/year depending on how much you import), and submit a simple report once a year. The PRO handles collection for you."
3. **Pilot engagement program:**
    - Select 10 SME importers (mix of willing and skeptical) for intensive hand-holding (Months 0-12)
    - NEMA provides:
        - Free registration assistance (staff fills out forms with importer)
        - PRO liaison (facilitate joining KEPRO/EPROK)
        - Ongoing support (phone/email helpdesk)
    - Document time/cost burden for SMEs, refine processes
    - Pilot participants become peer educators: "It's not as bad as I feared"
4. **Cost mitigation measures:**
    - **Tiered fees:** Advocate for fee structure with lower rates for <100 tonnes/year:
        - <50 tonnes: 50% discount
        - <100 tonnes: 25% discount
    - **Registration fee waiver:** First year registration fee waived for SMEs (KES 5,000 foregone but buys goodwill)
    - **Payment plans:** Allow quarterly installments vs. annual lump sum (cash flow management)
    - **PRO group rates:** KEPRO/EPROK offer discounted rates for association members joining collectively

Phase 2: Facilitation and support (Months 6-24):

Objective: Make compliance as easy and cheap as possible for SMEs

Tactics:

1. **Simplified compliance pathways: Option A: Full PRO Delegation (Recommended for 90% of SMEs):**
    - SME registers with NEMA (simple online form, 30 minutes)
    - SME joins PRO (KEPRO/EPROK) paying fee based on tonnage
    - PRO handles ALL other obligations:

        - Develops EPR plan on behalf of members
        - Operates collection system
        - Submits data to NEMA
        - Manages evidence notes
    - SME only obligation: Pay PRO fees, provide annual import data (from KRA records)
    - **Cost:** KES 50,000-200,000/year (vs. KES 3-5M for individual compliance)

Option B: Collective Association Compliance (For organized groups):

- 20-30 SMEs form association-based collective scheme
- One association representative handles compliance for all members
- Cost-sharing: KES 1-2M total ÷ 25 members = KES 40,000-80,000 per member
- Example: Luthuli Avenue electronics shops form "Luthuli E-Waste Collective"

2. **Digital tools:**
    - **Mobile app:** Simple registration and reporting via smartphone
        - M-Pesa payment integration
        - Photo upload for documentation
        - SMS reminders for deadlines
    - **USSD code:** For non-smartphone users (*4831#* to register)
    - **WhatsApp Business:** NEMA official account for queries
3. **Business development services (continued):**
    - Partner with Kenya Industrial Estates (KIE), Kenya Investment Authority (KenInvest), and SME-focused NGOs to provide:
        - **Compliance training workshops:** Free 2-hour sessions in accessible locations (Nairobi CBD, Mombasa town, Gikomba)
            - Held on Saturdays (when shops closed)
            - Light refreshments provided (attendance incentive)
            - Certificate of attendance (social proof for customers)
            - Topics: Registration process, PRO selection, record-keeping, customer communication
        - **Record-keeping systems:** Free Excel template for tracking imports (simple, works on basic phones)

- **Legal advice clinics:** Free 30-minute consultations with environmental lawyers (addressing liability concerns)
- **Business formalization support:** Link to broader formalization programs (tax registration, business licenses)

4. **Microfinance linkages:**
    - Partner with Equity Bank, KCB, Kenya Women Microfinance Bank to offer:
        - **Compliance loans:** KES 50,000-500,000 at concessional rates (8-10% vs. 15-18% typical)
        - Purpose: Cover first-year PRO fees, registration costs, consultant fees if needed
        - Collateral: Inventory-based lending (using imported stock)
        - Repayment: 12-24 months
    - Partner with saccos (savings and credit cooperatives) serving traders:
        - Gikomba Traders Sacco
        - Luthuli Avenue Merchants Sacco
        - Special "environmental compliance" product
5. **Grace period and amnesty:**
    - **Year 1 (Months 0-12):** No penalties for late registration, only encouragement
    - **Month 12:** Deadline for registration (well-publicized, countdown campaigns)
    - **Months 13-18:** Warning letters to unregistered importers identified through KRA data
    - **Month 18+:** Enforcement begins, but graduated:
        - First offense: Warning + 30-day compliance period
        - Second offense: KES 50,000 fine (reduced from standard KES 100,000 for SMEs)
        - Third offense: Standard penalties + business closure consideration

Phase 3: Peer-to-peer support and normalization (Months 24+):

Objective: Create culture where compliance is "normal business practice" among SMEs

Tactics:

1. **Peer educator program:**
    - Recruit 20-30 SME importers who successfully complied in Years 1-2
    - Train as peer educators (2-day training on communication, adult learning)
    - Deploy to trader associations, markets, workshops
    - Compensation: Stipend (KES 5,000/session) + recognition (certificate, media profile)

- Message: "I was worried too, but here's how I did it, it's manageable"

2. **Success story campaigns:**
    - Document 10-15 SME compliance stories:
        - **Profile 1:** "Jane Wanjiku, single mother, imports electric irons from China"
            - Before: Worried about costs, didn't understand requirements
            - After: Registered with NEMA (took 2 hours), joined KEPRO (KES 80,000/year), now displays compliance certificate in shop
            - Result: Won government tender for school supply because of compliance, business grew 30%
    - Media: Radio interviews (Swahili stations), social media videos, posters in markets
    - Theme: "Compliance pays"
3. **Association-based monitoring:**
    - Trader associations adopt "compliance standards" for membership
    - Association meetings include compliance check-ins
    - Peer pressure: "Everyone in our association is registered, are you?"
    - Association facilitates bulk PRO membership (group discounts)
4. **Market-based incentives:**
    - Public procurement: Government/county tenders require supplier compliance verification
    - Corporate buyers: Large retailers (Naivas, Carrefour) require supplier compliance for electronics
    - Consumer awareness: "Buy from registered dealers" campaign
    - Compliance mark: Stickers for shops ("NEMA Registered E-Waste Producer #12345")
5. **Continuous simplification:**
    - Annual review of SME compliance burden:
        - Can reporting be simplified further?
        - Can costs be reduced? (review PRO fee structures)
        - What are remaining barriers?
    - SME Advisory Committee to NEMA (5 SME representatives, meet quarterly)
    - Responsive regulatory approach: If something isn't working, fix it

Communication Channels:

- **Trader associations:** Monthly meetings, WhatsApp groups, SMS broadcasts

- **Market visits:** NEMA officers conduct weekly "office hours" at major markets (Gikomba, Luthuli, Biashara Street) - informal Q&A, not enforcement
- **Radio:** Weekly 30-minute program on Swahili stations (KBC Swahili Service, Radio Citizen, Radio Jambo) - "E-Waste Compliance Made Simple"
- **SMS campaigns:** Bulk SMS to registered importers (KRA database) with reminders, tips, encouragement
- **Social media:** Facebook groups for SME producers, WhatsApp Business account
- **Print:** Posters in Swahili and English at markets, bus stations, county offices

Success Indicators:

Short-term (Year 1):

- 30% of SME importers register (45-60 companies)
- Zero violent protests or mass opposition
- 10 pilot participants successfully comply and become advocates
- 3+ trader associations formally endorse compliance

Medium-term (Year 2-3):

- 60% of SME importers register (90-120 companies)
- 80%+ of registered SMEs join PROs (vs. attempting individual compliance)
- Average compliance cost for SMEs <5% of annual profit (demonstrating affordability)
- Zero SMEs forced out of business solely due to e-waste compliance costs

Long-term (Year 5):

- 80% of SME importers registered and compliant
- SME non-compliance viewed as "abnormal" by peers
- Compliance mark recognized by consumers (market advantage)
- Average SME compliance cost declines to 2-3% of profit (economies of scale, PRO efficiencies)

Risk Mitigation:

Risk 1: Mass non-compliance due to unaffordability

- Mitigation: Tiered fees reducing SME burden by 25-50%
- Mitigation: PRO collective compliance (cost reduction vs. individual)
- Mitigation: Microfinance access for first-year costs
- Contingency: If >50% still cannot afford, consider further fee reductions or extended grace periods

Risk 2: SME exit from market (formalization driving informalization)

- Mitigation: Make formal compliance easier than informal operation (import controls catch unregistered)
- Mitigation: Business support services enhance viability of formal operators
- Contingency: If significant market exit observed (>20% of SMEs), review fee structures and provide transitional support

Risk 3: Political mobilization against regulations ("government killing small business")

- Mitigation: Early engagement with trader associations creating buy-in
- Mitigation: Success stories showing SMEs thriving under regulations
- Mitigation: Visible enforcement against large non-compliant producers (fairness perception)
- Contingency: Political leadership (Cabinet Secretary, President) publicly supports SMEs and clarifies affordability measures

7.3.8 Informal E-Waste Collectors and Processors

Profile:

- **Population:** 5,000-8,000 individuals (Section 6.5.2)
- **Demographics:** Predominantly young men (18-35 years), low education (primary/some secondary), urban poor
- **Locations:** Concentrated in Dandora (Nairobi), Mukuru (Nairobi), Kware (Mombasa), Kachok (Kisumu)
- **Activities:** Street collection, manual dismantling, open burning for copper recovery, acid leaching of circuit boards
- **Income:** KES 10,000-50,000/month (highly variable), often sole household income
- **Organization:** Loosely organized through patron-client networks, some cooperatives emerging

Power-Interest Assessment:

- **Power/Influence:** 2/5 (Low politically, but can disrupt implementation)
    - No formal political representation
    - Numerical strength (5,000-8,000 people + dependents = 25,000-40,000 affected)
    - Can mobilize community sympathy ("government harassing poor people")
    - Potential for violent resistance if enforcement is heavy-handed
    - Media can portray as victims
- **Interest Level:** 5/5 (Maximum - existential threat to livelihoods)
    - Regulations threaten to eliminate their entire business model
    - No obvious alternative livelihood

- Already marginalized population
- Fear of police harassment and arbitrary penalties

- **Classification:** KEEP INFORMED (Low Power, High Interest), but high risk of becoming BLOCKERS if mismanaged

Impact Analysis:

Benefits to Informal Sector:

- **Health protection:** Safety equipment, training, health services can reduce disease burden
  - Value: Reduction in respiratory disease (500-1,000 cases annually), heavy metal poisoning (200-400 cases), chronic conditions
  - Monetized: KES 75-150M in avoided health costs over 10 years (conservative), but benefits accrue individually
- **Income stabilization:** Formalized workers earn more stable income (reduced day-to-day variability)
  - Formal sector wage: KES 30,000-40,000/month (KES 360,000-480,000/year)
  - Informal average: KES 20,000/month (KES 240,000/year) but highly variable
  - Formalization premium: +50-100% for those who successfully transition
- **Legal protection:** Formal employment provides labor rights, social security (NHIF, NSSF)
  - Value: NHIF (KES 1,700/year), NSSF (KES 2,400/year), legal protection (difficult to monetize)
- **Skill development:** Training programs provide transferable skills (entrepreneurship, safety, technical)
- **Social dignity:** Formal employment reduces stigma associated with waste work
- **Long-term mobility:** Formalization opens pathways to business ownership, supervisory roles
- **Quantified benefits (for those who formalize):** KES 120,000-240,000/year income gain + health benefits

Costs to Informal Sector:

- **Income loss (short-term):** During transition, many will experience income reduction
  - Formalization requires licensing (KES 2,000), equipment (KES 5,000), may take months
  - Some lose independence and flexibility valued in informal work
  - Estimated 30-50% income reduction for 6-12 months during transition
- **Livelihood loss (if no transition):** Those unable/unwilling to formalize lose income entirely
  - Estimated 30-50% of informal workers may not successfully transition
  - 1,500-4,000 people need alternative livelihoods

- Economic loss: KES 240,000/year × 3,000 people = KES 720M annually (aggregate)

- **Loss of autonomy:** Formal employment means bosses, schedules, rules (vs. self-directed informal work)
- **Enforcement risk:** Police harassment, fines, confiscation of tools/materials
- **Displacement:** Enforcement may push workers from current locations (Dandora, Mukuru) without alternatives
- **Social network disruption:** Informal sector has strong social ties; formalization may break these

Net Impact: Highly uncertain and heterogeneous

- **For successful formalizers (30-40%):** Strongly positive (income gains, health protection, dignity)
- **For those displaced (30-50%):** Strongly negative (livelihood loss, no alternatives)
- **For those in transition (20-30%):** Temporarily negative, then positive if successful

Aggregate assessment: Without inclusive integration strategy, regulations impose severe costs on vulnerable population (KES 500M-1B in lost livelihoods). With integration strategy (KES 140M investment per Chapter 6), can achieve net positive outcome for majority.

Current Position: Strong Oppose (perceive as existential threat) **Desired Position:** Neutral (accepting of gradual formalization with safety nets) **Gap:** +2 to +3 (enormous persuasion and support required)

Key Concerns:

1. **Economic survival:** "What will I eat tomorrow if you ban my work?"
2. **Police brutality:** "Will police arrest me and destroy my tools?"
3. **Feasibility of formalization:** "I only went to Standard 6 (primary school). How can I get a business license?"
4. **Capital requirements:** "Where do I get KES 50,000 to buy proper equipment?"
5. **Formal sector access:** "Why would WEEE Centre hire me? I have no papers (certificates)."
6. **Age and health:** "I am 45 years old, already have damaged lungs from burning. Who will employ me?"
7. **Family responsibility:** "I support 5 children and my elderly mother. I cannot risk losing income."
8. **Trust in government:** "Government always promises help then disappears. Why should I believe this time?"

Engagement Strategy - Highly Sensitive and Phased:

Guiding Principles:

1. **"Do no harm":** Avoid enforcement until alternatives exist
2. **"Nothing about us without us":** Genuine participation of informal workers in designing integration programs

3. **Gradualism:** 3-5 year transition, not overnight
4. **Respect:** Acknowledge value of current work and skills, not stigmatize
5. **Safety nets:** Ensure no one falls into destitution

Phase 1: Trust-building and harm reduction (Months 0-12):

Objective: Establish relationship and demonstrate good faith before any enforcement

Tactics:

1. **Community dialogue (not enforcement):**
    - NEMA + NGO partners (Clean Up Kenya, Dandora Youth Initiative) conduct community meetings in informal processing sites
    - Format: Open-air barazas (community forums), food provided, Swahili language
    - Message:
        - "We know you are working hard to support your families"
        - "We are worried about your health - the smoke and chemicals are dangerous"
        - "We want to work with you to make your work safer and help you earn more"
        - "No one will be arrested today or tomorrow - this is a conversation, not enforcement"
    - Listen: What are your concerns? What would help you?
    - Output: Community-designed integration plan
2. **Immediate harm reduction (no strings attached):**
    - Distribute free safety equipment (no requirement to formalize):
        - 2,000 workers × (gloves + masks + safety goggles) = KES 5M
        - Branded: "NEMA Cares for Waste Workers"
        - Message: "Use these to protect yourself. More support is coming."
    - Free health screening camps (Ministry of Health partnership):
        - Blood lead testing
        - Respiratory function tests
        - Treatment for acute conditions
        - Referrals to public health facilities
    - Mobile clinics quarterly (Months 3, 6, 9, 12)
3. **Demonstration formalization projects:**
    - Identify 100 willing informal workers (not coerced, genuinely interested)

- Intensive support package (Months 3-12):
  - **Training:** 2-week program on safe dismantling, business basics, financial literacy
  - **Capital:** KES 10,000 grant + KES 20,000 loan (subsidized, 5% interest, 2-year repayment)
  - **Licensing:** NEMA staff assist with micro-collector license application (simplified, KES 2,000 fee waived first year)
  - **Market linkage:** Contracts with WEEE Centre, EACR to purchase materials at fair prices
  - **Mentoring:** Assigned mentor from successful cooperative or formal recycler
- Document outcomes:
  - Income change (baseline vs. 6 months, 12 months)
  - Health indicators
  - Job satisfaction
  - Challenges faced
- Share results transparently with broader informal sector

4. **Cooperative development:**
   - Support formation of 3 pilot waste picker cooperatives:
     - **Dandora Green Workers Cooperative** (Nairobi)
     - **Coastal E-Waste Collectors Cooperative** (Mombasa)
     - **Kisumu Waste Entrepreneurs Cooperative**
   - Technical assistance:
     - Cooperative registration (Ministry of Industrialization)
     - Governance training (ILO Cooperative Development Program)
     - Business planning
     - Collective bargaining with formal recyclers
   - Initial capitalization: KES 5M per cooperative (co-financing: 60% government/partners, 40% member savings)
   - Cooperative provides members:
     - Shared equipment (carts, scales, safety gear)
     - Group purchasing power
     - Access to formal markets

- Social fund (emergency assistance, health costs)

Phase 2: Scaled formalization (Months 12-36):

Objective: Enable 40% of informal workers to formalize through diverse pathways

Tactics:

1. **Multi-pathway approach: Pathway 1: Direct employment by formal recyclers (Target: 500 workers, 10%)**
    - WEEE Centre, EACR, new entrants hire informal workers as employees
    - Incentive for recyclers: Wage subsidy (KES 10,000/month for first 6 months, KES 5,000/month for next 6 months) = KES 90M total over 2 years
    - Training: 1-month on-the-job training program
    - Benefits: Formal employment contract, NHIF, NSSF, safety equipment
    - Challenge: Only 500 jobs likely available (formal sector capacity limited)

Pathway 2: Micro-collection enterprises (Target: 1,500 workers, 30%)

- Individual or small groups (2-5 people) obtain micro-collector licenses
- Support package:
    - **Simplified licensing:** 1-page application, KES 2,000 fee (waived Year 1), basic requirements (complete training, commit to deliver to licensed recyclers only)
    - **Startup capital:** KES 15,000 grant per person (cart, scale, phone, safety gear, working capital)
    - **Training:** 1-week course on collection routes, customer service, record-keeping, safety
    - **Market access:** Counties operate aggregation hubs where micro-collectors sell at posted daily prices (transparency)
    - **Microfinance:** Access to sacco loans for working capital
- Business model: Self-employed collectors supplying formal recyclers
- Income potential: KES 25,000-35,000/month (vs. KES 20,000 informal average)

Pathway 3: Cooperative membership (Target: 1,000 workers, 20%)

- Expand 3 pilot cooperatives + form 2 additional (5 total)
- Each cooperative: 200 members
- Cooperative services:
    - Collective contracts with formal recyclers (better prices through volume)
    - Shared equipment and facilities

- Internal savings and credit schemes
- Health insurance pools
- Business development support

- Membership requirements: Attend training, pay monthly dues (KES 500), follow safety protocols
- Benefits: Higher incomes (10-20% premium through collective bargaining), social safety net, democratic governance

Pathway 4: Alternative livelihoods (Target: 500 workers initially, expand to 2,000)

- For those unable/unwilling to continue in waste sector
- Partnership with Kenya Youth Employment and Opportunities Project (KYEOP), NYS, TVET institutions
- Options:
  - Construction trades training (3 months) + job placement
  - Motorcycle taxi (boda boda) operator: Savings group model to purchase motorcycles
  - Small-scale agriculture: Link to urban farming programs
  - Retail/hospitality: Basic skills training + job placement
  - Security services: Training + licensing
- Support: Training stipend (KES 10,000/month during training), job placement assistance
- Success rate: Realistic 40-50% placement rate

2. **Aggregation hub model:**
   - Counties establish 10 aggregation hubs (Nairobi 3, Mombasa 2, Kisumu 1, Nakuru 1, Eldoret 1, Thika 1, Machakos 1)
   - Infrastructure (per hub):
     - Covered area (200 sq meters)
     - Weighbridge (accurate measurement)
     - Security
     - Office (record-keeping, payments)
     - Storage (temporary before transfer to recyclers)
   - Operations:
     - Open 5 days/week, 8am-4pm
     - Informal collectors bring materials, weighed, paid immediately (M-Pesa or cash)

        - Prices posted daily (transparency)
            - Copper: KES 500/kg
            - Aluminum: KES 200/kg
            - Circuit boards: KES 150/kg
            - Iron/steel: KES 20/kg
        - No payment for hazardous components (CRTs, mercury lamps) - these accepted free for proper disposal
    - Financing: 40% PRO, 40% county, 20% recycler service fees

3. **Financial inclusion:**
    - Partner with Equity Bank, KCB, M-Pesa to offer:
        - **E-Waste Collector Savings Account:** No minimum balance, no monthly fees, linked to M-Pesa
        - **Emergency loan:** KES 5,000-20,000, 10% interest, 6-month repayment (for medical, school fees, equipment repair)
        - **Equipment financing:** KES 20,000-50,000, 12% interest, 12-18 month repayment (for carts, scales, storage)
        - **Savings groups:** Village Savings and Loan Associations (VSLAs) model adapted for waste collectors
4. **Social protection:**
    - **Health insurance:** Subsidize 50% of NHIF premiums for registered micro-collectors (KES 850/year subsidy × 1,500 = KES 1.3M annually)
    - **Accident insurance:** Group policy for registered collectors (covers medical costs from work injuries)
    - **Social fund:** Emergency assistance for registered collectors facing crisis (death in family, medical emergency)
        - Managed by cooperatives or county committees
        - Funded by: 2% levy on aggregation hub transactions + government contribution

Phase 3: Enforcement with protection (Months 36+):

Objective: Eliminate hazardous informal processing while protecting livelihoods

Tactics:

1. **Gradual enforcement escalation:**
    - **Month 36-48:** Focus on egregious practices only:
        - Open burning (major air pollution, severe health hazard)

        - Acid leaching near water bodies or residential areas
        - Child labor in e-waste processing
    - Approach: Engagement before enforcement
        - First contact: NEMA + NGO visit, offer alternative pathway, 3-month transition period
        - Second contact: Warning letter, referral to formalization support services
        - Third contact: Enforcement action (fine, confiscation, prosecution)
    - Parallel: Ensure transition support services available (don't enforce without alternatives)

2. **Safe spaces for transition:**
    - Designate transition zones where informal processing tolerated temporarily IF:
        - No open burning or acid leaching
        - Use of safety equipment (masks, gloves)
        - Children excluded
        - Registration with NEMA (simple form, no fee, no penalties)
    - Gradual phase-out: 6-month intervals, reduce permitted activities
    - Example: Dandora designated zone (hectares 10-12), all workers register, burning banned Month 40, manual dismantling only Months 40-48, full formalization by Month 48

3. **Enforcement paired with opportunity:**
    - Every enforcement action accompanied by offer of support:
        - "You are fined KES 20,000 for open burning, BUT fine is waived if you complete training and obtain micro-collector license within 60 days"
    - Second-chance approach (not punitive)
    - Message: "We want you in the formal system, earning safely, not in jail"

4. **Community-based monitoring:**
    - Train community health volunteers and local leaders as monitors
    - Report hazardous practices (burning, acid use) to NEMA hotline
    - Community enforcement: Social pressure within informal sector against most dangerous practices
    - Reward system: Communities that eliminate burning receive infrastructure investment

Communication Channels:

- **Community meetings:** Monthly barazas in Dandora, Mukuru, Kware, Kachok (ongoing dialogue)

- **Peer educators:** 50 former informal workers trained as community mobilizers (credibility)
- **Radio:** Daily Swahili programs on community stations (Pamoja FM in Dandora, Ghetto Radio in Mukuru)
- **SMS:** Bulk SMS to registered collectors with opportunities, price updates, safety tips
- **Posters:** Visual materials (many workers have limited literacy) in Swahili and Sheng
- **NGO intermediaries:** Clean Up Kenya, Dandora Youth Initiative, Mukuru Promotion Centre as trusted messengers
- **WhatsApp groups:** Cooperative members, micro-collectors (peer support, information sharing)

Success Indicators:

Short-term (Year 1):

- 2,000 workers receive safety equipment and use it regularly
- Zero violent confrontations between informal workers and authorities
- 100 demonstration formalizers complete program, 70% report positive income change
- 3 cooperatives registered and operational with 300 members

Medium-term (Year 2-3):

- 2,000 workers formalized through diverse pathways (40% of total)
- Open burning reduced by 70% (measured by air quality, community reports)
- Zero deaths or severe injuries from informal processing (vs. estimated 5-10 annually baseline)
- 5 cooperatives operational with 1,000 members total
- 1,000 workers accessed microfinance for equipment/working capital

Long-term (Year 5):

- 3,000 workers (60%) formalized or in alternative livelihoods
- Hazardous informal processing eliminated in Dandora, Mukuru (transition zones closed)
- Average income of formalized workers KES 30,000-35,000/month (50% above informal baseline)
- 10 cooperatives sustainable and self-financing
- Social protection coverage: 80% of formalized workers have health insurance

Risk Mitigation:

Risk 1: Violent resistance to enforcement

- Mitigation: No enforcement in first 3 years; only support and harm reduction
- Mitigation: Community-designed transition plans (local ownership)
- Mitigation: Police sensitivity training (avoid brutality)

- Contingency: If violence occurs, immediate suspension of enforcement, independent investigation, community dialogue reset

Risk 2: Formalization pathways insufficient (can't absorb 5,000 workers)

- Mitigation: Realistic targets (40-60% formalization over 5 years)
- Mitigation: Diverse pathways (employment, micro-enterprise, cooperatives, alternative livelihoods)
- Mitigation: Continuous expansion of formal sector capacity (recycler investment)
- Contingency: If pathways saturated, extend transition timelines, invest more in alternative livelihoods

Risk 3: Formalized workers earn less than informal (transition not attractive)

- Mitigation: Income monitoring and course corrections
- Mitigation: Wage subsidies for first year (bridge transition)
- Mitigation: Aggregation hubs ensure fair prices (no exploitation)
- Contingency: If formalization reduces income, adjust support packages (higher grants, better market linkages)

Risk 4: Elite capture (cooperatives/programs captured by well-connected individuals, excluding most vulnerable)

- Mitigation: Democratic governance training for cooperatives
- Mitigation: Transparent selection criteria for support programs
- Mitigation: Independent monitoring (NGO oversight, community feedback mechanisms)
- Contingency: If capture detected, restructure governance, direct support to excluded individuals

7.3.9 International Development Partners (World Bank, AfDB, UNEP)

Profile:

- **Stakeholder group:** Multilateral development banks, UN agencies, bilateral donors actively supporting Kenya's environment sector
- **Key actors:**
    - World Bank (AEHPMP - Africa Environmental Health and Pollution Management Programme)
    - African Development Bank (Circular Economy Facility)
    - UNEP (headquartered in Nairobi, global e-waste program)
    - Bilateral: JICA (Japan), GIZ (Germany), USAID, EU, others
- **Resources:** Potential financing pool of USD 50-200M for e-waste infrastructure and capacity building

Power-Interest Assessment:

- **Power/Influence:** 4/5 (High through financing and technical clout)

    - Control access to concessional financing (loans, grants)
    - Technical assistance and global expertise
    - Convening power (bring government, private sector, NGOs together)
    - International credibility and standard-setting
    - Can influence National Treasury through fiscal support
- **Interest Level:** 4/5 (High interest in successful implementation)
    - E-waste aligns with development mandates (environment, health, poverty)
    - Kenya as potential African model for replication
    - Visibility and results for headquarters reporting
    - Fiduciary concerns about implementation capacity
- **Classification:** MANAGE CLOSELY

Impact Analysis:

Benefits to Development Partners:

- **Program success:** Well-designed regulations create foundation for effective development assistance
- **Development outcomes:** Measurable impacts (health, environment, jobs) demonstrate value of investment
- **Regional model:** Kenya's success enables replication in other African countries (scaling impact)
- **Partnership visibility:** Collaboration with innovative national program enhances partner reputation
- **Quantified benefit:** Intangible but significant - successful programs justify future funding, institutional mandates

Costs to Development Partners:

- **Financial commitment:** Grants/loans for infrastructure, capacity building (USD 20-50M potential commitment)
- **Technical assistance:** Staff time for advisory, monitoring, troubleshooting
- **Fiduciary risk:** If implementation fails or funds misused, reputational damage
- **Opportunity cost:** Resources allocated to e-waste cannot support other priorities
- **Quantified cost:** USD 20-50M financial + staff time (difficult to quantify)

Net Impact: Positive if implementation successful (development outcomes worth investment), negative if implementation fails (wasted resources).

Current Position: Support (interested but cautious pending implementation capacity demonstration) **Desired Position:** Strong Support (active financing and technical partnership) **Gap:** +1

Key Interests:

1. **Implementation readiness:** Are government systems adequate to absorb and utilize financing effectively?
2. **Fiduciary assurance:** Will funds be used as intended? Risk of corruption or mismanagement?
3. **Measurable results:** Can impacts be tracked and reported to headquarters/boards?
4. **Co-financing:** Government commitment (budget allocation) demonstrates ownership
5. **Sustainability:** Will programs continue after external funding ends?
6. **Regional spillover:** Can Kenya's model inform other countries?
7. **Safeguards:** Environmental and social safeguards (especially informal sector)

Engagement Strategy:

Phase 1: Partnership formulation (Months -6 to 6):

1. **Project concept development:**
    - Work with World Bank (AEHPMP), AfDB to develop e-waste infrastructure project
    - Components:
        - Component 1: Institutional capacity (NEMA, counties) - USD 15M
        - Component 2: Collection infrastructure (centers, equipment) - USD 25M
        - Component 3: Informal sector integration - USD 10M
        - Component 4: Technical assistance and knowledge management - USD 5M
    - Total: USD 55M over 5 years
    - Financing: 60% grants (World Bank, AfDB), 40% GoK (counterpart funding)
2. **Project preparation:**
    - Environmental and Social Impact Assessment (ESIA) - comprehensive safeguards analysis
    - Stakeholder engagement per World Bank ESS10 (Environmental and Social Standard)
    - Results framework with clear KPIs
    - Implementation arrangements (PIU - Project Implementation Unit within NEMA)
    - Procurement strategy
    - Timeline: 12-18 months
3. **Board approval process:**
    - World Bank Board approval (requires satisfactory preparation)
    - AfDB Board approval
    - National Treasury concurrence (loan guarantees if applicable)

Phase 2: Implementation support (Years 1-5):

1. **Technical assistance:**
    - UNEP provides: E-waste technical standards, import control training, regional coordination
    - JICA provides: Technology transfer (Japanese EPR experience), study tours
    - GIZ provides: Informal sector integration models (Ghana experience)
    - Embed long-term technical advisors in NEMA (2-3 international experts)
2. **Financing modalities:**
    - **Grants:** Capacity building, TA, informal sector programs (high transaction cost activities)
    - **Concessional loans:** Infrastructure (collection centers, equipment) with long repayment (20 years, 2% interest)
    - **Results-based financing:** Tranches released upon achievement of milestones (incentivize performance)
3. **Monitoring and reporting:**
    - Quarterly progress reports to development partners
    - Annual independent evaluation
    - Mid-term review (Year 3) with course corrections
    - Environmental and social safeguards monitoring (grievance mechanisms, informal sector impacts)
4. **Knowledge management:**
    - Document lessons learned for replication
    - Regional workshops sharing Kenya experience (EAC, ECOWAS, SADC)
    - Publications: Case studies, policy briefs, technical reports
    - South-South cooperation: Kenya experts advise Uganda, Tanzania, Rwanda
    - Global showcasing: Present at Basel Convention COP, UNEA, African Ministerial Conference

Phase 3: Sustainability transition (Years 4-5):

1. **Graduation planning:**
    - Develop exit strategy from Year 1 (not last-minute)
    - Transition to domestic financing sources:
        - EPR producer fees accumulate (KES 1B+ annually by Year 5)
        - Government budget allocation institutionalized

        - Commercial financing for private sector (banks lending to recyclers)
    - Technical capacity handover: International advisors transition to mentoring role

2. **Follow-on programming:**
    - Second-phase investment (if successful): Scaling to all 47 counties, advanced recycling technologies
    - Regional programs: EAC harmonization, cross-border waste management

Communication Channels:

- **Strategic:** Semi-annual meetings between Cabinet Secretary MoECCF and Country Directors/Representatives
- **Program management:** Monthly coordination meetings (PIU, World Bank Task Team, AfDB, UNEP)
- **Technical:** Weekly calls/emails on specific issues
- **Reporting:** Quarterly implementation status reports, annual portfolio reviews

Success Indicators:

- Financing commitments secured: USD 40M+ by Year 2
- Implementation on track: >80% of planned activities completed on schedule
- Fiduciary clean: Zero audit findings of misuse
- Results achieved: Collection targets, formalization rates, health outcomes per results framework
- Regional replication: 2+ countries adopt Kenya-inspired regulations by Year 5

7.4 Stakeholder Mapping: Power-Interest Matrix

Figure 7.1 visualizes stakeholders on the Power-Interest grid:

Quadrant 1: MANAGE CLOSELY (High Power, High Interest)

- NEMA
- MoECCF
- National Treasury
- KRA Customs
- County Governments (CoG)
- Large EEE Producers
- KEPRO/EPROK (PROs)
- WEEE Centre
- Development Partners (World Bank, AfDB, UNEP)

Quadrant 2: KEEP SATISFIED (High Power, Low Interest)

- Kenya Police Service
- Attorney General
- President's Office (oversight role)
- Cabinet (collective)
- Parliament (legislation amendments if needed)

Quadrant 3: KEEP INFORMED (Low Power, High Interest)

- SME Importers
- Informal Collectors/Processors
- Civil Society NGOs
- Affected Communities (Dandora, Mukuru)
- Refurbishers
- Academic Researchers

Quadrant 4: MONITOR (Low Power, Low Interest)

- General Public (urban consumers)
- Rural populations
- Media (variable interest)
- Religious organizations
- International research networks

7.5 Position Analysis: Support/Opposition Spectrum

Table 7.1 maps stakeholder positions:

Strong Support	Support	Neutral	Oppose	Strong Oppose
NEMA	MoECCF	National Treasury	SME Importers	Informal Processors
WEEE Centre	Ministry of Health	KRA	Grey Market Importers	Some Dandora residents
KEPRO/EPROK	KEBS	County Governments		
UNEP	Large Producers	Public		
Environmental NGOs	ICTA	Media		

Academic Institutions	Development Partners			
Affected Communities (health-focused)				

Table 7. 1Position Analysis: Support/Opposition Spectrum

Analysis:

Supporters (60% of stakeholder power): Critical mass of regulatory authorities, formal private sector, international partners creates favorable environment

Opponents (15% of stakeholder power): Concentrated in vulnerable populations (informal sector, SMEs) requiring targeted mitigation

Neutral (25% of stakeholder power): Treasury and counties are swing actors; their support is achievable through economic case and capacity support

Strategic implication: Regulations are politically feasible if:

1. Treasury neutrality secured (budget allocated)
2. Informal sector integration genuinely implemented (avoiding violent resistance)
3. SME concerns addressed (tiered fees, PRO simplification)

7.6 Impact Distribution: Winners and Losers

Table 7.2 quantifies differential impacts (10-year NPV):

Stakeholder Category	Benefits (KES M)	Costs (KES M)	Net Impact (KES M)	% of Total Benefits	% of Total Costs
Government	2,200	979	+1,221	15%	11%
- NEMA	250	700	-450		
- Other agencies	100	279	-179		
- Fiscal revenue	310	0	+310		
- Avoided costs	1,540	0	+1,540		
Private Sector	3,700	8,010	-4,310	25%	89%
- Recyclers	2,800	194	+2,606		
- Large producers	500	4,680	-4,180		
- SME producers	100	2,730	-2,630		
- PROs	300	406	-106		
Public/Communities	9,000	0	+9,000	60%	0%
- Health benefits	280	0	+280		

- Environment	2,190	0	+2,190		
- Employment	480	0	+480		
- Import substitution	3,500	0	+3,500		
- Consumer surplus	2,550	0	+2,550		
Informal Sector	500	200	+300	-	2%
- Formalized workers	400	50	+350		
- Displaced workers	100	150	-50		
TOTAL	**14,950**	**8,990**	**+5,960**	**100%**	**100%**

Table 7. 2: quantifies differential impacts (10-year NPV)

Key Findings:

1. **Public is primary beneficiary:** 60% of benefits accrue to general public (health, environment, employment)
2. **Private sector bears costs:** 89% of costs borne by producers, but only 40% by large producers who can afford them
3. **Recyclers are winners:** Formal recycling sector gains KES 2.6B (revenue from increased volumes)
4. **Government slightly negative:** Direct fiscal cost (KES 979M) exceeds direct fiscal benefits (KES 310M), but justified by public benefits
5. **Distributional justice:** Benefits flow to low-income communities (health, environment), costs to businesses and consumers with ability to pay - moderately progressive
6. **Critical vulnerability:** Informal sector and SME producers face severe impacts requiring targeted mitigation (KES 140M informal integration + tiered fees for SMEs)

7.7 Stakeholder Engagement and Communication Strategy

7.7.1 Strategic Communication Objectives

1. **Build awareness:** 80% of key stakeholders understand regulations by Month 6
2. **Generate support:** Achieve 65% support among critical stakeholders by gazettal
3. **Facilitate compliance:** 70% producer registration by Month 12
4. **Manage opposition:** Zero violent confrontations, constructive engagement with opponents
5. **Sustain commitment:** Maintain political and financial support through implementation

7.7.2 Segmented Communication Approach

Segment 1: Political Leadership (Cabinet, Governors)

- **Messages:** Political wins, international recognition, public health protection, legacy

- **Channels:** One-on-one briefings, Cabinet memos, high-level forums
- **Frequency:** Quarterly updates, crisis communication as needed
- **Messengers:** Cabinet Secretary MoECCF, Principal Secretaries, NEMA Director-General

Segment 2: Technical Government (NEMA, KRA, KEBS, Counties)

- **Messages:** Clear roles, capacity support, implementation tools, problem-solving
- **Channels:** Technical workshops, SOPs, online portal, coordination meetings
- **Frequency:** Monthly coordination, weekly for operational issues
- **Messengers:** NEMA technical staff, development partner advisors, peer agencies

Segment 3: Private Sector (Producers, Recyclers, PROs)

- **Messages:** Compliance pathways, business opportunities, competitive fairness, support services
- **Channels:** Industry roundtables, webinars, email bulletins, help desk, toolkits
- **Frequency:** Quarterly forums, monthly newsletters, on-demand help desk
- **Messengers:** NEMA producer liaison unit, KAM, PROs, peer companies

Segment 4: Vulnerable Groups (Informal Sector, SMEs)

- **Messages:** Respect, support, alternatives, gradual transition, no immediate enforcement
- **Channels:** Community meetings (barazas), radio (Swahili), SMS, peer educators, NGO intermediaries
- **Frequency:** Monthly community meetings, weekly radio programs, daily SMS tips
- **Messengers:** Trusted community leaders, former informal workers, NGOs, religious leaders

Segment 5: Civil Society and Media

- **Messages:** Transparency, impacts, successes, challenges, stakeholder inclusion
- **Channels:** Press briefings, media tours, social media, annual reports, open data portal
- **Frequency:** Quarterly press briefings, real-time social media, annual reporting
- **Messengers:** NEMA communications unit, Cabinet Secretary (major announcements), NGO partners

Segment 6: General Public

- **Messages:** Health protection, proper disposal, environmental benefits, how to participate
- **Channels:** Mass media (TV, radio, print), social media, schools, religious institutions, retail
- **Frequency:** Campaign bursts (3-month intensive campaigns annually), sustained presence
- **Messengers:** NEMA, celebrity ambassadors, community champions, brands (co-branding)

7.7.3 Key Messages Framework

Core Narrative: "Kenya is taking bold action to protect our health and environment by properly managing electronic waste. Together—government, business, and communities—we are building a system that keeps toxic materials out of our neighborhoods, creates decent jobs, and recovers valuable resources. This is our responsibility to current and future generations."

Message Pillars:

1. **Health Protection:**
    - "E-waste contains dangerous chemicals harming our children's health"
    - "Proper management prevents lead poisoning, respiratory disease, cancer"
    - "Dandora and Mukuru deserve clean air and safe environments"
2. **Economic Opportunity:**
    - "Formal e-waste management creates 300+ decent jobs paying KES 30,000+/month"
    - "Recovered materials worth KES 10 billion annually can fuel our economy"
    - "Kenya can become East Africa's e-waste management hub"
3. **Shared Responsibility:**
    - "Producers who sell electronics must take them back when finished"
    - "Government will enforce rules fairly and support transition"
    - "Consumers play a role by returning old devices to collection points"
4. **Fairness and Protection:**
    - "Rules apply to everyone—no more unfair competition from illegal imports"
    - "We support informal workers transitioning to safer, better-paying jobs"
    - "Small businesses get help complying without breaking the bank"
5. **Progress and Pride:**
    - "Kenya leads Africa in environmental protection"
    - "Our children will inherit cleaner, healthier communities"
    - "We show the world that development and environment go together"

7.7.4 Feedback and Grievance Mechanisms

Multi-Channel Feedback System:

1. **Hotline:** Toll-free number (0800-EWASTE / 0800-392783)
    - Multilingual (English, Swahili, Kikuyu)
    - 8am-6pm, Monday-Friday
    - Trained operators log complaints, queries, suggestions

2. **Online Portal:** www.nema.go.ke/ewaste-feedback
    - Web form for submissions
    - Track complaint status with reference number
    - Public dashboard showing complaint trends, resolution rates
3. **SMS:** Short code (e.g., 20121)
    - Text complaints or queries
    - Automated acknowledgment, human follow-up within 48 hours
4. **Email:** ewaste.feedback@nema.go.ke
5. **Physical:** Suggestion boxes at county offices, collection centers
6. **Community:** Regular barazas where grievances can be aired publicly

Grievance Categories and Response Protocols:

Category	Response Time	Resolution Process
Illegal dumping/burning	24 hours	Investigation, enforcement action
Unfair fees	5 days	Review by NEMA fee committee
Informal worker mistreatment	48 hours	Mediation, escalation to MoH or Police if abuse
Producer non-compliance	7 days	Verification, enforcement referral
Collection center issues	3 days	County coordination, service improvement
General inquiries	2 days	Information provided

Table 7. 3: Grievances Categories and Response Protocols

Transparency and Accountability:

- **Quarterly grievance reports:** Published online showing complaints received, resolved, pending
- **Independent review:** Annual audit of grievance mechanism by ombudsman or civil society
- **Feedback loop:** Systemic issues identified through grievances inform policy adjustments

7.8 Conflict and Risk Analysis

7.8.1 Stakeholder-Related Risks

Risk 1: Informal Sector Violent Opposition

- **Likelihood:** Moderate (30%)
- **Impact:** High (implementation delays, casualties, political backlash)
- **Triggers:** Aggressive enforcement without alternatives, police brutality, income loss
- **Mitigation:** Inclusive integration, no early enforcement, community dialogue, safety nets

- **Contingency:** Suspend enforcement, independent inquiry, reset engagement

Risk 2: Treasury Budget Denial

- **Likelihood:** Moderate-High (40%)
- **Impact:** Critical (implementation impossible without funding)
- **Triggers:** Fiscal constraints, competing priorities, skepticism about ROI
- **Mitigation:** Strong economic case, phased requests, development partner co-financing, political leadership
- **Contingency:** Scale back scope, seek donor bridge financing, extend timelines

Risk 3: Producer Non-Compliance

- **Likelihood:** Moderate (35%)
- **Impact:** High (undermines entire system)
- **Triggers:** High costs, weak enforcement, competitive disadvantage perception
- **Mitigation:** PRO simplification, import controls, registry transparency, penalties
- **Contingency:** Enhanced enforcement, public naming, import bans for non-compliant brands

Risk 4: County Non-Cooperation

- **Likelihood:** Low-Moderate (25%)
- **Impact:** Moderate (delays, uneven implementation)
- **Triggers:** Capacity constraints, unfunded mandate perception, political disagreements
- **Mitigation:** Capacity building, infrastructure co-financing, inter-governmental protocols, CoG engagement
- **Contingency:** Prioritize willing counties, leverage conditional grants, political pressure through President's office

Risk 5: Corruption and Elite Capture

- **Likelihood:** Moderate (30% - given Kenya's corruption challenges)
- **Impact:** Moderate-High (undermines legitimacy, wastes resources)
- **Triggers:** Weak oversight, opaque processes, high-value contracts (equipment, infrastructure)
- **Mitigation:** Transparent procurement, public registry, independent audits, civil society watchdogs, whistleblower protection
- **Contingency:** Prosecutions, contract cancellations, systems reforms

Risk 6: Regional Arbitrage (Trade Diversion)

- **Likelihood:** Moderate-High (40%)

- **Impact:** Moderate (undermines effectiveness, producer gaming)
- **Triggers:** Kenya regulations stricter than neighbors (Uganda, Tanzania), porous borders
- **Mitigation:** EAC harmonization advocacy, bilateral agreements, intelligence sharing with neighboring customs
- **Contingency:** Enhanced border controls, diplomatic engagement, accept some leakage as unavoidable

7.8.2 Conflict Resolution Mechanisms

Tier 1: Administrative Resolution (NEMA)

- Informal mediation by NEMA officials
- Most producer-regulator disputes, fee disagreements
- Timeline: 30 days

Tier 2: Alternative Dispute Resolution (ADR)

- Facilitated mediation or arbitration
- Complex multi-party disputes (e.g., PRO-producer, county-recycler)
- Neutral third-party facilitator
- Timeline: 60 days

Tier 3: Environmental and Land Tribunal

- Formal legal process
- Established under EMCA for environmental disputes
- Used when ADR fails or legal interpretation needed
- Timeline: 6-18 months

Tier 4: Judicial Review (High Court)

- Constitutional or statutory interpretation challenges
- Final resort
- Timeline: 1-3 years

Preventive Approaches:

- Regular stakeholder forums surface issues early
- Ombudsman role within NEMA for informal complaints
- Multi-stakeholder advisory committees (producer representation, civil society)
- Transparent decision-making reduces perception of unfairness

7.9 Stakeholder Engagement Implementation Plan

7.9.1 Timeline and Milestones

Pre-Gazettal Phase (Months -6 to 0):

- Month -6: Stakeholder analysis completed, engagement strategy approved
- Month -5 to -3: Intensive consultations (industry roundtables, county workshops, community dialogues)
- Month -2: Public comment period on draft regulations
- Month -1: Final stakeholder validation workshop
- Month 0: Gazettal

Launch Phase (Months 0-6):

- Month 1: Public launch event with Cabinet Secretary, media campaign
- Months 1-3: Producer registration campaign, compliance toolkit dissemination
- Months 2-6: County capacity building (training 200+ officers)
- Months 3-6: Informal sector harm reduction (safety equipment, health screening)
- Month 6: Progress report to National E-Waste Coordination Committee

Implementation Phase 1 (Months 6-18):

- Month 9: Import control pilot at Mombasa
- Month 12: Producer registration deadline, enforcement begins
- Month 12-18: Collection center construction (10 centers)
- Month 12-18: Informal sector formalization pathways operational
- Month 18: Mid-term review and course corrections

Scaling Phase (Months 18-36):

- Months 18-24: PRO systems fully operational
- Months 18-36: Expansion to 20 collection centers, 30+ counties
- Month 24: Informal sector cooperative models mature
- Month 36: Hazardous practice enforcement begins (with safety nets)

Maturation Phase (Months 36+):

- Year 3-5: System optimization, continuous improvement
- Year 5: Comprehensive evaluation, second-generation regulations

7.9.2 Responsibility Matrix

Stakeholder Group	Lead Engagement Entity	Supporting Entities	Frequency
Political Leadership	MoECCF Cabinet Secretary	NEMA DG, Treasury PS	Quarterly
National Agencies	NEMA Director-General	MoECCF, Development Partners	Monthly
County Governments	NEMA County Coordinators	CoG, MoECCF	Monthly
Large Producers	NEMA Producer Liaison Unit	KAM, PROs	Quarterly Forums
SME Producers	NEMA + Trader Associations	PROs, NGOs	Monthly
PROs	NEMA Compliance Directorate	Industry, Counties	Weekly
Recyclers	NEMA Licensing Unit	PROs, Development Partners	Monthly
Informal Sector	NGO Partners + NEMA Community Unit	Counties, Health Ministry, CBOs	Weekly (community level)
Civil Society	NEMA Stakeholder Engagement Unit	Development Partners	Quarterly
Development Partners	MoECCF + NEMA	National Treasury, PIU	Monthly
Media	NEMA Communications Unit	MoECCF Communications	Quarterly briefings, ongoing
General Public	NEMA + Media	NGOs, Counties, Schools, Religious	Campaign bursts

7.9.3 Budget for Stakeholder Engagement

3-Year Stakeholder Engagement Budget:

Activity Category	Year 1 (KES M)	Year 2 (KES M)	Year 3 (KES M)	3-Year Total (KES M)
Consultations and Workshops	8	6	4	18
- National stakeholder forums (4/year)	2	2	1.5	5.5
- County workshops	4	3	2	9
- Industry roundtables	1	0.5	0.5	2

- Community dialogues	1	0.5	0	1.5
Communication Materials	5	3	2	10
- Toolkits and guidance documents	2	1	0.5	3.5
- Posters, brochures (Swahili/English)	1.5	1	1	3.5
- Radio/TV spots	1.5	1	0.5	3
Media and Public Campaigns	10	8	6	24
- Mass media campaigns (3-month bursts)	7	5	4	16
- Social media management	2	2	1.5	5.5
- Press briefings and media tours	1	1	0.5	2.5
Feedback and Grievance System	3	2	2	7
- Hotline operations	1.5	1	1	3.5
- Online portal development/maintenance	1	0.5	0.5	2
- Community feedback mechanisms	0.5	0.5	0.5	1.5
Stakeholder Capacity Building	15	12	8	35
- Producer compliance training	5	4	3	12
- SME and informal sector support	6	5	3	14
- County officer training	4	3	2	9
Monitoring and Evaluation	2	3	3	8
- Stakeholder surveys and assessments	1	1.5	1.5	4
- Independent engagement audits	1	1.5	1.5	4
TOTAL	**43**	**34**	**25**	**102**

Table 7. 4: Budget for 3-Year Stakeholder Engagement

Financing sources:

- NEMA budget: 40% (KES 41M)
- Development partner grants: 40% (KES 41M)
- Producer contributions (co-branding campaigns): 20% (KES 20M)

7.10 Conclusions and Recommendations

7.10.1 Key Findings

1. **Stakeholder landscape is complex but manageable:** 90+ distinct stakeholder groups with divergent interests can be effectively engaged through differentiated strategies
2. **Political feasibility is achievable:** Critical mass of support (60% of stakeholder power) exists, with key swing actors (Treasury, counties) persuadable through economic case and capacity support
3. **Vulnerable groups require priority attention:** Informal sector (5,000-8,000 workers) and SME importers (150+ companies) face severe impacts requiring KES 140M+ mitigation investment
4. **Benefits are widely distributed, costs concentrated:** 60% of benefits accrue to general public (health, environment), 89% of costs borne by private sector (primarily producers), creating favorable political economy
5. **Implementation depends on stakeholder cooperation:** NEMA cannot succeed alone; requires active partnership from KRA (import controls), counties (collection), PROs (producer compliance), and NGOs (community engagement)
6. **Communication is as important as regulation:** Well-designed rules will fail without sustained, culturally-appropriate, multi-channel communication ensuring awareness, understanding, and buy-in

7.10.2 Strategic Recommendations

Recommendation 1: Adopt phased, inclusive implementation approach

- Year 1: Capacity building, voluntary compliance, no enforcement
- Year 2: Gradual enforcement with grace periods and support
- Year 3+: Full enforcement with continuous improvement

Recommendation 2: Prioritize informal sector integration over enforcement

- Allocate KES 140M to integration programs as identified in Chapter 6
- Zero enforcement of informal processing in first 3 years
- Community-designed transition plans with genuine worker participation
- Success measured by formalization rates, not prosecutions

Recommendation 3: Secure Treasury buy-in through economic argumentation

- Present CBA demonstrating 1.66:1 benefit-cost ratio
- Emphasize phased budget approach (not all KES 123M needed upfront)
- Leverage development partner co-financing (40-60% external funding)
- Frame as investment with measurable ROI, not recurrent expense

Recommendation 4: Simplify compliance for SMEs

- Implement tiered fee structures (50% discount for <50 tonnes/year)

- PRO collective compliance as default pathway (vs. individual systems)
- Digital tools (mobile app, USSD, WhatsApp) for simplified registration/reporting
- Microfinance access and 12-month grace period

Recommendation 5: Establish robust inter-agency coordination

- Formalize National E-Waste Coordination Committee with Cabinet backing
- NEMA-KRA MOU for import controls with 4-hour response time SLA
- NEMA-County framework agreements clarifying roles and financing
- Monthly coordination meetings with technical working groups

Recommendation 6: Invest in sustained stakeholder engagement

- Allocate KES 102M over 3 years for engagement (included in implementation budget)
- Hire dedicated stakeholder engagement staff within NEMA (5 officers)
- Establish multi-stakeholder advisory committee with producer, NGO, county representation
- Quarterly public reporting on implementation progress (transparency builds trust)

Recommendation 7: Develop adaptive management capacity

- Annual regulatory review process incorporating stakeholder feedback
- Mid-term evaluation (Year 3) with course corrections
- Flexibility to adjust fees, timelines, requirements based on implementation lessons
- Learning orientation: "Implementation as experiment" not rigid blueprint

Recommendation 8: Leverage champions and early adopters

- Identify and support 3-5 "champion companies" for pilot programs
- Document and showcase 10-15 SME success stories
- Recruit 20-30 peer educators from informal sector
- Awards and recognition for best-performing counties, producers, cooperatives

7.10.3 Critical Success Factors

Implementation success depends on:

1. **Political will:** Sustained Cabinet-level commitment through implementation challenges
2. **Adequate resourcing:** KES 123M annual government budget + KES 1B+ EPR fees
3. **Inter-agency cooperation:** Effective NEMA-KRA-KEBS-County partnerships
4. **Social license:** Community acceptance through inclusive processes and visible benefits
5. **Private sector buy-in:** Producer compliance at 80%+ rates

6. **Adaptive management:** Responsive course corrections based on feedback

Final Assessment: Stakeholder analysis reveals that Kenya's E-Waste Regulations are politically feasible and can achieve broad-based support IF implementation prioritizes:

- Genuine inclusion (especially vulnerable groups)
- Transparent, responsive governance
- Adequate capacity and resources
- Sustained, culturally-appropriate communication
- Phased approach allowing learning and adaptation

The regulatory framework creates conditions for success, but outcomes depend critically on quality of stakeholder engagement during implementation. This chapter provides the roadmap; execution determines results.

8. DATA COLLECTION AND ANALYSIS

This section delineates the methodological framework employed to collect and analyze stakeholder data for the Regulatory Impact Assessment (RIA) of Kenya's proposed Electronic and Electrical Waste (E-Waste) Regulations, 2025. The study, commissioned by the National Environment Management Authority (NEMA), adopts a multi-stakeholder perspective to holistically evaluate the potential economic, social, environmental, and operational ramifications of the regulatory proposal.

Data Collection and Stakeholder Composition

Data was systematically gathered in May 2025 through structured questionnaires, targeting a diverse cross-section of entities integral to the e-waste management ecosystem. The stakeholder cohort was strategically selected to capture insights from the entire value chain, encompassing both the creators and managers of electronic equipment and the end-users and regulators of the waste stream. The final sample comprised the following groups:

- **Producers and Handlers:** This included four (4) Manufacturers and four (4) Waste Handlers, representing the core of the production and end-of-life processing sectors.
- **Government and Regulatory Bodies:** Perspectives from five (5) County Governments, two (2) national Government Ministries, and the primary Regulatory Body (NEMA) were incorporated to assess governmental readiness and oversight capacity.
- **Financial and Public Sectors:** One (1) Financial Institution provided insight into financing and investment considerations, while sixty-one (61) members of the General Public contributed data on awareness, disposal behaviors, and willingness to pay.

To ensure confidentiality and promote candid responses, all data was anonymized. Specific organizations are referred to using generic identifiers (e.g., “Manufacturer A,” “County Government C”) or aggregate terms.

Data Processing and Analytical Framework

The collected data underwent a rigorous processing and analysis pipeline utilizing the R statistical programming environment, leveraging packages including tidyverse, ggplot2, corrplot, and plotly. The analytical procedure consisted of three key phases:

1. **Data Cleaning and Harmonization:** The raw datasets were consolidated and refined to ensure consistency and accuracy. This involved:

- Addressing data integrity issues, such as removing duplicate entries (which refined the General Public dataset from 65 to 61 unique records) and handling missing values (e.g., #NULL! entries).

- Standardizing categorical responses and recoding binary indicators for uniform analysis.
- Converting qualitative financial estimates (e.g., cost ranges like "KES 500,000–1M") into quantitative numeric midpoints (e.g., KES 750,000) to enable statistical computation.

2. **Multi-Modal Analysis:** Given the heterogeneity of the data and the constrained sample sizes for certain stakeholder groups, a pluralistic analytical approach was adopted, prioritizing descriptive and qualitative depth over inferential statistics.
   - **Descriptive Statistics:** Key metrics—including counts, proportions, medians, and ranges—were calculated for critical variables such as regulatory awareness, anticipated compliance costs, prevalent e-waste categories, and current disposal practices.
   - **Cross-Tabulations and Relationship Mapping:** The analysis explored interrelationships between variables, such as correlating public awareness levels with preferred disposal methods, or assessing county government awareness against their self-reported preparedness for implementation.
   - **Qualitative Thematic Analysis:** Open-ended responses were systematically coded and categorized to extract emergent themes, including recurring challenges (e.g., "high infrastructure costs," "informal sector integration") and substantive suggestions for regulatory improvement.
3. **Data Visualization:** To enhance the interpretability and communicative power of the findings, the analysis was supported by a suite of advanced visualizations. These included not only standard bar plots and pie charts but also more nuanced representations like heatmaps for correlation matrices and violin plots to illustrate the distribution and probability density of key variables, particularly for the general public data.

Limitations and Analytical Constraints

The interpretative scope of this study is bounded by several methodological limitations. The small sample sizes for key stakeholder groups—notably manufacturers (n=4), waste handlers (n=4), and financial institutions (n=1)—constrain the statistical power and generalizability of findings within these cohorts. Furthermore, the general public data exhibits a significant urban bias (70.5% of respondents), potentially underrepresenting rural perspectives and practices. These limitations were actively mitigated by:

- Foregrounding descriptive statistics and qualitative insights over predictive models.
- Explicitly acknowledging sample size constraints in all relevant interpretations.
- Focusing on the identification of trends, themes, and stakeholder-specific nuances rather than making broad population-level inferences.

The subsequent presentation of findings is structured by stakeholder group to preserve this nuanced perspective, with cross-cutting themes and integrated conclusions presented in the final section of this report.

8.1 Detailed Analysis of Manufacturers

Business Profiles

Among the respondents, 33.3% were manufacturers and 66.7% were distributors or retailers, all operating within urban areas, highlighting the concentration of electrical and electronic equipment (EEE) businesses in such settings.

- One manufacturer handled 10 different EEE categories including batteries, IT equipment, and lighting.
- Another dealt with only two categories (IT and electrical tools), while one respondent did not specify.
- The business handling the widest category range showed dominance in high-volume items such as batteries and large appliances.

Regarding units and value:

- One business reported 673,000 units (value indicated as KES 0, likely erroneous).
- Another declared 240 units worth KES 600,000.
- One did not provide any figures.
- Excluding the outlier, the median number of units is 240, and the median value is KES 600,000.

Regulatory Awareness and Compliance

One business (n=3) was registered with a Producer Responsibility Organization (PRO), while the others were not. Those familiar with the E-Waste 2025 Regulations showed greater compliance, such as engaging in recycling initiatives. Annual compliance costs ranged from KES 250,000 to KES 5 million, with a median of KES 4 million.

Key challenges reported include:

- High compliance costs (66.7%)
- Unclear regulatory guidelines (66.7%)
- Limited access to recycling facilities (33.3%)
- Reporting challenges (33.3%)
- Overlap with existing regulations (33.3%)

Qualitative feedback described registration as “costly” and highlighted the absence of nearby

recycling partners as a major constraint.

E-Waste Management Practices

Only one business (n=3) has a formal take-back program in partnership with a licensed recycler (KES 80/kg) and reports return rates of 10–20%. The others either do not return e-waste or did not specify.

Support for regulations was evident:

- Two respondents (n=3) supported mandatory producer registration.
- One (n=3) was undecided, citing potential regulatory duplication.

Economic Impact

High compliance costs may lead to increased product prices. However, businesses with recycling programs may recover costs through partnerships. Smaller firms risk non-compliance without targeted financial and technical support.

(See the visualization graphics in the full report in the Annex Section)

Key Insight: Larger manufacturers with established programs are better positioned for compliance, but smaller distributors require financial and technical support, particularly for take-back initiatives.

8.2 In-depth Analysis of County Governments' Perspectives on E-waste Regulations (n=5)

This section provides a more detailed breakdown of the insights gathered from five county governments regarding the proposed Electronic and Electrical Waste (E-waste) Regulations. The analysis focuses on their current state of awareness, preparedness, perceived challenges, views on registration and record-keeping, and the anticipated economic, environmental, and social impacts.

1. Regulatory Awareness and Compliance

Awareness of Regulations: A significant majority of the surveyed county governments demonstrated awareness of the proposed E-waste Regulations. Specifically, **four out of five counties (80%)** reported being aware, while **one county (20%)** indicated a lack of awareness. This awareness among the majority is a positive indicator for the foundational understanding of the new regulatory framework. Cross-tabulation analysis further revealed a direct correlation between awareness and preparatory actions taken by the counties. For instance, the aware counties were more likely to have initiated preliminary steps, such as one county's proactive engagement in stakeholder meetings to discuss the implications and implementation of the regulations.

Preparation for Implementation: Despite a high level of awareness, the actual commencement of preparatory activities for implementing the regulations is limited. **Only**

one county (20%) reported having begun tangible preparations. The remaining counties cited several significant hurdles preventing them from initiating preparatory measures. These commonly included:

- **Lack of Capacity:** A prevalent concern among counties was the absence of sufficient human resources, technical expertise, and operational capabilities to manage e-waste effectively under the new regulations.
- **Insufficient Collection Points:** The inadequacy or complete absence of designated e-waste collection points was a critical infrastructure gap identified.
- **Challenges in Enforcement:** Counties expressed apprehension regarding their capacity to effectively enforce the regulations, pointing to potential difficulties in monitoring and ensuring compliance.
- **Low Public Awareness:** Beyond their own governmental awareness, some counties highlighted the need for increased public awareness about e-waste issues and the forthcoming regulations to ensure citizen participation and compliance.

Qualitative analysis of the responses further underscored that **resource constraints** are a common and overarching theme. Comments from county officials, such as "limited staff" and "no collection infrastructure," consistently emphasized the pressing need for additional resources and support to bridge these operational gaps.

Key Challenges Anticipated: Counties anticipate facing a range of challenges in the implementation phase, each cited by a minority but collectively indicating a diverse set of concerns:

- **Public Compliance (20%):** One county (1 out of 5) foresaw difficulties in ensuring the general public's adherence to the new e-waste disposal guidelines.
- **Limited Officer Capacity (20%):** Another county highlighted the insufficient number and training of enforcement officers, which could hinder effective oversight.
- **Enforcement Difficulties (20%):** A third county expressed concerns about the practicalities of enforcing the regulations, implying potential legal or logistical hurdles.
- **Lack of Collection Points (20%):** Consistent with preparation challenges, one county again identified the scarcity of collection infrastructure as a major impediment.
- **Data Security/Costs (20%):** One county raised concerns about the financial implications and data security aspects associated with managing e-waste data. Cross-tabulation analysis of these challenges revealed that **enforcement and infrastructure (specifically, collection points)** are consistently identified as the top barriers across the counties, suggesting these areas require significant focus for successful implementation.

2. Registration and Record-Keeping

Support for Mandatory Registration: There is strong support among county governments for the mandatory registration of e-waste producers and handlers. **Four counties (80%)** unequivocally supported mandatory registration, viewing it as a crucial step for accountability and data tracking. **One county (20%)** remained undecided, indicating a need for more time to evaluate the implications of such a requirement before committing to support. Notably, this support for mandatory registration was **unanimous among the counties that were already aware** of the proposed regulations, highlighting a perceived benefit of structured oversight within an informed regulatory environment.

Preferred Registration Frequency: Regarding the frequency of registration, preferences were split:

- **Biennial Registration (80%):** Two counties preferred registration every two years, citing this as a more manageable frequency that aligns with their current capacity constraints.
- **Annual Registration (40%):** Two other counties opted for annual registration, suggesting a preference for more frequent updates and stricter oversight.
- The preference for biennial registration by a notable proportion of counties further reinforces the underlying capacity constraints and the need for pragmatic regulatory approaches that consider administrative burdens.

Support for Record-Keeping Requirements: There was **unanimous support (100%)** across all five counties for requiring producers to maintain comprehensive records. These records would encompass the types and quantities of electrical and electronic equipment (EEE) placed on the market, as well as the collection rates and treatment methods for e-waste. Similar unanimous support was expressed for mandating recyclers and transporters to maintain detailed records of their e-waste handling activities. In terms of existing systems, **two counties reported having partial record-keeping systems** in place, indicating some foundational infrastructure. One county specifically mentioned plans to install a weighbridge, demonstrating an intent to improve quantitative data collection. However, the remaining counties explicitly stated a lack of the necessary infrastructure to support comprehensive record-keeping, highlighting a significant investment need.

Qualitative Insight on Data Management: Qualitative insights from county officials emphasized the critical need for **data standardization**, with comments like "need digital tools" underscoring the desire for modern, efficient, and uniform data management systems. Furthermore, securing **funding** was highlighted as paramount, with statements such as "external support critical" indicating that financial assistance is seen as essential for developing and maintaining the required data infrastructure and for overall compliance.

3. Impacts of Proposed Regulations

Economic Impacts: The proposed regulations are largely anticipated to have mixed economic effects:

- **Cost Increases (80%):** Four out of five counties (80%) expect to face increased operational costs due to compliance requirements. The median anticipated cost increase was substantial, estimated at **KES 999,000**. This concern about rising costs was directly correlated with existing infrastructure gaps, suggesting that counties with poorer existing e-waste management infrastructure anticipate higher initial investment costs to comply.
- **Job Creation Potential (100%):** Despite cost concerns, all five counties (100%) expressed optimism about the potential for job creation. They specifically cited opportunities in the establishment and growth of recycling enterprises, collection services, and other related e-waste management activities, indicating a recognition of the broader economic benefits.

Environmental Impacts: There is a **unanimous expectation (100%)** among all counties that the new regulations will lead to significant environmental benefits. Key anticipated improvements include:

- **Reduced Pollution:** Specific mentions were made of a decrease in soil and water contamination, indicating a clear understanding of the direct environmental harm caused by improper e-waste disposal.
- **Improved Management of UPOPs (Unintentionally Produced Organic Pollutants):** Counties also recognized the role of regulations in better managing hazardous substances often found in e-waste, thus mitigating their release into the environment.
- **Healthier Ecosystems:** Overall, counties expressed a vision for "healthier ecosystems" as a direct outcome of improved e-waste management.

Social Impacts: The social implications of the regulations are also perceived to be dual-natured:

- **Improved Health and Awareness (100%):** All counties anticipate improved public health outcomes as a result of reduced exposure to hazardous e-waste materials. They also expect an increase in public awareness regarding responsible e-waste practices.
- **Informal Sector Income Loss:** A significant concern raised by counties is the potential for **income loss within the informal waste picking sector**. There's a clear recognition that "waste pickers need support," highlighting the necessity for inclusive strategies that safeguard the livelihoods of vulnerable groups who currently derive income from e-waste collection.

Take-Back Programs: The concept of take-back programs, where manufacturers are responsible for collecting their end-of-life products, garnered strong support:

- **Support for Take-Back (80%):** Four counties (80%) expressed support for such programs, recognizing their potential to streamline e-waste collection and ensure proper disposal.
- **Neutral Stance (20%):** One county (20%) remained neutral, suggesting they were still evaluating the feasibility or implications. Counties identified **environmental protection** as a key benefit of take-back programs. However, they also highlighted significant challenges, primarily **costs** associated with setting up and running these programs, and the ongoing need for **public awareness** to ensure consumer participation.

Key Insight: Counties' strong support is tempered by infrastructure and capacity gaps, necessitating funding and digital tools to operationalize regulations.

8.3 Detailed Analysis of E-waste Handler Operations and Compliance (n=4)

This section provides an in-depth examination of the operational characteristics, regulatory adherence, health and safety practices, and perceived impacts among the four surveyed e-waste handlers. This analysis sheds light on the current landscape of e-waste management from the perspective of active participants in the sector.

1. Operational Overview

Roles and Specializations: The surveyed e-waste handlers exhibit a diverse range of roles within the e-waste management ecosystem. Exactly half of the respondents, or **two out of four (50%)**, identify primarily as recyclers, focusing on the processing of e-waste materials. A significant portion, **one out of four (25%)**, operates as a collector and exporter, indicating involvement in cross-border movement of e-waste. The remaining **one handler (25%)** performs a multi-faceted role, engaging in both recycling and refurbishment, highlighting a more integrated approach to e-waste recovery. Cross-tabulation of roles with operational data suggests that handlers primarily focused on recycling tend to manage a broader range of e-waste categories.

Geographic Distribution of Operations: The geographic distribution of these operations indicates a concentration in urban centers, with **three out of four handlers** located in urban areas. Only **one handler** is situated in a rural setting, reflecting the current operational diversity and potentially the accessibility of infrastructure and markets.

E-waste Categories Handled: The scope of e-waste categories managed by these handlers varies. One handler demonstrates a comprehensive approach, processing **eight**

distinct categories of e-waste, including Information Technology (IT) equipment, batteries, and various household appliances. In contrast, the other handlers exhibit a more specialized focus, primarily concentrating on IT equipment and batteries. The median number of e-waste categories handled across all surveyed entities is **4.5**, suggesting that most handlers manage a moderate, rather than exhaustive, range of e-waste types.

Monthly Processing Quantity: In terms of processing capacity, the majority of handlers manage substantial volumes of e-waste. **Three out of four handlers (75%)** reported processing between 100 to 1,000 kilograms of e-waste monthly. A smaller proportion, **one handler (25%)**, processes less than 100 kilograms per month. The median monthly processing quantity is approximately **500 kilograms**, indicating a notable, albeit varied, throughput within the sector.

Processing Methods Employed: The methods utilized for e-waste processing are largely manual, reflecting the prevalent practices in the region. **Three out of four handlers (75%)** rely on manual dismantling techniques. Furthermore, **two out of four handlers (50%)** engage in refurbishment activities, extending the lifespan of electronic devices. Only **one out of four handlers (25%)** is involved in the export of e-waste. The operational approach of the multi-role handler (recycler/refurbisher) notably contrasts with that of smaller, more specialized handlers, who typically demonstrate more limited processing capacities and a narrower range of methods.

2. Regulatory Awareness and Compliance

National Environment Management Authority (NEMA) Registration: A crucial finding is the universal adherence to regulatory requirements regarding registration. All **four surveyed handlers (100%)** are registered with the National Environment Management Authority (NEMA), with three explicitly possessing valid NEMA license numbers. This indicates a high level of formalization and awareness concerning baseline regulatory obligations within the formal e-waste management sector.

Compliance Actions Undertaken: Beyond mere registration, handlers have undertaken specific actions to enhance their compliance:

- **Improved Segregation (75%):** Three out of four handlers (75%) have actively improved their e-waste segregation practices, a critical step for efficient and environmentally sound recycling. This improvement in segregation correlates with larger operational scales, suggesting that more established handlers are better equipped to implement such practices.
- **Formal Registration (50%):** Two out of four handlers (50%) specifically reported undertaking actions related to formal registration, reinforcing the importance of this initial step in compliance.

- **Environmentally Sound Practices (50%):** Half of the handlers (50%) have adopted environmentally sound practices, indicating a move towards more sustainable and responsible e-waste management methodologies.

Compliance Costs: The financial burden of regulatory compliance varies among handlers. **Two out of four handlers (50%)** reported monthly compliance costs exceeding KES 100,000, signifying substantial expenditure. The other **two handlers (50%)** incur costs ranging from KES 10,000 to KES 100,000 per month. The median monthly compliance cost is estimated at **KES 75,000**. Further analysis indicates a strong correlation between higher compliance costs and specific expenditures such as licensing fees, with one handler explicitly mentioning an KES 80,000 licensing fee as a major component of their operational expenses.

Challenges to Compliance: Handlers face distinct challenges in achieving full compliance:

- **High Licensing Fees (75%):** A significant majority, **three out of four handlers (75%)**, identified high licensing fees as a primary impediment. Qualitative feedback strongly reinforces this, with comments such as "fees too high for small businesses" highlighting the disproportionate impact on smaller entities.
- **Unclear Reporting Guidelines (50%):** Half of the handlers (50%) cited unclear reporting guidelines as a challenge, indicating a need for more precise and accessible information on regulatory reporting requirements.
- **Equipment Shortages (25%):** One out of four handlers (25%) reported shortages of necessary equipment, which can hinder the adoption of advanced and safer processing methods.

3. Health and Safety Protocols

Occupational Safety and Health (OSH) Compliance: Compliance with Occupational Safety and Health (OSH) standards is largely observed among the handlers. **Three out of four handlers (75%)** reported complying with OSH regulations, including the use of Personal Protective Equipment (PPE) and implementing waste minimization strategies. This compliance level is positively linked to access to training, suggesting that education plays a vital role in fostering safe working environments. One handler (25%) remained unsure about their full compliance, indicating a potential knowledge gap or inconsistency.

Reported Health Issues: A highly positive finding is that **none of the surveyed handlers (100%)** reported any health issues among their workers attributed to e-waste handling. This outcome suggests that current safety measures, even if informal, are largely effective in preventing immediate health detriments related to their operations.

Use of Protective Gear: Consistent use of protective gear is common, with **three out of four handlers (75%)** always utilizing PPE. However, **one handler (25%)** reported only sometimes using protective gear. This inconsistency is often correlated with smaller-scale operations, where resources or formalized safety protocols might be less stringent.

Awareness of Prohibitions: All surveyed handlers demonstrate complete awareness of regulatory prohibitions. Every handler **(100%)** was aware of the bans on open burning and indiscriminate dumping of e-waste, indicating a fundamental understanding of environmentally harmful practices.

4. Perceived Impacts and Support Needs

Impacts on Income/Profits: The perceived impact of regulations on income or profits is mixed: **two handlers (50%)** reported a negative impact, while the other **two (50%)** perceived a neutral to positive impact. Negative impacts were specifically correlated with smaller operations, suggesting that micro and small enterprises might bear a heavier financial burden from compliance costs or market shifts introduced by regulations.

Impacts on Safety, Access, and Efficiency: Handlers generally rated the impacts on safety, access to e-waste, and operational efficiency positively, with ratings typically falling between 3 and 5 on a scale (where 5 is most positive). However, the concern regarding high licensing costs notably influenced the perceptions of smaller handlers, who often viewed these costs as detrimental to their overall operational efficiency. Qualitative feedback from handlers consistently highlighted the need for **more safety workshops** and training, indicating a desire to further enhance safety conditions and operational knowledge.

Support Mechanisms Required: Handlers identified several critical areas where external support would significantly enhance their ability to comply with regulations:

- **Training (75%):** A large majority, **three out of four handlers (75%)**, emphasized the need for comprehensive training on regulatory requirements, best practices for e-waste handling, and new technologies.
- **Subsidies (50%):** Half of the handlers (50%) requested subsidies, likely for equipment acquisition, operational costs, or to offset high licensing fees.
- **Clearer Guidelines (50%):** Two out of four handlers (50%) expressed a need for clearer guidelines, particularly concerning reporting mechanisms and specific e-waste fractions. This indicates a demand for more precise and actionable regulatory instructions to facilitate easier compliance.

Key Insight: High licensing fees disproportionately affect smaller handlers, while multi-role operations suggest scalability potential with equipment support.

8.4 Detailed Analysis of General Public Perceptions and Practices Regarding E-waste Management (n=61)

This section provides an in-depth analysis of the survey data collected from 61 members of the general public (after duplicate entries were filtered). The analysis focuses on their demographic profiles, e-waste generation patterns, disposal practices, levels of awareness and participation in recycling initiatives, and preferences for future e-waste management strategies.

1. Demographic Profile of Respondents

Geographic Location: The majority of respondents reside in urban areas, accounting for **70.5%** of the sample. Peri-urban residents constitute **18.0%**, while those from rural areas make up **11.5%**. This distribution indicates an urban bias in the sampling methodology, which should be considered when generalizing findings.

Income Distribution: The income levels among the respondents are diverse. A significant portion, **36.1%**, reported a monthly income of less than KES 20,000. Respondents earning between KES 20,000 and KES 50,000 represent **27.9%**, while those earning between KES 50,000 and KES 100,000 constitute **19.7%**. The highest income bracket, exceeding KES 100,000, accounts for **16.4%**. The median monthly income among the surveyed individuals is approximately **KES 35,000**.

Education Level: The educational attainment of the respondents is notably high. Individuals with university or college education form the largest group at **59.0%**. Those with secondary education comprise **29.5%**, and postgraduates account for **11.5%**. A key correlation observed is that higher education levels are generally associated with increased awareness regarding e-waste issues.

Cross-Tabulation Insights: Further analysis through cross-tabulation revealed significant interrelationships between demographic factors:

- **Income and Residency:** A moderate positive correlation (Pearson r=0.42) was found between higher income levels (specifically, over KES 50,000) and urban residency. This suggests that wealthier individuals are more likely to reside in urban centers.
- **Education and Risk Awareness:** Postgraduate education demonstrated a strong link to environmental risk awareness, with **80% of postgraduates** reporting awareness of e-waste risks, compared to an overall awareness rate of **65.6%** across the entire sample. This highlights the role of advanced education in fostering environmental consciousness.

2. E-waste Generation and Device Management

Commonly Owned Devices: The prevalence of electronic devices among the general public is substantial. Smartphones are universally owned by all respondents (**100%**). Televisions are present in **83.6%** of households, followed by laptops/tablets at **78.7%**. Small appliances are owned by **73.8%**, and power banks/batteries by **67.2%**. The median number of electronic devices owned per household is **4**, indicating a high saturation of electronic gadgets in daily life.

Device Replacement Frequency: The frequency at which electronic devices are replaced varies considerably:

- **47.5%** of respondents replace their devices every 4–5 years.
- **36.1%** replace devices only when they are broken or no longer functional.
- A smaller proportion, **16.4%**, replaces devices every 2–3 years. An interesting correlation (Pearson r=0.31) was observed between more frequent replacement cycles (2–3 years) and higher income levels, suggesting that affluent individuals may upgrade their devices more regularly.

Primary Reasons for Replacement: The dominant reason for device replacement is **malfunction**, cited by **49.2%** of respondents. The desire for **better performance** accounts for **23.0%** of replacements, while **obsolescence** (where a device becomes outdated) contributes **16.4%**. Device malfunction remains the leading cause for replacement consistently across all income levels, emphasizing the need for durable products and accessible repair services.

3. E-waste Disposal Practices

Current Storage Practices: A significant proportion of respondents, **45.9%**, store their end-of-life electronic devices at home. Approximately **29.5%** opt to give away or sell their used electronics, while **16.4%** dispose of them in regular trash. Urban residents demonstrate a higher propensity to store e-waste at home (**50%**) compared to their rural counterparts (**30%**), potentially due to limited disposal options or greater awareness of environmental concerns.

Methods of E-waste Disposal: The most common disposal methods include:

- **Donating to friends/family (49.2%):** This informal channel is widely used for repurposing electronics.
- **Storing indefinitely (36.1%):** Many households retain old devices, potentially contributing to a significant hidden e-waste stream.
- **Regular trash (29.5%):** A concerning proportion still disposes of e-waste through general waste streams, which can lead to environmental contamination.
- **Informal collectors (19.7%):** While offering a pathway for collection, this method often lacks formal environmental safeguards. A notable correlation exists

between low awareness of e-waste risks (34.4% of the sample) and disposal in regular trash; **40% of unaware individuals** resort to trash disposal, in contrast to **20% of aware individuals**, highlighting the critical role of awareness campaigns.

Reasons for Selling/Giving Away Devices: When respondents choose to sell or give away their e-waste, the primary motivator is **convenience (36.1%)**. This is followed by a desire to **help others (29.5%)** and the potential to earn **money (16.4%)**. Convenience was found to be a more significant factor among urban respondents (**40%**) compared to rural respondents (**25%**), possibly due to better access to second-hand markets or donation points.

4. Awareness and Participation in E-waste Management

Awareness of E-waste Risks: Overall, **65.6%** of the general public is aware of the environmental and health risks associated with improper e-waste disposal, including concerns like environmental degradation and health risks. Conversely, **34.4%** remain unaware. Awareness levels are notably higher among university-educated individuals (**70%**) and urban residents (**68%**), underscoring the influence of education and geographic location on environmental consciousness.

Knowledge of Recycling Programs: Knowledge about existing e-waste collection or recycling programs in their area is relatively low, with only **29.5%** of respondents confirming awareness of such initiatives. Urban respondents are more likely to be informed about these programs (**35%**) compared to rural residents (**20%**), suggesting a disparity in access to information or services.

Willingness to Participate in Take-Back Programs: There is a strong willingness among the public to participate in take-back programs if they become available. **80.3%** of respondents expressed direct willingness, while **13.1%** indicated they might be willing if encouraged by factors like accessibility. Only **6.6%** were outright unwilling. A positive correlation (Pearson r=0.38) was observed between willingness to participate and overall awareness of e-waste risks, indicating that informed individuals are more likely to support such initiatives.

Perceived Barriers to Proper Recycling: The primary barrier preventing proper e-waste recycling is the **lack of nearby collection points**, cited by **36.1%** of respondents. Other significant barriers include a **lack of awareness (19.7%)** regarding recycling options and a **preference for selling (13.1%)** old devices for monetary gain. Rural respondents disproportionately highlight the lack of collection points (**50%**) compared to urban residents (**30%**), reinforcing the infrastructure gap in remote areas.

Willingness to Pay for Disposal: A majority of the general public, **62.3%**, expressed willingness to pay a small fee for proper e-waste disposal. Among these individuals, the

median amount they are willing to pay is **KES 1,000**, with a wide range spanning from KES 0 to KES 5,000. A positive correlation (Pearson r=0.45) exists between higher income levels and a greater willingness to pay, suggesting that financial capacity influences the readiness to contribute to responsible disposal.

5. Preferences for Future E-waste Management

Preferred Collection Methods: When asked about the most convenient e-waste collection methods, respondents indicated:

- **Drop-off points (49.2%):** Locations in markets or supermarkets are favored for their accessibility.
- **Community drives (36.1%):** Organized events within neighborhoods are also a popular choice.
- **Pick-up services (14.7%):** Door-to-door collection, while convenient, was less frequently cited. Urban residents show a stronger preference for drop-off points (**55%**) compared to rural residents (**40%**), reflecting existing infrastructure and lifestyle differences.

Preferred Awareness Campaign Channels: To encourage proper e-waste disposal, the public suggests various awareness campaign channels:

- **Social media (44.3%):** Social media advertisements are seen as the most effective medium.
- **Radio/TV announcements (36.1%):** Traditional media channels remain highly influential.
- **Community workshops (19.7%):** Direct engagement through workshops is also valued. Social media campaigns are particularly preferred by younger respondents (under 35 years old), with **50%** expressing this preference, indicating a demographic alignment with digital platforms.

Perceived Impact of New Regulations: The anticipated impact of new e-waste regulations on daily life is varied:

- **Positive impact (49.2%):** Nearly half expect a positive impact, primarily citing a cleaner environment.
- **No impact (32.8%):** A significant portion believes the regulations will not affect their daily lives.
- **Negative impact (18.0%):** A minority anticipates negative impacts, primarily due to perceived inconvenience or increased costs. Positive expectations are strongly correlated with awareness of e-waste issues; **60% of aware individuals** anticipate a positive impact, compared to only **30% of unaware individuals**.

Support for Manufacturer Take-Back Policies: There is overwhelming support for government policies requiring manufacturers to take back old electronics, with **88.5%** of the public expressing support. This support is highest among urban and more educated respondents, reflecting a higher degree of understanding and concern for producer responsibility in e-waste management.

Key Insight: Universal smartphone ownership and high take-back support (88.5%) suggest potential for mobile-based collection apps, but low awareness (34.4%) and reliance on informal disposal (19.7%) highlight education and infrastructure needs.

Discussion

8.5 Cross-Cutting Themes and Recommendations for E-waste Management in Kenya

This section synthesizes key findings across all stakeholder groups—manufacturers, county governments, waste handlers, and the general public—to identify overarching themes and formulate actionable recommendations for the effective implementation of the Electronic and Electrical Waste (E-waste) Regulations.

1. Cross-Cutting Themes

1.1. Regulatory Awareness: While a foundational level of awareness exists, significant disparities are evident across stakeholder groups. Waste handlers demonstrate the highest awareness, with **100%** reporting familiarity with the regulations, likely due to their direct operational involvement. County governments follow at **80%**, indicating a relatively strong understanding at the administrative level. Manufacturers, retailers, and distributors show a moderate awareness of **66.7%**, suggesting room for targeted outreach. The general public exhibits the lowest, albeit still significant, awareness at **65.6%**. This collective data underscores that while a majority of stakeholders are generally informed, sustained and public-focused campaigns are crucial to translate awareness into broad-based compliance and participation, particularly among citizens.

1.2. Compliance Challenges: A pervasive theme across all stakeholder groups is the burden of compliance costs and the lack of clarity in regulatory guidelines.

- **Cost Implications:** Manufacturers anticipate substantial cost increases, ranging from **KES 250,000 to KES 5,000,000**. Waste handlers face a median monthly compliance cost of approximately **KES 75,000**, with some reporting expenses over KES 100,000, largely driven by licensing fees (e.g., KES 80,000). County governments project significant financial outlays, with a median expected cost of **KES 999,000** for implementation. These figures collectively highlight the considerable financial implications across the value chain.

- **Unclear Guidelines:** Both manufacturers and waste handlers consistently cite unclear reporting guidelines as a significant impediment to compliance. This ambiguity can lead to misinterpretation, increased administrative burdens, and reduced efficiency in adherence.
- **Disproportionate Impact on Smaller Entities:** The qualitative feedback, particularly from waste handlers, strongly indicates that high licensing fees and overall compliance costs disproportionately affect smaller businesses. This financial strain can act as a barrier to formalization and sustainable operation for micro and small enterprises within the e-waste sector.

1.3. E-waste Management Infrastructure and Practices: Current e-waste management capabilities and practices vary significantly, revealing critical gaps:

- **Manufacturer Responsibility:** Only one out of three surveyed manufacturers reported having an existing take-back or recycling program, highlighting a widespread lack of formalized producer responsibility schemes.
- **County-Level Infrastructure:** County governments universally express a significant deficit in local e-waste collection points and the broader infrastructure required for effective management. This absence often forces citizens to seek alternative, often informal, disposal methods.
- **Handler Capacity:** While waste handlers are actively involved in processing, many require subsidies for essential equipment, indicating a need for capital investment to enhance their operational capacity and adopt more advanced, environmentally sound technologies.
- **Public Disposal Habits:** The general public's reliance on informal disposal channels remains a concern. A notable 29.5% of respondents admit to disposing of e-waste in regular trash, and 19.7% resort to informal collectors. These practices pose significant environmental and health risks due to the improper handling of hazardous materials.

1.4. Support for Regulations: Despite the aforementioned challenges, there is broad and strong support for the proposed E-waste Regulations across all stakeholder groups, reflecting a shared understanding of the necessity for a structured approach to e-waste management:

- **Waste Handlers (100% support):** Universal support, indicating their readiness for a formalized framework.
- **General Public (88.5% support for manufacturer take-back):** Overwhelming public backing for producer responsibility initiatives.
- **County Governments (80% support):** Strong support from local authorities, who are critical for implementation.
- **Manufacturers (66.7% support):** A majority support the regulations, despite concerns about costs, signaling recognition of long-term benefits. However, concerns regarding potential cost duplication and overlapping regulatory

requirements, particularly from manufacturers, suggest a need for harmonized and streamlined implementation frameworks to prevent unnecessary burdens.

1.5. Anticipated Impacts: The anticipated impacts of the regulations present a mixed but generally positive outlook:

- **Environmental Benefits:** There is a unanimous expectation across all groups for significant environmental improvements, primarily through reduced pollution (e.g., soil and water contamination, better management of Unintentionally Produced Organic Pollutants - UPOPs).
- **Economic Burdens and Job Creation:** While economic burdens, largely due to compliance costs, are anticipated (especially by manufacturers and counties), all stakeholders also foresee considerable potential for job creation within the emerging e-waste management and recycling industries.
- **Social Implications:** Improved public health and awareness are widely expected. However, the potential negative impact on the livelihoods of informal sector waste pickers is a significant social concern that requires careful mitigation strategies to ensure an inclusive transition.
- **Digital Engagement Opportunities:** The universal ownership of smartphones among the general public (**100%**) presents a unique opportunity for leveraging digital tools, such as mobile applications, to enhance public engagement, facilitate collection services, and disseminate information efficiently.

1.6. Interesting Insight: The Awareness-Disposal Correlation A compelling insight derived from the analysis is the significant positive correlation (Pearson r=0.38) between public awareness of e-waste risks and their propensity for proper disposal methods. This correlation is a powerful indicator that well-designed and widespread awareness campaigns could substantially reduce the reliance on informal disposal methods, such as disposal in regular trash (currently **29.5%**) or through informal collectors (**19.7%**). This potential for behavioral change is particularly promising in urban areas, where high smartphone penetration enables the deployment of app-based solutions for locating collection points and accessing recycling information, thereby bridging the information gap and promoting responsible practices.

2. Recommendations

Based on the cross-cutting themes and insights, the following recommendations are proposed to ensure the effective and equitable implementation of the E-waste Regulations:

2.1. Streamline Regulatory Frameworks:

- **Clarify Guidelines:** It is imperative to develop and disseminate clear, concise guidelines for reporting and the handling of problematic e-waste fractions. This addresses the concerns raised by a significant portion of manufacturers (**2 out of 3**) and waste handlers (**2 out of 4**), as well as county governments, ensuring consistent interpretation and easier compliance across all stakeholders.
- **Resolve Duplication:** Address and resolve any concerns regarding regulatory duplication, as raised by **1 out of 3** manufacturers. A harmonized and non-overlapping regulatory environment will reduce administrative burdens and foster greater industry cooperation.

2.2. Implement Targeted Financial Support Mechanisms:

- **Tiered Fee Structures:** Introduce tiered fee structures for manufacturers and handlers, wherein smaller entities face lower licensing fees (e.g., manufacturers below KES 250,000 and small waste handlers below KES 80,000). This approach acknowledges the disproportionate impact of high costs on small businesses and encourages formalization.
- **Funding for County Infrastructure:** Allocate dedicated financial resources to county governments to facilitate the establishment and operation of adequate e-waste collection centers and necessary infrastructure. This directly addresses the critical need highlighted by counties to bridge existing capacity gaps.
- **Cap Public Disposal Fees:** Implement a reasonable cap on any fees charged to the general public for e-waste disposal, ideally at a median of **KES 1,000**, to encourage participation without creating financial barriers. The identified range of willingness to pay (KES 0–5,000) provides a basis for this cap.

2.3. Prioritize Infrastructure Development:

- **Urban Drop-off Points:** Strategically establish accessible drop-off points, particularly in urban areas, as this is the preferred collection method for **49.2%** of the general public and a key request from county governments.
- **Subsidize Handler Equipment:** Provide subsidies or incentives for waste handlers to acquire essential equipment for safe dismantling, recycling, and advanced processing technologies. This will enhance their operational efficiency and environmental performance.

2.4. Enhance Awareness and Training Initiatives:

- **Multi-channel Public Campaigns:** Launch extensive awareness campaigns utilizing preferred channels such as social media (**44.3% public preference**) and radio/TV (**36.1% public preference**) to educate the public on e-waste risks and proper disposal methods.

- **Targeted Training:** Provide comprehensive training programs for county government officials and waste handlers on the new regulations, best practices for e-waste management, and occupational health and safety protocols.

2.5. Protect and Integrate the Informal Sector:

- **Formalization Pathways:** Develop clear pathways for licensing and formalizing informal waste pickers, acknowledging the current reliance of **19.7%** of the public on informal collectors. This ensures their inclusion in the formal system and provides them with support and protection.
- **Subsidies for Formalization:** Offer subsidies or incentives to informal sector waste handlers to facilitate their transition into the formal waste management system.
- **Monitoring and Feedback:** Establish a robust monitoring mechanism to assess the socio-economic impacts on the informal sector and provide timely feedback and adjustments to policies within a defined timeframe (e.g., 60 days post-implementation).

2.6. Leverage Digital Tools for Efficiency:

- **Centralized Reporting Platforms:** Develop user-friendly digital platforms for reporting, as requested by county governments and supported by **1 out of 3** manufacturers. This will streamline data collection and improve regulatory oversight.
- **Public-facing Mobile Application:** Create a dedicated mobile application for the general public to easily locate e-waste collection points, access information on proper disposal, and potentially schedule pick-up services. This leverages the **100% smartphone ownership** among the public for enhanced engagement.

2.7. Promote Take-Back Programs and support the transition towards a circular economy:

- **Incentivize Producer Responsibility Organizations (PROs):** Introduce incentives for manufacturers to establish or join Producer Responsibility Organizations (PROs) to manage the take-back of end-of-life products. This aligns with the strong support from county governments (**4 out of 5**) and the general public (**88.5%**).
- **Support Community Drives:** Collaborate with county governments to support and expand community collection drives and support the transition towards a circular economy, a preferred method for **36.1%** of the public, to enhance accessibility and participation.

Conclusion

The comprehensive analysis reveals strong, albeit nuanced, stakeholder support for the 2025 E-waste Regulations. However, it critically highlights persistent barriers such as the high costs of compliance, significant infrastructure gaps, and varying levels of public awareness. Deeper insights confirm that increased awareness directly correlates with improved compliance and proper disposal practices, emphasizing the transformative potential of targeted communication. The findings also underscore that smaller entities across manufacturers and waste handlers disproportionately bear the financial brunt of new regulations, necessitating tailored support. Enhanced visualizations across stakeholder datasets clarified critical trends, such as the general public's continued reliance on informal disposal channels and the notable capacity constraints faced by county governments. By addressing these identified challenges through streamlined regulations, strategic financial support, infrastructure development, robust awareness campaigns, and inclusive approaches for the informal sector, Kenya can effectively transition towards a sustainable and circular economy for electronic waste. Maintaining anonymized data throughout this assessment ensured stakeholder privacy while preserving the analytical depth required for impactful policy recommendations. Further data collection with larger samples would enhance generalizability.

9. COST-BENEFIT ANALYSIS: A COMPREHENSIVE ASSESSMENT

9.1 Introduction and Methodological Framework

This chapter presents a cost-benefit analysis (CBA) to evaluate the economic efficiency of implementing Kenya's proposed Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025. The analysis adheres to established methodological frameworks for regulatory impact assessment as outlined by the Organization for Economic Co-operation and Development (OECD, 2020) and the World Bank (2017). It seeks to quantify and monetize, where feasible, the costs and benefits across economic, environmental, and social dimensions to determine whether the regulatory intervention generates a net positive welfare outcome for Kenya (Boardman et al., 2018).

A critical methodological consideration involves cost attribution, as raised in stakeholder feedback (National Environment Management Authority [NEMA], 2024, Issue #9). This feedback correctly notes that certain waste management costs are already mandated under existing regulatory frameworks, namely the *Sustainable Waste Management (Extended Producer Responsibility) Regulations, 2024* (EPR Regulations) and the *Environmental Management and Co-ordination (Waste Management) Regulations, 2024* (Waste Management Regulations). To address this concern, the present CBA employs the following approach:

1. **Isolation of Incremental Costs:** Only costs uniquely attributable to the specific requirements of the E-Waste Regulations—those not already covered by the EPR or Waste Management Regulations—are included.
2. **Proportional Allocation of Shared Costs:** In instances of regulatory overlap, costs are allocated based on the proportional contribution of the e-waste stream relative to other waste categories.
3. **Sensitivity Analysis:** The analysis tests scenarios with varying degrees of cost overlap to demonstrate the robustness of the findings under different assumptions.

The analysis demonstrates that even after accounting for this regulatory overlap, the E-Waste Regulations generate substantial net benefits. This is primarily achieved through enhanced technical specificity, targeted material recovery requirements, and strengthened enforcement mechanisms not present in the more general waste regulations (Ogundiran & Osibanjo, 2021).

9.2 Analytical Scope and Research Question

The central research question guiding this analysis is: Do the net benefits of Kenya's Draft E-Waste Regulations justify the incremental implementation costs, when considering:

- Incremental regulatory and compliance costs beyond existing EPR and Waste Management Regulations?
- Quantifiable improvements in environmental protection and public health?
- Economic benefits from enhanced material recovery and circular economy development?
- Avoided future public expenditure on environmental cleanup and health remediation?

Analytical Boundaries:

- **Geographic Scope:** National (Kenya), with urban-rural disaggregation where data permits (Kenya National Bureau of Statistics [KNBS], 2023).
- **Temporal Scope:** A 10-year assessment period (2025-2035), with sensitivity analysis conducted for 5-year and 15-year horizons to test the impact of the time frame.
- **Baseline Year:** 2024 conditions, characterized by an estimated 1% formal recycling rate and 53,559 tonnes of annual e-waste generation (Global E-waste Statistics Partnership, 2024).

Comparator Scenarios:

- **Status Quo Baseline:** No new e-waste regulations; continuation of current informal sector dominance under the general purview of existing waste regulations.
- **Proposed Regulatory Scenario:** Full implementation of the E-Waste Regulations, 2025.
- **Partial Implementation Scenario:** A phased rollout achieving 50% of intended outcomes, used for sensitivity analysis.

Financial Parameters:

- **Discount Rate:** A real discount rate of 7%, consistent with the Government of Kenya standard for public investment appraisal (National Treasury, 2022). Sensitivity analysis is performed at 5% and 10%.
- **Currency:** All values are presented in Kenya Shillings (KES) and US Dollars (USD), converted at a projected 2025 exchange rate (1 USD = KES 129).

9.3 Current Baseline Conditions: The Status Quo

9.3.1 E-Waste Generation and Composition

Kenya generates an estimated 53,559 metric tonnes of e-waste annually (KNBS, 2025). The composition by category is as follows:

- **IT and Telecommunications Equipment** (e.g., computers, mobile phones): Comprises 35% by unit count but only 15% by weight (approximately 8,034 tonnes).
- **Large Household Appliances** (e.g., refrigerators, washing machines): Dominates by weight at 45% (approximately 24,102 tonnes).
- **Small Household Appliances and Consumer Electronics:** Accounts for 25% by unit count and 40% by weight (approximately 21,423 tonnes).

The e-waste stream is experiencing a rapid growth trajectory of 8-12% per annum (Forti et al., 2024). This is driven by increasing technology penetration, with mobile phone ownership reaching 89% of the population (Communications Authority of Kenya, 2024), and reducing device lifespans, as smartphones are now replaced every 2-3 years compared to 4-5 years historically (Babbitt et al., 2021).

Projected Generation (2025-2035):

- **Conservative Scenario (8% p.a. growth):** 116,100 tonnes by 2035.

- **Moderate Scenario (10% p.a. growth):** 139,100 tonnes by 2035. This analysis employs the 10% growth rate as the baseline projection.

9.3.2 Current Management Practices

- **Formal Sector (≈5% or 2,678 tonnes annually):** Capacity is provided by a handful of licensed operators, including the WEEE Centre (processing ~2,400 tonnes) and East African Compliant Recycling (~1,800 tonnes) (WEEE Centre, 2023). Total licensed capacity (~4,700 tonnes) is underutilized due to significant collection challenges from a dominant informal sector. Material recovery rates in the formal sector are estimated at 85% for metals and 60% for plastics, with residues exported or safely disposed (Kiddee et al., 2013).
- **Informal Sector (≈95% or 50,881 tonnes annually):** Practices are characterized by:
    - Manual dismantling for high-value components (~40% of volume).
    - Open burning for copper recovery (~30% of volume), a significant source of airborne pollutants.
    - Acid leaching of circuit boards (~10% of volume), leading to soil and water contamination.
    - Indiscriminate dumping in municipal landfills or the environment (~20% of volume).

Environmental and Health Consequences:

The informal processing results in severe externalities:

- **Soil Contamination:** An estimated 5,000 hectares within 2km of major processing sites (e.g., Dandora, Mukuru) show elevated levels of heavy metals (Asante et al., 2012).
- **Water Pollution:** Heavy metal concentrations in the Nairobi River have been recorded at 10-50 times the World Health Organization (WHO) safe drinking water standards (UN-HABITAT, 2010).
- **Occupational Health:** Between 5,000 and 8,000 informal workers are directly exposed to hazardous materials without adequate personal protective equipment (Lundgren, 2012).
- **Community Health:** Approximately 50,000 residents living within 2km of informal burning sites face elevated risks of respiratory and neurological diseases (Grant et al., 2013).

9.3.3 Material Value Loss

The gross recoverable material value within Kenya's annual e-waste stream is substantial. The Global E-waste Monitor 2024 estimates that the global e-waste stream contains USD 91 billion in recoverable materials, equating to approximately USD 1,468 per tonne (Baldé et al., 2024).

Applying this to Kenya:

- Gross Material Value: 53,559 tonnes × USD 1,468/tonne = **USD 78.6 million (KES 10.14 billion) annually.**

Current Value Capture:

- **Formal Sector (5%):** Processes 2,678 tonnes, capturing a gross value of USD 3.9 million. After accounting for processing and export costs, the net retained value is approximately 30%, or **USD 1.2 million (KES 155 million)**.
- **Informal Sector (95%):** Processes 50,881 tonnes with low recovery efficiency. With an estimated value capture rate of only 20% (focusing primarily on copper and aluminum), it secures roughly **USD 14.9 million**. However, this "captured" value is offset by the significant external costs of environmental damage and public health impacts (Schluep et al., 2021).

The total annual economic loss, considering inefficient recovery and externalities, is estimated at **USD 60-70 million** in unrealized material value and accrued social costs.

9.3.4 Costs Already Incurred Under Status Quo

The status quo imposes significant hidden costs on the Kenyan economy and society:

- **Healthcare Costs:**
    - Respiratory disease treatment: 500-1,000 cases × KES 30,000/case = **KES 15-30 million** (WHO, 2019).
    - Heavy metal poisoning: 200-400 cases × KES 50,000/case = **KES 10-20 million**.
    - Long-term chronic conditions (cardiovascular, neurological, cancer): Estimated **KES 50-100 million** annually.
- **Environmental Remediation Liability:**
    - Contaminated sites requiring future cleanup: 5,000 hectares × KES 200,000/hectare = **KES 1 billion** in future liability (NEMA, 2023).
    - Increased municipal water treatment costs: **KES 50-100 million** annually for affected municipalities (Nairobi, Thika, Kiambu).
- **Economic Opportunity Costs:**
    - Lost employment in a potential formal recycling sector: **3,000-5,000 jobs foregone** (International Labour Organization, 2020).
    - Lost tax revenue from informal sector activities: **KES 100-200 million** annually.
    - Property value depression in adjacent communities (e.g., Dandora, Mukuru): Estimated **KES 3-5 billion**.

The aggregate of these status quo hidden costs amounts to approximately **KES 1.2-1.5 billion annually**, excluding long-term, contingent liabilities for health and environmental remediation.

9.4 Regulatory Options and Scenarios

9.4.1 Option 1: Status Quo Continuation

Description: Maintain current conditions with minimal formal recycling, continued informal sector dominance, implementation only of general EPR and WMR provisions without e-waste specificity.

Projected outcomes (2025-2035):

- Formal recycling rate remains 5% ± 2%
- Environmental and health impacts continue escalating
- Material value losses continue
- No systematic import controls

Costs: Status quo costs (KES 1.2-1.5 billion annually) continue and escalate with e-waste growth

Benefits: None; this is the baseline comparator

Net Present Value: Defined as zero (baseline)

9.4.2 Option 2: Proposed E-Waste Regulations (Full Implementation)

Description: Complete implementation of proposed regulations including:

- Mandatory producer registration and EPR obligations (beyond general EPR provisions)
- E-waste-specific collection and treatment standards
- Import controls with functionality testing
- Licensing and oversight of refurbishers, collectors, recyclers
- Prohibition enforcement on hazardous practices
- Informal sector integration programs

Projected outcomes:

- **Conservative scenario:** 30% formal recovery by Year 3 (16,068 tonnes), 40% by Year 5
- **Optimistic scenario:** 60% formal recovery by Year 5 (32,135 tonnes), 70% by Year 10

This analysis uses conservative scenario as base case, with optimistic scenario for sensitivity analysis.

9.4.3 Option 3: Phased/Partial Implementation

Description: Gradual rollout over 5 years, achieving 50% of intended outcomes.

Note: This option explored in sensitivity analysis (Section 9.10) but not full base case, as international evidence suggests partial implementation often fails due to insufficient critical mass for infrastructure viability.

9.5 Addressing Cost Overlap with Existing Regulations

9.5.1 Costs Already Covered by EPR Regulations, 2024

The Sustainable Waste Management (EPR) Regulations, 2024 (L.N. 176/2024) establish general producer obligations across all product categories including EEE. Costs **already mandated** include:

Producer-level costs:

1. **Basic registration with NEMA:** KES 5,000 per producer (E-Waste Regs Schedule 3 sets same fee no incremental cost)

2. **EPR plan development:** KES 50,000-200,000 per producer for 4-year plan (one-time)
3. **Annual reporting:** KES 20,000-50,000 per producer annually for data compilation and submission
4. **General collection infrastructure:** Producers must establish "collection systems" (EPR Regs Section 5)

These EPR baseline costs apply regardless of E-Waste Regulations and are therefore EXCLUDED from this CBA.

9.5.2 Incremental Costs Unique to E-Waste Regulations

The E-Waste Regulations impose **additional, e-waste-specific requirements** beyond EPR baseline:

1. E-waste-specific treatment fees (Regulation 7):

- EPR Regulations: General "waste management fees" unspecified
- E-Waste Regulations: Specific fees for problematic fractions (CRTs, mercury lamps, refrigerants)
- **Incremental cost:** KES 50-500/kg for problematic items (Schedule 5A proposed)
- **Annual aggregate:** ~10% of e-waste (5,356 tonnes) × average KES 150/kg = **KES 803 million annually**

2. Refurbisher licensing and compliance (Regulation 11):

- EPR/WMR: No specific refurbisher provisions
- E-Waste Regulations: Mandatory licensing, record-keeping, proper disposal of unserviceable parts
- **Incremental cost:** 500 refurbishers × KES 10,000 license + KES 30,000 annual compliance = **KES 20 million annually**

3. Enhanced collection center standards (Regulation 12):

- EPR: General "collection points" required
- E-Waste Regulations: Specific standards (segregation, storage, safety, weighbridge)
- **Incremental cost:** Upgrading to e-waste standards: KES 2 million per center × 20 centers (phased to 47 over 10 years) = **KES 40 million capital, KES 20 million annual operating**

4. Specialized recycler requirements (Regulations 13-14):

- WMR: General waste handler licensing
- E-Waste Regulations: E-waste-specific dismantling standards, environmentally sound management, evidence notes
- **Incremental cost:** Technology/process upgrades: KES 5-10 million per recycler × 5-10 facilities = **KES 25-100 million capital**

5. Import control infrastructure (Regulations 17A-C proposed):

- EPR/WMR: No import-specific provisions
- E-Waste Regulations: Pre-import notification, functionality testing, port inspections
- **Incremental cost:**
    - NEMA-KRA systems integration: KES 5 million (one-time)
    - Inspection infrastructure (equipment, training): KES 15 million (one-time)
    - Annual inspection operations: KES 10 million

6. Functionality testing and waste definition system (Regulation 2A, Schedule 7 proposed):

- EPR/WMR: No objective waste criteria
- E-Waste Regulations: Testing protocols, laboratory accreditation, certification system
- **Incremental cost:**
    - KEBS accreditation program: KES 5 million (one-time)
    - Laboratory equipment for 5-10 labs: KES 2 million each = KES 10-20 million
    - Annual testing operations: KES 10-15 million

9.5.3 Shared Costs: Proportional Allocation

Some costs are shared between e-waste and other waste streams under EPR/WMR. Following accounting principles, these are allocated proportionally:

NEMA enforcement and monitoring:

- Total NEMA waste management budget: KES 180 million annually (Chapter 6)
- E-waste proportion of waste streams: ~5% by weight of total waste
- **E-waste allocation:** 5% × KES 180M = KES 9 million annually
- **But:** E-waste regulations significantly increase NEMA workload (registry, import controls, technical assessments)
- **Incremental increase:** Additional 10 dedicated e-waste officers + systems = KES 50 million annually (Chapter 6 analysis)
- **Thus incremental cost attributable to E-Waste Regs:** KES 41 million annually (KES 50M - KES 9M baseline)

County collection services:

- Total county waste management budgets: ~KES 4.5 billion annually across 47 counties (Nairobi alone KES 4.5B, others pro-rata)
- E-waste proportion: ~0.5% of municipal solid waste by weight

- **Baseline allocation to e-waste:** ~KES 22 million nationally
- **Incremental for e-waste-specific infrastructure:** KES 55 million annually (Chapter 6 Section 6.3.4)
- **Incremental cost:** KES 33 million annually

9.5.4 Summary: Incremental Costs Beyond EPR/WMR

Cost Category	EPR/WMR Baseline (KES Million)	E-Waste Regs Increment (KES Million)	Total Cost (KES Million)
Producer registration/reporting	50 (already required)	0	50
Problematic fraction fees	0 (not specified in EPR)	803	803
Refurbisher compliance	0 (not in EPR/WMR)	20	20
Collection infrastructure	22 (pro-rata county allocation)	33	55
Recycler upgrades	50 (general standards)	50 (e-waste specificity)	100
Import controls	0 (not in EPR/WMR)	15	15
Testing/certification	0 (not in EPR/WMR)	12	12
NEMA enforcement	9 (pro-rata baseline)	41	50
TOTAL ANNUAL	**131**	**974**	**1,105**

Table 9. 1: Incremental Cost Beyond EPR/WMR

Capital costs (one-time, first 3 years):

- Collection centers: KES 40 million
- Recycler facilities: KES 50 million (public investment/subsidies; private investment additional)
- Import/testing infrastructure: KES 25 million
- **Total capital:** KES 115 million

Critical finding: Of KES 1.105 billion total annual costs, **KES 974 million (88%) represents incremental costs unique to E-Waste Regulations**, with only KES 131 million (12%) overlapping with EPR/WMR baseline that would occur regardless.

Implication: The majority of costs are NOT duplicative but rather address e-waste-specific challenges (problematic fractions, import controls, technical standards) that general EPR/WMR cannot adequately address.

9.6 Benefit Quantification Framework

9.6.1 Material Recovery Benefits

Conservative scenario (30% formal recovery by Year 3):

Year 3 generation: 53,559 tonnes × $(1.10)^3$ = 71,290 tonnes Formal recovery: 30% × 71,290 = 21,387 tonnes

Gross material value: 21,387 tonnes × USD 1,468/tonne = USD 31.4 million (KES 4.05 billion)

Net domestic value retention: International evidence (Buchert et al., 2012; Hagelüken & Corti, 2010) and Kenya stakeholder data indicate:

- Processing costs: 20-30% of gross value (dismantling, sorting, transportation)
- Export costs: 30-40% of gross value (most materials exported as concentrates to specialized smelters)
- **Net retention:** 30-50% of gross value

Conservative estimate: 30% net retention Year 3 benefit: USD 31.4M × 30% = **USD 9.4 million (KES 1.21 billion)**

Optimistic scenario (60% formal recovery by Year 5):

Year 5 generation: 53,559 × $(1.10)^5$ = 86,264 tonnes Formal recovery: 60% × 86,264 = 51,758 tonnes Gross value: 51,758 × USD 1,468 = USD 76.0 million Net retention (optimistic 50%): **USD 38.0 million (KES 4.90 billion)**

10-year cumulative material recovery benefit (conservative, NPV at 7%):

Year	Generation (tonnes)	Formal Recovery (30%)	Net Value Retained (KES M)	Discount Factor	Present Value (KES M)
1	58,915	17,674	778	0.935	727
2	64,806	19,442	856	0.873	747
3	71,290	21,387	941	0.816	768
4	78,419	23,526	1,035	0.763	790
5	86,264	25,879	1,139	0.713	812
6-10	(increasing)	(increasing)	6,800 (cumulative)	Various	4,350
TOTAL			**11,549**		**8,194**

Table 9. 2: 10-year cumulative material recovery beneft (conservative, NPV at 7%)

10-year NPV of material recovery (conservative): KES 8.19 billion 10-year NPV of material recovery (optimistic, 60% recovery): KES 19.8 billion

9.6.2 Avoided Health and Environmental Costs

Health cost avoidance:

Grant et al. (2013) and WHO (2021) document health costs from e-waste exposure. Kenya-specific estimates:

Conservative (per tonne diverted from informal to formal processing):

- Respiratory disease treatment avoided: KES 500/tonne (based on 1% incidence × KES 30,000 treatment)
- Heavy metal poisoning avoided: KES 300/tonne
- Long-term chronic disease: KES 700/tonne (present value)
- **Total health cost avoidance: KES 1,500/tonne**

Year 3 (21,387 tonnes formal): 21,387 × KES 1,500 = **KES 32 million**

Optimistic (higher remediation value):

- If long-term cancer, cardiovascular costs fully accounted: KES 5,000/tonne
- Year 5 (51,758 tonnes): 51,758 × KES 5,000 = **KES 259 million**

Environmental remediation cost avoidance:

Robinson (2009) and Kenya-specific data (UN-HABITAT, 2010) on Dandora contamination:

Soil/water remediation:

- Cost to remediate contaminated sites: KES 200,000/hectare
- E-waste contributes ~30% of contamination at mixed waste sites
- Area affected: Currently 5,000 hectares; growing 200 hectares/year
- Regulations prevent additional 150 hectares/year contamination (75% reduction in growth)
- **Annual remediation cost avoided:** 150 hectares × KES 200,000 × 30% = **KES 9 million**

Water treatment cost reduction:

- Current elevated treatment costs for Nairobi, Thika water: KES 50-100 million/year
- E-waste contribution: ~20%
- Reduction with formal management: 50% (gradual)
- **Annual benefit (Year 5+):** KES 50M × 20% × 50% = **KES 5 million**

Property value recovery:

- Dandora, Mukuru property values depressed 40-60% (Hite et al., 2001 methodology)
- Cleanup enables 30% value recovery on ~5,000 properties × KES 2M average = KES 3 billion total

- **Amortized over 10 years: KES 300 million/year undiscounted**, NPV ~KES 2.1 billion

10-year health and environmental benefits NPV (conservative):

- Health: KES 32M/year growing to 45M by Year 10 = **NPV KES 280 million**
- Environmental remediation: KES 9M/year = **NPV KES 63 million**
- Water treatment: KES 5M/year (starting Year 3) = **NPV KES 28 million**
- Property values: **NPV KES 2.1 billion**
- **Total: KES 2.47 billion**

9.6.3 Circular Economy and Employment Benefits

Formal sector job creation:

International benchmarks: 15-20 jobs per 1,000 tonnes processed in formal facilities (OECD, 2016)

Conservative scenario (30% recovery = 21,387 tonnes Year 3): 21,387/1,000 × 15 = **321 formal jobs**

Average formal sector wage: KES 30,000/month × 13 months = KES 390,000/year **Annual wage bill:** 321 × KES 390,000 = **KES 125 million**

Tax revenue from formalization:

- Income tax (~15% effective rate): KES 125M × 15% = KES 19 million
- Corporate tax from recyclers: Estimated KES 15 million (on KES 100M net revenues at 15% rate)
- VAT on equipment/services: KES 10 million
- **Total annual tax revenue: KES 44 million**

Social security contributions: KES 25 million annually (NHIF, NSSF)

10-year employment/fiscal benefits NPV: KES 480 million (jobs) + **KES 310 million** (taxes) = **KES 790 million**

Import substitution:

- Recovered materials (copper, aluminum, plastics) reduce import needs
- Estimated 5-10% import substitution on materials
- Value: KES 500M-1B annually (conservative: KES 500M)
- **10-year NPV: KES 3.5 billion**

9.6.4 Total Quantified Benefits Summary

10-year Net Present Value (Conservative Scenario, 7% discount):

Benefit Category	NPV (KES Billion)	Primary Sources

Material recovery	8.19	Baldé et al., 2024; Buchert et al., 2012
Health cost avoidance	0.28	Grant et al., 2013; WHO, 2021
Environmental remediation avoidance	0.09	Robinson, 2009; UN-HABITAT, 2010
Property value recovery	2.10	Hite et al., 2001
Employment and wages	0.48	OECD, 2016
Tax and social security revenue	0.31	Calculation
Import substitution	3.50	Buchert et al., 2012
TOTAL QUANTIFIED BENEFITS	**14.95**	

Table 9. 3: 10-year Net Present Value (Conservative Scenario, 7% discount)

9.7 Cost Quantification: Incremental to E-Waste Regulations

9.7.1 Government Implementation Costs (Incremental Only)

NEMA operational costs (beyond EPR/WMR baseline):

- 10 dedicated e-waste officers: KES 600,000/year × 10 = KES 6 million
- E-waste registry system: KES 30 million (capital, Year 1) + KES 10 million/year maintenance
- Laboratory equipment: KES 20 million (capital, Year 1)
- Training and capacity building: KES 12 million/year
- Enforcement operations: KES 15 million/year
- **Annual recurrent (steady state): KES 53 million**
- **Capital (Years 1-2): KES 50 million**

KRA collaboration (import controls):

- MOU implementation and training: KES 5 million (one-time)
- Inspection infrastructure: KES 10 million (one-time)
- Annual operations: KES 10 million
- **Annual recurrent: KES 10 million**

KEBS testing program:

- Laboratory accreditation: KES 5 million (one-time)
- Reference equipment: KES 15 million (one-time)
- Annual oversight: KES 5 million

- **Annual recurrent: KES 5 million**

County governments (incremental beyond baseline):

- From Chapter 6 analysis: KES 55 million annual recurrent, KES 40 million capital
- **Annual recurrent: KES 55 million**

Total government incremental costs:

- **Annual recurrent:** KES 123 million
- **Capital (Years 1-3):** KES 115 million

10-year NPV: Capital (KES 115M discounted) + Recurrent (KES 123M × annuity factor 7.024) = **KES 115M + KES 864M = KES 979 million**

9.7.2 Producer Compliance Costs (Incremental Only)

Problematic fraction fees:

- ~10% of e-waste requires special treatment (CRTs, mercury lamps, refrigerants)
- Year 3: 71,290 tonnes × 10% = 7,129 tonnes
- Fee: KES 150/kg average = KES 150,000/tonne
- **Annual cost Year 3:** 7,129 × KES 150,000 = **KES 1.07 billion**

Collection infrastructure investment (producer/PRO funded):

- 20 collection centers (phased to 47), 40% funded by producers (60% government/development partners)
- Capital: KES 40M × 40% = KES 16 million (spread over Years 1-5)
- Operating: KES 20M annual × 40% = **KES 8 million annually**

Enhanced reporting and compliance:

- Beyond EPR baseline, e-waste-specific reporting: KES 10,000/producer annually
- 200 registered producers: **KES 2 million annually**

Total producer incremental costs:

- **Annual (steady state):** KES 1.08 billion
- **Capital:** KES 16 million

10-year NPV: KES 16M + (KES 1.08B growing from Year 2 × relevant discount factors) = **KES 7.82 billion**

9.7.3 Recycler and Collector Costs (Incremental Only)

Recycler facility upgrades:

- Technology investments for environmentally sound management beyond general standards

- 5-10 facilities × KES 10 million average upgrade = KES 50-100 million capital
- Conservative: **KES 50 million** (50% public subsidy, 50% private)
- **Private share: KES 25 million**

Refurbisher licensing and compliance:

- 500 refurbishers × (KES 10,000 license + KES 30,000 annual compliance) = **KES 20 million annually**

Collector formalization:

- Micro-collector training and equipment: KES 15 million (Year 1, from Chapter 6)
- Annual licensing: KES 2 million (2,000 collectors × KES 1,000 waived first year, then charged)

Total private sector costs:

- **Annual recurrent:** KES 22 million
- **Capital:** KES 40 million (KES 25M recyclers + KES 15M collectors)

10-year NPV: KES 194 million

9.7.4 Total Costs Summary

10-year Net Present Value (KES Billion):

Cost Category	NPV	Notes
Government implementation	0.98	NEMA, KRA, KEBS, Counties incremental
Producer compliance	7.82	Primarily problematic fraction fees
Recycler/collector private costs	0.19	Facility upgrades, formalization
TOTAL COSTS	**8.99**	**All incremental to E-Waste Regs**

Table 9. 4: 10-year Net Present Value (KES Billion):

9.8 Net Benefit Calculation and Benefit-Cost Ratio

9.8.1 Base Case (Conservative Scenario)

10-year analysis at 7% discount rate:

- **Total Benefits NPV:** KES 14.95 billion
- **Total Costs NPV:** KES 8.99 billion
- **Net Present Value: KES 5.96 billion**
- **Benefit-Cost Ratio:** 14.95 / 8.99 = **1.66:1**

Internal Rate of Return: 14.2% (significantly exceeds 7% discount rate)

Interpretation: For every KES 1 invested in implementing E-Waste Regulations (incremental to EPR/WMR), Kenya gains KES 1.66 in benefits. The positive NPV of KES 5.96 billion indicates the regulations are economically efficient.

Annual benefit stream (undiscounted, steady state Year 5):

- Material recovery: KES 1.14 billion
- Health/environmental: KES 350 million
- Employment/fiscal: KES 270 million
- Import substitution: KES 500 million
- **Total: KES 2.26 billion annually**

Annual cost stream (undiscounted, steady state):

- Government: KES 123 million
- Producers: KES 1.08 billion
- Private sector: KES 22 million
- **Total: KES 1.23 billion annually**

Net annual benefit (steady state): KES 1.03 billion

9.8.2 Optimistic Scenario Results

Assumptions:

- 60% formal recovery by Year 5 (versus 30% conservative)
- 50% net value retention (versus 30%)
- Higher health cost avoidance (KES 5,000/tonne versus KES 1,500/tonne)

10-year NPV:

- **Benefits:** KES 31.4 billion (material: 19.8B, health/env: 3.8B, other: 7.8B)
- **Costs:** KES 10.1 billion (slightly higher due to more infrastructure needed)
- **Net Present Value: KES 21.3 billion**
- **Benefit-Cost Ratio: 3.11:1**

9.8.3 Breakeven Analysis

When do cumulative benefits exceed cumulative costs?

Using undiscounted cash flows for clarity:

Year	Cumulative Benefits (KES M)	Cumulative Costs (KES M)	Net Cumulative (KES M)
1	450	1,350	-900

2	1,580	2,450	-870
3	3,120	3,550	-430
4	5,180	4,680	+500
5	7,760	5,900	+1,860

Table 9. 5: Breakeven Analysis using discounted cash flows

Breakeven point: Between Year 3 and Year 4 (approximately 42 months after implementation)

This is consistent with international EPR system experiences where initial infrastructure investments are recouped within 3-5 years (OECD, 2016).

9.9 Non-Quantified Benefits

Several significant benefits resist quantification but merit explicit recognition:

9.9.1 Biodiversity and Ecosystem Resilience

Robinson (2009) and Costanza et al. (2014) document ecological damage from e-waste toxins affecting aquatic life, soil microorganisms, and pollinators. Benefits include:

- Restored fish populations in Nairobi River system
- Soil fertility recovery in riparian zones
- Reduced bioaccumulation in food chains
- Enhanced ecosystem resilience to climate change

Qualitative assessment: High value, particularly for communities dependent on fishing, agriculture in affected areas.

9.9.2 International Reputation and Trade Access

Prakash and Potoski (2006) and UNCTAD (2020) demonstrate that environmental compliance enhances:

- Access to environmentally-conscious markets (EU, US)
- FDI attraction from ESG-focused investors
- Regional leadership positioning (Kenya as East African environmental leader)
- Green Climate Fund and concessional financing eligibility

Qualitative assessment: Moderate to high value; difficult to isolate e-waste contribution from broader environmental governance.

9.9.3 Innovation and Technology Transfer

Ellen MacArthur Foundation (2015) documents circular economy as innovation driver:

- Local recycling technology development (adapting to African context)
- Digital innovations (M-Pesa-based collection systems)

- Entrepreneurship opportunities in waste management sector
- Technical skills development transferable to manufacturing

Qualitative assessment: Moderate value; long-term benefits (10+ years).

9.9.4 Social Cohesion and Community Wellbeing

Cleanup of dumpsites and reduction of environmental nuisances improves:

- Community pride and social capital
- Reduced stigma for residents of affected areas (Dandora, Mukuru)
- Mental health and quality of life
- Educational outcomes (children no longer working in hazardous waste)

Qualitative assessment: High value for affected communities (~50,000 people directly, 500,000+ indirectly).

9.9.5 Avoided Catastrophic Risks

Proper e-waste management prevents:

- Major fire incidents at dumpsites (2016 Dandora fire cost KES 20M emergency response)
- Acute pollution events (fish kills, water contamination requiring emergency interventions)
- Public health crises (disease outbreaks linked to contamination)

Qualitative assessment: Low probability but high consequence events; insurance value of prevention significant.

Aggregate non-quantified benefit assessment: Conservatively valued at **20-30% of quantified benefits = KES 3-4.5 billion NPV**, bringing total benefits to **KES 18-19.5 billion** versus KES 8.99 billion costs.

Adjusted Benefit-Cost Ratio including non-quantified benefits: 2.0-2.2:1

9.10 Sensitivity Analysis

9.10.1 Discount Rate Variation

Discount Rate	Benefits NPV (KES B)	Costs NPV (KES B)	Net NPV (KES B)	BCR
5% (lower)	17.82	10.45	7.37	1.71:1
7% (base)	**14.95**	**8.99**	**5.96**	**1.66:1**
10% (higher)	12.18	7.68	4.50	1.59:1

Table 9. 6: Discount Rate Variation

Interpretation: Results robust across discount rate range. Even at 10% (reflecting high opportunity cost of capital), regulations remain economically justified.

9.10.2 Recovery Rate Variation

Formal Recovery Rate (Year 5)	Benefits NPV (KES B)	Net NPV (KES B)	BCR
20% (pessimistic)	10.8	1.81	1.20:1
30% (conservative base)	**14.95**	**5.96**	**1.66:1**
40% (moderate)	19.2	10.21	2.14:1
60% (optimistic)	31.4	21.3	3.11:1

Table 9. 7: Recovery Rate Variation

Critical threshold: Even at 20% formal recovery (below international comparators), regulations remain cost-beneficial (BCR 1.20:1).

9.10.3 Material Value Retention

Net Domestic Retention	Benefits NPV (KES B)	Net NPV (KES B)	BCR
10% (very pessimistic)	8.2	-0.79	0.91:1
20% (pessimistic)	11.6	2.61	1.29:1
30% (conservative base)	**14.95**	**5.96**	**1.66:1**
50% (optimistic)	21.7	12.71	2.41:1

Table 9. 8: Material Value Retention

Critical threshold: Regulations become cost-neutral at ~12% net domestic retention. Below this, non-quantified benefits must justify costs. Above 20%, clear positive NPV.

Risk mitigation: Domestic value retention can be enhanced through:

- Attracting downstream processing (smelters, refiners) to Kenya/East Africa
- Negotiating better terms with export partners
- Developing regional material trading mechanisms

9.10.4 Implementation Effectiveness

Implementation Success	Formal Recovery Achieved	Benefits NPV (KES B)	Costs NPV (KES B)	Net NPV (KES B)	BCR
Failure (10% recovery)	10%	7.5	8.99	-1.49	0.83:1
Partial (20% recovery)	20%	10.8	8.99	1.81	1.20:1
Conservative (30%)	**30%**	**14.95**	**8.99**	**5.96**	**1.66:1**
Moderate (40%)	40%	19.2	9.5	9.7	2.02:1
High success (60%)	60%	31.4	10.1	21.3	3.11:1

Table 9. 9: Implementation Effectiveness

Critical insight: Implementation effectiveness is the key determinant of success. Achieving at least 20% formal recovery (modest by international standards) is essential for positive NPV.

Success factors (from Chapter 6 institutional analysis):

- Adequate NEMA staffing and budget (KES 50M+ annually)
- Functional county collection infrastructure (minimum 20 centers operational)
- Effective import controls (reducing illegal imports by 50%+)
- Successful informal sector integration (40%+ formalization)

9.10.5 Time Horizon Variation

Time Horizon	Benefits NPV (KES B)	Costs NPV (KES B)	Net NPV (KES B)	BCR
5 years	5.8	5.2	0.6	1.12:1
10 years (base)	**14.95**	**8.99**	**5.96**	**1.66:1**
15 years	22.4	11.8	10.6	1.90:1
20 years	28.1	14.2	13.9	1.98:1

Table 9. 10: Time Horizon Variation

Interpretation: Longer time horizons strengthen the case for regulations as:

- Initial capital investments are amortized
- Benefits grow with e-waste generation (10% annually)
- Long-term health benefits materialize (cancer prevention, etc.)

9.10.6 Multi-Variable Scenario Analysis

Worst-case scenario:

- 10% discount rate
- 20% formal recovery
- 20% net value retention
- **Result:** NPV = KES 0.5 billion, BCR = 1.06:1

Still marginally cost-beneficial, supported by non-quantified benefits

Best-case scenario:

- 5% discount rate
- 60% formal recovery
- 50% net value retention
- **Result:** NPV = KES 28.6 billion, BCR = 3.45:1

Range: Under plausible scenarios, NPV ranges from **KES 0.5 billion to KES 28.6 billion**, with base case at **KES 5.96 billion**.

9.11 Distributional Analysis: Who Bears Costs and Receives Benefits?

9.11.1 Cost Distribution

Producers/Importers (87% of costs = KES 7.82B):

- Large producers (>1,000 tonnes/year): ~20 companies bearing 60% of producer costs = KES 4.7B
- Medium producers (100-1,000 tonnes/year): ~50 companies bearing 30% = KES 2.3B
- Small producers (<100 tonnes/year): ~130 companies bearing 10% = KES 0.78B

Cost per tonne for producers: KES 1,080M / 71,290 tonnes (Year 3) = **KES 15,150/tonne**

Pass-through to consumers:

- If fully passed through: ~1% increase in EEE prices (KES 15,150 on average KES 1.5M device)
- Likely partial pass-through: 0.5-0.7% price increase
- **Consumer impact:** Modest; average household (4 devices/10 years) pays additional KES 3,000-4,000 over decade

Government (11% of costs = KES 0.98B):

- National government: KES 750M (NEMA, KRA, KEBS)
- County governments: KES 230M (40% cost-shared with producers/development partners)

Private sector recyclers/collectors (2% of costs = KES 0.19B):

- Formal recyclers: KES 125M (facility upgrades)
- Refurbishers: KES 40M (licensing, compliance)
- Collectors: KES 25M (formalization)

9.11.2 Benefit Distribution

Consumers and general public (60% of benefits = KES 9B):

- Health improvements: KES 280M (reduced disease burden)
- Environmental quality: KES 2.1B (property values, cleaner water/air)
- Import substitution: KES 3.5B (lower product prices long-term)
- Employment: KES 480M (wages to 300+ workers from affected communities)
- Tax-funded services: KES 310M (improved government revenues)
- Non-quantified quality of life improvements

Private sector (25% of benefits = KES 3.7B):

- Recycler revenues: KES 2.8B (from material sales, service fees)
- Refurbisher businesses: KES 400M (formalized market access)
- PRO service providers: KES 500M (collection, logistics services)

Government (15% of benefits = KES 2.2B):

- Tax revenues: KES 310M
- Reduced public health expenditure: KES 280M
- Avoided environmental remediation: KES 90M
- Enhanced international standing: KES 1.5B+ (climate finance access, trade benefits)

9.11.3 Equity Considerations

Progressive impact:

- Low-income communities (Dandora, Mukuru) receive disproportionate health/environmental benefits
- Informal workers gain formalization opportunities (income +30-50% with formalization per Dias, 2016)
- Costs borne primarily by producers/high-income consumers

Regressive elements:

- Small producers face higher compliance costs per unit than large producers (economies of scale)
- Consumers face modest price increases on essential goods (phones, appliances)

Mitigation measures:

- Tiered fee structures for small producers (recommended in Chapter 5)
- Subsidies for informal sector transition (KES 90M allocated)
- Tax incentives for low-income consumer access to refurbished equipment

Net distributional impact: Moderately progressive – benefits accrue disproportionately to vulnerable populations while costs are borne by those with greater ability to pay.

9.12 Risk Analysis and Mitigation Strategies

9.12.1 Implementation Risks

Risk 1: Insufficient institutional capacity

- **Likelihood:** High (Chapter 6 documents significant capacity gaps)
- **Impact:** Regulations "on paper only"; formal recovery <10%

- **Consequence:** Negative NPV (costs exceed benefits)
- **Mitigation:**
    - Prioritize NEMA capacity building (KES 50M annually minimum)
    - Phased rollout allowing capacity development
    - Development partner technical assistance
    - **Cost of mitigation:** Included in base case (KES 979M NPV)

Risk 2: Producer non-compliance

- **Likelihood:** Moderate (fragmented import market, enforcement challenges)
- **Impact:** <50% of producers register and comply
- **Consequence:** Reduced benefits (BCR falls to 1.2-1.3)
- **Mitigation:**
    - Strong penalties (proposed: KES 10M for non-registration)
    - Import controls catching non-compliant actors
    - Public registry creating reputational incentives
    - **Cost of mitigation:** Enforcement costs included in base case

Risk 3: Informal sector resistance

- **Likelihood:** Moderate to high (5,000-8,000 livelihoods affected)
- **Impact:** Social unrest, continued illegal operations, political backlash
- **Consequence:** Implementation delays, reduced effectiveness
- **Mitigation:**
    - Inclusive integration programs (KES 140M allocated Chapter 6)
    - Gradual formalization timelines (3-year transition)
    - Microfinance and training support
    - **Cost of mitigation:** KES 140M NPV (not fully included in base case; adds 1.6% to costs)

Risk 4: Technology/market risks

- **Likelihood:** Low to moderate
- **Impact:** Material prices collapse, recycling becomes uneconomic
- **Consequence:** Formal sector exits market, benefits reduced 50%+
- **Mitigation:**

- Diversify material recovery (not solely copper/gold)
- Long-term contracts with material buyers
- Government guarantee fund for problematic fractions
- **Cost of mitigation:** Guarantee fund 2% of producer fees = KES 20M annually

9.12.2 External Risks

Risk 5: Trade diversion

- **Likelihood:** Moderate (porous borders with Uganda, Tanzania)
- **Impact:** Imports route through neighbors with weaker controls
- **Consequence:** Reduced producer registration, continued illegal imports
- **Mitigation:**
  - EAC harmonization efforts (cost: KES 20M over 3 years)
  - Intelligence sharing with neighboring customs
  - Bilateral agreements on enforcement cooperation

Risk 6: Technology disruption

- **Likelihood:** Moderate (rapid tech change)
- **Impact:** New product categories (EVs, IoT, solar) not covered by initial regulations
- **Consequence:** Regulatory gaps emerge
- **Mitigation:**
  - 3-year regulatory review cycles
  - Flexible Schedule 1 amendment process
  - **Cost of mitigation:** Minimal (administrative)

Risk 7: Economic downturn

- **Likelihood:** Low to moderate
- **Impact:** Reduced EEE consumption, smaller e-waste volumes, lower material prices
- **Consequence:** Benefits reduced 20-30%, but costs also reduce
- **Mitigation:**
  - Countercyclical: regulations provide employment during downturn
  - Material recovery still valuable
  - Health/environmental benefits independent of material prices

9.12.3 Aggregated Risk Assessment

Monte Carlo simulation (1,000 iterations with correlated risk variables):

Outcome	Probability	NPV Range (KES B)	BCR Range
Highly successful	15%	15-28	2.5-3.5
Successful (above base case)	35%	8-15	1.8-2.5
Base case achievement	**30%**	**4-8**	**1.4-1.8**
Partial success	15%	1-4	1.1-1.4
Failure (below breakeven)	5%	-2 to 1	0.8-1.1

Table 9. 11: Aggregated Risk Assessment

Expected value (probability-weighted): NPV = **KES 6.8 billion**, BCR = **1.72:1**

Risk-adjusted NPV (applying 15% risk premium to discount rate = 8.05%): **KES 5.2 billion**

Interpretation: Even accounting for implementation risks, regulations remain economically justified with 95% probability of at least breaking even and 80% probability of generating significant positive returns.

9.13 Strategic Recommendations for Maximizing Net Benefits

9.13.1 Priority Investments

Based on sensitivity analysis, highest-return investments are:

1. Import controls (highest leverage):

- Investment: KES 25M (capital + 3-year operations)
- Impact: Reduce illegal imports 50-70%, increase producer compliance 20-30%
- Benefit enhancement: +KES 1.5-2B NPV
- **Return on investment: 60-80:1**

2. NEMA capacity building:

- Investment: KES 200M (3-year program)
- Impact: Enable enforcement, registry management, technical oversight
- Prevents implementation failure scenario
- **Essential enabler; without it, negative NPV likely**

3. Informal sector integration:

- Investment: KES 140M
- Impact: Maintain collection volumes, prevent social disruption, accelerate formalization
- Benefit enhancement: +KES 800M-1.2B NPV (employment, tax revenue)

- **Return on investment: 6-9:1**

9.13.2 Cost Optimization Opportunities

1. Leverage existing EPR infrastructure:

- PROs can serve multiple product streams (packaging, EEE, batteries), reducing per-stream overhead
- Estimated savings: KES 50-100M over 10 years

2. Regional cooperation:

- Joint East African recycling facilities (serving Kenya, Uganda, Tanzania, Rwanda) achieve economies of scale
- Reduces per-country capital investment 40-60%
- Estimated savings: KES 500M-1B capital costs

3. Digital systems:

- Electronic registry and reporting reduces administrative costs 30-50% versus paper-based
- Investment: KES 30M
- Savings: KES 10M+ annually = KES 70M NPV

4. Phased implementation:

- Focusing on urban centers (70% of e-waste generation) in Years 1-3 reduces initial infrastructure costs
- Gradual rural expansion in Years 4-7 as revenues materialize
- Smooths cash flow while maintaining NPV

9.13.3 Benefit Enhancement Strategies

1. Domestic value retention:

- Attracting downstream processors (smelters, refiners) increases net retention from 30% to 50%
- Benefit increase: +KES 4.5B NPV
- Policy instruments: Tax incentives, infrastructure support, regional market access

2. Accelerated formalization:

- Intensive informal sector engagement increases formal recovery from 30% to 40% by Year 5
- Benefit increase: +KES 3.2B NPV
- Investment required: +KES 50M (beyond base case)

3. Extended scope:

- Including batteries, solar panels, EV components from outset (rather than later amendments)
- Benefit increase: +KES 1-1.5B NPV
- Implementation: Schedule 1 expansion (minimal cost)

9.14 Conclusions and Policy Implications

9.14.1 Summary of Findings

This comprehensive cost-benefit analysis, explicitly addressing cost attribution concerns raised by NEMA, demonstrates:

1. Incremental costs are justified and necessary:

- Of KES 8.99 billion total 10-year costs, **KES 7.95 billion (88%) are incremental costs unique to E-Waste Regulations**, not duplicative of EPR/WMR
- These incremental costs address e-waste-specific challenges (problematic fractions, import controls, technical standards) that general regulations cannot adequately manage

2. Strong positive net benefits:

- **Base case NPV: KES 5.96 billion** over 10 years
- **Benefit-Cost Ratio: 1.66:1** (KES 1.66 benefit per KES 1 invested)
- **Including non-quantified benefits: BCR 2.0-2.2:1**

3. Results robust across scenarios:

- Positive NPV in 95% of risk scenarios
- Breakeven achieved with only 20% formal recovery (versus 30% base case, 65% EU benchmark)
- Sensitivity analysis confirms economic viability under diverse assumptions

4. Breakeven timeline acceptable:

- Cumulative benefits exceed costs by **Year 4** (42 months)
- Consistent with international EPR system experiences

5. Distributional impacts favorable:

- Benefits accrue disproportionately to low-income, environmentally-vulnerable communities
- Costs borne primarily by producers/high-income consumers
- Net progressive impact with appropriate mitigation for small producers and informal workers

9.14.2 Critical Success Factors

Implementation success depends on:

1. **Adequate institutional capacity** (NEMA, counties): Minimum KES 50M annual investment

2. **Effective import controls**: Reducing illegal imports by 50%+
3. **Inclusive informal sector integration**: 40%+ formalization within 3 years
4. **Producer compliance**: Achieving 70%+ registration within 18 months
5. **Infrastructure development**: Minimum 20 collection centers operational by Year 3

9.14.3 Comparison with International Benchmarks

Country/Region	Collection Rate	BCR	Implementation Period	Source
Switzerland	95%	2.5-3.0:1	20+ years (mature system)	SENS, 2021
EU average	65%	1.8-2.2:1	15+ years	EEA, 2020
Rwanda	25% (target by 2025)	1.5-1.8:1	5 years	UNEP, 2021
South Africa	20%	1.3-1.5:1	12 years	Godfrey & Oelofse, 2017
Kenya (projected)	**30% (Year 3)**	**1.66:1**	**Target 3-5 years**	**This analysis**

Table 9. 12: Comaprison with International Benchmarks

Kenya's projected performance is **realistic and achievable** based on regional comparators, with BCR consistent with international experience.

9.14.4 Final Recommendation

PROCEED with implementation of E-Waste Regulations, 2025 subject to:

1. **Confirmation of institutional investments:** Budget allocation of minimum KES 123M annually for government implementation (NEMA, KRA, KEBS, counties)
2. **Critical amendments incorporated:** Import controls (Regulations 17A-C), waste definition clarity (Regulation 2A, Schedule 7), informal sector integration provisions (Regulation 12A)
3. **Phased implementation approach:** Urban centers (Years 1-3), rural expansion (Years 4-7), allowing capacity development while maintaining economic viability
4. **Continuous monitoring:** Quarterly performance assessment against KPIs, with mid-course corrections as needed
5. **Stakeholder engagement:** Sustained consultation with producers, recyclers, counties, informal sector ensuring inclusive implementation

Economic justification is compelling: The regulations generate net benefits of KES 5.96 billion (base case) to KES 21.3 billion (optimistic) over 10 years, with benefits exceeding costs by factor of 1.66 to 3.11 depending on implementation effectiveness.

The investment is sound, the risks manageable, and the imperative clear: Kenya cannot afford continued informal e-waste management given health, environmental, and economic costs. The proposed regulations represent an economically efficient path forward.

10. COMPARATIVE REGULATORY ANALYSIS, EVALUATION, AND LEGAL JUSTIFICATION

This section evaluates the E-Waste Regulations 2025 against international best practices and existing Kenya Laws/Regulations in waste management that are closely related. The purpose of this critical analysis is to determine how the proposed Regulations relate to other Laws, whether there are overlaps, duplicity, complimentary or supplementary relationships. This will also help determine whether E-Waste Regulations are justifiable as a standalone, does it contradict other laws and regulations, or does it compliment/supplement other laws.

10.1 Comparison with International Best Practices

Examining e-waste management practices in other countries can provide valuable insights for Kenya. For instance, countries like Switzerland, South Africa, and India have implemented structured e-waste management systems that Kenya can learn from. South Africa and Nigeria have launched producer-led end-of-life management schemes with mixed results, underscoring the need for clear regulatory frameworks, inclusive stakeholder participation, and robust enforcement. These systems often include formal recycling sectors, public awareness campaigns, and regulatory frameworks that ensure proper disposal and recycling of electronic waste. By studying these models, Kenya can identify effective strategies to enhance its own e-waste management practices[74].

Foundational Principle: Producer Accountability for End-of-Life Costs

The core principle behind Kenya's draft regulations, as well as the regulations in the countries mentioned above, the European Union, Germany, and Rwanda, is producer accountability for the financial and/or physical burden of managing a product once consumers have finished using it. This policy approach shifts the financial and/or physical responsibility for a product's end-of-life management from the government to the producers. Here is the comparison of Kenya’s draft e-waste regulations with the European Union, Germany, and Rwanda:

- **Kenya:** The draft regulations state that producers must bear the end-of-life costs obligation to reduce pollution and environmental impacts throughout the product's life cycle. This includes designing products that minimize waste and are easy to reuse or recycle, as well as establishing take-back schemes.
- **European Union:** The EU's Waste Electrical and Electronic Equipment (WEEE) Directive also establishes the producer-led end-of-life management principle. It

[74] Anyango, *A Framework for Sustainable E-Waste Management in Kenya: The Case of ICT*; Kimotho, “A Framework for Sustainable E-Waste Management in Kenya: The Case of ICT (Master’s Thesis)”; Muhani, *A Framework for Sustainable E-Waste Management in Manufacturing and Processing Industries, Industrial Area Nairobi County, Kenya*.

mandates that manufacturers or distributors finance and establish an infrastructure for collecting, recycling, and recovering WEEE.

- **Germany:** The German Electrical and Electronic Equipment Act (ElektroG) transposes the EU WEEE Directive into German law, also based on the principle of producer-led end-of-life management.
- **Rwanda:** Rwanda's e-waste management regulation also provides for the establishment of producer-led end-of-life management, requiring producers to support the collection and recycling of their equipment.

Registration, Licensing, and Reporting

All reviewed regulations require producers to register with a national authority, though the specifics vary.

- **Kenya:** The draft regulations require all producers to register with the National Environment Management Authority (NEMA) and secure an annual operating license. Producers must also provide updated information on the quantities of products they introduce to the market, as well as their recyclability.
- **Germany:** German law mandates that all merchants who place electrical and electronic equipment on the market must first register with a competent authority, the Stiftung EAR. Foreign manufacturers must also appoint an authorized representative to handle their registrations and a financial guarantee.
- **European Union:** Member states are required to maintain a registry of producers that is publicly accessible. The EU also introduced a common methodology for calculating the weight of EEE placed on the market in each Member State and the amount of WEEE generated.

Take-Back Schemes and Collection

All three regulatory frameworks emphasize the importance of take-back schemes, though they differ in implementation.

- **Kenya:** The Kenyan regulations require producers to establish post-consumer collection and take-back systems, which may include a deposit refund system. Producers can implement these obligations through an individual scheme or a collective one via a Producer Responsibility Organisation (PRO).
- **Germany:** Retailers with at least 400 square meters of sales space must offer return options for old electrical appliances. There are specific rules for "1:1 take-back" (when a customer buys a new device of the same type) and "0:1 take-back" (for up to five small devices, regardless of a new purchase).
- **European Union:** The WEEE Directive requires manufacturers to create an infrastructure that allows users to return WEEE from private households free of charge. This led to the formation of national "producer compliance schemes" where producers pay an annual fee for the collection and recycling of e-waste.

Other Noteworthy Aspects

- **Financial Mechanisms:** The Kenyan regulations introduce EPR fees, set by the Cabinet Secretary for Environment, Climate Change, and Forestry, to fund the EPR system's infrastructure and operations. This is a common approach in many the producer accountability for end-of-life costs systems, where fees are internalized in the product price to cover end-of-life management costs.
- **Illegal Shipments:** The EU has a specific focus on combating the illegal export of e-waste to non-OECD countries. The WEEE Directive obliges exporters to test whether equipment works and provide documentation on the nature of shipments that could be considered illegal.
- **Scope of Products:** The German Electrical and Electronic Equipment Act covers a broad range of devices, including passive devices like USB sticks and charging cables. The Kenyan regulations provide a schedule outlining categories of electrical and electronic equipment covered by the rules.
- **Enforcement:** The Kenyan regulations prescribe penalties for non-compliance, such as giving false information or not fulfilling statutory obligations. In Germany, electronic marketplaces and fulfillment service providers must check for ElektroG registration, and a failure to provide proof can result in the actor being blocked.

Similarities and Alignment with Best Practices

The Kenyan draft regulations align with several international best practices by:

- **Adopting Producer Accountability for End-of-Life Costs Principles:** Similar to the EU's WEEE Directive, the Kenyan regulations place the primary financial and physical responsibility for the end-of-life management of e-waste on the producers and importers. This is a core tenet of modern e-waste legislation worldwide.
- **Mandating Collection and Take-Back Systems:** Both the Kenyan and international regulations require producers to set up take-back schemes to ensure consumers have a free and easy way to return e-waste.
- **Defining Specific E-Waste Categories:** The Kenyan regulations, like the EU WEEE Directive, are not general but provide a specific list of product categories (in its First Schedule) that fall under the scope, providing clarity for producers.
- **Establishing a Regulatory Framework:** The regulations in both Kenya and the EU create a formal, centralized system for registration, licensing, and reporting to ensure compliance and monitor progress.

Areas of Difference and Potential for Further Development

While aligned in principle, the Kenyan regulations show some differences from more established models, which could present challenges or opportunities:

- **Financial Mechanisms:** The Kenyan regulations detail specific fees and a formula for producer obligation based on market share. While this is a common approach, some international models use a more flexible fee modulation system that incentivizes producers to design more environmentally friendly products (eco-design).
- **Prohibition and Treatment Standards:** The Kenyan regulations contain specific prohibitions on environmentally unsound practices like open burning, which is a key issue in developing countries. However, they do not appear to have a complementary directive like the EU's RoHS (Restriction of Hazardous Substances) Directive, which preemptively restricts the use of dangerous materials in EEE at the manufacturing stage.
- **Integration of the Informal Sector:** A significant challenge in many developing countries, including Kenya, is the large informal e-waste recycling sector. The Kenyan regulations mention collection incentives but do not explicitly outline a detailed strategy for formalizing or integrating this sector, which is a key component of successful e-waste management in other developing nations.
- **Transboundary Movement of Waste:** While the Kenyan regulations restrict the importation of specific items like Cathode Ray Tubes (CRT), they do not appear to have the same level of detailed provisions and controls for the export or import of e-waste as international conventions like the Basel Convention and its amendments, which are critical for preventing illegal waste dumping.

Adopting international best practices, such as standardized labelling, take-back programs, and integration of informal waste collectors, can enhance the effectiveness of Kenya's e-waste management system. Implementing standardized labeling facilitates the identification and proper handling of electronic waste, ensuring that hazardous components are managed safely. Take-back programs, where consumers return end-of-life electronic products to manufacturers or designated collection points, have been effective in several countries. In Kenya, guidelines have been established to promote such practices, encouraging retailers and producers to participate in the collection and proper disposal of e-waste[75]. The informal sector plays a significant role in e-waste collection and recycling in Kenya. Integrating these workers into formal waste management systems can enhance efficiency and safety. Initiatives like the E-Waste Initiative Kenya (EWIK) have been instrumental in training and incorporating informal waste collectors, providing them with the necessary skills and resources to handle e-waste responsibly[76].

[75] National Environment Management Authority, “Guidelines for E-Waste Management in Kenya,” 2010.

[76] Aspen Network of Development Entrepreneurs and KOIS, “Investing in the Waste and Circularity Sector in Kenya: An Introductory Guide”; Maina, “EWIK: Enabling Kenya’s Informal Settlements’ Participation in Sustainable e-Waste Management.”

Collaboration with regional and international partners can also facilitate knowledge exchange and capacity building, thereby enhancing the effectiveness of Kenya's e-waste management initiatives. Engaging with such partners allows for the sharing of best practices, access to technical expertise, and the development of robust regulatory frameworks. These collaborations not only provide technical assistance but also foster an environment of shared learning and innovation, crucial for the advancement of sustainable e-waste management practices in Kenya.

10.2 Nature of Relationship Between the EPR, WMR, and the Proposed E-Waste Regulations, 2025

The Sustainable Waste Management (Extended Producer Responsibility) Regulations, 2024 (Legal Notice No. 176) (EPR), the Environmental Management and Co-ordination (Waste Management) Regulations, 2024 (Legal Notice No. 178) (WMR) and the proposed Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025 (E-Waste) are integral components of Kenya's evolving waste management framework. Their relationship is characterized by complementary objectives and scopes, aiming to enhance environmental sustainability through effective waste management practices:

1. Legislative Foundations

Sustainable Waste Management (Extended Producer Responsibility) Regulations, 2024: Enacted under the Sustainable Waste Management Act, 2022[77], the **EPR Regulations (L.N. 176/2024)** operationalize the principle of Extended Producer Responsibility (EPR), mandating producers to manage the entire lifecycle of their products, including post-consumer waste, across various sectors such as packaging, electronics, and batteries.

Proposed Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025: Anticipated under the Environmental Management and Co-ordination Act (EMCA, Cap. 387), these regulations aim to provide detailed guidelines specifically for the management of electrical and electronic waste (e-waste), addressing aspects like collection, recycling, and disposal.

2. Scope and Specificity

EPR Regulations: These regulations establish a broad framework for EPR across multiple product categories, including electrical and electronic equipment (EEE). They outline obligations for producers, such as registration, reporting, and participation in compliance schemes.

Proposed E-Waste Regulations: Focusing exclusively on e-waste, these regulations are expected to delve deeper into the technical and operational aspects of e-waste

[77] Government of Kenya, "Environmental Management and Co-Ordination (Waste Management) Regulations, 2024 (Legal Notice No. 178)."

management, complementing the broader EPR framework by providing specific requirements for handling EEE waste.

3. Institutional Roles and Coordination

EPR Regulations: The implementation of these regulations is overseen by the National Environment Management Authority (NEMA), which is responsible for approving compliance schemes and monitoring producer obligations.

Proposed E-Waste Regulations: While also under NEMA's purview, these regulations are expected to involve additional stakeholders, such as county governments and licensed e-waste recyclers, to ensure effective management of e-waste at various administrative levels.

4. Complementarity and Integration

The EPR Regulations provide a foundational framework that assigns responsibility to producers for the end-of-life management of their products. The proposed E-Waste Regulations are designed to build upon this foundation by offering detailed procedures and standards specifically for e-waste. Together, they aim to create a cohesive system where producers are not only held accountable but also guided on the practical steps for managing e-waste effectively.

5. Implementation Challenges and Legal Developments

It's important to note that the implementation of the EPR Regulations has faced legal challenges. In May 2025, the High Court issued a conservatory order temporarily suspending their enforcement pending further hearings. This development underscores the need for clear, harmonized regulations and stakeholder engagement to ensure the successful rollout of both the EPR and the forthcoming e-waste regulations[78].

Since the three Regulations anchor waste management in Kenya, there are shared clauses that may seem to repeat, but their repetition is logically essential as explained after the table. These Clauses are tabulated below:

Shared Clauses Among EPR, EMCA-WMR, and EMCA-E-Waste

Clause/Concept	**The Sustainable Waste Management (Extended Producer Responsibility) Regulations, 2024 (EPR)**	**The Environmental Management and Co-ordination (Waste Management) Regulations, 2024 (Waste Regulations)**	**The Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025 (E-Waste)**

[78] Oduor, F., “Court Stops NEMA from Enforcing 2024 Producer Responsibility Rules, Easing Pressure on Manufacturers.”

Polluter Pays Principle	Purpose/Regulation 3: Operationalization of the polluter pays principle.	Principle: Mentioned in the Sixth Schedule. (Transboundary Movements/Shipments of Waste - 9. Waste generator(s) - producer(s) of E-waste in Basel Annex VIII (or IX if applicable))	
Extended Producer Responsibility	Obligations/Regulation 5: Defines and mandates EPR.	Obligations/Regulation 8: Imposes specific obligations on producers to manage e-waste.	
Waste Minimization & Cleaner Production	Obligations/Regulation 5(1)(d), (e), (f): Requires producers to design products to minimize waste and promote a circular economy.	Methods/Regulation 5: Waste generators must adopt cleaner production methods.	Principles/Sixth Schedule: Lists waste prevention, minimization, and cleaner production as principles.
Registration & Licensing	Registration/Regulation 7, 9, 14: Registration of producers, schemes, and annual operating licenses.	License/Regulation 7, 10: Licenses for waste transportation and disposal sites.	Registration/Regulation 6, 13: Registration of producers and licenses for recyclers.
Collection & Take-Back	Obligations/Regulation 5(1)(b): Producers must establish a take-back scheme.	Responsibility/Regulation 4(2): Waste generators are responsible for collection and segregation.	Obligations/Regulation 12: Outlines obligations for operating a collection center.
Transitional Provisions	Regulation 23: Includes a transitional provision.	Regulation 38: Includes transitional provisions.	Regulation 27: Includes a transitional provision.
General Penalties & Offences	Regulation 21, 22: Outlines offences and general penalties.	Regulation 36: Outlines offences and penalties.	Regulation 23, 24, 25, 26: Outlines specific offences

			and a general penalty.

Table 10. 1: Shared Clauses Among EPR, EMCA-WMR and EMCA-E-Waste

The shared clauses between the EPR, Waste Management, and E-Waste regulations are crucial because they establish a consistent and unified foundation for environmental law in Kenya. They ensure that even though the regulations target different waste streams, they are all built upon the same core principles and legal mechanisms.

Here are the importance and necessity of each shared clause:

- **Polluter Pays Principle:** This principle, a cornerstone of environmental law, is explicitly or implicitly present in all three documents. Its necessity is to ensure that the costs of pollution are borne by those who cause it, rather than by society at large. The overlap is important because it establishes this principle as a fundamental legal requirement across all waste management activities, from general waste to highly specific e-waste.
- **Extended Producer Responsibility (EPR):** The EPR Regulations provide the overarching framework for this concept, while the E-Waste Regulations apply it to a specific product category. The necessity of this overlap is to legally mandate that producers are responsible for their products' entire lifecycle. The Waste Regulations and E-Waste Regulations reinforce this by including specific obligations for producers and waste generators, solidifying the idea that producers are not just selling products but are also responsible for their end-of-life management.
- **Waste Minimization & Cleaner Production:** The overlap in these clauses demonstrates a consistent legal push towards preventing waste at its source. Instead of just focusing on end-of-pipe solutions (like treatment and disposal), all three regulations require a proactive approach. This shared focus is necessary to promote a circular economy, reduce the overall volume of waste, and conserve raw materials, a goal that is consistent across all three pieces of legislation.
- **Registration & Licensing:** All three regulations require some form of registration or licensing for key players, whether they are producers, transporters, or recyclers. The necessity of this is to create a formal, auditable system for waste management. It ensures that all entities handling waste are known to the authorities, can be held accountable, and are operating in a way that is compliant with legal and environmental standards. The overlap ensures that this is a standard requirement regardless of the type of waste being handled.
- **Collection & Take-Back:** The overlapping clauses on collection and take-back schemes are necessary to close the loop in the waste management system. The EPR regulations outline the general obligation for producers to take back products, which is then made more specific for e-waste in the E-Waste Regulations. This

legal requirement is crucial for ensuring that waste is properly channeled away from informal disposal sites and towards formal, regulated treatment facilities.

- **Transitional Provisions:** The presence of transitional clauses in all three documents is a matter of practical and legal necessity. It ensures a smooth transition from old regulations to the new ones, giving affected parties time to adapt their practices, update their infrastructure, and apply for the necessary licenses and registrations. This avoids disruption and ensures continuity in waste management practices.
- **General Penalties & Offences:** The consistent inclusion of clauses on penalties and offenses across all three regulations is fundamental for the legal framework to be effective. It provides a deterrent against non-compliance and gives the regulatory authority the power to enforce the law. This overlap ensures that the consequences for violating waste management rules are consistent, regardless of the specific waste stream involved.

Do the three target different products or wastes?

Based on the content of the three Laws/Regulations, they do target different products and waste streams. While there is some repetition in the overarching principles, each regulation has a specific scope.

- **The Sustainable Waste Management (Extended Producer Responsibility) Regulations, 2024 (EPR)**: This regulation is a broad framework that applies to all producers. Its focus is on establishing the principle of Extended Producer Responsibility for a wide range of "products" and "packaging materials,". The regulations encompass a wide array of products and packaging materials that pose environmental challenges due to their complexity in reuse, recyclability, or recoverability[79].
    - **Product Categories:** As detailed in the First Schedule, the regulations cover:
        - Packaging materials for both hazardous and non-hazardous products (e.g., cardboard, glass, plastic, aluminium).
        - Electrical and electronic equipment, including mercury auto switches, thermostats, batteries, and accumulators.

[79] Clyde & Co., “The Extended Producer Responsibility Regulations 2024 – What It Means for Producers in Kenya.”

- End-of-life motor vehicles.
- Other non-packaging items such as rubber products, sanitary towels, and diapers.

The goal is for producers to take financial and physical responsibility for the entire lifecycle of their products, which could include plastics, glass, paper, etc.

- **The Environmental Management and Co-ordination (Waste Management) Regulations, 2024 (WRM)**: This is the most general of the three. It covers a wide array of waste categories, including municipal, industrial, hazardous, and biomedical waste. The regulation is a comprehensive set of rules for the general management, handling, and disposal of waste, not focusing on a particular product but rather on the broad classification of waste.
- **The Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025 (E-Waste)**: This regulation is highly specific. As its name suggests, it exclusively targets "Electrical and Electronic Equipment" (EEE) and the waste generated from them. The **First Schedule** of this document lists detailed categories of products it covers, such as IT and telecommunication equipment, household appliances, and consumer electronics, making its focus distinct and narrow compared to the other two.
- **Product Inclusion:**
    - Consumer electronics (e.g., mobile phones, computers, televisions).
    - Household appliances (e.g., refrigerators, washing machines).
    - Industrial electrical equipment.
    - Off-grid solar products[80].

Summary

In essence, the EPR Regulations establish the "what" and "who" of producer responsibilities across various sectors, including electronics, while the proposed E-Waste Regulations are poised to define the "how" by detailing the processes and standards for managing e-waste. Their successful integration is crucial for advancing Kenya's sustainable waste management objectives.

The E-Waste Regulations, 2025 as a Stand-Alone Regulation

The Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025 (E-Waste) is important as a stand-alone regulation because it addresses specific, unique aspects of e-waste that are not covered in the

[80] Corbyn, D. et al., “E-Waste Toolkit Module 4 Briefing Note: E-Waste Regulation and Compliance.”

broader provisions of the Waste Management Regulations, 2024, or the general EPR Regulations, 2024.

Here is a tabulation of the issues and clauses that are unique to The Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025 (E-Waste), and which make it a crucial stand-alone regulation.

Issues and Clauses Unique to the E-Waste Regulations

Issue/Clause	**The Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025 (E-Waste)**
Specific Waste Categories	The **First Schedule** provides a detailed list of categories of Electrical and Electronic Equipment (EEE) covered, such as household appliances, IT equipment, and consumer electronics.
Prohibitions and Restrictions	**Regulation 17** specifically restricts the importation of Cathode Ray Tubes (CRT) for recycling. **Regulation 19** lists specific prohibited treatment methods for e-waste, such as open burning.
Unique Roles and Obligations	**Regulation 11** defines and outlines the obligations for "refurbishers" of e-waste. **Regulation 12** details the specific obligations for operating a "collection centre."
Specialized Forms and Calculations	The **Fourth Schedule** introduces a unique "Evidence Note" form to track the treatment of e-waste. The **Fifth Schedule** provides a specific "Formula for Calculation of Producer Obligation" based on market share.

Table 10. 2: Issues and Clauses Unique to the E-Waste Regulations

The key issues and clauses unique to the E-Waste Regulations explained:

1. Specific Waste Categories and Terminology

- **Focus on E-Waste:** The entire Regulation is dedicated to defining and managing Electrical and Electronic Equipment (EEE) and waste thereof. This includes specific categories of EEE in the **First Schedule**, such as household appliances, IT and telecommunications equipment, and consumer electronics. The other regulations (EPR and WMR) are more general and do not contain this level of detail.

2. Specific Prohibitions and Restrictions

- **Cathode Ray Tubes (CRT): Regulation 17** specifically restricts the importation of CRT for recycling. This kind of precise, product-specific prohibition is not found in the other two laws.

- **Prohibited Treatment: Regulation 19** outlines specific prohibitions on the treatment of e-waste, such as the use of open burning or acid leaching, which are specific to the hazardous nature of e-waste. The other regulations do not provide this detailed list of prohibited treatment methods.

3. Unique Roles and Obligations

- **Refurbishers: Regulation 11** details the specific obligations of "persons who refurbish" e-waste, including record-keeping and ensuring the proper disposal of unserviceable parts. This role is not defined in the other regulations.
- **Collection Centers: Regulation 12** outlines the specific obligations for operating a collection center for e-waste, including proper storage, record-keeping, and the duty to accept all categories of e-waste.
- **Recyclers: Regulation 14** provides specific obligations for recyclers of e-waste, requiring them to operate in an environmentally sound manner and maintain detailed records. The regulation also outlines the process for obtaining a recycler's license in **Regulation 13**.

4. Specialized Forms and Calculations

- **Evidence Note:** The **Fourth Schedule** introduces a specific "Evidence Note" form to be used by recyclers to verify the treatment of e-waste. This document is unique to the E-Waste Regulations.
- **Producer Obligation Formula:** The **Fifth Schedule** provides a specific "Formula for Calculation of Producer Obligation," which is a detailed calculation based on market share. While the EPR regulations mention producer obligations, they do not provide this specific formula.

In summary, while the EPR and Waste Regulations provide a foundational framework, the E-Waste Regulations serve as a critical, detailed supplement by addressing the unique toxic and complex nature of electrical and electronic waste through specific definitions, prohibitions, and obligations for all parties involved in its lifecycle.

11. DETAILED RECOMMENDATION AND ROADMAP FOR IMPLEMENTATION

A. Recommendation

The primary recommendation is the Immediate Adoption and Full Implementation of the Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025, using a structured, phased rollout approach.

This approach, while implementing the comprehensive framework (The Preferred Option), manages initial costs and builds necessary capacity over time.

B. Roadmap for Implementation

The implementation should be structured around four strategic pillars to ensure a smooth transition, effective enforcement, and the realization of maximum net benefits.

Phase I: Institutional Setup & Legal Harmonization (0–12 Months)

- **Legal Finalization:** Formally enact the E-Waste Regulations, 2025, ensuring explicit legal harmonization that mandates the EPR financial resources to fund the national and county collection and sorting infrastructure (e.g., ward collection sites).
- **Establish Registry:** NEMA must immediately establish the Electrical and Electronic Equipment Registry and make it operational for producer registration.
- **Digital Platforms:** Develop and launch the Centralized Reporting Platform for producers and recyclers and the public-facing Mobile Application to streamline data collection, improve oversight, and help the public locate collection points.
- **Targeted Training:** Roll out comprehensive training programs for NEMA staff, County Government officials, and formal waste handlers on the new regulations, licensing procedures, and Environmentally Sound Management (ESM) practices.

Phase II: Capacity Building & Market Incentivization (12–24 Months)

- **Formal Sector Incentivization:** Introduce incentives, tax breaks, or subsidies for manufacturers to establish or join Producer Responsibility Organizations (PROs) and manage robust take-back schemes.
- **Infrastructure Investment:** Facilitate investment in, and the licensing of, formal recycling facilities and support County Governments in establishing the mandated ward collection and sorting infrastructure.
- **Informal Sector Formalization:** Develop and launch clear formalization pathways for informal waste pickers, including offering subsidies and support to facilitate their transition into the licensed waste management system.

- **Pilot Programs:** Implement pilot recycling facility development programs and collection incentive programs in key urban areas to test systems and generate localized data.

Phase III: Enforcement & Public Awareness (24–36 Months)

- **Full Enforcement:** Implement robust enforcement mechanisms, including penalties for non-compliant producers and recyclers, and enforce the ban on hazardous informal practices.
- **Public Campaigns:** Launch sustained, nationwide public awareness and education campaigns to increase the public's knowledge of proper disposal and the location of designated collection points. This campaign should leverage the new mobile application.
- **Value Retention Strategy:** Implement domestic value retention strategies to maximize the capture of valuable materials, further strengthening the economic case for the regulations.
- **Stakeholder Engagement:** Sustain stakeholder engagement to solicit feedback and adjust policies, particularly concerning the socio-economic impacts on the newly integrated informal sector.

Phase IV: Review and Optimization (36+ Months)

- **Monitoring and Verification (MRV):** Establish a continuous and robust monitoring, reporting, and verification (MRV) system to track key performance indicators (KPIs) such as collection rates, recycling volumes, and compliance levels.
- **Policy Review:** Conduct a comprehensive review of the regulations after three years to assess their effectiveness, costs, and impacts, ensuring they continue to meet the intended objectives of a sustainable and circular e-waste economy.

11 CONCLUSION

The Regulatory Impact Assessment (RIA) unequivocally concludes that the implementation of the Environmental Management and Co-ordination (Electrical and Electronic Waste Management) Regulations, 2025, is necessary, justified, and represents the most efficient regulatory option to address the escalating e-waste crisis in Kenya.

The current Status Quo (No New Regulations) baseline is unsustainable, as the unsafely managed 95% of e-waste continues to pose severe and escalating risks to human health and the environment through the propagation of hazardous substances. The market-based mechanisms proposed, specifically the mandatory producer accountability for end-of-life costs scheme, are deemed the most effective tool for shifting the financial and logistical burden of end-of-life management onto the producers, thereby fostering a circular economy.

The comprehensive CBA has shown that the environmental, health, and economic benefits—including value recovery from domestic materials and non-quantified job creation—will substantially outweigh the compliance and administrative costs, even under conservative assumptions. The regulations are not merely an exercise in compliance but a strategic tool to unlock domestic economic value and position the country as a leader in sustainable waste management.

However, the success of the regulations is conditional upon two critical factors:

1. **Harmonization:** The specific, product-focused E-Waste Regulations must be seamlessly integrated and harmonized with the broader framework established by the Sustainable Waste Management (Extended Producer Responsibility) Regulations, 2024, to prevent overlaps and cost duplication for producers. Furthermore, the financial resources collected from producers must be explicitly mandated to fund the collection and recycling infrastructure proposed in complementary legislation, such as the E-Waste Bill, 2025.
2. **Capacity and Inclusion:** Immediate action is required to bridge the significant infrastructure gaps and address the potential socio-economic disruption to the informal sector, which relies on e-waste for its livelihood.

Therefore, the final recommendation is the adoption and full implementation of the Regulations through a carefully structured, phased roadmap that prioritizes institutional capacity building and inclusive social transition.

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