K4D Knowledge, evidence and learning for development

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# Explainer 1 | Drivers, barriers and opportunities of e-waste management in Africa

**This summary is based on a rapid review that provided an assessment of the drivers, barriers and opportunities of e-waste management in Africa.**[1]

## 1 Introduction

Population growth, increasing prosperity and changing consumer habits globally are increasing demand for consumer electronics. **Rapid changes in technology, falling prices and consumer appetite for better products mean that more electronics are being purchased and disposed of at increasing rates.** Further to this, products associated with net zero and energy transition goals can become major contributors to the e-waste challenge. The necessary wind turbines, solar panels, electric car batteries, and other "green" technologies require vast amounts of resources and at the end of their lifetime, they can pose environmental hazards. This has exacerbated e-waste management challenges and seen millions of tons of electronic devices become obsolete. This is true across the African continent, where challenges in e-waste management are driven by a lack of awareness, environmental legislation and limited financial resources.

## 2 What is e-waste?

E-waste is any electrical or electronic equipment, which is waste, including all components, subassemblies and consumables, which are part of the equipment at the time the equipment becomes waste (WHO, 2021: xii). In terms of origin, in 2019, an estimated 53.6 million metric tons (Mt) of e-waste was generated globally (an average of 7.3 kg per capita). **Africa generated a total of 2.9 million Mt of e-waste, or 2.5 kg per capita, the lowest regional rate in the world.**

## 3 How is e-waste managed?

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

A number of countries in Global North have developed policies and established infrastructure to recycle e-waste. However, it remains lucrative to transport waste to the Global South, where there are no or limited policies or legislation to govern its management. Only thirteen African countries have e-waste legislation and enforcement is challenging.[2]

**E-waste in Africa is the product of two main sources:**

- **Local Sources:** Electronics manufacturing within Africa is growing. The production, use, recycling, and disposal of these items has also increased, resulting in higher volumes of e-waste.
- **Import of Used Electronic and Electrical Equipment (UEEE):** There is growing demand for electronic devices in the Global South. In some low-income countries this has led to increasing import of UEEE which is more affordable than new electronic equipment.

Reports have emerged of illegal transboundary movement of hazardous waste from the Global North disguised as commercial goods (Yu, et al., 2017). There is an increase in intra-African e-waste movement from countries such as South Africa, to other countries with porous borders such as the Democratic Republic of Congo, Zimbabwe, and Mozambique.

**Reading time:**

5-7 minutes

**Who is this for:**

FCDO personnel, partners and external development actors involved with the policy or implementation of environmental issues which cover the energy transition and e-waste in Africa.

**What you can find:**



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

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

## 4 What are the barriers to effective e-waste management in Africa?

Challenges in e-waste management in Africa are exacerbated by a lack of awareness, insufficient environmental legislation, and limited financial resources. Proper disposal of e-waste requires training and investment in recycling and management technology. This is important because improper processing can have severe environmental and health effects. Countries that import UEEE and e-waste often lack policies, knowledge, and appropriate disposal facilities, thus resulting in the accumulation of e-waste (Forti et al., 2020).

The main barriers to effective e-waste management include:

- **Regulatory challenges:** Legislative frameworks are insufficient and government agencies lack of capacity to enforce regulations.
- **Infrastructure:** Currently, there is limited infrastructure for e-waste collection.
- **Operating standards and transparency:** It is not always clear where companies tasked with and collectors move e-waste products.
- **Illegal imports:** Linked to the above, there are issues associated with the illegal import of e-waste.
- **Security:** Security is a concern for e-waste managers, particularly when tasked with the destruction of hard-drives from institutions and organisations.
- **Data gaps:** Data gaps on the quantity, location and material make-up of e-waste create a challenge for downstream recycling partners.
- **Trust:** Ensuring product performance in repair processes and maintaining the trust of consumers, waste partners and industry peers in collaborations are further challenges.
- **Informality:** The prevalence of unstructured collection by informal workers challenges the formalisation of e-waste management.
- **Costs:** High cost remains one of the most significant barriers to improving e-waste management practices, including the costs involved in accessing waste, transporting it, treating it, and, when necessary, shipping it overseas.

## 5 How will the energy transition impact e-waste management?

Whilst the aspirations associated with energy transition and net zero are laudable, products associated with these goals can become major contributors to the e-waste challenge. **The necessary wind turbines, solar panels, electric car batteries, and other "green" technologies require significant resources. Further to this, at the end of their lifetime, they can pose further environmental hazards.** For example, in the solar power sector, worldwide photovoltaics (PV) waste is estimated to reach around 78 million tonnes by 2050 (Chowdhury, et al., 2020).

To cater for the waste from the net zero / energy transition and make the transition sustainable, the sourcing and recycling of input materials must be improved dramatically. The push towards a circular economy has provided stakeholders across the value chain with an impetus to initiate systemic improvements and invest in infrastructure and awareness raising.

## 6 What are the e-waste management opportunities in Africa?

Although e-waste contains toxic and hazardous metals such as barium and mercury, it also contains non-ferrous metals such as copper, aluminium and precious metals such as gold and copper, which – if recycled – could have a value exceeding 55 billion euros. There thus exists the potential to convert existing e-waste challenges into an economic opportunity.

**Trade, repair, and recovery of materials from e-waste serve as a source of livelihood for many poor parts of the population.** The Agbogbloshie dumpsite in Ghana is estimated to provide livelihoods for approximately 4,500 to 6,000 workers directly (Daum et al., 2017). Recovery of important raw materials from e-waste has become a business in Ghana and has resulted in global and transboundary trade. It is estimated that Ghana makes between US$ 105 and 268 million annually from materials sourced from e-waste.

## 7 How will a circular economy for e-waste benefit Africa?

A circular economy for e-waste will provide the following socio-economic and environmental benefits:

- **Repairing, remanufacturing, and upcycling to extend use cycles and create employment:** Businesses focused on repairing, remanufacturing, and upcycling electronics benefit people by providing income opportunities, and benefit the environment by extending a product's end-of-life.
- **Capturing the economic opportunity of urban mining:** Urban mining is the process by which valuable resources are extracted from complex waste streams. The economic opportunity for e-waste urban mining in African countries is significant.
- **Scaling up e-waste recycling to create income generation opportunities:** The development of e-waste collection, grading, and recycling facilities represents a key opportunity in terms of value creation through the capture and effective recycling of commodities.
- **Harnessing the enabling role of technology for e-waste management:** Employing digital solutions to enhance operational efficiency is seen as particularly relevant for the high transport and logistical costs associated with the trade of recyclables and haulage.

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