

Recycling e-waste can help create jobs and reduce poverty in Africa

By [Juliette Biao](#)

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The "trash is cash" slogan is currently being used so that waste is viewed through a new and innovative lens.



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It also reveals a new approach with regard to electronic waste (e-waste), a category of waste which encompasses a broad range of discarded sold or donated electronic devices. These include mobile phones, computers, personal stereos, fluorescent and incandescent light bulbs, as well as large household appliances such as television sets, refrigerators, washing machines, air conditioners, etc.

It is recognised that electronics manufacturing is now the world's largest and fastest growing industry. Due to rapid changes in technology and falling prices, millions of tonnes of high-tech electronic devices become obsolete in the developed nations every year. A significant part of this e-waste is shipped, sometimes illegally, to Africa with no or inappropriate recycling infrastructure. The e-waste usually ends up in landfills, which are poorly managed, if at all, or ill-equipped recycling facilities.

A potentially devastating deluge of e-waste is threatening the planet, particularly in Africa which usually does not have proper waste management systems in place. According to the European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL), around 50 million tonnes of personal computers (PCs) are thrown away each year.

Part of this waste probably ends up in Africa. An article published by the Environmental Health Perspectives shows that each month 100,000 PCs arrive at the Nigerian port of Lagos alone.

Wastewater

Modern electronics can contain up to 60 different chemical elements including base metals such as copper (Cu) and tin (Sn), special metals such as cobalt (Co), indium (In) and antimony (Sb), and precious metals like silver (Ag), gold (Au) and palladium (Pd). Although some chemicals present in electronic components are hazardous, many have economic value. This makes e-waste a tradable commodity and a source for job creation and poverty reduction in Africa.

The market potential of products from innovative recycling technologies is important. Ghana alone generated 179,000 tonnes of e-waste in 2009. Waste generated from computers, printers, mobile phones, TVs and refrigerators ranges from 7,500 tonnes for Kenya to 60,000 tonnes for South Africa.

This waste contains 130 kg of copper, 3.5 kg of silver, 340 g of gold and 140 g of palladium, representing a value of approx. \$6,155,000 at today's market value of these metals.

Besides metals, waste mobile phones also contain other valuable materials such as plastics, glass and ceramics. This example shows the huge potential of e-waste in terms of business, job creation and poverty reduction in Africa, which can only be attained through the development of programmes to properly recycle current and future e-waste. Recycling would also have a positive impact on metal resources, and of course, the environment.

Today the supply of metals for electrical and electronic equipment application is mainly through primary production (mining) since secondary production (recycling) is still marginal. In Africa, the environmental impact of mining is significant, especially for precious and special metals mined from low concentration ores.

Mining involves the use of considerable amounts of land and consumption of huge quantities of energy. Moreover, mining generates large quantities of wastewater as well as high emissions of sulphur dioxide (SO₂) and carbon dioxide (CO₂), a well-known greenhouse gas.

A study published by Solving the E-waste Problem (StEP) and UN Environment entitled *Recycling - From E-waste to Resources* showed that the cumulated CO₂ emissions associated with the primary production of metals used in the electrical and electronic industry accounts for an annual level of 23.4 million tonnes, almost 1/1,000 of the world's CO₂ emissions.

Cooling and freezing

In contrast, only a fraction of these CO₂ emissions is generated when recovering metals using state-of-the-art recycling processes. For example, production of 1kg aluminium by recycling uses only 1/10 or less of the energy required for primary production and prevents the generation of 1.3kg of bauxite residue, 2kg of CO₂ emissions, 0.011kg of SO₂ emissions as well as the impacts and emissions associated with the production of the alloying elements used in aluminium. For precious metals, the specific emissions saved by state-of-the-art recycling are even higher.

The substances contained in the electronic devices can also have a negative impact on the environment. For example, cooling and freezing equipment employ ozone-depleting substances (ODS) such as Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFCs) in the refrigeration system and these have a high global warming potential.

We should keep in mind that e-waste poses a serious hazard to human health and the environment when dumped in landfills or improperly recycled. Computers are toxic traps. They contain heavy metals such as lead, cadmium and mercury, brominated flame-retardants, Polyvinyl Chloride (PVC) and sometimes Polychlorinated Biphenyls (PCBs).

Heavy metals and other hazardous substances found in electronics can contaminate groundwater and pose other environmental and public health risks. Lead can cause damage to the central and peripheral nervous systems, blood system and kidneys in humans. Lead accumulates in the environment and has highly acute and chronic toxic effects on plants, animals and microorganisms. Children suffer developmental effects and loss of mental ability, even at low levels of exposure.

Informal and unorganised

In Africa, e-waste recycling is performed by the informal and unorganised sector that uses improper techniques such as the open burning of waste to recover metals. This is of particular concern as the incineration of brominated flame retardants (BFRs) at a low temperature (600-800°C) may lead to the generation of extremely toxic polybrominated dibenzodioxins (PBDDs) and furans (PBDFs).

It is possible to turn the huge e-waste trash in Africa into cash and generate jobs and income opportunities for the urban poor while reducing its negative environmental impacts. To do so, there is need to look into feasible and practical ways to integrate the informal e-waste recycling sector across the continent into sound, sustainable e-waste management strategies.

Waste and the pollution it exacts on our surroundings is bad for the environment. At the same time, it offers opportunities for job creation, especially for young Africans who are joining the job market in millions every year.

It is time for us to view e-waste driven pollution in Africa through a new and positive lens.

The author is the Regional Director, UN Environment, Africa Office.

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