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Case Study

Cathode Ray Tubes (CRTs) Reuse and Recycle Challenge

Global Alliance Africa collaborates with the WEEE Centre in Kenya to promote partnerships that address key sustainability challenges in the electronic waste sector

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The Context



Electronic waste (e-waste) is one of the **fastest-growing waste streams in the world**. New technologies are constantly replacing old electronic devices, creating challenges in how to dispose of redundant equipment.

Innovate UK KTN's Global Alliance Africa project¹ recently supported the WEEE Centre (Waste Electrical and Electronic Equipment Centre)² in Kenya through its Open Innovation (OI) initiative to identify innovations for recycling and re-use of Cathode Ray Tubes (CRTs), which are rapidly being displaced by newer technologies.

CRTs are bulky and their disposal is complex, with each part processed separately and some of these parts containing hazardous materials including lead, cadmium, phosphorus, mercury, and beryllium. However, the successful recycling of this e-waste has the potential to create positive social, environmental and economic impact.



"As a small company without the resources to invest in R&D," explains the WEEE Centre's former Chief Commercial Officer, Simone Andersson, *"we would have had to stop receiving them, which is against the general idea of what we want to be doing."*



The WEEE Centre estimates there are **40,000 CRT units per year** locally that require processing.

Lacking the expertise to process the glass fractions (front panel and funnel glass), the WEEE Centre was faced with potentially having to stop processing any further CRTs due to lack of storage space.

Global Alliance Africa collaborated with the WEEE Centre to identify innovative solutions that address **how to process the non-lead component of the glass screens to create a commercially viable product**.

By facilitating and seed-funding the collaboration between the WEEE Centre and Swedish environmental agency Milav³ and research institute RISE⁴, the project is building new and stronger international partnerships which address key sustainability challenges through innovation, whilst also identifying solutions that are commercially viable and bring added funding and investment to local partners.

1. iuk.ktn-uk.org/programme/africa/
2. weecentre.com
3. milav.se
4. ri.se/en

Project Impact

Following months of collaboration, the winning solution from Milav/RISE centred on **how to find a possible reuse and/or recycling solution for the non-leaded front panel glass of the CRT screens.**

The partnership between Milav/RISE and the WEEE Centre facilitated transfer of knowledge on circular economy best practice and innovation, which is an area of strength for UK and European markets looking to make businesses more sustainable in line with Sustainable Development Goal (SDG) objectives. *“The techniques that we used are common in Europe to recycle CRT glass”,* explains Frank Tholfsson, Environmental Consultant from Milav, *“The OI Challenge helped us to share that knowledge with the WEEE Centre in Kenya.”*

Samples of lead-free panel glass (80% of CRT glass) were sent to RISE in Sweden for analysis to determine their chemical composition - a necessary first step before it is possible to establish what the glass can be used for within the glass market. Subsequently a site visit took place in Kenya, where Milav helped to identify a customer for the recycled glass within the local Kenyan market, a local glass studio creating household glassware and art pieces using recycled glass. Ensuring that innovation solutions are not just ‘bought off the shelf’, but follow a strong localisation agenda to ensure they are fit for purpose in the market they are being introduced to, is a key priority for the Global Alliance Africa project when working on collaboration initiatives.

As a result of the pilot activities the organisations were able to successfully establish a clear process for producing glass that is commercially viable. *“It seems easy and simple once you have the knowledge”,* explains Simone Andersson, *“but a year ago we didn’t know what could be done and we were also worried about the content of substances in the front panel glass.”*

Going forwards the WEEE Centre will focus on establishing the wider market value of the recycled glass to ensure it is economically sustainable. If successful, the WEEE Centre anticipates it will increase the volume of CRTs processed from 250 tonnes per year up to 500 tonnes per year, with the potential to grow and expand this further.

Catherine Masolia, Chief Operations Officer from the WEEE Centre commented that, *“The collaboration facilitated by Innovate UK KTN opened new doors for WEEE Center. Through the expertise and technologies shared by our partners, we are set to transform electronic waste challenges into opportunities to earn revenue and create jobs. We’re proud that our efforts not only benefit us, but also contribute to a more sustainable and resourceful community. Thanks to the strategic alliance, WEEE Center will successfully transform electronic waste hurdles into community-enriching ventures.”*

This is an example of how the Global Alliance Africa project has helped to facilitate market access with clear direct benefits to local stakeholders by facilitating international partnerships through Innovate UK KTN’s broad network of innovation stakeholders and international reach.

Not only are the benefits of the project felt by the WEEE Centre, but **the OI Challenge has also inspired the WEEE Centre to share the knowledge** created through this project with other stakeholders in the e-waste recycling industry at two international conferences.

By investing in circular economy solutions to electronic waste the project has helped to save more CRTs from going to the landfill, where harmful chemicals contained within units often leech into water and soil as units degrade. This is in line with the UK-government's ambition to move towards a circular economy, keeping resources in use as long as possible, extracting maximum value from them, minimising waste and promoting resource efficiency⁵, whilst also ensuring that solutions do not have adverse effects on the environment.

Emmy Chirchir - Science Technology and Innovation (ST&I) Advisor and Cluster Lead, East Africa Research and Innovation Hub also highlighted that, *"Through this collaborative and co-creative open innovation process, the UK aims to support businesses, innovators and academics to accelerate ambitious ideas into real-world solutions. This will also contribute to strengthening the capacity and resilience of Kenya's innovation systems."*



Next Steps

Global Alliance Africa's OI intervention offers up a model of how knowledge transfer can create new market opportunities whilst contributing to positive environmental and social impact.

Next steps include exploring additional market opportunities: *"The WEEE Centre has other electrical waste that contains glass,"* says Dr Lina Grund, Scientist at RISE, *"and we can work together to see if we can adapt the technology that we've developed here in Sweden to process these kinds of glass so that it works within the resources available for our partners."*

A complementary pilot project is also underway between WEEE Centre and UK-based Quinnovations using the innovative process of 'ultrasonic agitation', a low-energy method of separating the fractions of lead-containing funnel glass (20% of CRT glass). With positive outcome from this pilot, the Milav/RISE and Quinnovations solutions would provide a complete solution to the processing of CRTs (panel glass and funnel glass).

This tripartite collaboration between the UK, Sweden and Kenya will positively contribute towards the development and deployment of innovation in recycling and reusing electronic waste in Kenya.

As Dr Lina Grund puts it: *"When you have a good connection with people, the distance is a small problem."*

Simone Andersson explains, *"The Global Alliance Innovation Challenge has helped us reach out internationally to find solutions on problematic parts of our operations, and we are very happy and humbled by the professional support from the Global Alliance Africa team at Innovate UK KTN throughout the process."*

About Global Alliance Africa



The Global Alliance Africa project is a six-year project funded by UK International Development through Innovate UK (GCRF) and the Foreign, Commonwealth and Development Office (FCDO).



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