

*E-waste management in Africa***Rising up the political agenda**

Printed circuit boards discovered in the backyard of a scrap metal dealer in the suburbs of Nairobi, Kenya (Photo by Empa)

**Last year, Hewlett Packard (HP), the Digital Solidarity Fund (DSF) and the Swiss Federal Laboratories for Materials Testing and Research (EMPA) supported baseline studies into e-waste management in Kenya, Morocco and Senegal. And recently, the partners also launched a pilot e-waste recycling project in South Africa. From such analyses, it can be concluded that, on the African continent, progress is being made in e-waste management but that substantial challenges still lie ahead.**

**T**he problem of e-waste management in Africa came to the public's awareness only recently. 'When we first asked South Africans about their problems with e-waste in 2003, they thought of all the virtual trash produced on the Internet rather than of a physical waste stream.'

explains Rolf Widmer of the Swiss Federal Laboratories for Materials Testing and Research (EMPA).

Since then, the issue of e-waste has been mounting the political agenda on the African continent. Indeed, an awareness milestone was

marked by the Nairobi Declaration on e-Waste, which was adopted at the eighth meeting of the Conference of the Parties (COP8) to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes in 2006.

In general, Africa is lacking infrastructure for e-waste recycling; only in South Africa has an e-waste recycling industry evolved over recent years. In the absence of e-waste management systems within the various countries, it is the economically viable e-scrap fractions that are recycled at most. On the African continent, there are no sustainable solutions available for the appropriate recycling, treatment and disposal of hazardous fractions. Experience shows that informal activities are focused mainly on the collection and recovery of copper and steel through burning.

Over recent years, informal sector growth has been observed in some African countries: Ghana is a case in point, as revealed by a recent Greenpeace report. Triggered by illegal trans-boundary shipment of e-waste and increased domestic consumption of electronics, there is a severe risk that informal activities will begin to rule the sector. Although Africa in general has seen rapid growth in electronics consumption, the e-waste situation is somewhat mixed - as illustrated by the following reports on South Africa, Kenya and Morocco.

### South Africa

Created by the IT industry, the e-Waste Association of South Africa (eWASA) is currently establishing a sustainable e-waste collection and recycling scheme for the country.

A 2008 eWASA-commissioned study estimates that white goods, consumer electronics and IT in South African homes amount to anything between one million and two million tonnes, most of which is likely to enter the waste stream in the next five to 10 years. The survey suggests that the top 10% of households by income generate nearly 80 000 tonnes of e-waste each year across all product categories. It is believed that several tens of thousands of tonnes of e-waste - generated mainly in the form of IT equipment from corporate entities - must be added to this total.

Of these 100 000-plus tonnes of e-waste, formal recyclers in South Africa process approximately 20 000 tonnes; end users are thought to be storing most of the remainder although some of this material is recycled informally, ends up in the general waste or is dumped illegally.

Recyclers processing ferrous and non-ferrous metals have been operating in South Africa for decades, as have e-scrap recyclers such as Desco (since 1992). Recently, however, new e-waste recyclers have emerged. There is also some degree of specialisation, with technology imported into the country to deal with, for example, fluorescent discharge lamps. Recycling processes used by these operators are not uniform, and include mainly manual dismantling and, in a few cases, mechanised shredding. Solutions are not available, however, for the proper handling of cathode ray tubes (CRTs), brominated plastics and printed circuit boards.

'A key concern is the potential threat of backyard electrochemical processes being set up,

similar to India and China,' says Alan Finlay, lead author of the aforementioned study. Electrochemical processes allow for precious metals to be extracted but, if the process is unregulated, casual disposal of toxic chemicals can become a health hazard.

### No specific legislation

There is currently no specific legislation to deal with e-waste in South Africa. However, the new National Environmental Management Waste Bill (2007) has come before parliament and provides several definitions which can be read as having an impact on e-waste, such as: what constitutes 'acceptable exposure' (ie the maximum permissible concentration of a substance, which is relevant when collecting or recycling e-waste in volume); 'best practicable environmental option' (relevant to a context when the latest technology for recycling e-waste may not be available); 'hazardous waste' and 'inert waste' (which includes waste that does not undergo significant transformation after disposal, and which may have relevance to some e-waste fractions); and 'extended producer responsibility measures' (which are likely to impact on the responsibility of vendors and others after the sale of a product).

This is the first time that legislation has been used to drive a waste minimisation approach. It is limited to waste streams that are not dealt with by other pieces of legislation in order to avoid duplication and to complement existing legislation. Industry-led waste management plans are encouraged.

### Kenya

On average, informal e-scrap recyclers in Nairobi can earn 6000 Kenyan shillings (US\$ 3) per day, which is above the global poverty alleviation target of US\$ 1. This means that those engaging in electronics recycling are better off than 49% of the Kenyan population, observed Muriuki Mureithi when presenting the findings of the 'e-Waste Management in Kenya' study at a stakeholder workshop in Nairobi last June. 'There is an opportunity for some business activity on the ground,' the workshop was told. 'The challenge is how we make the US\$ 3 a day sustainable.'

Conducted by the Kenya ICT Action Network (KICTAnet), the Kenyan baseline study included nearly 40 interviews with industry vendors, retailers, refurbishers and informal recyclers, among others. The study estimates that about

### Cape Town Material Dismantling and Recovery Facility

Desperate for a job and worried about how she would support her children, Nadia was thrilled to join the workforce at the HP-sponsored Cape Town Material Dismantling and Recovery Facility. She enthuses: 'It's a great project and really exciting too. I had no idea you could make money from electronic waste. It's opened my eyes and it's helping other people learn about e-waste as well. From the neighbours who pop in to find out what we're doing to the teams we've trained, people are so surprised to learn it's important to dispose of e-waste safely and that you can earn a living from it too.'

Nadia is one of 20 staff working at the Cape Town facility. The pilot project is part of the E-waste Management in Africa initiative launched by HP, DSF and EMPA. The facility processed over 58 tonnes during its 10-month start-up phase in 2008. Income of around US\$ 15 000 has already been generated via three revenue streams: sales of recovered and refurbished components and equipment; sales of recovered secondary raw materials; and sales of waste-to-art products.

The facility raises awareness and provides training/education to formerly disadvantaged individuals, creating opportunities for entrepreneurship in the technical maintenance, dismantling and waste-to-art project sectors. The project has trained a range of individuals - from immigrants to school leavers looking to gain hands-on expertise. Most had no experience of the e-waste sector and several used their knowledge of the IT field to move into permanent employment elsewhere. The community nature of the operation is also a motivation for the staff.

Job creation goes beyond the project to similar enterprises in other regions, with the business concept currently being replicated in Durban, South Africa.



2500 tonnes of personal computers and monitors were discarded in 2007. Project researcher Tim Waema says that 2007 also saw significant growth in IT imports into Kenya and that this should raise concerns about future quantities of e-waste in the country. An increase in e-waste volumes is 'likely', he believes.

While around 50% of the country's PC market is estimated to comprise second-hand equipment, for many of the companies surveyed there was no clear strategy for the disposal of old technology. Some 70% of the study respondents suggested they were aware of the environmental impacts of e-waste but only 20% had an e-waste policy. Means of disposal included selling old equipment, cannibalising it for spare parts or simply storing it. In some instances, technology was returned to the seller, given to a recycler or simply thrown away in the general waste. When IT was disposed of, it was generally deemed 'unfixable', suggesting it had little second-hand value. Encouragingly, a quarter of respondents suggested they were willing to pay to support the safe disposal of discarded technology.

### Recycling partnerships

Some recycling capacity for metals and plastics was evident in Kenya, and refurbishers like



Stockpiling of computer monitors in the backyard of an e-waste recycler in South Africa. South Africa doesn't have a sustainable solution for the recycling of cathode ray tubes. (Photo by Empa)

Computers for Schools Kenya had developed recycling partnerships with credible local partners. Exported obsolete IT equipment included CRT monitors which could not be recycled locally - a situation typical elsewhere in Africa. Printed circuit boards were mostly shipped out of the country to, for example, Europe. Some 'green' initiatives undertaken by the government included encouraging the country's youth to focus on e-waste and actively discouraging the open burning of old electronic products. However, government representatives also

expressed concern about a lack of capacity to deal with e-waste in Kenya.

Nevertheless, the government is in the process of developing a concept document on e-waste. It was also already a requirement of the Ministry of InfoCom's 2006 policy on information and communications technologies that discarded electronics are disposed of in an environmentally sound manner. Perhaps most significantly, Kenya's regulator - the Communications Commission of Kenya (CCK) - had included a clause in its Unified Licensing Framework requiring licensed operators to take responsibility for the safe disposal of their old technology. According to Alice Wanjira, a CCK board member and KICTANet co-ordinator, the framework should have a trickle-down effect and begin to shape policy decisions at ministerial level within the Kenyan government.

### Morocco

The stock of televisions, computers and mobile phones in Morocco was estimated at 222 000 tonnes in 2007. The resultant annual e-waste flow amounts to 13 500 tonnes of computers and monitors, and 15 000 tonnes of televisions. Discarded mobile phones make up approximately 1700 tonnes a year.

Households hold 81% of this stock, companies 18% and government agencies 1% - a distribution imbalance explained mainly by the high penetration rate of televisions. Households also generate 73% of the annual e-waste flow followed by companies and government on 26% and 1% respectively.

Morocco's pickers use carts to collect recyclables from public rubbish bins, factories and dumps. To date, none of these pickers seem to specialise

### Call to join public-private partnership

The 'e-Waste Management in Africa' project concluded that a second phase of this initiative is crucial to assess sustainable business models in e-waste recycling through a feasibility study and medium- to large-scale pilot projects.

This second phase will require the support of a partnership of governments from industrialised countries, electronics manufacturers, telecom service providers, recyclers and agencies experienced in the implementation of knowledge partnerships in developing countries. A consortium comprised of the initial partners HP, DSF and EMPA, as well as Deutsche Gesellschaft für Technische Zusammenarbeit (the German Agency for Technical Cooperation), is keen to facilitate this partnership by easing communication between the different organisations and programmes to prevent them working in isolation so that knowledge can be shared and joint solutions sought. The consortium members are also active in the worldwide 'Solving the e-Waste Problem' initiative (StEP) which ensures access to a professional global knowledge network.

The intention is to implement pilot projects in several African countries, each with one or several points of focus. These may include: assessing what policy and enforcement is required to safeguard health and establish common standards; designing financing models to pay for sustainable recycling of all e-waste fractions and to ensure a fair distribution of revenues to all players in the e-waste chain; developing appropriate models to access and connect waste streams; ascertaining the appropriate level of technology and locations where recycling processes should be performed, including possible solutions for exporting certain fractions to, for example, Europe where these could be fed into recycling systems; unlocking technological access to reveal the most effective ways to promote skills development, technology transfer and business partnerships with large international recyclers; and developing the best organisational framework for the recyclers to ensure the system supports local innovation and helps to forge international partnerships.

in e-waste because of, they say, low demand. In general, only metal scrap is collected, of which a large proportion is exported to foreign smelters and therefore does not benefit the domestic metallurgical industry. The formal and informal recovery of precious metals from, for example, printed circuit boards does not appear to exist in Morocco, except for the Gue-massa metallurgical complex which specialises in metals such as copper, lead, zinc and cobalt.

### Environmental initiatives

Also in Morocco, there is no specific e-waste legislation and no organised e-waste management system. However, some legislation can be read as favourable to the introduction of a framework for the regulation of e-waste management given the parallel implementation of an appropriate collection and recycling infrastructure. Though the question of sustainable e-waste management has not been raised explicitly, both the government and the private sector are

active with environmental protection initiatives: the former with the Environmentally Sustain-

*Alan Finlay: 'A key concern is the potential threat of back-yard electrochemical processes...'*

able Industrial Development scheme; and the latter with the Social Responsibility Charter of the General Confederation of Moroccan Enterprises. In order to translate these commitments into action, existing conventions and strategies need to be amended to take e-waste management into account.

### The way forward in Africa

Representatives of e-waste projects in Morocco, Senegal, Kenya, Uganda, Nigeria and South Africa were invited to attend the WasteCon'08 conference in Durban, South Africa, and to present a national status report. Following inter-

national-level discussion of e-waste management, a proposal for the way forward was drafted in the form of the 'Durban Declaration on e-Waste Management in Africa'.

The declaration avoids the formulation of ready-made, implementable solutions as it was agreed that every country requires its own process to define a road-map related to specific projects. Key recommendations

include: improvement of co-operation between national, African and international players through a multi-stakeholder process; creation of awareness at all levels of governance and the general public; enabling the recycling markets by identifying appropriate material trading routes; developing a policy and legislative framework; and promoting best available technology and practice through technology transfer and capacity building.

Translation of these recommendations into reality will rely on the strong commitment of the African stakeholders and the continuation of international development support. □

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