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Urban Mining, Challenges and Opportunities for Africa

"Synergies between e-waste recycling and mining of mineral resources"
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**World Resources
Forum**



Materials Science & Technology



Introduction

“*Urban mining*” is the process to recover the compounds and materials from products which have reached their end of life. The concept is often referred to as recycling of waste. As such urban mining is an alternative to the extraction of resources from geological deposits (“*primary mining*”) for the production of goods and infrastructure. Africa is endowed with large deposits of mineral resources, including significant reserves of bauxite, chromite, diamonds, cobalt and platinum-group metals. With recent production start-ups of several mines in many African States, the continent continues to play a leading role in the global production of mineral resources. Indeed, mineral resources contribute significantly to merchandise exports in almost half of the 54 African countries [2].

African countries are however not only primary suppliers of such materials. Secondary materials are accumulating in large amounts as waste especially in urban settlements. These “urban mines” contain significant amounts of valuable resources, including non-renewable resources. A very interesting case of urban mines are the so-called short-term urban mines of obsolete consumer products, such as electrical and electronic equipment (EEE). Volumes of waste EEE (WEEE), or e-waste for short, will increase in the future due to higher penetration of consumer goods particularly in emerging markets and the intense trade of second-hand products to Africa. In combination with the current high primary commodity prices and comparatively low labour costs, recovery and international trade in secondary materials from urban mines in Africa will continue to increase in the coming years. Related economic opportunities are already seized through local recycling in various African countries, however often in informal settings at high social and environmental costs and at low material recovery efficiency rates.

Hence Africa faces the challenge to implement efficient and sustainable recovery systems for secondary materials from e-waste as a new market and job creation opportunity. This requires functioning 'reverse supply chains' with adequate capabilities for recycling and refining as well as sufficient control over their material quality and the environmental and social impacts of the related processes.

These challenges are recognized by African countries and the international community since a few years and were addressed in various attempts to drive solutions forward in coordinated actions. Examples are 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, the Durban Declaration on E-waste Management in Africa from 2008, the Abuja Platform on E-waste from 2009, as well as the “Call for Action on e-Waste in Africa”, which was adopted at the Pan African Forum on e-waste in Nairobi in 2012. All of these documents were instrumental in moving forward the e-waste topic in national political agendas and paved grounds for first solutions, which are shaping in some African countries such as Ghana, Kenya, Nigeria, South Africa and Tanzania. However direct links and synergies to the primary mining sector were neither established nor integrated into strategic plans so far.

The World Resources Forum (WRF) is increasingly taking these issues into account in its deliberations, most recently in the 2011 WRF Conference, held in Davos, Switzerland, 21-23 September 2011¹. The topic will also be discussed in the upcoming WRF 2012, to be held in Beijing, China, 21-23 October 2012. This workshop at the ADF will help identify issues to further work on, in preparation of WRF 2013, to be held in Davos, October 6-9, 2013.

¹See www.worldresourcesforum.org for background materials and meeting reports of the conferences

This ADF pre-event aims at discussing these issues with a focus on synergies between Africa's primary mining industry and opportunities given by urban mining of secondary materials from obsolete electrical and electronic equipment. These synergies will be analysed with experts in the fields of *policy issues* related to mineral resources in Africa and to urban mining in general, *infrastructure issues* regarding mining, recycling and refining, and *standards issues* for responsible mining and electronics recycling.

Policy Issues

A first step towards an innovative and holistic vision for governing the mineral sector in Africa for growth and sustainable development was made possible through the African Mining Vision (AMV). It was drafted in 2009 by a technical taskforce jointly established by the African Union and United Nations Economic Commission for Africa (ECA). The AMV advocates for "transparent, equitable and optimal exploitation of mineral resources to underpin broad-based sustainable growth and socio-economic development" and is anchored on the understanding that mineral resources are part of the stock of natural capital that can encourage Africa's development[3]. It further underscores that development can occur if Africa succeeds to transform transient mineral wealth into other forms of lasting capital which outlive the currency of mining.

In the past, African countries have had liberal mining regimes and a number of countries have signed extensive Bilateral Investment Treaties (BITs) as a means to securing foreign direct investments (FDI). While BITs are important internationally binding instruments, they are more focused on investment protection against nationalization or expropriation, assurances for the free transfer of funds and the provision for dispute settlement mechanisms between investors and host countries rather than their value addition to the host country.

Besides the efforts made in the mining sector, an innovative and sustainable way to contribute to creating jobs and added value in many African countries will be the development of a specialized recycling industry for electrical and electronic equipment. Since the numbers of sold new and imported second-hand products has experienced a rapid increase over the past few years, a considerable amount of the extracted resources actually return to the African countries. By efficiently managing these secondary resources, a complementary and mostly independent system for the production of mineral resources can be established. Urban mining knowingly reduces the dependence on rising commodity prices and imports, but also reduces significantly the environmental impact of production [4]. The prudent use of resources also allows people in less developed regions of the world, such as Africa, to improve sustainably the standard of living.

In most countries in Africa, the local business sector is rather weak and not very capable of adequately taking advantage of the various opportunities provided by the extractive industries, including in the provision of goods and services. Nevertheless, the building up of take-back and dismantling infrastructure for e-waste could serve as a trigger for development of sustainable business models for small and medium enterprises in Africa. The advantages and opportunities that lie in the field of urban mining in general and e-waste management in particular are undisputed, but in order to promote such a development, appropriate policies have to be developed.

A first step into this direction has been undertaken by the various international, regional and national platforms and its associated declaration documents as listed in the introduction. In addition, various African governments have stated the processes to develop and implement policy and legislative

frameworks related to e-waste management. Currently the fourteenth session of the African Ministerial Conference on the Environment (AMCEN-14) is preparing a decision on e-waste as an attempt to coordinate national activities on a regional level and implement an action plan.

Infrastructure Issues

A brief glance at the primary mining industry in Africa reveals that at present Canadian, Australian and European mining companies dominate the industry, while Chinese companies are gaining considerable traction through large Greenfield investments and the acquisitions of incumbent western firms.

However, the importance of Artisanal and Small-scale Mining (ASM) in Africa is not to be neglected. ASM is a marginalized sector and the informal miners are trapped in a poverty loop from which it is difficult to escape. Very often, mining operations employ rudimentary equipment and techniques, and access to finance is constrained. In addition, many miners lack the necessary business skills and information to upscale their operations. Environmental impacts are serious, labor conditions harsh and access to extension services and other administrative support is reduced [2]. ASM is labor-intensive and provides more employment than large-scale mining. Between 15 to 20% of the world's non-fuel minerals, approximately 18% of Africa's gold and almost all of Africa's gemstones, except diamonds, are produced by ASM. Furthermore, ASM is a precursor to large mines and allows the exploitation of deposits that are not amenable to large-scale mining [5].

The situation in the "urban mining sector", at least regarding the recovery of e-waste, presents itself in a similar manner. This industry in many African countries is comprised of mainly informal small or family enterprises which recover the valuable materials under mostly artisanal practices causing severe negative impacts on their health and the environment. Huge quantities of cables are burnt and plastic casings generally suffer from the same fate; CRT glass is most often dumped in the outskirts or even within the city. Even though there are a growing number of initiatives looking to develop sustainable business models for e-waste recycling, there is still a striking lack of formal recycling infrastructure and a need for the development of appropriate technology or partnerships with global players. In addition, hardly any country in Africa counts on effective systems for the collection of the products that are no longer desired by public entities, private companies and households.

One of the main challenges in this field, apart from setting up effective collection of obsolete and discarded equipment and from assuring environmentally sound local dismantling practices, is the diversion of the flows to a formal downstream recovery process. Even though this management system of secondary mineral resources is independent from the primary mining sector, it has to be analyzed more in detail how the existing mining infrastructure could be used also for the downstream processing of secondary materials recovered from e-waste.

Standards Issues

It cannot be ignored that the exploitation of mineral resources leaves permanent adverse marks on the environment. Environmental degradation and the social impact of mining are often linked to poor governance, weak regulatory frameworks and insufficient enforcement capacity[2]. In the past two decades, initiatives designed to recognize and expand the scope of social responsibility of mining companies have grown. Several non-governmental organizations (NGOs), such as the Alliance for Responsible Mining (ARM), the Framework for Responsible Mining and the Initiative for Responsible

Mining Assurance (IRMA) have advocated the reformation of mining activity into “responsible mining”.

The mining companies have been called upon to go beyond maximizing profits and assume their Corporate Social Responsibility (CSR). CSR is a framework for formulating and implementing the expanded roles and responsibilities of the corporate sector to incorporate expectations and needs of the society in their business model. It has an immense potential to mitigate the negative reputation of mining, lead to reduced conflicts with communities and employees, and ultimately result in a higher value for the company as part of their business model.

However, the ultimate goal should be the development of transparent and sustainable supply chains. On the demand side, consumers in industrial countries are increasingly concerned about production circumstances of imported goods and wish to have transparent product declarations. They have made clear that they request standards, benchmarks, codes of conduct and guidelines on the management of the mineral resources sector.

Recognizing these trends, some corporations have moved to distinguish themselves from competitors by subjecting their operations to independent scrutiny and establishing a verifiable chain of custody for products. Many have come to realize that compliance with the laws of the countries in which they operate may not be sufficient to protect the environment or vulnerable communities. Some corporations acknowledge the need for compliance with international codes, protocols, covenants, declarations, instruments, and customs that protect basic human rights, self-determination, cultural integrity, labour and social rights, and the natural environment[6].

This call for “certified trading chains” also applies to the production of secondary mineral resources, especially because developing and countries with economies in transition are mainly suppliers of primary, but in the last years increasingly also of secondary commodities or resources. International trade in non-renewable secondary commodities from developing countries will continue to increase in the coming years, due to multiple reasons: Higher penetration of consumer goods particularly in emerging markets, high primary commodity prices, geopolitical strategies and comparatively low labour costs.

While quality and sustainability labelling is established for some renewable commodities (e.g. Forest Stewardship Council – FSC) it is nearly inexistent for non-renewable and completely unknown for non-renewable secondary commodities (e.g. recycled printed wiring boards). Though the existence of instruments to address the social and environmental impacts of primary and secondary (urban) mining is crucial, the key challenge is the capacity to enforce the application of such instruments, and assess, monitor and regulate the impacts.

In this context, the following components should be discussed in the light of primary vs. urban mining: International Standard (e.g. ISO), verification systems (e.g. auditing, reporting, certification and accreditation), incentive systems (e.g. labelling, registration, long-term marketing programme) and long term governance and management.

Outlook and Objectives of the Workshop

Green economy concepts are becoming part of the mainstream vocabulary in development economics. This includes approaches such as urban mining and decoupling resource intensity and economic growth from environmental degradation. There is a growing consensus that a more sustainable economy requires an absolute reduction in resource use at a global level and the reduction of the environmental impact of such a use[2].

The collection and recycling of obsolete electronic equipment can make an important contribution towards a more sustainable economy and the responsible management of our non-renewable mineral resources. At present, Africa faces the challenge to implement efficient and sustainable recovery systems for secondary materials from e-waste as a new market opportunity. This requires the development of functioning 'reverse supply chains' with adequate capabilities for recycling and refining. But besides the setting up of appropriate collection and recycling infrastructure, there is a strong need for policies, which allow for the establishment of a level playing field, and technical standards for the recycling, which guarantee sufficient control over the material quality and the environmental and social impacts of the related recovery processes.

Recognizing these demands, the synergies with primary mining seem rather apparent. Nevertheless, it is important to reflect on this topic with experts from both fields, the primary and the secondary mining sector and further explore the synergies, challenges and opportunities for Africa.

This is what the workshop “Urban Mining, Challenges and Opportunities for Africa - Synergies between e-waste recycling and mining of mineral resources” wants to achieve. The workshop is developed in the context of the **Eighth African Development Forum**, organized by the **World Resources Forum**, a global science-based platform for sharing knowledge about the economic, political, social and environmental implications of global resource use, and supported by **Empa**, an interdisciplinary research and services institution for material sciences and technology development and **Hewlett-Packard (HP)**, the world’s largest technology company for solutions in printing, personal computing, software, services and IT infrastructure.

Agenda of the Workshop

The Workshop will take place on Monday 22 October, from 09:30 – 16:30 at the UN Conference Center, at UNECA headquarters in Addis Ababa, Ethiopia.. The Workshop programme is divided into two sections:

- (1) Introduction and keynote presentations
- (2) Panel discussion in the afternoon

Details can be found in the separate “Agenda” document.

References

- [1] Stephan Lutter& Stefan Giljum (SERI; Vienna/Austria), taken from World Resources Forum www.worldresourcesforum.org
- [2] ADF Concept Note: “Mineral Resources for Africa's Development: Anchoring a New Vision – An Issues Paper”, and 2011 World Resources Forum meeting report, Shaping the Future of our Natural Resources, Davos, Switzerland, September 2011
- [3] African Mining Vision (AMV): African Union, February 2009. Downloaded at ..
- [4] www.urban-mining.com
- [5] ADF background document “CONCEPT NOTE - Governing and Harnessing Natural Resources for Africa’s Development”
- [6] Miranda et al. (2005): “Framework for Responsible Mining: A Guide to Evolving Standards”
- [7] Call for Action on e-Waste in Africa (from the Pan-African forum on e-waste management, March 2012 / Nairobi)