

“UNEP Role in Promoting Environmental Sound Management of E-Waste”

Introduction:

- The electronics and information technology industry is the world’s largest and fastest growing manufacturing industry.
- As a consequence of this remarkable growth, combined with the phenomenon of rapid product obsolescence, discarded electronic equipment, or e-waste, is now recognized as the fastest growing waste stream in the industrialized world.
- This new waste stream would be of environmental significance due to resource and energy consumption
- Most electronic wastes are also hazardous wastes, because of widespread usage of toxic chemicals in today’s high-tech equipment, such as:
 - brominated flame retardants in plastics and circuit boards,
 - beryllium alloys in connectors,
 - lead-tin based solders,
 - lead and barium laden cathode ray tubes,
 - mercury lamps, etc..
- A number of developing countries are generally considered to be the main importers of E-Wastes generated around the world. Importing countries can earn significant income from refurbishing used PCs and disassembling obsolete PCs, monitors, and circuit boards and then recovering the gold, copper and other precious metals.
- Due to the lack of financial resources available to most people in developing countries, much of the growth in the IT sector in developing countries has been fueled by the importation of hand-me-down, used equipment from rich, developed countries, whose consumers are all too happy to find buyers for it. As a result, many brokers and businesses have sprung up to channel used equipment from North to South, rich to poor.

What is E-Waste:

Electronic Waste (E-waste) is a popular, informal term for any electrical or electronic appliance that has reached its end-of-life (EoL). Another popular term is Waste Electrical and Electronic Equipment (WEEE). However, there is no standard definition of E-waste or WEEE.

- More than 500 million computers will become obsolete in the USA alone between the year 1997 and 2007
- 130 million cellular phones will be discarded in the USA by the year 2005, resulting in 65,000 tones of phone waste
- 610 million mobile phones are to be discarded of in Japan by 2010
- 315 million PCs will become obsolete in 2004 alone

- Every year, an EU citizen leaves behind 25kg of E-Waste
- 25-50 million tones of E-Wate are generated per year world wide
- Today, E-Waste comprises more than 5 per cent of all municipal waste, which is nearly the same amount of all plastic packaging, and is growing steadily

The Arab Region and Its ICT Industry:

- ☒ The Arab region consists of 22 countries and territories with a combined population of some 325 million people spanning two continents.
- ☒ The prevalence of ICT in the Arab region is below that of international averages, particularly with regard to the use of personal computers and internet access.
- ☒ Grow rates of internet users range from 200 to 1100 percent. Between 2002 and 2005, internet subscriber rate rose with factor four in the Arab region.
- ☒ Telephone line and cellular subscriptions were highest in the United Arab Emirates at 94 subscribers for every 100 population, followed by Bahrain and Kuwait, at 84 and 72 respectively.

Movement of E-Waste:

- ✚ Some are documents and controlled under Basel Convention for trans-boundary movement.
- ✚ Some are moved as second-hand products
- ✚ Some are dismantled for the recovery of valuable metal parts.
- ✚ Some which are not recycled or re-used are thrown in open dumpsites or burnt in open air.

Extended Producer Responsibility:

- To make manufacturers “financially” responsible for the entire life-cycle of their products, especially when they become obsolete.
- The underlying assumption is the company’s interest in easier recycling and decomposition, and as such resources use limitation, pollution prevention and waste avoidance through ecological “green” design, re-use, re-manufacturing and efficient recycling.

Potential Markets for Plastics from End-of-Life Electronics:

- ❖ *Telecommunications*
 - Decommissioned Tele. Exchange
 - Mobile Phones

- Novelty Phones
- FAX Machines
- ❖ ***Household Appliances***
 - Television Sets
 - Vacuum Cleaners
 - Radios
 - Video/DVD Players
 - Coffee Machines
- ❖ ***Electrical***
 - Fuse Boxes
 - Connectors
 - Wire Coatings
- ❖ ***Computers***
 - Internal Parts
 - External Parts (Casings, Pointing Devices etc.)
 - Peripherals (Printers, External Drives etc.)

Mobile Phone Partnership Initiative:

The Mobile Phone Partnership Initiative (MPPI) was launched in December of 2002, when 10 manufacturers signed a declaration entering into sustainable partnership, with the Basel Convention and in cooperation with other stakeholders, to develop and promote the environmentally sound management of end-of-life mobile phones. MPPI was:

- ✓ Adopted at the sixth Conference of the Parties to Basel Convention (decision VI/31)
- ✓ A Mobile Phone Working Group (MPWG) was formed
- ✓ MPPI “project groups” prepared guidance papers for MPWG and Parties consideration on:
 - Refurbishment;
 - Recovery and Recycling;
 - Awareness raising and training;
 - collection and trans-boundary movement
- ✓ Develop an overall guidance document on Environmentally Sound Management of end-of-life mobile phones which should assist in the promotion of sustainable consumption and production.
- ✓ Partnership with environmental non-governmental organisations & the industry and business sectors.
- ✓ Initiate pilot projects on collection schemes in areas and regions in need of such projects.
- ✓ Involve, where appropriate, the Basel Convention Regional Centres.
- ✓ Developing countries & countries with economies in transition are encouraged to join Mobile Phone Working Group (MPWG).

The goals of working group are to:

- Achieve better product stewardship

- Influence consumers toward more environmentally friendly behavior.
- Promote the best refurbishing/recycling/disposal options
- Mobilize political and institutional support for environmentally sound management of mobile phones
- Create an initiative that could be replicated to build new public/private partnerships for the environmentally sound waste management

E-Waste Projects Currently Undertaken by UNEP's Division of Technology, Industry and Economics (DTIE):

Mobile Back Senegal;

In Senegal, the proliferation of legally and illegally imported cell phones and the absence of activities for recycling when they become obsolete are a major public concern. The project "Mobile Back Sénégal" aims at creating the missing activities of collection, repairs and refurbishment of old cell phones or giving an artistic and commercial value to end-of-life cell phones. The project at the same time aims at promoting in the population a good environmental practice. As a whole, the project supports the dynamic local development, contributes to the protection of the environment and sustainable development and helps to reduce the digital divide.

The project objectives were:

- Setup a workshop for repairing and recycling cell phones for West Africa.
- Refurbished cell phones to be sold at a "special price" to low income groups.
- Irreparable end-of-life cell phones to be transformed into artistic objects with commercial value.
- Create a centre for promoting good environmental practices and acquiring experience in view of transferring to other regions.
- Raise awareness among cell phone users, specially young users, on the issues related to E-Wastes and sustainable consumption and production patterns.

Environment and E-Waste India;

The project aims at reducing the environmental and health impacts due to improper e-waste recycling in India in general and industrial production E wastes in Mumbai, in particular. It also provides support to the formulation of a national WEEE strategy and seeks to improve income opportunities, particularly of poor communities by changing the working conditions and job security in the (informal) e-waste recycling sector.

To multiply the effects, the results and the lessons learnt from the project will be formulated in such a way that they can be transferred to other developing countries through a South and Southeast Asian network for information exchange.

The project objectives were:

- At the National Level, promote the re-organisation of the current E-Waste recycling sector by raising public awareness and accelerating the policy process to enhance extended producer responsibility, promoting profitable environmental and social management among business and policy makers and increasing technical know-how among relevant sectors

- At the Local Level (Mumbai), minimise and avoid the practice of open-burning and leaching E-Waste
- At the Regional Level, a network for the exchange of experience among the countries of South and Southeast Asia will be established and linked to the global policy discussions on E-Waste

Desk Study on E-Waste Management in the Arab Region

Commissioned by: UNEP & Centre for Environment and Development in the Arab Region and Europe (CEDARE):

To figure out the state of E-waste recycling and existing projects in the Arab region, a survey was carried out covering all Arab States. In total over 300 questionnaires were sent out to NGOs, governmental organizations, and ICT companies. The received answers indicate that there is no formal E-waste sector. Five international organizations, four companies and four NGOs are active in 9 Arab countries. The projects are mostly assessment studies and basic data collections leading to the assumption that the implementation of E-waste projects is in its initial phase. The received answers showed that the private sector enterprises are active in Egypt and United Arab Emirates (UAE) supporting the collection of used mobile phones and batteries and the refurbishment/recycling.

More than 25 potential partners were found for a collaboration in different fields like awareness campaigns, capacity building, technical assistance for recycling and refurbishment projects, donation of old End-of-Life (EOL) equipment, or funding of future projects.

As E-waste recycling in the Arab countries is made by the informal sector comparable to India and China, the sector could face similar environmental and health problems in the future. To prevent this and to improve the health and environmental circumstances E-waste pilot projects has to be launched. An accurate E-waste management system allows many opportunities with advantages for all stakeholders: material recovery and appliance refurbishment allow job creation and business opportunities.

Aims of the Study:

- ☒ The aim of this mapping study was to identify all actors and activities in the ICT E-waste field in the Arab region.
- ☒ The main actors were the governmental organizations, the companies producing or selling ICT devices or deliver ICT services and the non-governmental organizations addressing different issues in the E-waste field.
- ☒ The study aimed at giving an overview of all available information and the current situation and practices in the target region.
- ☒ Outline the available legislation and regulations, the state of E-waste Management, and detail profile of the key stakeholders.

E-Waste Challenges in the Arab Region Identified by the Study:

○ The growing quantity

The amount of electronic products discarded globally has skyrocketed recently, with 20 - 50 million tons generated every year. E-waste now makes up five percent of all municipal solid waste worldwide, nearly the same amount as all plastic packaging. Asia discards an estimated 12 million tons each year. E-waste is now the fastest growing component of the municipal solid waste stream because people are upgrading their mobile phones, computers, televisions, audio equipment and printers more frequently than ever before. The average lifespan of computers in developed countries has dropped from six years in 1997 to just two years in 2005. While TVs have the biggest life span, mobile phones are outdated most rapidly. The second rapidly scrapped devices are computers and its hardware. Mobile phones and computers are causing the biggest problem because they are replaced most often. Developing countries are expected to triple their E-waste production over the next five years.

○ Hazardous substances in electronic products

Electronic devices are a complex mixture of several hundred materials. A mobile phone, for example, contains 500 to 1000 components. Many of these compounds contain toxic heavy metals such as lead, mercury, cadmium and beryllium and hazardous chemicals, such as brominated flame retardants. Polluting PVC plastic is also frequently used. These dangerous substances cause serious pollution and put workers at risk of exposure when the products are produced or disposed of. Especially lead and mercury are highly toxic and can harm human health even at low levels of exposure

○ The need of E-waste Technology, Inventory and Knowledge

The Needs Assessment Study from the Basel Convention Regional Center (BCRC) reveals that in Saudi Arabia secure disposal or recycling facilities are few or lacking. Few disposal facilities (secured landfills) were identified in Bahrain, Egypt, Morocco and Kuwait. There is only one hazardous waste landfill in Egypt located in Alexandria. Some countries from the region is planning and/or constructing secured landfills (e.g. Saudi Arabia, Jordan and Yemen). Information about recycling facilities in the countries of the region is very limited and probably most of the existing recycling facilities are of small scale or of limited capacity. In hand with the need for technology goes the need for E-waste inventories. The BCRC Needs Assessment Study reveals that Syria's present needs consist of development of hazardous waste inventory and programs for inventories of secured landfills. Furthermore, there is a need of information for decision-making. Additionally, there are not enough trained personnel to establish, enforce, and implement hazardous wastes management standards.

○ The need for E-waste policies and regulations

Most environmental legislations of the Basel Convention member Arab countries are of framework nature when compared to the model National legislation of the Basel Convention. The bylaws of Bahrain and Saudi Arabia are good examples to propagate to the Arab countries along with the Arabic version of the hazard waste national

legislation models so that countries that are updating or developing their legislations can use as references. Gathering detailed information about the legislation status was impossible in some Arab countries like Kuwait and Libya (BCRC Annual report, 2007). The BCRC Needs Assessment Study revealed that regarding national legislations, many countries in the Arab region issued their national laws and regulations taking into considerations the provisions of the BC (e.g. Saudi Arabia, Bahrain, Jordan, Egypt) other countries need to revise their legislations regarding the hazardous wastes to fully reflect the provision of the Basel convention (e.g. Morocco and Syria). Information from most of the countries is scarce and frequently incomplete.

○ ***E-waste Export from Arab States***

According to the Basel Action Network (BAN), computer waste/scrap goes to Karachi (Pakistan) from countries including Kuwait, Saudi Arabia, and the United Arab Emirates (Exporting Harm, Basel Action Network, URL). Exporting Harm states that in Pakistan, circuit boards are desoldered using blowtorches with no fans set up for ventilation and acid operations take place indoors without ventilation. Furthermore, Pakistani businessmen purchase the E-waste from Dubai and forward it to Karachi in sea-going containers. Investigators working to prepare the Exporting Harm report found that typical costs of a scrap purchase in Dubai were around 35-40 Pakistani rupees (65 US cents) per kilogram, including all expenses

E-Waste opportunities in the Arab Region Identified by the Study:

● ***Refurbishment and Material Recovery***

Refurbishment and material recovery is a way to stimulate small and big businesses. The fraction including precious materials like iron, copper, aluminum, gold and other metals in E-waste is over 60%, while pollutants comprise 2.7%. The rising value of these components has made recycling more economically attractive, as the materials prices have increased dramatically over the past years.

● ***Creating Jobs and Improving Job Quality***

In the US, the recycling industry sustained an 8.3% growth rate annually in the number of jobs. Formalized manual disassembly of E-waste in a large scale specialized material recovery facility is a way to substitute irregular incomes linked to informal sector activities of the previously disadvantaged population with stable and properly registered jobs, ultimately leading to capacity building, poverty alleviation and crime reduction. The support of entrepreneurial activities in a formalized E-waste material recovery facility provides also opportunities for any IT related business to implement a Corporate Social Responsibility programme.

● ***Reduction of the Environmental Impact***

Electronic products are made from valuable resources which require energy to mine and manufacture. Reusing and recycling these materials from end-of-life electronics conserves natural resources and avoids air and water pollution, as well as greenhouse gas emissions that are caused by manufacturing new products. When comparing the environmental impact of E-Waste recycling with that derived from the baseline scenario (incineration of all E-Waste and primary production of the raw materials), E-

waste recycling proves to be clearly advantageous from an environmental perspective.

- ***Recycling Friendly Design***

There are different opportunities how to improve the design of ICT equipment: choose environmental sound materials, use less material, design for refurbishment, recycling, reuse (Life Cycle Thinking), and design for health friendly dismantling. The design of a product should concern strategic decisions that will connect discarded products to final use as recycled products, component parts, materials, or energy. To do so, design process should include life cycle thinking.

Potentials for Environmental Sound Management of E-Waste in the Arab Region:

- Develop E-waste guidelines and regulations
- Develop national/regional action plan for ESM of E-waste
- Implement monitoring, harmonisation and control system for the trans-boundary movement of used E-products & wastes
- Encourage Extended Producer Responsibility within the industry
- Build capacities of stakeholders and hold national awareness campaigns on E-wastes (Collaboration between UNEP, Centre for Environment and Development in the Arab Region and Europe (CEDARE), Basel Convention Regional Centre in Cairo (BCRC), World Bank, Governments/Telecom Regulators & the Industry)
- Develop E-waste management standards concerning occupational health & environment
- Encourage setting up of pilot recycling facilities, including recycling plastics from EOL electronics.
- Explore on the national/regional levels, the potentials of using environmentally sound options for managing plastics from EOL electronics.

Conclusions and Recommendations:

- ✓ **Awareness;** The low number of E-waste activities identified indicated that there is a need for raising E-waste awareness in the Arab region.
- ✓ **Status;** The few projects located and the content of them indicated that E-waste management in the Arab region is in its starting phase. There is a need for more basic data collection, inventories and assessment studies in all areas of the Arab region.
- ✓ **Legal Framework;** To ensure a sustainable E-waste management a regulatory and legal framework has to be developed and implemented. The level of implementation and the content of the framework have potential for improvement especially concerning the ICT sector.

- ✓ **Pilot Projects;** The implementation of E-waste management pilot project is a key factor for the development of technology, best practice and the dissemination across the Arab region.
- ✓ **Sustainable Business Solutions and Infrastructure;** Private enterprises play a key role and have to be incorporated in a recycling system. Technical assistance and business models have to be developed. Those models should be based on high social and environmental standards.

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