Emerging Issues, Challenges and Opportunities in Environmentally Sound Management of E-waste

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Presentation Outline

- What is E-waste and problems associated with it
- Global E-waste facts
- International laws, regulations and initiatives
- End-of-life management
- Upstream reduction of E-waste
- E-waste in developing countries – some issues and challenges
- Case studies from Africa, Latin America and SIDS
- Conclusions

What is E-waste? (anything that has a battery or a power plug)

- Computers
- Monitors
- Keyboards
- Photocopiers
- Televisions
- VCRs
- Fax Machines
- Mobile Phones
- Video Cameras
- Stereos
- Microwave Ovens
- Washing Machines
- Dishwashers
- Digital Cameras

E-Waste Facts

- Every year 20 to 50 million tonnes of e-waste are generated worldwide
- By 2020 e-waste from old computers in South Africa and China will have jumped by 200-400% and by 500% in India from 2007 levels
- By 2020 e-waste from discarded mobile phones will be about 7 times higher than 2007 in China and 18 higher in India
- In 2007, 271 millions computers were sold worldwide
- Globally more than 1 billion mobile phones were sold in 2007

Source: 2009 United Nations Study

E-waste Facts

- 500 million computers became obsolete in the US between 1997 and 2007
- In the United States more than 150 million mobiles and pagers were sold in 2008
- Developing countries like Senegal and Uganda can expect e-waste flows from Personal computers alone to increase 4 to 8-fold by 2020
- One billion PCs will be in use by the end of 2008 - two billion by 2015 with most growth in emerging Brazil, Russia, India, and China

Source: 2009 United Nations Study

Problems Associated with E-waste

- Dangerous chemicals and metals from e-waste may leach into the environment
- Lead (Pb) - most significant concern
- Lead present in the solders used to make elec connections on printed wire boards and Cathode Ray Tubes (CRTs)
- Mercury found in laptop computers and discha lamps.
- Cadmium (found in chip resistors, CRTs)
- Brominated Flame Retardants (BFRs)

International Laws, Regulations and Initiatives

- Waste Electrical and Electronic Equipment (WEEE) Directive
- Restriction of Hazardous Substances (RoHS) Directive
- EU Directive on Energy-using-Products (EuP)
- EU Directive on Registration, Evaluation and Authorisation of Chemicals (REACH)
- E-waste regulations in Japan, China, India, Korea, United States, Canada
- Basel Convention
- Basel Convention Partnership on the ESM of E-waste in the Asia-Pacific region
- Mobile Phone Partnership Initiative (MPPI)
- Partnership for Action on Computing Equipment (PACE)
- StEP Initiative
- Regional 3R Forum in Asia

End-of-Life Management of E-waste

- **Reuse:** the recovery and trade of used products or their components as originally designed;
- **Servicing:** a strategy aimed at extending the usage stage of a product by repair or maintenance;
- **Remanufacturing:** the process of removing specific parts of the waste product for further reuse in new products;
- **Recycling:** Recycling can be done with or without disassembly, including the treatment, recovery, and reprocessing of materials contained in the used products or components in order to replace the virgin materials in the production of new goods;
- **Disposal:** the processes of incineration with or without energy recovery or landfill.

E-waste Recycling in China

E-waste Recycling in India

E-waste Recycling in Africa

Upstream Reduction of E-waste Green Design & Toxic Reduction

- Implement Cleaner Production, Design for Environment etc.
- Reduced use of toxins during production (e.g. Lead free solders & alternatives to BFRs)
- Finding new materials and technologies
- Purchasing upgradeable equipment

Extended Producer Responsibility (EPR)

- EPR schemes make producers physically or financially responsible for the environmental impacts of their products throughout their life cycle.
- Includes upstream and downstream impacts

E-waste in Developing Countries – Issues & Challenges

- Favourite destinations- India, China, Philippines, Hong Kong, Indonesia, Sri Lanka, Pakistan, Bangladesh, Malaysia, Vietnam and Nigeria
- Increased volume of e-waste imported illegally into developing countries
- Most of the second hand EEE imported to developing countries are rarely tested
- Admixture of used EEE and e-waste are not shipped as wastes but as second hand EEEs
- Lack of well-established systems for separation, storage, transportation, treatment and disposal of waste
- Co-disposal of e-waste with domestic waste in open dumps
- Tackling the emerging informal e-waste recycling where e-waste is managed by using methods such as open dumps, backyard recycling and disposal into surface water bodies.

E-waste in Developing Countries – Issues & Challenges

- Lack of funds and investment to finance formal recycling infrastructures
- Absence of appropriate legislation to deal with the issue
- Implementing EPR in developing countries is a major challenge to policy makers
- Unwillingness of consumers to handout their used EEE or pay for the disposal of waste
- Reluctance from the public to pay for e-waste recycling and disposal services as they can make money by selling used EEE instead
- Emotional attachment to used EEE means that most of them are stored

E-waste Case Studies

- Africa – South Africa, Kenya, Morocco, Uganda, Senegal
- Latin America – Colombia, Brazil
- Small Island Development States – Fiji, Samoa, Jamaica
- Australia

Conclusions

- Well defined regulatory procedure adequate enough to control illegal exports of e-waste and to ensure their environmentally sound management
- Improve country's ability to gather data and inventory on e-waste generation including their transboundary movement and to access appropriate and cost effective technologies to manage e-waste within their own borders
- Establishment of proper intuitional infrastructures for collection, storage, transportation, recovery, treatment and disposal of e-waste at regional and national levels
- Improving the working conditions and minimisation of work related toxic exposure at e-waste collection, processing, recovery and disposal facilities
- Awareness raising programmes and activities on issues related to health and safety aspects of e-waste in order to encourage better management practices.

Conclusions

- Develop public-private-community partnerships to encourage the establishment of formal e-waste recycling and disposal enterprises
- Address the obstacles related to implementing EPR
- Require the countries that export used EEE to developing countries to formally test the equipment prior to export
- Prohibit import of e-waste if the receiving country does not possess adequate capacity to manage these wastes in an environmentally sound manner
- Promote reduction and reuse of EEE
- Support the development of regulatory mechanisms and e-waste management infrastructures in developing countries including the small island development states