Management of Hazardous Wastes and E-wastes in developing countries

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Presentation Outline

• Hazardous waste management in developing countries
• 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 – specific issues and challenges
• E-waste in Greater Mekong Sub-region
Hazardous Waste Management in Developing Countries

- Increased generation
- Issues with the definition
- Lack of proper inventory
- Transboundary movement
- Lack of resources and infrastructure
- Poor implementation of 3Rs
- Issues related to informal recycling
- Small to Medium Sized Enterprises

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 million computers were sold worldwide.
- Globally more than 1 billion mobile phones were sold in 2007.

Source: 2009 United Nations Study

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**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 electrical connections on printed circuit boards and Cathode Ray Tubes (CRTs).
- Mercury found in laptop computers and discharge 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, Indonesia, Sri Lanka, Pakistan, Bangladesh, Malaysia, Viet Nam 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 in Developing Countries - Future Directions

- Well defined regulatory procedure
- Improve country’s ability to gather data and inventory on e-waste
- Establishment of proper institutional infrastructures
- Improving the working conditions of recyclers
- Awareness raising programmes
- Develop public-private-community partnerships
- 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
- Promote reduction and reuse of EEE.
E-waste in Mekong Sub-region

- Increasing amounts of e-waste
- Transboundary movements
- Lack of policies and regulations specifically related to e-waste
- Lack of infrastructure and resources
- Problems associated with informal recycling sector
- Lack of proper data on e-waste generation and its sources

E-waste in Cambodia

- New and used EEE are imported
- Does not manufacture EEE
- No specific e-waste regulations
- E-waste inventory in 2007
- 900,000 used TVs, 14,000 used PCs and 340,000 used mobiles imported 2004-06
- Have conducted 6 training programs in 2008
- Plans for pilot projects on collection
- Set up regulations and standards for e-waste management
- Capacity building
E-waste in Lao PDR

- Lack of capacity in planning and management
- Insufficient technical knowledge and resources
- Low awareness of public on impacts of solid waste
- E-waste generation rapidly increasing
- No specific legislation to control the import of used EEE
- Laws exist to control the movement of hazardous waste across the border and within the country
- Hazardous Chemical Strategy to the year 2020 and Action Plan for 2006-10
- Signatory to number of international conventions

E-waste in Vietnam

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage increase from 2006–2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Televisions</td>
<td>1230%</td>
</tr>
<tr>
<td>Computers</td>
<td>1000%</td>
</tr>
<tr>
<td>Mobile Phones</td>
<td>600%</td>
</tr>
<tr>
<td>Refrigerators</td>
<td>880%</td>
</tr>
<tr>
<td>Air Cons</td>
<td>1650%</td>
</tr>
<tr>
<td>Washing Machines</td>
<td>700%</td>
</tr>
</tbody>
</table>
E-waste in Vietnam

- No laws and regulations specifically dealing with e-waste
- Informal recycling activities being undertaken in Vietnamese craft villages
- Difficulties with clear criteria distinguishing between second hand EEE and e-waste.
- Urgent need to develop specific legislation related to e-waste incorporating 3R
- Cleaner production in industry towards 2015 and vision to 2020

E-waste in Thailand

- About 80,000 tons/year of e-waste in 2009
- EEE manufacturers generated about 20,000 tons/year
- 2.5 million units of TVs, PCs, mobile phones, refrigerators, air conditioners and washing machines in 2009
- About 2,000 EEE, 8000 junk shops & 30 formal recycling
- Illegal imports, lack of general awareness about e-waste, incomplete databases and inventories related to e-waste, lack of environmental sound management practices and lack of specific laws and regulations on e-waste.
- National Strategic Plan on Integrated Management of WEEE (WEEE Strategic Plan) in July 2007
- WEEE Plan includes strategies for technology development and best practice, capacity building and participation, law development and enforcement, financial and investment mechanisms and organisation development
- Target 50% collection and recycling by 2011
E-waste in Thailand

- Thai RoHS and Green Procurement
  [http://www.thairohs.org](http://www.thairohs.org)
- Ewaste inventory
- Fluorescent Lamp pilot take back
- Capacity building for customs and port officers
- Regulation of dismantling and recycling facilities
- Public awareness
- Prioritising of WEEE