E-waste Economic Perspective

BY

ENG’R ADEGBOYEGA ADELEYE
Definition

• Loosely discarded, surplus, broken, faulty, obsolete electronic gadget
  – Examples
    • Phones/ Mobile Phones, TV, Computers, Fax Machines, Refrigerators, Audio Equipments, Other Electronic devices.

• Economic Perspective
  • gains
  • drains
Waste Anatomy: 25Kg PC

Main concerns of e-waste => Heavy Metals
- Lead, Zinc, chromium, cadmium
- Harmful for both organism and environment

<table>
<thead>
<tr>
<th>Materials</th>
<th>Content (% of weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLASTIC</td>
<td>23</td>
</tr>
<tr>
<td>FERROUS MATERIAL (e.g. Iron)</td>
<td>32</td>
</tr>
<tr>
<td>NON-FEROUS MATERIAL - Lead, Zinc, Cadmium</td>
<td>18</td>
</tr>
<tr>
<td>ELECTRONICS -(Silver, Platinum, Gold)</td>
<td>12</td>
</tr>
<tr>
<td>GLASS</td>
<td>15</td>
</tr>
</tbody>
</table>
2 SIDES OF THE COIN

• ADVOCATES
• CRITICS
Advocates

• Ethical Reasons
• Recovery/ Retrieval of valuable Materials
• Reduces raw material process chain
  • fewer materials in production
  • Long lasting product encouraged
• Safer and more efficient Cycling process
Critics

- Raise product & Waste Management Cost
- Limit innovation
- Facilities might cause harm to the environment
- E-waste is negligible 4%
- Disassembly problems
  - Costly & Dangerous
- Less than 5% of original cost retrieved
- Insincerity
FEARS
Zamfara Lead Poison Tragedy

EPIDEMIC DISCOVERY ANNOUNCED JUNE 4, 2010 – Dr. Henry Akpan

- A series of lead poisonings in Zamfara State, Nigeria, led to the deaths of at least 163 people between March and June 2010,
  - including 111 children.
  - Health ministry figures state the discovery of 355 cases, with 46 percent proving fatal.
Positive Uses of Lead

• Bullets: the density and mass make it a great projectile

• Batteries: the density makes it a great insulator

• Xray protective garments: the density prevents x-rays from going through
Mercury Hazard

- Mercury poisoning (also known as hydrargyria (Hg) or mercurialism) is a disease caused by exposure to mercury or its compounds.
- Hg - heavy metal that occurs in several forms, all of which can produce toxic effects in high enough doses.
  - Its zero oxidation state Hg0 exists as vapor or as liquid metal,
  - its mercurous state Hg+ exists as inorganic salts,
  - its mercuric state Hg2+ may form either inorganic salts or organomercury compounds;
  - the three groups vary in effects. Toxic effects include damage to the brain, kidney, and lungs. Mercury poisoning can result in several diseases, including acrodynia (pink disease), Hunter-Russell syndrome, and Minamata disease.[2]
Positive Uses of Mercury

• used for Thermometers, Barometers, and Manometers
• used for extracting gold and silver from their ores
• Once used for silvering the backs of mirrors
• unites with most of the other metals to form alloys
• the explosive powder put into percussion caps, cartridges, and fuses
• mercury-vapor lamps, which emit light rich in ultraviolet radiation; various kinds of such lamps are used for street lighting,
Positive Uses of Mercury

• mercury forms a special type of alloy called an amalgam; a special amalgam (mostly mercury, silver, and tin) is used in dentistry for filling teeth
• electrode in the production of chlorine and sodium hydroxide
Is e-waste an Economic Waste?

- Yes, it is an economic waste and a gold mine
- Can be considered as a good business opportunity
  - with a proper recycling methods
  - technologies used safe guarding the environment
E-waste Fact

• Over 92% can be Reused/ Recycled
• Require Special Handling & Recycling Techniques
Present Situation

- 23% Plastic
  - RECYCLED LOCALLY

- 33% Ferrous Material
  - RECYCLED LOCALLY
    - UNIVERSAL STEEL & CO

- 15% Glass
  - GUINEA GLASS & CO

- 18% Non Ferrous & 12% Electronics
  - WASTE
  - CAN BE HARNESSSED
World Economic Waste

• 1 TON OF CELL PHONE THROWN AWAY (LANFILLED or INCINERATED)

EQUALS

• Throwing away nearly 283g (10 ounces) of gold and 141g (5 ounces) of platinum.
MONETIZATION

• 31 grams of gold is now selling for approximately $1,150 on the open market. The equivalent weight of platinum sells for $1,450.

• High prices encourage more mining, but the cost to human health.
World Economic Waste

• Other precious metals that are teased from the Earth
  » including indium, gallium, palladium, and ruthenium, are being discarded in much the same way as other electronic waste (e-waste).

• Tantalum, the essential constituent of the capacitors used in cell phones.
  » Approximately 37% of the world’s supply of tantalum comes from Central Africa, where mining it has been linked to devastating wars and environmental pollution.
ECONOMIC GAIN METHODS

• Reuse
  • If functional, donate or sell to user

• Recover / Reprocess
  • Local Content

• Recycle
  • Components that can’t be repaired
RECYCLE
Environmental Friendly E-waste Recycling

• Recycling E-waste in an environmental friendly way by DDS4, Difference in Density Separation
  1. Without burning
  2. Without the use of strong acids for metal recovery
  3. Without any material going into landfill
  4. With 100% utilization
Inference

• End-of-Life electronic resource recovery is a valuable source of raw-material for many industries
Hi-Tech Waste- A gold mine

• HIGHLIGHTS
  • Recovery of high-value of engineering plastics derived from petroleum which is a non-renewable resource.
  • Recovery of mixed plastics by extensive dis-assembly which can increase the product purity and fetch better value
  • Recovery of mixed non-ferrous and ferrous by disassembly identification and pre-sorting will reduce the total amount of e-waste to be recycled thus reducing the cost of operation.
Hi-Tech Waste- A gold mine

• The mixed metals are separated using ferro fluid separation thus avoiding purification of mixed metals by other conventional processes.
  » Liquid Research USA

• PVC Cables less than 2mm can undergo vinyl loop recycling process to recover PVC and copper separately which can be used as virgin raw material and burning can be avoided.

• Precious metals like gold and platinum are recovered by using hydrochloric acid and a sub-zero salt that is a substitute for concentrated nitric acid.
  » Process is currently used in Canada.
LOCAL CONTENT POLICY

- Waste to Wealth
- Human Capacity Development
Harzards

• CHINA:
  • Thousands of children in China’s Henan Province are sick from lead poisoning, because they live near a facility operated by Henan Yuguang Gold & Lead Company, one of the world’s largest mining conglomerates.

• NIGERIA:
  • Punch, 15 June 2010 – 300 Deaths recorded in Zanfara State
  • Guardian Feb. 8, 2011 – 11 Blinded & 1015 being treated for high lead in their bloodstream in Anka/Bukkuyum Local Councils of Zamfara State
DANGERS

• INADEQUATE TRAINING
• INADEQUATE INVESTMENT
  – High prices tempt many more people extract precious metals from existing products – at great danger to themselves and others
REALITY

- Cottage industries in countries in Nigeria and such as China, Ghana, India,
  - employ ill-equipped artisans
  - not sufficiently trained to avoid harmful procedures that contaminate the environment and sicken themselves and their neighbors.
artisanal e-waste mining

• vulnerable populations stumble while attempting to make a living through artisanal e-waste mining
Advantages

• Local Content Policy
  – Waste-to-Wealth
• Building Local capabilities
• Reduced Raw Material Chain
RECOMMENDATIONS

• E-waste Awareness Program
• Qualification of Private Collectors
• Establishment of State Collection Centres
  » Existing Facilities
• Recycling Vendor Qualification Program
  » Canadian Experience
• Investment in Tested Technology to take Economic Advantage of E-waste
RECOMMENDATIONS cont’d

• State Government To Fund
  • Collection
  • Recover, Reuse, Recycle
END

• Thank you