Auditing e-Waste: Approaches for sustainable development

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Session Plan

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Sustainable development

- In response to global threats to environment, concept of Sustainable development was evolved in 1983 by the World Commission on Environment and Development (WCED)

- '**sustainable development'** means development that 'meets the needs of the present without compromising the ability of future generations to meet their own needs'

  – Recognizes the need for a balance or trade-off between economics, social progress and environment

  – Does not focus solely on environmental issues

International efforts

- United Nations Conference on Environment and Development, better known as the Earth Summit , held in Rio
  - Milestone event, effectively focusing the world's attention on environmental & development problems we face as a global community
  - Brought together 172 nations, 108 heads of state, 1400 non-governmental organisations (NGO's), and about 8000 journalists from all over the world with the objective of preparing the world for attaining the long-term goals of sustainable development
- **Agenda 21,** the world's plan of action for sustainable development, adopted by the international community at the 1992 Earth Summit in Rio
  - Landmark achievement, incorporating environmental, economic and social concerns into a single framework

International efforts

- Ten years later, the international community came together once again at the ***World Summit on Sustainable Development (WSSD)*** in Johannesburg in 2002
    - Objective was to review the developments of the past decade & to forge a cohesive global partnerships to achieve a comprehensive implementation of Agenda 21
- ***The Commission on Sustainable Development*** also known as CSD created in December 1992 to ensure effective follow-up of the 1992 Earth Summit
- **Rio +20 conference** organised in June 2012
    - Objective is to secure renewed political commitment for sustainable development, assess the progress to date and the remaining gaps in implementation

Sustainable development – waste management

- Main product of the WSSD—the Plan of Implementation—is the world's most recent global agenda for achieving sustainable development

- Building on *Agenda 21* of the 1992 Earth Summit held in Rio de Janeiro, Brazil, the Plan sets direction and commitments in areas such as poverty reduction, education, water, waste, air, biodiversity, forests, and energy.

  - At the national level, some countries have integrated their WSSD commitments into sustainable development strategies.

Sustainable development – waste management

- (Paragraph 21a)

- Develop waste management systems

  - with highest priorities placed on waste prevention and minimization, reuse and recycling, and environmentally sound disposal facilities, including technology to recapture the energy contained in waste

  - encourage small-scale waste-recycling initiatives that support urban and rural waste management and provide income-generating opportunities, with international support for developing countries.

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E waste

- Waste from electronic and electrical appliances which have reached their end- of- life period or are no longer fit for their original intended use and are destined for recovery, recycling or disposal.

    – includes IT components like computer and its accessories- monitors, printers, keyboards, central processing units;

    – Electrical items like TVs, air conditioners, refrigerators mobile phones and chargers, remotes, compact discs, headphones etc.

    – almost any household or business item with circuitry or electrical components with power or battery supply

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E waste

- One of the fastest growing waste streams in developed as well as in developing countries

  – Due to the fact that the life span of computers has dropped in developed countries from six years in 1997 to just two years in 2005

  – mobile phones have a lifespan of even less than two years

- Exponential growth in amount of e-waste generated per year

- Has a major impact on developing countries as loopholes in the current laws allows the export of e-waste from developed to developing countries (70% of the collected e waste ends up in unreported and largely unknown destinations).

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Environment and health risks

- Inappropriate methods like open burning, which are often used by the informal sector in developing countries to recover valuable materials, have heavy impacts on human health and the environment.

- Harmful emissions of hazardous substances mainly come from:

    - the product itself (if landfilled): Lead in circuit boards or cathode ray tube (CRT) glass, mercury in liquid crystal display (LCD) backlights

    - substandard processes: Dioxin (a cancer causing chemical) formation during burning of halogenated plastics or use of smelting processes without suitable off-gas treatment

    - reagents used in the recycling process: cyanide and other strong leaching acids, nitrogen oxides (NOx) gas from leaching processes and mercury from amalgamation

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# E- Waste: a trans-boundary issue

- Awareness of health and environmental impacts posed by poor disposal methods adopted for e-waste has been the basis of global action leading to the tightening of laws and regulations

  – This has, in turn, triggered an increase in the cost of hazardous waste disposal through safer means, compelling many countries to search for more economically viable ways of disposing waste abroad.

- As a result, many developed countries export hazardous wastes including electronic wastes to the developing countries

  – Illegal export becomes possible when environment and occupational regulations are non-existent, minimal, lax or not well-enforced, as they are in some developing countries.

- Low labour costs in these countries also provide the impetus for the export in wastes

  – Exporting e-waste is more lucrative for the exporter country than recycling or disposing it within the country.

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International Agreements

- ## Basel convention

  - The overarching objective of the Basel Convention is to protect human health and the environment against the adverse effects of hazardous wastes

  - Scope of application covers a wide range of wastes defined as "hazardous wastes" based on their origin and/or composition and their characteristics

  - Includes E waste

  - The provisions of the Convention center around the following principal aims:

    - reduction of hazardous waste generation and the promotion of environmentally sound management of hazardous wastes, wherever the place of disposal;

    - the restriction of transboundary movements of hazardous wastes except where it is perceived to be in accordance with the principles of environmentally sound management; and

    - a regulatory system applying to cases where transboundary movements are permissible.

Waste management hierarchy
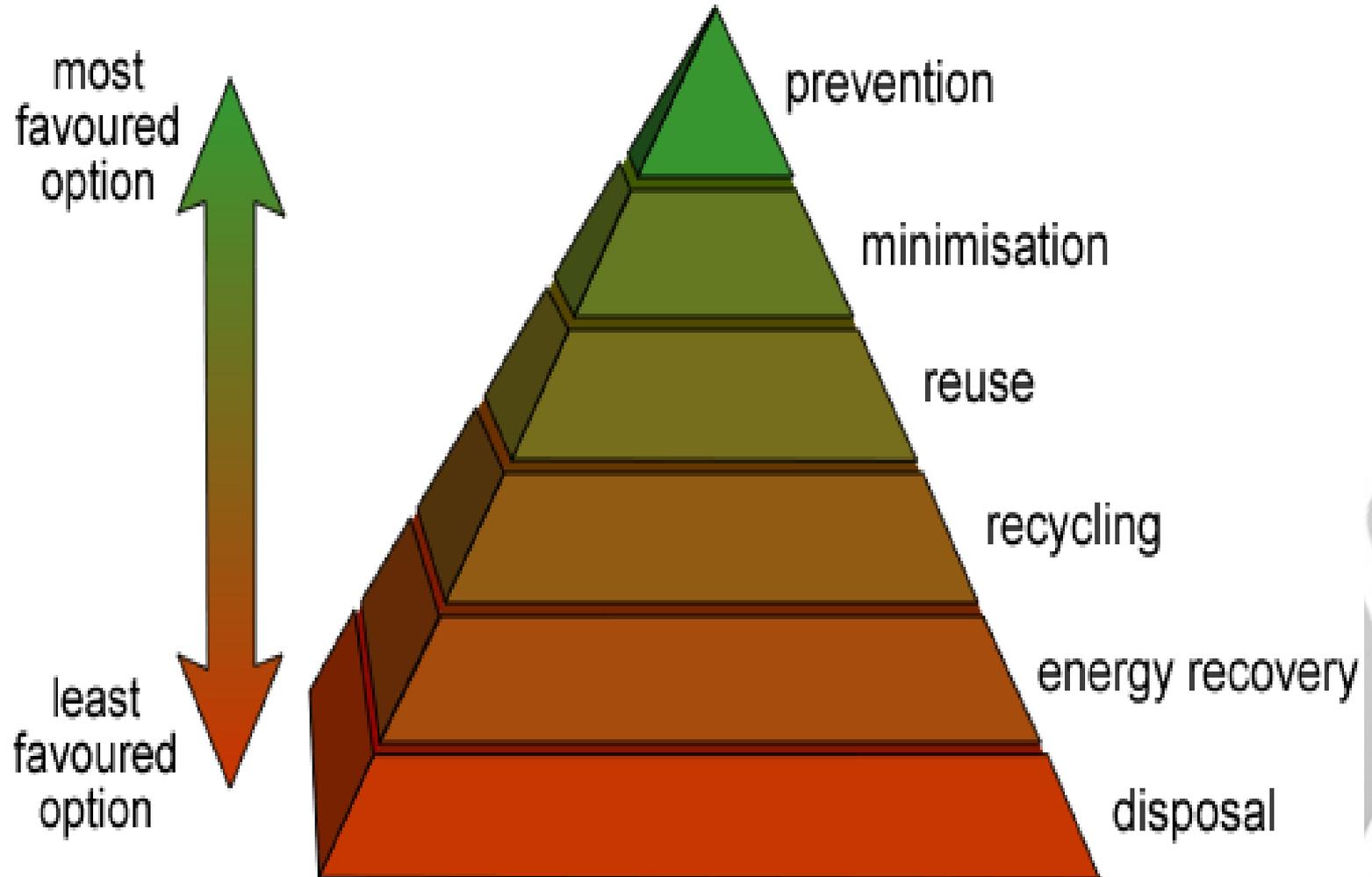
Sustainable management of E waste

- Depends on policy/programme/laws of government

- Some universally accepted methods

  i. Reduction of the Hazardous Substances (RoHS) in the Electronic & electrical Equipment

     - increasing trend in the reduction in the use of hazardous substances such as lead, cadmium, mercury, polychlorinated biphenyls (PCBs) and other toxic and hazardous substances for which safe substitutes have been found.

     - Many countries have adopted the RoHS regulations in the manufacture of electrical and electronic equipment

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ii. Extended Producer Responsibility (EPR)

- an environment protection strategy that makes the producer responsible for the entire life cycle of the product, especially for take back, recycle and final disposal of the product

- Producers' responsibility is extended to the post-consumer stage of the product life cycle

- needs to be included in the legislative framework making EPR a mandatory activity associated with the production of electronic and electrical equipment

- producers shall take the responsibility of collection of the end of use equipment through facilitating the establishment of a common collection point and suitable storage infrastructure

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E-waste Composition and Recycle Potential

- The consumption of e-waste and its recyclable potential is specific for each appliance

- In order to handle this complexity, the parts/materials found in e-waste divided broadly into six categories and recycling strategies for each required and framed

  - Iron and steel, used for casings and frames

  - Non-ferrous metals, especially copper used in cables, and aluminum

  - Glass used for screens, windows

  - Plastic used as casing, in cables and for circuit boards

  - Electronic components

  - Others (rubber, wood, ceramic etc.)

Recycling, Reuse and Recovery Options

- **Dismantling**
  - Removal of parts containing dangerous substances (CFCs, Hg switches, PCB); removal of easily accessible parts containing valuable substances (cable containing copper, steel, iron, precious metal containing parts, e.g. contacts).

- **Refurbishment and reuse**
  - potential for those used electrical and electronic equipment which can be easily refurbished to put to its original use.

- **Recycling/recovery of valuable materials**
  - Ferrous metals in electrical are furnaces, non-ferrous metals in smelting plants, precious metals in separating works.

- **Treatment/disposal of dangerous materials and waste**
  - Shredder light fraction is disposed of in landfill sites or sometimes incinerated (expensive)
  - CFCs are treated thermally
  - PCB is incinerated or disposed of in underground storages
  - Hg is often recycled or disposed of in underground landfill sites.

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Audit issues

- Existence of database regarding e waste

- Recognition of threats to health and environment posed by e waste

- Existence of waste policy/ laws/rules governing management of e waste

- Strategies to reduce, reuse and recycle e waste

- Collection and segregation of e waste

- Proper e- waste disposal

- Proper accountability mechanisms for e waste

- Compliance to e- waste policies/laws/rules

- Monitoring of compliance to e- waste policies/laws/rules

- Adequacy of infrastructure for e- waste management

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Compliance Audit issues

- Contracts, if any, awarded for e- waste management, could be examined with reference to the usual audit checks for contracts.

- Targets for inspection of e-waste management facilities as per law/rule and whether shortfalls in inspection met

- Regulations for the issuance of licenses to the various establishments, checklist of conditions to be satisfied before issue of these licenses for management of e-waste and cases of omissions and lapses in compliance.

- Strategy for funding of e-waste management programs, the sources, conditions, sanctions, releases, payments, expenditure, maintenance of accounts etc.

- System of imposing punishments for the failures and non-adherence to the rules/regulations

  – Imposition, collection, crediting and adequacy of penalties.

  – Extent of dues pending recovery, efficiency of the system of imposition and recovery of penalty.

Issues in Performance Audit

- Assessment of the quantum of e-waste and risks associated with it
- Government policies on e- waste minimization and waste reduction
- Existence of legislations for disposal of e-waste
- Allocation of responsibility for the management of e-waste
- Compliance to and monitoring of rules governing e-waste management
- Evaluation and feedback mechanism
- Adequacy of funding and infrastructure

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Thank you!