

Understanding E-waste



What is E waste?

It is the term used to describe old or discarded electrical and battery operated appliances. Today's gadgets will turn into tomorrow's E-waste.



Causes of Gadgets becoming E waste

- Changes and Advancement in technology
- Changes in fashion, style, and status
- Changing configuration
- Attractive offers from manufacturers
- Small life of equipments

Some Examples

- Cell phone upgrades
- Digital TV Conversion
- Software upgrades
- Battery of i-Pod

Why is E waste a Problem?

- Composed of Hazardous Materials
- Products are quickly obsolete and discarded
- Electronic products are difficult to recycle
- Discarded electronics are managed badly
- Most e-waste goes to Landfills
- Most recyclers don't recycle, they export

Issues and Challenges

World Demand for Electric and Electronic Devices is Rising	Lack of Collection and Segregation at Source
Lack of Awareness	95% of E waste is recycled through informal sectors

Constituents of E waste

Hazardous Materials

Source of e-wastes	Constituent (Hazardous)	Health effects
Printed circuit boards, Computer monitors, Batteries	Lead (Pb)	• Damages nervous system and kidney • Affects brain development of children.
Chip resistors and Semiconductors	Cadmium (Cd)	• Accumulates in kidney and liver. • Causes neural damage
Relays and Switches, Printed Circuit Boards	Mercury (Hg)	• Chronic damage to the brain. • Respiratory and skin disorders
Motherboard	Beryllium (Be)	Lung cancer
Front panel of CRTs.	Barium (Ba)	• Muscle weakness; • Damage to heart, liver and spleen
Batteries	Lithium (Li)	• Nose and Throat Irritation. • Heavy exposure leads to Pulmonary edema

Valuable Materials

Source of e-wastes	Constituent (Valuable)	Uses
Cable, Housing	Plastics	Insulation
Funnel glass in CRTs, PWB	Lead, gold	Metal joining, Connectivity
Housing, PWB, CRT	Mercury, Zinc	Batteries, Switches
Housing, CRT, PWB, connectors	Aluminum, Silver Copper, iron	Conductivity, Magnetivity

Waste Hierarchy



- Refers to the "3 R's" Reduce, Reuse and Recycle
- Its aim is to extract maximum benefits from products and to generate the minimum amount of waste.

WEEE Directive

(Waste Electrical and Electronic Equipment Directive)
 • Introduced in January 2007. • Aims to reduce the amount of electrical and electronic equipments being produced. • To encourage everyone to reuse, recycle and recover it.

WEEE Categories

- Large household appliances
- Electric and Electronic Tools
- Toys, Sports Equipment
- IT and Telecommunications equipment
- Office, Information & Communication Equipment
- Entertainment & Consumer Electronics
- Medical devices

What should be done?

- Think before you throw. Do not throw away old equipments.
- Dispose them Safely. Give them to E waste receptacles
- Scientific Recycling should be preferred
- Make yours a waste sensitive Institute or Organization.
- Awareness among consumers and manufacturers
- Products should be made recyclable
- Proper laws and policies should be made

Methods of E waste Disposal



Recycle

Recycling is defined as the assembling, developing, promoting, or buying of new products, which are prepared from waste materials.



Steps in Recycling

- Dismantling of E-Waste
- Removal of hazardous materials such as PCB, Hg, removal of plastic etc.
- Strong acids are used to remove valuable metals such as gold, lead, copper etc.

Challenges in Recycling

- Close to 95% of the E waste that is recycled goes through the informal sector.

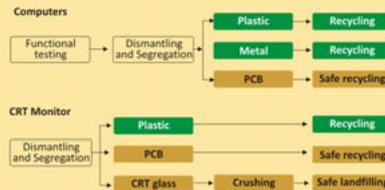
Examples of Scientific Recycling

Methods of Scientific Recycling

- Consumer recycling
- Donation
- Take back
- Exchange
- Corporate recycling

Advantages of Recycling

- Recycled materials can be used in developing new equipments
- Valuable Materials are retrieved
- Helps environment by avoiding pollution



Incineration

It is a controlled and complete combustion process, in which the waste material is burned in specially designed incinerators at a high temperature (900-1000°C).

Advantages

- Reduction of waste volume
- Utilization of energy of combustible substances
- Hazardous substances are converted into less hazardous substances

Disadvantages

- Emission of harmful gases and residues
- Emission of cadmium and mercury

Land fill

Land fill is also known as dump, is a site for the disposal of waste materials by burial and is the oldest form of waste treatment.

Disadvantages

- Metals like mercury, cadmium, lead reaches into the soil and ground water making them polluted
- Requires large amount of space
- It is not an environmentally sound treatment

Reuse

Lowering the usage eg. Plastics Reuse: It constitutes direct use or use after slight modifications to the original functioning equipment.

Advantages

- Electronic equipments like computers, cell phones etc. can be re-used.
- This method also reduces the volume of e-waste generation.
- No wastage of time and money