E-WASTE MANAGEMENT IN INDIA - CURRENT SCENERIO

PRESENTED BY :

Asok Kumar Das

Vice Chairman

Indian Institute of Chemical Engineers
Calcutta Regional Centre

Dr. H L Roy Building, Jadavpur University Campus
Raja S C Mullick Road, Kolkata-700032, India
Res. Address : CD-132, Sector-1, Salt Lake, Kolkata-700064, India
Ph: 91 9830391689, E-mail: das.asok.kr@gmail.com

Introduction

- In the 20th Century, the information and communication revolution has brought enormous changes in the way we organise our lives, our economies, industries and institution.
- At the same time, these have led to manifold problems including the problem of massive amount of hazardous waste and other wastes generated from electric products.
- It constitutes a serious challenge to the modern societies and require coordinated effects to address it for achieving sustainable development.

What is E-Waste?

Rapid growth of technology, upgradation of technical innovations, and a high rate of obsolescence in the electronics industry have led to one of the fastest growing waste streams in the world which consist of end of life electrical and electronic equipment product such as :

- ✓ Refrigerator, Washing machines, Computers and Printers, Televisions, Mobiles, Ipods etc.

- ✓Many of which contain toxic materials.

Composition of E-Waste

Consists of –

Ferrous & Non-ferrous Metals Plastics, Glass, Wood etc.

Iron & Steel - 50%

Plastics - 21%

Non-ferrous metal - 13%

Mercury, Arsenic, Lead etc.

E-Waste Generation in India

Projection by International Association of Electronic Recycler (IAER).

- 3 billion electronic and electrical appliances became WEEE in 2010.

- Globally about to 20 – 50 million tonnes of E-Waste are disposed of each year.

- Which accounts for 5% of all Municipal Solid Waste.

According to Comptroller and Auditor-General's (CAG) Report, over 7.2 MT of Industrial Hazardous Waste, 4 lakh Tonnes of electronic waste, 1.5 MT of Plastic waste, 1.7 MT of medical waste and 48 MT of municipal waste are generated in the country annually.

- CPCB has estimated that E-Waste exceeded 8 lakh tonnes mark in 2012.

Contd……

E-Waste Generation in India

- There are 10 states that contribute to 70% of the total E-Waste generated in the country.
- 65 cities generate more than 60% of the total E-Waste in India.
- Among the top ten cities generating E-Waste, Mumbai ranks first followed by Delhi, Bengaluru, Chennai, Kolkata, Ahmedabad, Hyderabad, Pune, Surat & Nagpur.
- Main source of electronic waste in India are the government, public and private (Industrial) sectors – 70%
- Contribution of individual house hold – 15%
- Rest being contributed by manufacturers.

Contd……

E-Waste Generation in India

Out of total E-Waste volume in India –

Television	-	68%
Desktop, Server	-	27%
Imports	-	2%
Mobile	-	1%

-Despite 23 units currently registered with Govt. of India, Ministry of Environment and Forest / Central Pollution Control Board, as E-Waste recyclers / preprocessors the entire recycling process more or less still exists in the unorganised sector.

-

Electronic waste in the global context

- It is estimated that more than 50MT E-Waste is generated globally every year
- A report of the United Nations predicted that by 2020, E-Waste from old computers would jump by 400% on 2007 levels in China and by 500% in India
- Additionally E-Waste from discarded mobile phones would be about seven times higher than 2007 levels in China and in India 18 timers higher by 2020
- China already produces about 2.3 million tonnes of E-Waste domestically second only to the US with about 3 million tonnes

Contd…….

Electronic waste in the global context

- Such predictions highlight the urgent need to address the problem of E-Waste in developing countries like India where the collection and management of E-Waste and the recycling process is yet to be properly regulated
- It may cause rising environmental damage and health problems of E-Waste recycling if left to the vagaries of the informal sector

Growth of electrical and electronic industry in India

The electronic market in India jumped from US $ 11.5 billion in 2004 to US $ 32 billion in 2009 making it one of the fastest growing electronic market worldwide with US $ 150 billion in 2010

India’s low manufacturing costs, skilled labour, raw materials, availability of engineering skill and opportunity to meet demand in the populous Indian Market have contributed significantly

India’s large and growing middle class of 320 – 340 million has disposable income for consumer goods

Environmental concerns & health hazard

-Generation of E-Waste in 2012 in India – 8 lakh tonnes

- Annual growth rate of E-Waste generation – 10%

- E-Waste highly complex to handle

- Pollutants and their occurrence in waste electrical and electronic equipment

Pollutant	Occurrence
Liquid crystal	Displays
Lithium	Mobile telephones, Photographic equipments, video equipments, batteries
Mercury	Components of Copper machines and steam irons, batteries in clocks and pocket calculators, switches, LCDs
Nickel	Alloys, batteries, relays, semiconductors, pigments
PCBs (poly chlorinated biphenyls)	Transformers, capacitors, softening agents for paints, glue, plastic
Selenium	Photoelectric cells, pigments, photo copiers, fax machines
Silver	Capacitors, Switches (contacts) batteries, resistors
Zinc	Steel, brass, alloys, disposable and rechargable batteries, luminous substances

Contd……

Pollutant	Occurrence
Arsenic	Semiconductors, diodes, microwaves, LEDs (light emitting diodes), solar cells
Barium	Electron tubes, filler of plastic and rubber, lubricant additives
Brominated flame proofing agent	Casings, circuit boards (plastic), cables and PVC cables
Cadmium	Batteries, pigments, solders, alloys, circuit boards, computer batteries, monitor, cathode ray tubes (CRTs)
Chrome	Dyes/ Pigments, Switches, Solar
Cobalt	Insulator
Copper	Conductor Cables, copper ribbons, coils, circuitry, Pigments
Lead	Lead reachable batteries, solar, transistors, lithium batteries, PVC (polyvinyl chloride), stabilizers, lasers, LEDs, thermo electrical elements, circuit boards

Impact of Hazardous Substances on health and environment

- Many of these substances are toxic and carcinogenic

-The materials are complex and have been found to be difficult to recycle in an environmentally sustainable manner causing health hazard

- The impacts is found to be worse in developing countries like India where people engaged in recycling E-Waste are mostly in the unorganised sector, living in close proximity to dumps or landfills of untreated E-Waste and working without any protection or safe guards

Dealing with E-Waste

Currently, around the world, the volume of obsolete computers and other E-Wastes temporarily stored for recycling or disposal is growing at an alarming rate causing enormous environmental and health hazard to any community.

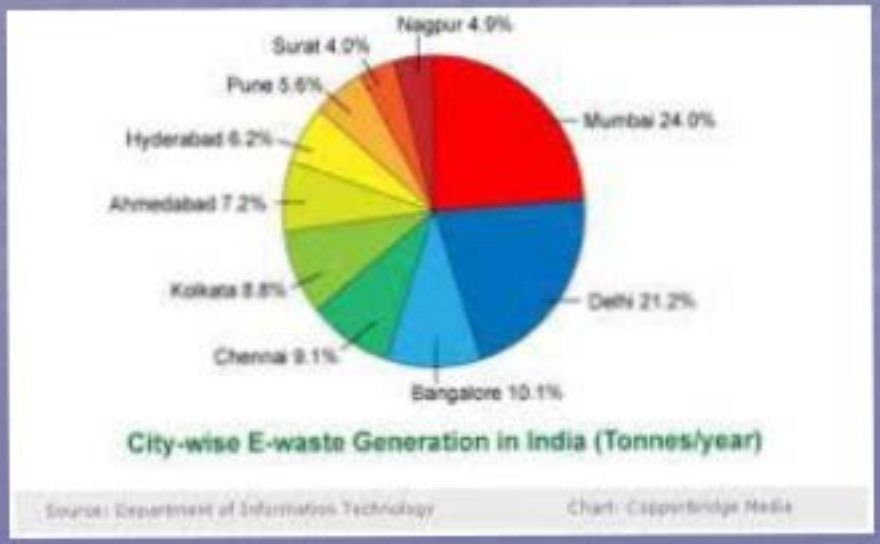
How much waste is in 500 million computers –

Plastic	-	6.32 Billion Pounds
Lead	-	1.58 Billion Pounds
Cadmium	-	3 Million Pounds
Chromium	-	1.9 Million Pounds
Mercury	-	0.632 Million Pounds

Contd……

Storing of E-Waste in landfills	-	environmental & health hazard
Incineration	-	environmental & health hazard
Reusing and recycling	-	limited life span, hazardous in unorganised sector


E-waste Recycling
Dont really have any plans
As an organization hasn't given it a thought
Recently started implementing
We have already implemented
Will implement in 3 to 6 months
13%
34.6%
39%
17.4%
18%
33.8%
27.3%
21.5%
11.3%
6.1%
22.2%
23.3%
21.5%
14.3%
18.4%


Nagpur 4.9%
Surat 4.0%
Pune 5.6%
Mumbai 24.0%
Hyderabad 6.2%
Ahmedabad 7.2%
Kolkata 8.8%
Delhi 21.2%
Chennai 9.1%
Bangalore 10.1%
City-wise E-waste Generation in India (Tonnes/year)
Source: Department of Information Technology
Chart: CopperBridge Media

Recycling of E-Waste – global trade in hazardous waste

-Basel convention on the control of Trans – boundary Movement of Hazardous waste and their Disposal, 1989

- Conference of Parties of the Basel Agreement, 2006 – to regulate the E-Waste movement

Major factors in global waste trade economy

- E-Waste export to the developing countries is governed by brute global economics
- low enforcement of environmental and occupational regulations
- low labour cost

Import of hazardous E-Waste in India

India is one of the largest waste importing countries in the world.

It generates about 350000 tonnes of electronic waste every year and imports another 50000 tonnes.

E-Waste economy in the unorganised sector

- More than 90% of the E-Waste generated in the country end up in the unorganised market for recycling and disposal
- The unorganised sector mainly consists of the urban slums of the metros and mini metros where recycling operations are carried out by the unskilled employees using the most rudimentary methods to reduce cost.
- Workers face dangerous working conditions as they may be without protection like gloves or masks.

Contd……..

E-Waste economy in the unorganised sector

- Very often child labour is employed to separate the parts from the circuit board utilising wire cutters pliers
- Nitric acid is used on the circuit board to remove gold and platinum
- It is estimated that about half of the circuit boards used in the appliances in India end up in Moradabad (Uttar Pradesh) also called Peetal Nagri or the brass city
- Private and Public Sector prefer auctioning their E-Waste to informal dismantlers and get good price of it
- Strict regulation is necessary to process E-Waste through organised sector

E-Waste economy in the organised sector

In July 2009, E-Waste Recyclers Association was formed

Problem facing the organised sector

- Lack of proper collection and disposal mechanism
- Stiff resistance from large informal sector
- TIC Group India Pvt. Ltd. in Noida (UP) has capacity 500 tonnes of E-Waste annually but processing only 200 tonnes per year
- Attero recycling unit in Roorkee (Uttarakhand) is a 35 crore plant can process 36000 tonnes per year although getting 600 tonnes currently
- License to import may be necessary to sustain formal business
- Collection system to improve

Contd……

E-Waste economy in the unorganised sector

E-Parisara in the formal sector in Bengaluru has been encouraged by the Central and State Pollution Control Board which would like it replicated in all major cities in the country

IBM, Tate Elxsi, ABB and Philips are among its clients. But many major IT firms are not responding

Capacity	-	3 tonnes / day
Utilising	-	1 tonne / day

Guidelines for Environmentally Sound Management Of E-Waste, 2008

- The concept of Extended Producer Responsibility (EPR)
- The EPR is an environment protection strategy that makes the producer responsible for the entire life cycle of the product, specially for take back, recycle and final disposal of the product
- State Pollution Control Boards were made responsible for enforcement of the guideline

"Nokia has covered around 300 offices across India, of several partner corporations from across sectors"

Poonam Kaul, director, corporate Communications, Nokia India

E-Waste (Management & Handling) Rules, 2011

EPR principle will apply

Collection of E Waste

- **Generated during manufacturing**
- **Generated from the end of life products**
- **Such E Wastes are channelized to a registered refurbisher or dismantler or recycler**
- **Individual identification code for product tracking**
- **Provide contact details of dealers and authorized collection centers to consumers**
- **Finance and organise the system**
- **Ensure safe transportation, storage**
- **Submit annual return**

Criticism of the new rule

- **It ignores the unorganized and small and medium sector, where 90% of the E-Waste is generated**
- **Does not provide any plan to rehabilitate those involved in informal recycling**
- **Collection, and dismantling of E-Waste is not hazardous and can be carried out by informal sector**
- **Extraction of precious metals is the hazardous process, which should be left to the organized sector**

Contd……

Criticism of the new rule

- **Business model to develop for collection of E-Waste from consumers**
- **Producers need to set up collection centers**
- **MSME sector, low turnover, not able to set up collection / processing centre**

Government Assistance for Treatment, storage and Disposal Facilities (TSDFS)

- It encourages setting up of integrated TSDF for hazardous waste management on Public Private Partnership (PPP) mode
- 28 TSDF have been set up
- Centre has provided financial assistance
- Memorandum of Understanding signed between MOEF, SPCB and entrepreneur
- Utilization certificate and progress report taken annually

Recognising the unorganised sector in India

- There are 23 formal recycling and reprocessing units having environmentally sound management facilities which are registered with CPCB
- E-Waste sector can be made into a viable business model indicated by a Bengaluru-based successful conglomeration of 70 informal recyclers
- Kabariwalas – called the Harit Recycler Union
- The Manufacturers Association for information Technology (MAIT) has embarked on a new MAIT-EU initiative which is a four year project beginning 2010 until 2014. The project create linkage between informal and formal recyclers and to set up collection centers to channelize E-waste for processing

Contd…..

- **Four cities including Delhi, Kolkata, Pune and Bengaluru have been identified for the project.**

- **Metal extraction is discouraged in the informal sector**

It is therefore important that viable solutions are found to address the problem of the E-waste involving skilled manpower from the informal sector of the economy and the use of appropriate technology.

E-Waste (Management & handling) rules, 2011 came into effect from 1st May, 2012

- The concept of Extended Producer Responsibility (EPR)
- The EPR is an environment protection strategy that makes the producer responsible for the entire life cycle of the product, specially for take back, recycle and final disposal of the product.
- State Pollution Control Boards were made responsible for enforcement of the guideline

E-Waste (Management & handling) rules, 2011 came into effect from 1st May, 2012

CHAPTER I

APPLICATION

These rules shall apply to every producer, consumer or bulk consumer involved in the sale, purchase and processing of electrical and electronic equipment or components as specified in schedule I, collection centre, dismantler and recycler of E-Waste and shall not apply to –

a) Batteries as covered under the Batteries (Management and Handling) Rules, 2001 made under the act;
b) Micro and small enterprises as defined in the Micro, Small and Medium Enterprises Development Act, 2006 and
c) Radio active wastes as covered under the provisions of the Atomic Energy Act, 1962 and rules made there under.

E-Waste (Management & handling) rules, 2011 came into effect from 1st May, 2012

CHAPTER – II

Responsibilities of the producer –

- Extended Producer Responsibility
- Responsibilities of the collection centers
- Responsibilities of dismantler
- Responsibilities of recycler

E-Waste (Management & handling) rules, 2011 came into effect from 1st May, 2012

CHAPTER III

- Procedure for seeking Authorization and Registration for handling E-Waste.
- Procedure for grant of authorization
- Power to suspend or cancel an authorization
- Procedure for registration with State Pollution Control Board
- Procedure for grant of registration

CHAPTER IV

Procedure for storage of E-Waste

E-Waste (Management & handling) rules, 2011 came into effect from 1st May, 2012

CHAPTER V

Reduction in the use of Hazardous Substances in the Manufacture of Electrical and Electronic equipment.

CHAPTER VI

Miscellaneous

- **Duties of Authorities**
- **Annual Report**
- **Transportation of E Waste**
- **Accident reporting and follow up**
- **Schedule i) Categories of electrical and electronic equipment covered under the rule**
- **Schedule ii) Applications, Exemptions**
- **Schedule iii) List of Authorities and corresponding duties**

Contd……

- Form I – Application for obtaining Authorization for generation/collection/storage/dismantling/recycling of E-waste
- Form I(a) – Form for granting Authorization for generation/collection/storage/dismantling/recycling of E-waste
- Terms and conditions of Authorization
- Form 2 – Form for maintaining records of E-waste handled/generated
- Form 3 – Form for filing Annual Return
- Form 4 – application form for registration of facilities processing environmentally sound management practice for recycling E-waste
- Form 5 – Form for Annual Report to be submitted by the State Pollution Control Board /Committees to the Central Pollution Control Board

Conclusion

- The quantum of wastes generated over the past several years have posed an ever increasing threat to environment and public health.
- CPCB have identified over 88 critically polluted industrial zones
- As far as e-waste is concerned, it has emerged as one of the fastest growing waste streams worldwide today
- As long as electronic products continue to contain an assortment of toxic chemicals and are designed without recycling aspect, they would pose a threat to environment and public health at their end-of-life
- Repeated awareness programme through print and electronic media is the need of the hour

Let us keep our City Clean

Thanks