

# **MANAGEMENT OF HAZARDOUS WASTE AND E- WASTE**

**National Environment Agency  
Singapore**

# Singapore



# Definition

## Waste

- materials which no longer can be used for the purposes they were intended for originally.

## Hazardous/Toxic Waste

- wastes which by their nature and properties may be potentially harmful to human health and/or the environment

# Hazardous Wastes (HW)

## Control Strategy

- **Avoid** generation of intractable wastes
- **Reduce** wastes by using clean technology, and implement waste minimisation, reuse and recycling processes
- **Regulate** collection, treatment, disposal & transboundary movements of HW
- **Monitor** and audit collection, treatment, disposal and transboundary movements
- **Promote** and support educational & training programmes

# Hazardous Wastes (HW)

This is achieved through:

- Planning and Building Plan Control
- Regulatory Control
- Monitoring and Enforcement
- Education and Training

# Regulatory Control

- Environmental Public Health (Toxic Industrial Waste) Regulations 1988 regulates the collection, treatment and disposal of toxic industrial wastes.
- Hazardous Waste (Control of Export, Import and Transit) Act 1998 regulates transboundary movements of hazardous wastes.

# EPH (TIW) Regulations

- Stipulates requirements on the generation, storage, collection, transportation, treatment and disposal of Toxic Industrial Waste (TIW).
- Licence is required for the collection, transport, storage, treatment and disposal of TIW.
- Wastes tracked by consignment note system.

# Hazardous Waste (Control of Export, Import and Transit) Act

- The “Hazardous Waste (Control of Export, Import and Transit)” Act and its Regulations was enacted on 16 Mar 98 to strengthen the implementation of the Basel requirements.
- A Basel permit from Pollution Control Dept (PCD) is required for any person who wishes to export, import and transit hazardous waste. (adopts the PIC procedure of the Basel Convention.)



# Hazardous Waste (Control of Export, Import and Transit) Act

- Maximum penalties for violation :
- Body corporate – S\$300,000 fine
- Individual – S\$100,000 fine or 2 years imprisonment or both

# Total Quantity of Hazardous Waste Collected and Imported/Exported

Year	Quantity Collected Locally	Quantity Imported/Exported
2003	217,000	10,300
2004	278,000	10,900
2005	339,000	10,200

# Substantiated Case of Illegal Transboundary Movement

- There is one substantiated case of illegal transit of hazardous waste in 2006
- Container of lead plates from used lead acid batteries was returned back to country of origin with assistance from the Competent Authority
- NEA is in the process of prosecuting the Singapore company involved in the case.

# Management of e-Waste in Singapore

- E-wastes broadly classified into 2 groups:
  - **Industrial e-waste** - waste produced by electronics industries such as rejects or residual waste from manufacturing processes and recycling operations
  - **Consumer e-waste** – waste produced by households and offices

# Management of e-Waste in Singapore

- Robust resale market for used electronic products  
=> very little e-waste disposed of at NEA's disposal facilities
- Currently working with:
  - **Manufacturers/brand owners** to encourage voluntary take-back of e-waste
  - **E-waste Recycling Companies** to expand/enhance their capabilities

# Existing Take-Back Programmes

- Dell Computers
- Hewlett Packard
- Nokia

# Existing Take-Back Programmes

- Take-back programme started in 2005.
- Take back mobile phones, PCs, printers, scanners, and other accessories of all brands at no charge.
- Recycling bins available at all of Nokia's Care Centres in Singapore.
- E-waste collected are recycled at local e-waste recycling plants



- Take-back programme for Singapore started in 2005 for household consumers
- Takes back personal computers and peripherals such as printers and scanners free-of-charge
- Collected equipment are sent to a recycling company in Singapore





- Take-back not limited to Dell-brand computers
- Committed to ensure that computers received from consumers are properly recycled and hard drive data is 100% destroyed
- Recycling companies are audited and certified to ensure that they meet Dell's worldwide standards



- HP Planet Partners Hardware Return and Recycling Programme
- Service is free, but extended to corporate customers only
- Units collected are recycled locally at designated e-waste recycling plants



- The programme offers to take back end-of-life HP and non-HP computer and printing hardware products such as:
  - Fax machines
  - Personal computers and Monitors
  - Servers
  - Handheld devices
  - Printers/ Scanners
  - Associated external components such as cable, mouse and keyboards



- Nokia's Mobile Phone Recycling Programme for Singapore was first launched in 2001 and re-launched in 2006
- Nokia's programme accepts mobile phones, chargers, earpieces, batteries and other accessories for recycling
- Recycling bins are available at all of Nokia's Care Centres in Singapore (see right)





- Recycling service is free-of-charge
- Units collected are recycled at local e-waste recycling plants

# Major E-waste Recycling Companies

- M/s Cimelia Resource Recovery Pte Ltd
- M/s SPM Recycling Pte Ltd
- M/s Centillion Environment & Recycling Ltd
- M/s TES-AMM Singapore Pte Ltd

Recycling

- Started in 2004, with capital of S\$30 Million
- Capacity of 25,000 MT per year
- Recycles e-waste such as used computers, hand phones, printed circuit boards, CRT/ LCD TVs, printer cartridges
- Facility specialized in precious metal recovery

# *SPM Refinery Pte Ltd*



- Started in 1999
- Plant Capacity of about 1,000 MT per year
- Recycles e-waste such as used computers, hand phones, printed circuit boards and industrial electronic scrap
- Facility specialize in precious metal recovery, refining and intellectual property destruction



# Upcoming Companies

## Centillion Environment & Recycling

- Formerly CitiRaya Industries
- Expected to be operational in 2007
- Recycles wide range of electronic products, with capability to recover precious metals
- Joint venture with Veolia Environmental Services

## Tes-AMM

- Expanded facilities ready in 2007
- New facilities include precious metal recovery capability and Li-ion battery recycling plant

# Transboundary Movement of e-Waste

## Basel Convention

- Considers electrical and electronic scrap, including computers, as hazardous wastes if heavy metals such as mercury, lead and cadmium and polychlorinated biphenyls (PCBs) are present in quantities that render the scrap hazardous.
- Does not regulate the export of second hand electrical and electronic equipment and devices meant for reuse.

# Transboundary Movement of e-Waste

- Import of e-waste is considered on a case-by-case basis taking the following into consideration:
  - Company has adequate recycling facilities;
  - Minimum generation of unrecoverable/unrecyclable wastes
- Hazardous e-waste imported into Singapore for recovery must go through additional Basel PIC notification procedure

# Transboundary Movement of e-Waste

- Export of e-waste for recycling/recovery is allowed under the following conditions:
  - The country of import does not deem the e-waste as hazardous waste, and agrees to the import.
  - The country of import regards the e-waste as hazardous waste, and agrees to the import via the Basel PIC notification procedures

# Challenges

- **Definitions of Hazardous Wastes** (Grey area on classification of wastes)
- **Interpretations of Hazardous Wastes in different countries**
- Inadequate Harmonised System Code for Hazardous Waste
- Lacking of Harmonised System Code for Second Hand products
- Industrial by-products that can be recycled / reused / reprocessed
  - Should it be classified as wastes?
  - Should export be allowed for use as raw material?



***Thank You***