E-Waste Management

AN ENVIRONMENTAL AWARENESS & EDUCATION INITIATIVE FOR CORPORATE ORGANIZATION

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Outline

1. Introduction to e-Waste
2. e-Waste regulatory framework
3. e-Waste Challenges
4. e-Waste Management
5. Way forward
Outline

1. Introduction to e-Waste
What is e-Waste?
Apakah “e-Waste” atau sisa buangan elektronik (e-sisa)?
Definition of e-Waste?
Definisi e-Sisa?

E-Waste is defined as waste from the assembly of electrical or electronic appliances that consist of components such as accumulators, mercury-switches, glass from cathode-ray tubes and other activated glass or polychlorinated biphenyl-capacitors, or contaminated with cadmium, mercury, lead, nickel, chromium, copper, lithium, silver, manganese or polychlorinated biphenyl. (DOE Malaysia, 2007)

e-Waste also represent component of waste from the following appliances that can no longer be used:

- Television, Radio, Telephone, Digital Clock
- Air-Conditioners
- Computers, Printers and accessories
- Photostat Machine, Facsimile Machine
- Washing Machine, Oven/Microwave, Refrigerator
- Video Camera Record/Recording (VCR) Stereo/Audio Device Electronic Game Devices
- Pendaflour light units

If the electrical or electronic components are separated from the casing, the casing itself does not fall under the Scheduled Waste category.
2007 e-waste generation (metric tonnes) 52,718.19 (4.6%)

2007 Electronic Industries (metric tonnes) 239,440.49 (21.0%)

2007 e-waste exported (metric tonnes) 2,350.00 (33.06%)

(DOE Malaysia, 2007)
e-Waste Samples
Contoh e-Sisa

DOE Malaysia, 2007

© April 2004, Basel Action Network (BAN)

**e- Waste Compositions of Contaminants**

**Komposisi Pencemar di dalam e-Sisa**

- **E-waste - Heavy metals**
  lead, zinc, chromium, cadmium, mercury

- **E-waste - Elements in trace amounts**
  germanium, gallium, barium, nickel, tantalum, indium, vanadium, terbium, beryllium, gold, europium, titanium, ruthenium, cobalt, palladium, manganese, silver, antinomy, bismuth, selenium, niobium, yttrium, rhodium, platinum, arsenic

- **E-waste - Other**
  silicon, carbon, iron, aluminium, tin, copper

- **E-waste - List of examples of devices containing these elements**
  CRT (lead in glass)
  Nickel-cadmium batteries

1: Lead in cathode ray tube and solder
2: Arsenic in older cathode ray tubes
3: Selenium in circuit boards as power supply rectifier
4: Polybrominated flame retardants in plastic casings, cables and circuit boards
5: Antimony trioxide as flame retardant
6: Cadmium in circuit boards and semiconductors
7: Chromium in steel as corrosion protection
8: Cobalt in steel for structure and magnetivity
9: Mercury in switches and housing
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<th>Entry #</th>
<th>COMPANY</th>
<th>ADDRESS</th>
<th>Contact No</th>
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<tr>
<td>1</td>
<td>Estalco Sdn. Bhd.</td>
<td>Pasir Gudang</td>
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<td>Hydro Metal (M) Sdn. Bhd.</td>
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<td>3</td>
<td>Natural Arrangement Sdn. Bhd.</td>
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For complete list, please refer to [http://www.doe.gov.my](http://www.doe.gov.my)

Source: Department of Environment Malaysia
Waste Sources - Industrial
Punca Penjanaan Sisa - Industri

Different sources of danger and their impacts to the environment

Energy Production
Construction and Demolition
Manufacturing
Feedlot
Mining and Quarrying
Hazardous Waste Dumpsite
Agriculture and Forestry
Sewage Treatment
Fertilisers & Pesticides
Leachate

Source: Geological Survey of Canada, the Geological Society
Outline

2. e-Waste regulatory framework
The Environmental Quality (Scheduled Waste) Regulations 2005

First Schedule (Regulation 2)

- Regulate all scheduled waste in Malaysia
- Enlist all waste that are scheduled waste

For e-waste,

- E-waste are generally coded as SW 110
- Batteries (phones etc) are coded as SW 103
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- The only global environment agreement on waste  
- 165 national governments (as at April 2005).  
- Regulates trade in hazardous wastes, including WEEE  
|   | Amendment to Basel Convention; The Basel Ban | - Prohibiting the export of hazardous waste from OECD to non-OECD countries  
- Not yet accepted globally |
| 2 | EU Directives (2005)  
- WEEE  
- RoHS | -Regulating product recycling (Waste Electrical and Electronic Equipment, WEEE)  
- Limiting the use of certain substances (Restriction on the use of Hazardous Substances, RoHS). Electronic Equipment, WEEE |
| 3 | Switzerland | -Swiss Ordinance on the Return, the taking back and the Disposal of Electrical and Electronic equipment (ORDEE)(1998). retailers, manufacturers and importers are required to take back, at no charge, appliances. Consumers,, are obliged to return end-of-life appliances and are not allowed to dispose of them via household waste or bulky item collection |
| 4 | Germany | -Electrical and Electronic Equipment Act - ElektroG Act (2005), governing the Sale, Return and Environmentally Sound Disposal of Electrical and Electronic Equipment |
Outline

3. e-Waste Challenges
Impacts to health, safety & environment

Kesan ke atas kesihatan, keselamatan & Alam Sekitar
17 Januari 2007 – Campaign on Increasing Public Awareness on Theft of Cables, Metal Fittings and Copper of Utility Providers in Malaysia

• Monetary lost; RM105m (2006) and 32m (2005)
• Fatality
• Illegal dumping of waste residues
• Environmental contamination
China, Malaysia, India, Kenya, and various African countries are said to be the countries where e-waste are sent for (illegal) processing.

(http://en.wikipedia.org/wiki/Electronic_waste)
e-Waste Challenges - International
Permasalahan e-Sisa - Antarabangsa

Delhi, India

Guiyu, China
e-Waste Challenges - International
Permasalahan e-Sisa - Antarabangsa

Delhi, India

Guiyu, China
4. e-Waste Management
It's Not Waste...Until You Waste it!

Bukan Sisa Buangan.. Sehinggaalah Anda Membuangnya !
e-Waste Management
Pengurusan e-Sisa

Data Storage

Yes

No

Secure
5 Pass Write/Delete

Valued Item

Yes

No

Refurbish,
Clean & Store in
Inventory

Research, note
technical details and
photograph.

Community
Program

2nd Hand
Trading

Some Valued
Components

Yes

Disassemble

Community Program

2nd Hand Trading

Disassemble

Some Valued
Materials

No

Yes

No

Valued Items

Send to Responsible Processor

Send to Recycler

Most favoured option

Prevention

Minimisation

Reuse

Recycling

Energy Recovery

Disposal

Least favoured option

Waste Management Hierarchy
Outline

5. Way forward
Green Computing ?
Green Thinking ?
Komputer (Berteknologi) Hijau ?
Pemikiran (berkonsepkan prinsip) Hijau ?
Green computing or green IT, refers to environmentally sustainable computing or IT.

It is "the study and practice of designing, manufacturing, using, and disposing of computers, servers, and associated subsystems—such as monitors, printers, storage devices, and networking and communications systems—efficiently and effectively with minimal or no impact on the environment."

Green IT also strives to achieve economic viability and improved system performance and use, while abiding by our social and ethical responsibilities.

Thus, green IT includes the dimensions of environmental sustainability, the economics of energy efficiency, and the total cost of ownership, which includes the cost of disposal and recycling.

It is the study and practice of using computing resources efficiently.

(Source: http://en.wikipedia.org/wiki/Green_computing)
Bright Green Environmentalism, an ideology based on the belief that the convergence of technological change and social innovation provides the most successful path to sustainable development.

(Source http://en.wikipedia.org/wiki/Bright_green_environmentalism)

The SIX Principles of Sustainability

1. Contribute to building a sustainable society, present and future
2. Apply professional and responsible judgement and take a leadership role
3. Do more than just comply with legislation and codes
4. Use resources efficiently and effectively
5. Seek multiple views to solve sustainability challenges
6. Manage risk to minimise adverse impact to people and the environment

(Source The Chemical Engineer Issue 825 March 2010)
Recycling – Improvement Needed
Kitar Semula – Keperluan Penambahbaikan

Ministry of Housing and Local Government Malaysia Reports..

…Malaysia’s recycling rate at a dismal 5% in 2008…

Neighbouring Singapore recorded a 56 per cent recycling rate last year, and the Philippines at 12 per cent while Malaysia's northern neighbours Thailand boasted almost a 50 per cent recycling rate in 2008... the government hoped to dramatically increase the rate of recycling to 30 per cent by the year 2020.
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