The Health and Environmental Impacts of e-Waste

Presenter: Susanne Dittke

Chemical Engineer/Environmental Consultant

Tel: 0027-21-7069829
Email:envirosense@xsinet.co.za
Skype: envirosense
www.envirosensecc.co.za

What is e-WASTE ?

- E-Waste (electronic or electrical) is generated from any equipment (running on electricity or a battery) that is discarded by the original user (still in working or non-working condition)

- Up to 36 different chemical elements can be incorporated into certain e-waste items and a typical monitor may contain as much as 6% of lead by weight

The Different Faces of e-Waste

e-Waste Volumes

The estimated amount of e-waste generated on the planet every year (20-50 million tons) put into containers on a train would go at least once around the world! www.greenpeace.org

e-Waste is fastest growing waste stream in South Africa. E-waste constitutes already 5-8 percent of municipal solid waste, and is accumulating at a rate three times that of other solid waste

RSA 2008 Baseline assessment: Combined ICT, Consumer Electronics and White Goods estimated between 1-2 million tons entering waste stream in 5-10 years (10-20% annual growth rate

In South Africa:

- ✗ No CRT or LCD monitor recycling facilities
- ✗ No mercury recovering facilities (e.g. for CFLs)
- ✗ No dedicated fridge degassing & recycling services
  Limited use for BFR treated plastic (ABS)

Up to 80% of E-waste from the U.S. for "Donations of Working Equipment" or "Recycling"

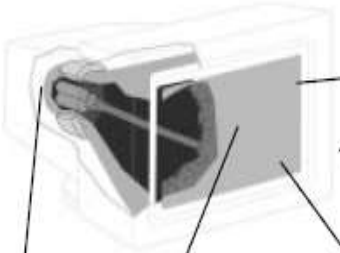
EarthECycle's Generous "Gift" for South Africa

- EarthECycle promises US charities (e.g. Humane Society) up to $10,000 for every 100,000 pounds of e-waste collected for safe "recycling" within the US

- BAN alerted RSA authorities of this container arriving in Durban

- RSA is signatory to Basel Convention

Some Hazardous Substances in PCs



Phosphor

Phosphor is applied as a coat to the interior of the CRT face plate. The hazards of phosphor are not well known, but the Navy warns this substance is "extremely toxic".

Barium

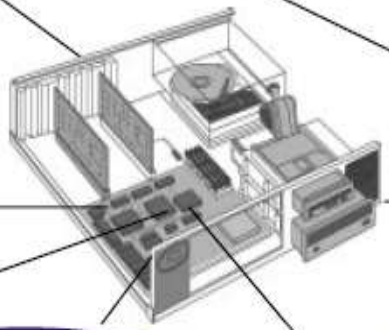
Barium is used in the front panel of the CRT to protect users from radiation. Studies show that short-term exposure to barium can cause brain swelling, muscle weakness, and damage to the heart, liver and spleen.

Brominated Flame Retardants

Polybrominated Diphenylethers (PBDE) are frequently used flame retardants & are likely endocrine disrupters. Research has revealed that levels of PBDEs in human breast milk are doubling every five years. PBDEs, like many halogenated organics, reduce levels of the hormone thyroxin in exposed animals & can potentially harm the developing fetus. Thyroxin is an essential hormone needed to regulate the normal development of all animal species, including humans.

Hexavalent Chromium

Used for corrosion protection of untreated & galvanized steel plates & hardener for steel housing. It can cause DNA damage & asthmatic bronchitis.



Lead

Cathode Ray Tubes (CRT) displays contain 4-8 lbs of lead & most solder used in circuit boards is leaded. CRTs are banned from landfills in Calif. & Mass., since US EPA determined possibility for lead to leach from equipment in landfills. Lead is toxic to the kidneys, nervous & reproductive systems & inhibits mental development of young children and fetuses.

Plastics

Plastics, including PVC make up to 13.8 pounds of an average computer. Dioxin can be formed when PVC is burned within a certain temperature range. Combinations of plastics are used in printed circuit boards, in components such as connectors, plastic covers & cables. Recyclers have dificulit identifying ans separating different types of plastic.

Cadmium

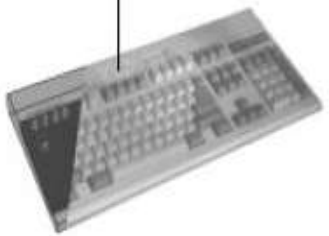
Surface Mount Device (SMD) chip resistors, infrared detectors, semiconductors and older types of cathode ray tubes contain cadmium. Furthermore, cadmium is used as a plastic stabilizer. It concentrates in the body & can cause kidney damage & harm to fragile bones.

Mercury

Light bulbs in flat panel displays, switches, & printed wiring boards all contain mercury. High levels of exposure contribute to brain & kidney damage, harm the developing fetus & can be passed down through breast milk. A recently issued fish advisory warns young children & pregnant women to two meals of fish caught in San Francisco Bay because of high levels of mercury found in San Francisco Bay fish. Mercury is stored in the fat of animals.

Beryllium

Beryllium is commonly found on motherboards and connectors. Beryllium has recently been classified as a human carcinogen.



Images courtesy of Materials for Future Foundation

Persistent Bioaccumulative Toxins

- Lead, mercury, cadmium, and polybrominated flame retardants are all persistent, bio-accumulative toxins (PBTs)
- They can create environmental and health risks when computers are manufactured, incinerated, landfilled or melted during recycling.
- PBTs, in particular are a dangerous class of chemicals that linger in the environment and accumulate in living tissues.
- And because they increase in concentration as they move up the food chain, PBTs can reach dangerous levels in living organisms, even when released in minute quantities.
- PBTs are harmful to human health and the environment and have been associated with cancer, nerve damage and reproductive disorders.

http://ghananewsonline.blogspot.com/2007/08/e-waste-is-killing-ghanaians-slowly.html

Key Informal Recycling Practices (next to component dismantling)

Burning of PVC cables to recover copper

Acid leaching, wet chemical processing, heat treatment for metal recovery

Incineration:

Releases heavy metals such as lead, cadmium and mercury into the air and ashes.

Mercury released into the atmosphere can bioaccumulate in the food chain (fish)

PVC plastic releases highly toxic dioxins and furans

Brominated flame retardants generate brominated dioxins and furans when e-waste is burned.

How is the situation in South Africa ?

- We do not have (yet?) a situation like China, India and West/North Africa
- BUT there is also visual evidence of informal recycling happening in township homes, middle income house garages & behind the closed doors of scrap metal dealers !
- New RSA Waste Act can and will enforce EPR principle
- eWASA is the official body to develop and oversee the South African Take Back system for both businesses and private households
- CT project: pilot project to develop a blueprint model replicable in other African cities and countries

  Enjoy the movie clip (7:30 minutes)

Objectives of the Project

- Redirection of material flows from uncontrolled informal to formal operations
- Detoxification of processed items, by removing toxic components and material streams, and safe disposal thereof
- Guaranteed occupational health and safety measures for workers in alignment with accepted international and HP standards
- Creation of jobs, skills transfer, capacity building and encouragement of small/medium enterprise business opportunities to promote “black economic empowerment”

Objectives of the Project

- Creation of added value through collaboration with local business and NGO partners and government initiatives including Waste2Art projects, educational centres, etc.
- Generation of data including baselining, monitoring and regular evaluation of progress made for the future replication of the pilot model
- Comply with the relevant international, national, provincial and local municipal laws and policies
- As a result from the pilot study findings contribute to the development of a viable national e-waste management system

What Else is Done about e-Waste ?

Some retailers and manufacturers now offer public and corporate take-back and/or recycling services in South Africa

What Can YOU Do ?

1. BUY ONLY WHAT YOU **REALLY** NEED
2. Don’t upgrade/buy latest model if the old one still works
3. Buy GREEN-Support the companies and brands that are the leaders in e-waste take back and recycling (see also next page)
4. Raise awareness and demand take-back from your local electronic goods and appliance seller/supermarket
5. Tell your colleagues what you learnt
6. Watch “The Story of Stuff” to find out more about the downside of senseless and relentless consumption…….

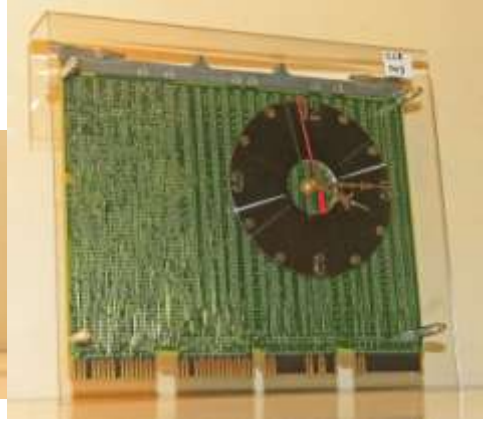
   www.storyofstuff.com
7. Start recycling of e-waste including ICT equipment batteries, cartridges in your school/business

“Buy Green” Chart- The Good, the Bad and the Ugly in Electronic Brands

- Put YOUR money where THEIR mouth is








Thank You For Your Interest

Questions ?