Electronic Waste

Addressing the future Today

By: Ahmed Shah & Tanveer Shaikh
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What is Electronic Waste?

- Electronic Waste, also recognized as E-Waste, is a combination of used or unwanted electronic products that have exceeded their shelf life.
- Computer equipment, monitors/TV's, cell phones, batteries, stereos, etc. are popular examples of items that contain harmful toxic components that need to be recycled properly.
- "Electronic waste accounts for 2 percent of America's trash in landfills but 70 percent of its toxic garbage. In 2003 alone, 3 million tons of e-waste were generated in the United States."

How is E-Waste generated?

- Manufactures need to use certain chemicals, elements, and compounds to synthesize a final consumer product.
- Years of R&D, multiple product generations, and consumers willingness to "upgrade", creates a constant supply of this type of waste.
- Items that contain numerous electrical components, generate the largest amount of e-waste. (i.e. Computers)

IBM®

SONY®

intel®

Toxins in E-waste

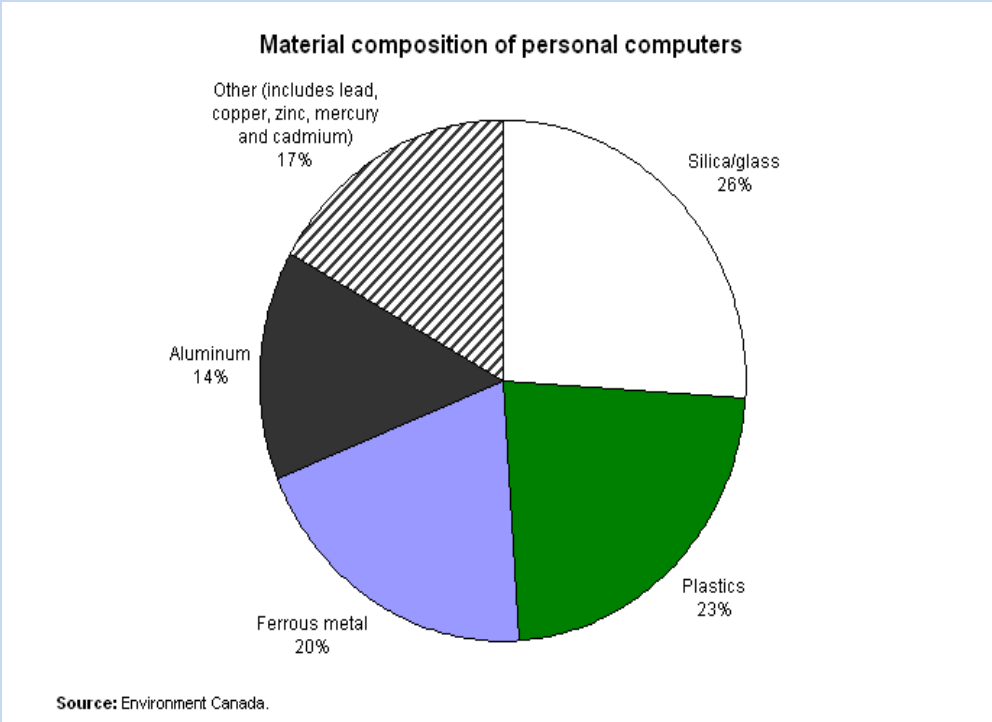
- Toxins in e-**waste** include polyvinyl chloride (PVC plastics), copper, lead, mercury, arsenic (in older models), cadmium, manganese, cobalt, gold, and iron.
- Between 1994 and 2003, disposal of PCs resulted in 718,000 tons of lead, 287 tons of mercury, and 1,363 tons of cadmium being placed in landfills.
- Mercury, chromium, lead, and brominated flame retardants are likely to cause the most adverse health effects in humans.

So what's the big deal?

- The issue at large is that because of the toxic nature of electronic components, our landfills are becoming polluted and these toxins are seeping into underwater reservoirs. This presents an environmental hazard for our habitat and ecosystem.
- In the United States and Europe, E-waste, at large, is regulated, however many other countries have less stringent regulations.
- Economically speaking, a lot of countries, instead of investing money to develop a process to recycle this waste, ship it out to third world countries. Initially this seemed like the logical move, until public awareness increased in regards to the situation.

One man's trash is another man's treasure

- The fact of the matter is that, E-waste contains numerous metals and materials that can be processed into raw reusable resources.
- Lead, tin, copper, silver, gold are few of the metals that can be recovered from E-waste.
- A lot of organizations collect E-waste and at the proper center, recycle the components into raw materials.



The Environmental Concern

- European and American companies since the 1980's have been disposing their electronic waste by shipping them to other countries such as China and India.
- Initially this seemed like an easy solution to the growing "waste" problem in our own domestic land fills. However, this was not the case.
- Environmentalists, upon further investigation, learned that these countries were improperly handling e-waste. They were processing components in very crude, inhumane, and destructive ways.


Who gets the trash?
Sources: Basel Action Network, Silicon Valley Toxics Coalition, Toxics Link India, SCOPE (Pakistan), Greenpeace China, 2002.
NB: the arrows thicknesses are not proportionnal to the traffic.
KAZAKHSTAN
MONGOLIA
KYRGYZSTAN
TAJIKISTAN
AFGHANISTAN
PAKISTAN
Islamabad
Karashi
Sher Shah
New Delhi
Ahmedabad
INDIA
Mumbai
Madras
Chennai
SRI LANKA
NEPAL
BHUTAN
BANGLADESH
BURMA
VIETNAM
LAOS
THA LAND
CAMBODIA
MALAYSIA
SINGAPORE
I N D O N E S I A
PHILIPPINES
TA WAN
NORTH KOREA
Beijing
Seoul
SOUTH KOREA
Tokyo
JAPAN
Pacific Ocean
China receives 90 % of the Asian recycling market..
CHINA
around 100 000 workers (including children) undrinkable water
Guangzhou
Guiyu
Nanhai
Macao
Shantou
Hongkong
South China Sea
Gulf of Bengal
Indian Ocean
from the Arabian Peninsula
from Europe
from North America
AUSTRALIA
Main e-waste recycling countries
E-waste recycling sites
known
suspected
Main ports where e-waste is received and dispatched
0
1 000 km

Improper recycling of E-waste

A man in India handling a CRT monitor tube.

A Chinese girl playing in electrical refuse.

Please click on the video below.

Kind of Shocking?

- Yes, however don’t worry, there are many things underway to prevent, circumvent, and downsize the growing market of “illegal” e-waste handling.
- The United States of America has taken initiative through strict environmental guidelines on proper e-waste management. No longer is waste being dumped overseas in other countries, it is now being processed domestically through profit and non-profit organizations.
- Other countries, such as Switzerland, utilizing a competitive business model , have developed their own efficient system for recycling.

No-E-Waste Recycling

- Is a private family owned, business founded in San Leandro, CA.
- They deal with all types of e-waste, but focus largely CRT monitors.

Business Model

- Follow a loose business model.
- Lots of competition, more than 500 collectors in state of California, more than 50 recyclers in the state.
- If they can't serve a customer recycling e-waste, they refer them to a reputable competitor who can dispose of the waste properly.
- Provide the recycling service for Free, to increase consumer awareness and to ensure waste is not thrown away in the garbage.
- Must be a resident of the state of California
- Most of their revenue is generated from the recycling of CRT monitors, because the state of California offers a subsidy for each pound of glass recycled, they receive additional revenue from the government.
- Waste that cannot be processed, is shipped and sold to a respective recycler who will dispose of the materials properly.
- A work force of 27 employees, handle the everyday operations of the company.

Swiss e-waste Competence

- A recycling system that was built over the last two decades based on private / industry initiatives and now covers the entire range of electrical and electronic consumer products.
- They developed the “E-waste ‘Wheel of Life’”, breaking down the recycling process into a more efficient and consumer friendly system.

E-waste “Wheel of Life”

“Wheel of Life”

- “Buy new Items” is the 1st stage in the wheel. Consumers go out and purchase electronic devices.
- The 2nd stage in this "wheel of life" is returning end-of-life appliances or Waste Electrical and Electronic Equipment (WEEE). Consumers are not allowed to dispose of WEEE through other than dedicated collection points. Fees might be applicable for certain wastes.
- The 3rd phase involves “Detoxification” – the removal of critical components from the e-waste in order to avoid dilution of and / or contamination with toxic substances. This work requires much manual labor and thus is unprofitable considering Swiss wages. Most of the costs and often this manual processes are outsourced by the large recyclers to nearby social institutions.

E-waste “Wheel of Life” (cont.)

- The 4th stage involves the shredding of like materials so they can be prepared for refinement.
- The 5th and final stage, is refinement, where Most of the fractions need to be refined or conditioned in order to be sold as secondary raw materials or to be disposed of in a final disposal site, respectively. Many refining processes take place outside Switzerland, entailing greater transport distances.
- Due to economies of scale, specialization and division of labor such large installations aren't needed in every country. For example, the refinery of Umicore in Belgium is made up of two main processes: The precious metal operations and the base metal operations.

The future and more to come

- E-waste is a growing environmental concern. Right now there are strict waste guidelines enacted by certain countries, however we as a humane society need to address this issue globally.
- The shipment of E-waste to foreign countries needs to be properly regulated.
- Corporations need to take greater initiatives in recycling products that exceed their shelf life. Sony allows consumers to return used products for recycling, however other companies need to follow in Sony's example.
- Technology is advancing everyday and solutions in the manufacturing of electronics continues to improve. as they generate less and less waste.
- In terms of sustainability, there are only a finite number of resources available to us, and recycling e-waste helps conserve a lot of them.
- Profit is not to be taken for granted in this industry, because essentially the recyclers obtain the e-waste for free, or charge a premium processing fee.