Model for certification standards scheme for Basel Action Network (BAN) stewardship to electronic recycled products

Kartik Mekala

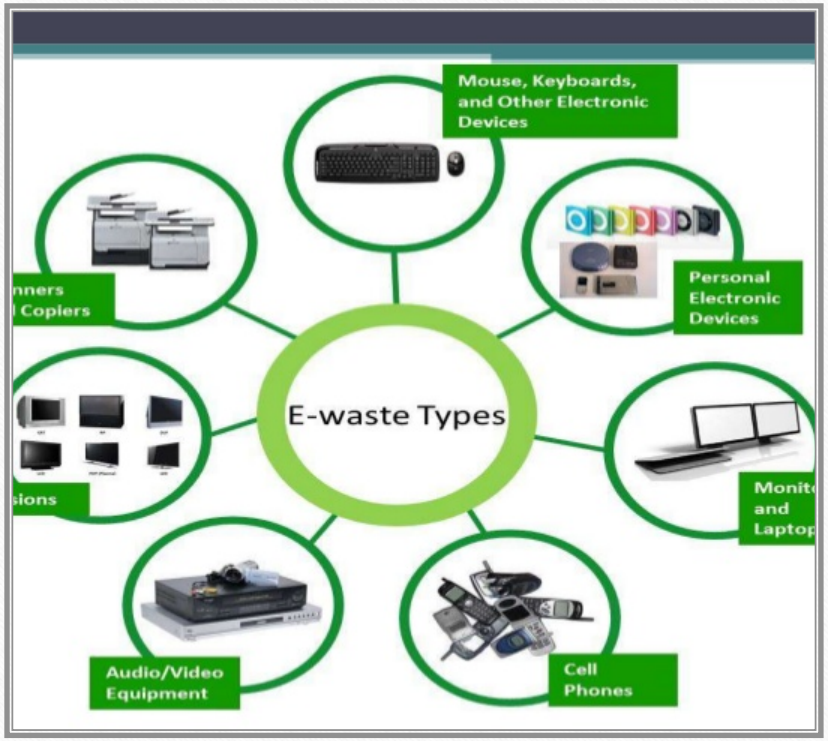
What Is E-Waste

E-waste is basically computer and technological garbage that is throwed away.

The waste includes computers, cellphones, monitors, wires, televisions and other kind of electrical products.

The Wicked Problem

- Fastest growing part of the worlds domestic waste stream.
- Used electronics made for reuse, resale, salvage, recycling or disposal are also E-waste.
- E-waste represents 2% of America's trash in landfills, but it equals 70% of overall toxic waste.

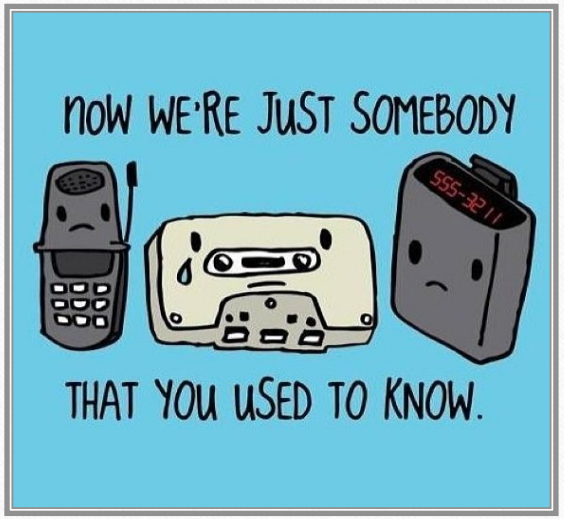


Beautiful isn't it ?


Export of e-waste
NORTH AMERICA
WESTERN EUROPE
EASTERN EUROPE
CHINA
INDIA
EGYPT
SENEGAL
IVORY COAST
NIGERIA
GHANA
BENIN
PAKISTAN
VIETNAM
HONG KONG
From North America
From Western Europe
Source: Greenpeace, Basel Action Network

Cause?

- Emerging technology and changes in trend cause changes in design and style.
- Not designed for sustainability instead designed for planned obsolescence.
- Consumerism and lack of regulation in E-waste export



Impact

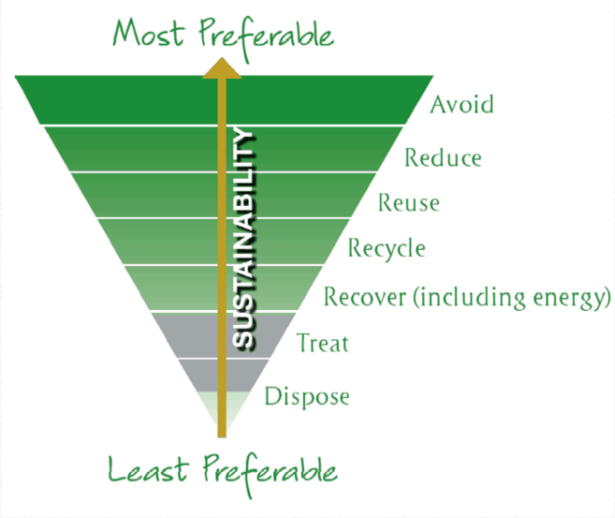
- Toxic emissions into environment and soil-crop-food pathway
- Non-biodegradable and causes soil and air pollution
- Dumping yard and nearby places are highly polluted and high risk for health hazards

Source - Kai Loffelbein (Ctrl X – A topography of Ewaste)

Background and Key Concepts

Waste Management Hierarchy

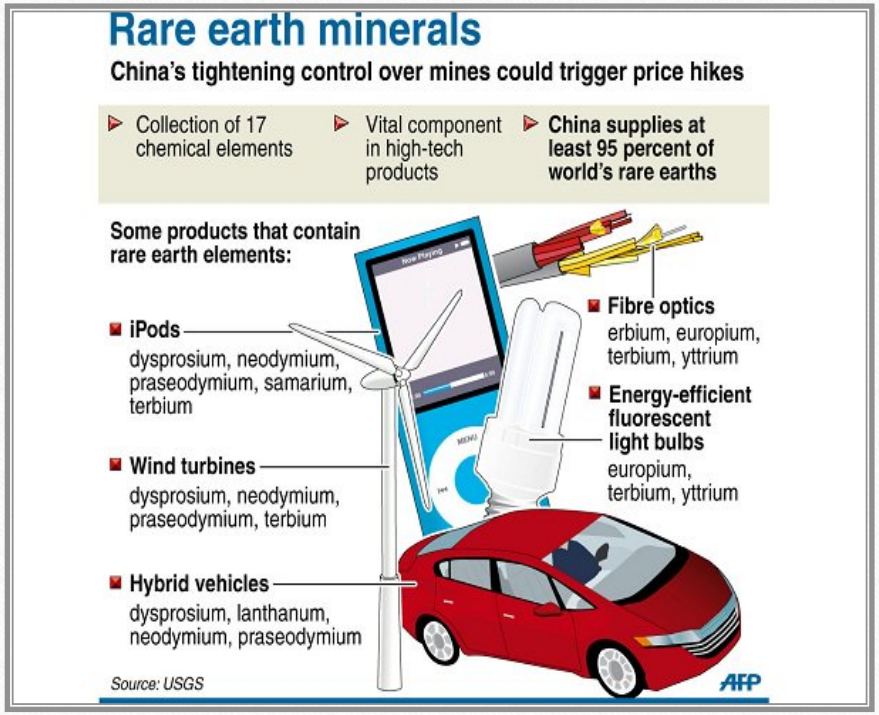
- Prevention of waste, followed by reuse, recycling, recovery and disposal.
- Growing concerns of finite material reserves.
- Waste stream regarded as valuable material sources.



Source - Waste Management Hierarchy (US EPA, 2015)

Rare earth elements

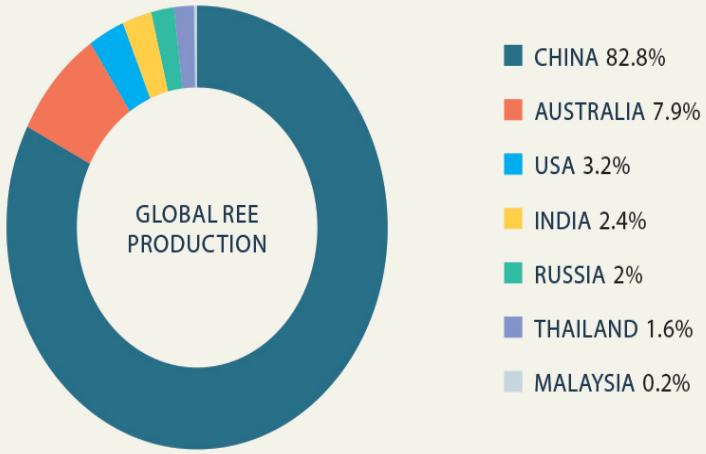
- Electronic products are constituted of toxic substances like lead, mercury, cadmium, nickel, beryllium, zinc, special metals and precious rare earth elements (REE).
- REEs are the 15 lanthanide metals in periodic table including scandium and yttrium and possess unique chemical and physical properties which attracts the electronic industry to design smaller and lighter technologies



Special Metals

- Gold, silver, platinum and the platinum group metals (ruthenium, rhodium, palladium, osmium, and iridium).
- They are all lustrous and beautiful. Most are less reactive than other metals, with the exception of silver, which tarnishes easily.

Figure 2. Global REE production 2015 (USGS, 2016).



Effects of E-waste on human health

E-Waste Toxic Components and their Damage to Human Health

Toxic Materials	Birth Defects	Brain Damage	Heart, Liver, Lung & Spleen Damage	Kidney Damage	Nervous/ Reproductive System Damage	Skeletal System Damage
Barium		X	X			
Cadmium	X		X	X	X	X
Lead	X	X		X	X	
Lithium	X	X	X	X	X	
Mercury	X	X	X	X		
Nickel	X		X	X	X	
Palladium	X	X	X	X		
Rhodium			X			
Silver	X	X	X	X	X	

Without safe recycling, most of these toxic components will end up in land fill – poisoning the soil and water

Ecolabel

- Ecolabelling is a voluntary scheme of environmental performance labelling and certification which can be applied by producers, importers and retailers across the life cycle stages of a product.
- Studies like Nielsen's global sustainability report indicate 66% of consumers are willing to pay more for sustainable and eco friendly products.
- It also indicates that 52% of consumers check packaging for ecolabels that convey environmental impact of the product.

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- Consumers trust Government or environmental NGOs more than private businesses for providing credible information, unless the sponsors certify ecolabel by third party auditors.
- It enables certification holders to differentiate their products in a competitive market.
- The certification model must direct, control and hold the greenwashing organizations and their supply chain accountable for performance of sustainable production and recycling.

Governance Mechanisms

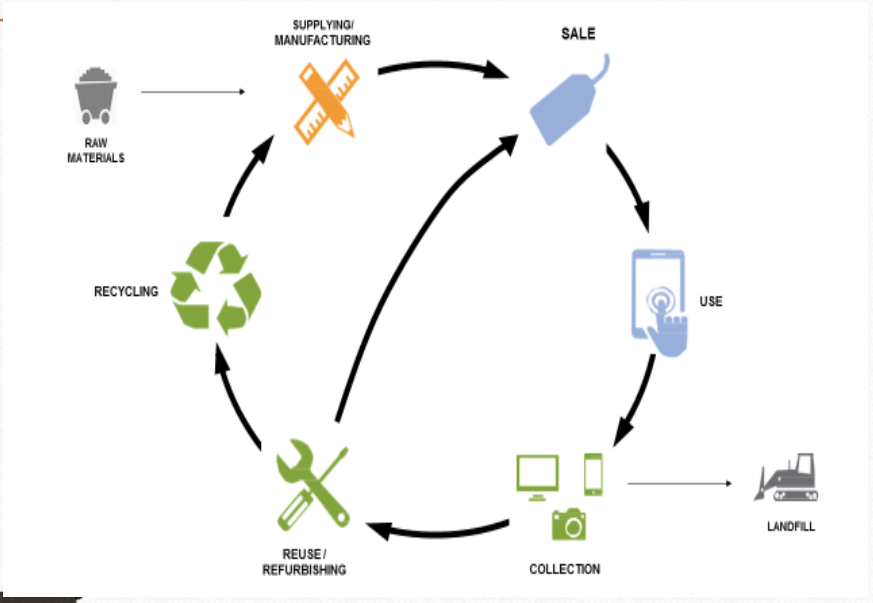
- Market-based mechanism internalizes the environmental externalities through price structuring.
- Signaling mechanism provides an assurance/credibility or signal towards hard to observe practices, or predicts organizational characteristics and practices.
- Learning mechanism implies technology transfer mechanism or environmental management mechanism.
- The certification can operate on either one (or more) of the mentioned governing mechanisms.

Ecolabel model for electronics

- This model bases its principles and core criteria across the life cycle stages of the electronic products and equipment.
- Uses QWERTY (Quotes for environmentally weighted recycling rather than weight based recycling) life cycle based approach.
- It calculates the net environmental impact associated with recycling, including impact of hazardous substances when not recovered, additional environmental burden of processing, transport, energy use and the avoided environmental impacts from recycling to mining materials.

Life Cycle Stages

- The life cycle approach aligns with the Waste hierarchy model.
- Introduction of Design for Sustainability as a pre-stage to the Life cycle stages of Electrical and Electronic products.



Basel Convention Stewardship Council

- The United Nations Basel Convention (1989) was set up to restrict the toxic trade of hazardous waste between developed countries and developing countries.
- Under the leadership of the Convention, Basel Action Network (BAN) was setup as an advocacy organization and a global partner for environmental justice.
- I propose a council name - Basel Convention Stewardship Council (BCSC) which shall act as an independent third party organization that can audit certifications for ecolabel accreditation.

Scope of the study

- In terms of scope of electronic components, the principles and criteria are globally applicable to all types and scales of electronic products defined by states in two ways -
- **Manufacturers obligation -** The list of products whose manufacturers must provide or pay for recycling programs and they are often called 'covered devices'.
- **Also covered for recycling -** Additional products that can be brought back by consumers for recycling (usually for free) under state programs and often referred to as 'eligible devices'.
- Both the types of electronic devices considered for purpose of this proposal includes - Television, Monitor, Desktop, Laptop, Tablet, E-reader, Printer, Fax, Scanner, Keyboard/ Mouse, DVD player, VCR, Converter box, Receivers-cable Satellite, Cell phone, Game-console, MP3 player, Small server, Digital Picture Frame and GPS.

Basis for Certification

- The basis of BCSC certification is based on the scoring system that evaluates the Principles and Criteria.
- The scoring system is based to offer flexibility for manufacturers to meet the specific requirements by replacing or limiting the materials requirements with environmental concerns.
- Certification decisions are guided by the following
  - The extent to which management activities satisfy each BCSC criterion,
  - The importance and/or consequence of failing to satisfy each BCSC criterion.

Principles and Criteria

Principle 1 – Design for Sustainability

- Design for sustainability is the philosophy of designing products, the built environment and services to comply with the principles of social, economic and ecological sustainability.
- Elimination of toxics in products and processes over the life cycle, e.g. BFR, PVC, phthalate DEHP, DBP, BBP and replacing with biologically benign alternatives.
- Integration of full chemical inventory into standards used by EPEAT® and make the information publicly available and verifiable.

Why to Design for Sustainability ?

- Because with the design changes, the precious metals and REE can be easily recovered.
- The electrical and electronic product life expectancy is increased.
- The cost of recycling with recovery of 70-80% value from the waste stream is extremely costly and may not be economically viable.
- It has been observed that precious metal concentrations is 10 times higher in PCB compared to commercial mining.

Continued

- It has been observed that the effects of production of special metals and REE like ruthenium, gold, palladium and platinum per ton has more than tenfold times environmental impact compared to that of aluminum (Wager et al., 2011)
- This can be explained due to the fact that precious metals and REE are typically extracted from low concentrated ores requiring intensive mining and complex refining, extraction and production processes.

Principle 2 –Responsible Sourcing of Materials

- The business and its supply chain must hold high standards of business practices in treating their workers.
- Offer operations safety and conduct business in environmentally responsible and in a ethical way.
- Develop requirements for its suppliers based on Responsible Business Alliance (RBA).
- Maintain international standards such United Nations Guiding Principles on Business and Human Rights, and Universal Declaration of Human Rights.

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- Forced labor and violation of human rights for labor force which can be conducted in any of the following ways –
  - Debt bondage: being trapped by debt owed to recruitment agents or employers for excessive recruitment fees, travel fees, visa processing
  - Deception related to wages, hours, overtime requirements and pay.
  - Retention of identity documents: being deprived of access to their passports
  - Working excessive hours for minimal pay
  - Restricted movement or degree of difficulty or danger of their jobs
  - Contract violations
  - Poor living conditions

- Include Cobalt to their expanding list of Conflict Minerals (In determination of source and chain of custody for Cobalt in the Democratic Republic of Congo (DRC) several violations of workers safety and child labor have been recorded)

Why to maintain responsible sourcing of materials ?

- In Democratic Republic of Congo (DRC), 50% of world lithium and cobalt are mined.
- The workers face human rights violation in terms of workers safety, child labor and power control by militia groups over the raw materials.
- Threatens the international peace and security with high chances of power dominance over the minerals to support the consumerism demand towards electronic products.

Principle 3 – Responsible Manufacturing

- Quality should be maintained throughout product development to command a competitive position in the market.
- Should be implemented across all the life cycle stages to make products more reliable and consistent on its durability and reduced obsolescence.
- Create and maintain site closure plan for remediation of sites and proper management of equipment in accordance with standard and regulations.
- Show environmental preparedness to respond to possible emergencies and ensure workers safety.

Principle 4 – Responsible Collection

- The biggest challenge in the United States currently is the collection strategies of E-waste.
- High costs of disposal and payment per pound discourage the consumer to get rid of their electronic waste by driving to some collection centre.
- Lack of incentives and regulations at federal and state levels result in accumulation of waste at consumer level itself.

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- Documentation of system of control to restrict imports of hazardous E-waste and Problematic Materials and Components (PCMs) entering the facility.
- Incentivization by manufacturing companies towards Electronic Take Back Program.
- Provide rewards based schemes to consumers recycling their E-waste, when making a purchase from the same manufacturing brand.

Solutions

- Circular Economy
- Manufacturers should deal with waste they create
- Design for Sustainability - remanufacture, assembly, disassembly, reliability, environmental guidelines and recovery
- Certification and Eco-label promoting recycled products.

REDUCE , REUSE

Thank You