Introduction to ESM best practices for e-refurbishers & e-recyclers in North America

(based on NAFTA CEC training modules)

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ESM is the right thing to do

- Taking all practicable steps to ensure that used & end-of-life products & wastes are managed in a manner that will protect human health & the environment
ESM guidance share key “generic” concepts...

**OECD**

*Core Performance Elements*

1. Environmental Management System
2. Safeguard Occupational & Environmental Health & Safety
3. Monitor, Recording & Reporting Programmes
4. Training Programme
5. Emergency Plan
6. Plan for Closure & After-care (with Financial Guarantees)

**UN Basel PACE**

*ESM Criteria*

1. Top Management Commitment to a Systematic Approach
2. Risk Assessment
3. Risk Prevention & Minimization
4. Legal Requirements
5. Awareness, Competency & Training
6. Record-keeping & Performance Measurement
7. Corrective Action
8. Transparency & Verification
... & identify operational-specific “best practices”

Understand & comply with relevant laws (including other country import restrictions)

Assess suitability of feedstock for reuse / recycling

List of accepted e-products

Depollute feedstock prior to shredding / crushing

Test & document functionality of refurbished products

Use proper personal protective equipment

Handle hazardous components with special care

Package equipment properly

Implement pollution control & abatement measures

Assure data security & destruction

Ensure safe & secure storage & transport

Assure downstream service providers practice ESM

Adopt formal sector operations & activities
Countries & facilities may be at different stages of ESM development.

Different stages in the process of growing to a high level of environmental management:

1. Non-compliance
2. Minimum compliance / end-of-pipe solutions
3. Compliance / adequate permits / environmental technology
4. Active waste and pollution prevention, process integrated solutions
5. Management system focus / environmental reporting
6. Product stewardship / chain approach / LCA-oriented tools
7. Integrated environmental management systems
8. Partnerships
9. Incorporation of social aspects
10. Sustainable business

Standards & certification

OECD Workshop on ESM of Wastes Destined for Recovery Operations (Austria, 2000)
## Electrical Component Substances of Concern

<table>
<thead>
<tr>
<th>Electrical Component</th>
<th>Substances of Concern</th>
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<tbody>
<tr>
<td>Plastics</td>
<td>Phthalate plasticizers, Bromated Flame Retardants</td>
</tr>
<tr>
<td>Cathode Ray Tubes (CRT)</td>
<td>Lead, Antimony, Mercury, Phosphors, Barium Oxide</td>
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<tr>
<td>Liquid Crystal Displays (LCD)</td>
<td>Mercury</td>
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<tr>
<td>Rubber</td>
<td>Phthalate plasticizer, Bromated Flame Retardants</td>
</tr>
<tr>
<td>Wiring / Electrical (Interior)</td>
<td>Phthalate plasticizer, Lead, Bromated Flame Retardants, Copper</td>
</tr>
<tr>
<td>Motherboards / Circuit Boards</td>
<td>Lead, Beryllium, Antimony, Bromated Flame Retardants</td>
</tr>
<tr>
<td>Fluorescent Lamps</td>
<td>Mercury, Phosphorus, Flame Retardants</td>
</tr>
<tr>
<td>Batteries</td>
<td>Lead, Lithium, Cadmium, Mercury, Nickel</td>
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<tr>
<td>External Electric Cables</td>
<td>Bromated Flame Retardants, Plasticizers</td>
</tr>
<tr>
<td>Light Emitting Diodes</td>
<td>Gallium arsenide</td>
</tr>
<tr>
<td>Used Mobile Phones</td>
<td>Cadmium, Lead, Arsenic, barium, beryllium, strontium</td>
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...that pose risks to health & the environment if improperly managed

<table>
<thead>
<tr>
<th>Environment</th>
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<tbody>
<tr>
<td>- Open burning / dumping</td>
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<tr>
<td>- Backyard smelting</td>
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<tr>
<td>- Uncontrolled acid leaching</td>
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<tr>
<td>- Processing dusts &amp; emissions</td>
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<tr>
<td>- Residual wastes</td>
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<tr>
<td>- Hazardous components</td>
</tr>
<tr>
<td>- Spills &amp; breakage</td>
</tr>
<tr>
<td>- Process wastewater</td>
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<tr>
<td>- Surface water runoff</td>
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<table>
<thead>
<tr>
<th>Human health</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Ingestion</td>
</tr>
<tr>
<td>- Skin or eye absorption</td>
</tr>
<tr>
<td>- Inhalation</td>
</tr>
<tr>
<td>- Brain, liver &amp; kidney damage</td>
</tr>
<tr>
<td>- Thyroid disruption</td>
</tr>
<tr>
<td>- Gastrointestinal tract damage</td>
</tr>
<tr>
<td>- Impaired neurological development</td>
</tr>
<tr>
<td>- Weakness, muscle atrophy, twitching</td>
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<tr>
<td>- Impaired fetal development</td>
</tr>
<tr>
<td>- Reduced fertility</td>
</tr>
<tr>
<td>- Anemia &amp; respiratory failure</td>
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<tr>
<td>- Memory &amp; learning problems</td>
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</tbody>
</table>
Examples of components that can pose risks

- Batteries
- Heating & cooling equipment
- Screens
- Capacitors
- Ink cartridges
- PCB transformers
- Smoke detectors
- Mercury thermostats
- Mercury bulbs

Risk prevention & risk management will be presented later
Environment, Health & Safety Management Systems facilitate ESM

- Systematic approach to integrate environmental, health & safety considerations into day-to-day activities of an organization

(details to follow)
ESM approaches should integrate the Waste Management Hierarchy

- Feasible opportunities for waste management should be undertaken at higher levels of this hierarchy
A chain is only as strong as its weakest link... so is ESM

- Understand ESM needs of your country & industry sectors
- Examine country laws in place that support ESM
- Apply consistent ESM measures to support level-playing fields
- Foster complimentary approaches & exceed legal compliance

☑ ISO 9000 ☑ ISO 14000 / EMAS ☑ OHSAS 18000 ☑ Service contracts ☑ Extended producer responsibility ☑ Standards for e-processing ☑ Certification & verification schemes ☑ Disposal bans
What do you think?

We already have ESM in place...
...we’re ISO 14001 certified.
ESM is a journey of a thousand steps

- Legal compliance is the bare minimum
- Quality control & environmental management systems are a great start
- Consider health & safety of workers & surrounding community
- Evolve to include increasingly specific provisions to protect EHS
- Identify a means to demonstrate conformity with ESM criteria
Consider industry-specific standards to support EHS needs of e-processors

- Standards are intended to augment, not replace, regulations
- Often used if laws are absent/insufficient or inadequately enforced
- Incite change & establish a level playing field

**Canadian voluntary standards**

1. Recycler Qualification Program (RQP)
2. Electronics Reuse and Refurbishing Program (ERRP)

- Initially developed by manufacturers in response to EPR obligations
- Electronic Product Recycling Association (EPRA) promotes uptake across Canada
- E-processors must meet standards to participate in provincial EPR programs
- EPRA conducts third party audit & verification of e-processors
EPSC’s Recycler Qualification Program in Canada considers several ESM aspects...

- Version 4 since 2004

- EHS management system
- Legal & other requirements
- EHS risk assessment
- Environmental controls
- Health & safety controls
- Operational controls
- Data security
- Sampling, audits, inspections
- Corrective action plans
- Emergency planning & response
- Transportation
- Downstream recyclers
...& specifies acceptable processes & end points

ONLY plastics can be exported to a non-OECD country for processing under the Recycler Qualification Program

- Requires EHS controls
- Prohibits illegal shipments
- Ensures diligence downstream
- Prohibits landfilling
- Prohibits prison labour
Governments have an important role to play in fostering ESM

- Understand what ESM means to you
- Identify & understand existing ESM strengths & weaknesses
- Promote EHS protection through regulations & enforcement
- Demonstrate leadership (how is government e-waste managed?)
Considerations & lessoned learned...

- Identify the current situation in your country (gather baseline information)
  - Types & quantities of e-waste generated
  - Final disposition of e-waste generated (e.g. recycled versus disposed)
  - Existing laws applicable to the management of e-waste (i.e. environmental, health, safety)
  - Existing infrastructure used to refurbish & recycle e-waste

- Prioritize activities to tackle the e-waste problem
  - Collection for environmentally sound management (ESM)
  - Address regulatory gaps (including imports / exports)
  - Others?
    - Infrastructure development, knowledge transfer
    - Waste reduction, green procurement
    - Reduced hazardous substance content
    - Data security, employment growth

- Establish partnerships to help advance the e-waste agenda
  - Relevant government authorities
  - Industry & associations (including retailer associations)
  - Others as appropriate (e.g. ENGOs, NGOs, academia...)


Considerations & lessoned learned...

- Consider economically sustainable approaches for collection & ESM first
  - Ancillary benefits from EU, US & Asian restrictions on e-waste content
  - Emergence of “dirty & clean” electronic product streams is unlikely

- Clearly define e-waste & clarify the scope of products for inclusion
  - Televisions & computers are usually addressed first
  - Broaden product scope using a phased-in approach

- Extended Producer Responsibility (EPR) versus Product Stewardship?
  - EPR is often preferred but manufacturers may not exist in some countries
  - Responsibilities may also be imposed upon first importers & first sellers
  - Product stewardship often entails continued financial support from governments & taxpayers

- Voluntary versus mandatory approaches?
  - Large number of players involved in the manufacture & sale of e-products
  - Free-riders may emerge & jeopardize the success of voluntary approaches
  - Industry & business leaders often request laws to level the playing field
Considerations & lessoned learned...

• EPR requires producers to design, finance & implement programs
  ✓ Industry often meet EPR responsibilities in a collective fashion
  ✓ Government authorities typically approve programs before implementation

• Curbing disposal of e-waste relies on consumer participation
  ✓ Ensure reasonable & convenient access to collection facilities
  ✓ Do not impose back-end fees to drop off e-waste at collection facilities
  ✓ Take-back programs should include a strong communications component
  ✓ Consider the use of incentives to encourage consumers to return e-products

• Utilize “ESM-compliant” service providers to manage e-waste
  ✓ Ensure operations are in accordance with applicable domestic & international law
  ✓ Develop standards for environmentally sound management
  ✓ Establish verification programs to approve service providers only if they meet standards
  ✓ Periodically inspect service providers to assure ongoing conformity
Considerations & lessoned learned...

- Programs should possess realistic, timely & meaningful targets
  - Integrated performance targets are becoming more popular
  - Establish indicators to assess how much risk is effectively managed

- Transparency is a critical aspect of program design & implementation
  - Identify interested stakeholders & consult with them along the way
  - Make annual reports publically available
  - Include third-party verified performance & financial statements (e.g. certified auditors)

- Clarify rules governing the allocation of program revenue
  - Use revenues for their intended purpose (e.g. offset costs of program delivery)
  - Consider whether financial incentives should be offered to collectors & recyclers
  - Avoid cross subsidization of product streams

- Programs should account for historical & orphan e-waste
  - Consumers will not differentiate
  - Quantities could be significant during initial stages of program implementation
Key take away messages:

1. Used & waste e-products pose risks if managed improperly
2. ESM protects the community health, worker safety & the environment
3. ESM can be achieved using complimentary approaches
4. EHS Management Systems foster systematic & continual improvement
5. ESM goes beyond legal compliance & standards certification
Cảm ơn
Thank you!

Hoan Kiem Lake & the Tortoise Tower
Hanoi