Broad Overview of E-Waste Management Policies in the U.S.

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Global E-Waste Management (GEM) Network Workshop
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Outline of US EPA Presentation

• Presentation Topics:
  – U. S. Legal Framework for e-Waste Management
  – State Laws for e-Waste Treatment and Recycling
  – Generation and Recycling/Reuse of e-Waste
  – Recent Findings on Status of e-Waste Processing in the United States
  – Efforts to Improve Electronics Recycling/Reuse in the United States and Beyond
  – Questions and Discussion
US Legal Framework for E-Waste Management

• Hazardous waste is regulated under the 1976 Resource Conservation and Recovery Act (RCRA)
  – Definition of hazardous waste is complex, based on testing and listing
  – Some electronics qualify as hazardous, some don’t
  – Materials destined for reuse aren’t considered “waste”
  – E-Waste is defined for each project or program, as appropriate
  – Authorized states can enforce federal RCRA regulations and manage electronics under their own state program
  – Federal Regulation: CRT glass and some batteries
  – Consensus-driven programs (e.g. recycling certification)

• Support ratification of the Basel Convention
• U.S. regulates used CRTs exported for recycling
• Federal export legislation: proposed, not passed
State Laws

• 25 U.S. States have laws that require e-waste recycling
  – Most use Extended Producer Responsibility model
  – Consumers and households usually eligible for free recycling
  – Fifteen include landfill disposal bans
  – Laws differ from state to state; challenge for manufacturers

• No Federal take-back legislation; take back is mandated at the state level
States highlighted in **orange** have some type of electronics recycling law
Financing Mechanisms*

- Advanced recovery fee – 1 state (CA only)
- Producer Responsibility (PR): Annual fee or own programs -2 states
- PR: Return share – 1
- PR: Market share – 7 (most like WEEE revisions)
- PR: Return share & market share - 7
- PR: None specified, but manufacturers run their own programs – 6

*courtesy of Jason Linnell, Executive Director, National Center for Electronics Recycling (NCER)
<table>
<thead>
<tr>
<th>State</th>
<th>Products Collected</th>
<th>Entities Collected From</th>
<th>2010 Lbs Per Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>Televisions, computer monitors, laptop</td>
<td>All</td>
<td>4.9</td>
</tr>
<tr>
<td>HI</td>
<td>Computer monitors, laptops, printers (no TVs until 2011)</td>
<td>All</td>
<td>2.4</td>
</tr>
<tr>
<td>IL</td>
<td>Computer, computer monitor, television, printer, mobile phones, telephone, others</td>
<td>Households only</td>
<td>2.4</td>
</tr>
<tr>
<td>IN</td>
<td>TVs, computer monitors, laptops, desktops, printers, computers, peripherals, fax machines, DVD players, VCRs</td>
<td>Households, public schools, small business</td>
<td>2.5</td>
</tr>
<tr>
<td>ME</td>
<td>TVs, computer monitors, laptops, printers, video game consoles, dig pic frames</td>
<td>Households (others added 2011)</td>
<td>4.0</td>
</tr>
<tr>
<td>MI</td>
<td>Computer, computer monitor, television, printer</td>
<td>Household and small business</td>
<td>0.8</td>
</tr>
</tbody>
</table>

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<th>State</th>
<th>Products Collected</th>
<th>Entities Collected From</th>
<th>2010 Per Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN</td>
<td>TVs, computer monitors, laptops, desktops, printers, computers, peripherals, fax machines, DVD players, VCRs</td>
<td>Households</td>
<td>6.7</td>
</tr>
<tr>
<td>OR</td>
<td>TVs, computer monitors, laptops, desktops</td>
<td>Households, small bus., non-profit, 7 or fewer</td>
<td>6.3</td>
</tr>
<tr>
<td>OK</td>
<td>computer monitors, laptops, desktops</td>
<td>Households</td>
<td>0.7</td>
</tr>
<tr>
<td>TX</td>
<td>computer monitors, laptops, desktops</td>
<td>Households</td>
<td>1.0</td>
</tr>
<tr>
<td>VA</td>
<td>computer monitors, laptops, desktops</td>
<td>Households</td>
<td>0.6</td>
</tr>
<tr>
<td>WA</td>
<td>TVs, computer monitors, laptops, desktops</td>
<td>Households, small gov’ts, small businesses, school district and charities</td>
<td>5.9</td>
</tr>
<tr>
<td></td>
<td>televisions, computers (desktop, laptop, netbook and tablet computers), desktop printers, computer monitors; other computer accessories, e-readers, DVD players, VCRs and other video players (i.e., DVRs); and fax machines</td>
<td>Households, k-12 public schools</td>
<td>4.2</td>
</tr>
</tbody>
</table>
Generation and Recycling of Used Electronics in the U.S.

- E-Waste makes up 1-2% of total waste stream in U.S.
- 2011 EPA Waste Characterization Report
  - Used data from 1980-2010
  - Estimated number of products reaching end-of-life (EOL) annually and how many were recycled, landfilled or stored
  - PCs (desktop and laptop), monitors, keyboards, mice, hard-copy devices, TVs, mobile devices
Generation and Recycling of Used Electronics in the U.S.

- In 2009:
  - 438 million new electronic products sold
  - 5 million short tons electronic products in storage
  - 2.37 million short tons ready for EOL management
  - 25% of 2.37 million short tons sent for recycling
  - 1999 to 2009: 122% increase in EOL electronics
  - 2006 to 2009: increase in recycling of 179 thousand short tons

- Accurate, Reliable Data Are Limited
End-of-life Electronics in the U.S.

- Disposed: 2,379,000 tons
- Recycled: 1,282,000 tons
- Recycled by Certified Recyclers: 250,000 tons (99% disposed, 1% recycled)

Yearly Data:
- 1990: 240,000 short tons
- 2000: 1,092,000 short tons
- 2010: 4,092,000 short tons

Sources:
- 1990 Recycled: based on historical knowledge of early electronics recyclers
- 2000 End-of-life: 1,092,000 short tons
- 2010 Recycled: 27 percent through 2009 (2010 projected)

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Electronics

**Desktop Computing**
- desktops
- mini-towers
- laptops and handhelds
- notebooks
- tablets
- hard drives

**Printers**
- laserjets
- deskjets
- thermal dot matrix
- line printers
- plotters
- paper trays

**Peripherals**
- keyboards
- mice
- power supplies
- cables
- speakers
- external drives, etc.

**Monitors**
- CRTs
- LCDs
- Wyse terminals, etc.

**Office Equipment**
- copiers
- scanners
- fax machines
- typewriters

**Audio/Video Equipment**
- tvs and displays
- VCR/DVD players
- projectors
- audio and video conferencing systems
- smart/electronic white boards

**Mobile Devices**
- cellular phones
- Blackberry/PDAs, pagers

**Telecom Equipment**
- telephones
- switches
- PBX
- voice mail and VoIP systems
- voice stations
- headsets

**Storage Equipment**
- video tapes
- audio tapes
- CDs
- tape, hard, thumb flash and zip drives
- data backup systems
- disk arrays
- SAN

**Mainframes**
- mid-range and servers
- power conditioning/UPS systems
- cabinets

**Networking Equipment**
- hubs, routers, switches, bridges

**Parts**
- AC adapters
- memory
- motherboards
- network, sound and video cards
- CD/DVD drives

**Healthcare Equipment**
- all non-biohazardous equipment:
  - defibrillators
  - EKG machines
  - mobile carts/workstations
  - patient monitors

**Banking**
- currency and coin counters
- transaction drawers
- check encoders and scanners
- receipt printers
- ATM machines

**Point-of-Sale**
- POS systems/registers
- barcode scanners
- receipt and barcode printers
- card readers
- touch screen monitors

**Miscellaneous**
- laptop carry cases
- modems
- software
- backup cabinets
- cameras
- video games
- ipods, iphones, ipads

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Summary of U.S. E-Waste Scenario

• **Key Issues:**
  – E-Waste is a rapidly growing segment of MSW
  – Consumers own about 24 electronic products/ household
  – Limited legal framework on used electronics management:
    • A patchwork of 25 different state laws; 15 with landfill bans
    • CRT Regulation; Spent Lead Acid Battery Regulation
  – Strong consensus-driven programs
    • Recycling certification,
    • EPEAT

• **Resulting Approach:**
  – Focus on stewardship of Federal electronics throughout their life cycle approach
  – Foster electronics stewardship through a combination of legal requirements and consensus driven initiatives
National Strategy for Electronics Stewardship (NSES)

- Strategy Launched July 20, 2011 with issuance of Report
  - [www.epa.gov/waste/conserve/materials/ecycling/taskforce/index.htm](http://www.epa.gov/waste/conserve/materials/ecycling/taskforce/index.htm)

- Report and Recommendations Developed by Interagency Task Force:
  - Council on Environmental Quality (CEQ)
  - U.S. Environmental Protection Agency (EPA)
  - U.S. General Services Administration (GSA)
Certified Recycling
- Protects human health and the environment
- Promotes best management practices for used electronics
- Minimizes worker exposure
- Maximizes reuse and recovery
- Ensures data and property security
- Holds companies accountable to continuously meeting best management practices

Recycling
- Saves natural resources
- Saves embodied energy
- Avoids pollution
- Increases green jobs

Improving Collections and Recycling
- Enhance Plug-In to eCycling
- Increase use of certified recyclers
- Educate on CRT rule
- Implement Federal Disposition Policy
- Promote Federal Electronic Challenge
- Improve electronic trade flows
- Provide technical assistance

Greener Computers
- EPEAT
- Energy Star
- Comprehensive Procurement Guidelines
EPA’s Role in Electronics Management

EPA is advocating the four goals of the National Strategy:

1. **Build incentives for greener electronics design and innovation.**
2. **Ensure that the Federal Government leads by example.**
3. **Increase Safe and Effective Management and Handling of Used Electronics in the United States.**
4. **Reduce Harm from US Exports of E-Waste and Improve Safe Handling of Used Electronics in Developing Countries.**
Goal 2: Ensure that the Federal Government leads by example.

- Federal Electronics Challenge (FEC):
  - 1) Acquisition and Procurement (EPEAT)
  - 2) Operations and Maintenance
    - Power Management, ENERGYSTAR
  - 3) End-of-life Management
    - Use certified electronics recyclers
      - E-Stewards certified
      - R2 certified
Goal 3: Increase Safe and Effective Management and Handling of Used Electronics in the U.S.

- Increase use of **certified recyclers** in the US:
  - Have the Federal government **lead by example**:
    - Establish a comprehensive and transparent government-wide policy on used Federal electronics that:
      - **maximizes reuse**, 
      - clears data and information stored on used equipment, and 
      - ensures that all Federal electronics are **processed by certified recyclers**.

- Certification Programs for Electronics Recyclers:
  - EPA encourages all electronics recyclers to become certified by demonstrating to an accredited, independent third-party auditor that they meet specific standards to safely recycle and manage electronics
    - Two accredited certification standards exist:
      - Responsible Recycling Practices (R2) [http://www.r2solutions.org/](http://www.r2solutions.org/)

- **Benefits of third-party certified responsible electronics recycling include:**
  - Reducing environmental and human health impacts from improper recycling;
  - Increasing access to quality reusable and refurbished equipment to those who need them; and
  - Reducing energy use and other environmental impacts associated with mining and processing of virgin materials – conserving our limited natural resources.
415 R2-certified facilities as of June 2013

109 e-Steward-certified facilities as of June 2013

524 certified facilities as of June 2013

*Dates listed above are approximate timeframes. The latest data entered above “May-13” are for the actual number of certified recyclers known to exist as of June 28, 2013. The current total may have changed since the latest entry date.
Electronics Recycling Facilities Certified to Either R2 or e-Stewards, or Certified to Both Standards
By value, most exports were products that were refurbished and resold as:
- working computers
- cell phones and other used products.

By weight, most exports were scrap materials that:
- come from UEPs that are disassembled or recycled in the United States;
- are commodity metals, plastics, and glass that are exported to be used in manufacturing processes overseas;
- Circuit boards are exported to smelting facilities to recover gold and other precious metals;
- Only a small share of U.S. exports of UEPs was sent overseas for disposal.
Emerging Issue: CRT Stockpiles

- Under RCRA, CRTs are hazardous waste when disposed of due to the presence of lead; Notice and consent is required for export for recycling or disposal.

- Few CRTs are made today. Therefore, recycling markets have become limited. This has caused an increase in the price of recycling the CRT glass.

- Concerns have been raised that this has led to CRT glass stockpiles.

- New technologies have become available; too soon to tell how they will help.

- Posted Frequently Asked Questions (FAQs) on the CRT regulations to ensure all parties understand their obligations for the CRT stockpiles under the Resource Conservation and Recovery Act (RCRA) and Superfund.

- Coordinating with state partners and other stakeholders to monitor the situation and determine what the appropriate federal role may be.
Types of Electronics Recyclers/Electronics Recycling Facilities in the U.S.

• There is no “one type” of Electronics Recycler or Electronics Recycling Facility in the U.S. “Recyclers” includes, but need not be limited to:
  – Resellers
  – Asset recoverers
  – Refurbishers
  – Demanufacturers
  – Shredding facilities
  – CRT Glass Processors
  – Precious metals refining facilities
  – Plastic recyclers: mold plastic into new products
  – various combinations of the above types
Contact Information

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