


**CBI**

## Challenges in Developing an Electronic Waste Management Program

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Project Manager, CB&I, Inc.  
September 17, 2013



A World of Solutions

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### Audience Poll

Video  
Mr. Arman Sadeghi  
President – All Green Recycling



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*“Wherever we live, we must realize that when we sweep things out of our lives and throw them away...they don’t ever disappear, as we might like to believe. We must know that “away” is in fact a place” ~ Jim Puckett, Basel Action Network*

Issue: Lack of a consistent framework and guidelines for businesses to follow in developing e-waste recycling programs.

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Outline

- Electronics Revolution – How did we get here?
- Electronic Waste Defined
  - Electronics Lifecycle
  - Environmental and Human Health Impacts
- Regulatory Framework
  - International
  - Federal
  - State
- Recycling Industry
  - Typical Recycling Process Flow Diagram
  - Recycler selection challenges
  - Business Assurance
- Business Case Studies – What businesses are doing to manage e-waste
  - Retailer
  - Manufacturer

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Electronics Revolution



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What is Driving the Electronics Revolution and E-Waste Crisis?

- Global technological revolution is fueling the rapidly increasing e-waste problem
  - “Newer is better” Concept – In with the new and out with the old
    - Over 1 Billion Smart Phones in the marketplace in 2013
    - “Apple Wins \$30 million iPad Contract from LA School District”
  - Effective product marketing
  - Competitive pricing
  - Technology boom in developing countries
- Consumer Culture
  - Demand for newer, smaller, faster and more efficient electronic devices
- Electronics Lifespan
  - Average life-span of a cell phone – 18 Months
  - Average life-span of a computer – 3-4 Years
- According to the Consumer Electronics Association (CEA), Americans now own approximately 24 electronic products per household (CEA, 2008)
  - My Household: ~22 electronic products

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**What is Driving the Electronics Revolution and E-Waste Crisis?**

- Fastest growing segment of municipal solid waste
  - According to the EPA, in 2009 e-waste made up approximately 2% of our national solid waste stream
    - 130,000 computers discarded per day
    - 100 million mobile devices discarded per year
- According to an EPA study, in 2009 approximately:
  - 438 million new consumer electronics were sold, doubling sales from 1997
  - 5 million tons of electronics were in storage awaiting disposal
  - 2.37 million tons of electronics were ready for end-of-life management
  - 141 million mobile devices were ready for end-of-life management
  - 25% of electronics were collected for recycling
    - ~110 million tons of obsolete electronics directed to municipal solid waste stream without recycling

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**What is Driving the Electronics Revolution and E-Waste Crisis?**

- Why should we be concerned?
  - Growing volume of obsolete electronics in storage ready for end-of-life management
  - Tech-savvy culture – “Newer is Better” mentality
  - Lack of regulation requiring proper management
  - Unscrupulous recycling business practices
  - Potential monetary and legal implications
  - History of illegal exporting/dumping in developing countries
  - Health and environmental impacts
  - Finite resources with a great opportunity for resource conservation and materials recovery

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**Electronic Waste – Defined**



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### E-Waste Defined

- No clear definition for “e-waste” at the Federal level
  - EPA loosely defines as “electronic equipment near the end of its useful life”
- State e-waste recycling programs all define “e-waste” differently:
  - **California:** “Any electronic device that is identified as hazardous waste”
  - **Oregon:** Covered Electronic Devices include “computers, monitors, and TVs”
  - **South Carolina:** Covered devices “means a covered computer device and a covered television device marketed and intended for use by a consumer”
  - **Indiana:** “Product or apparatus in which primary function provided by electronic circuitry and components and may contain a CRT”

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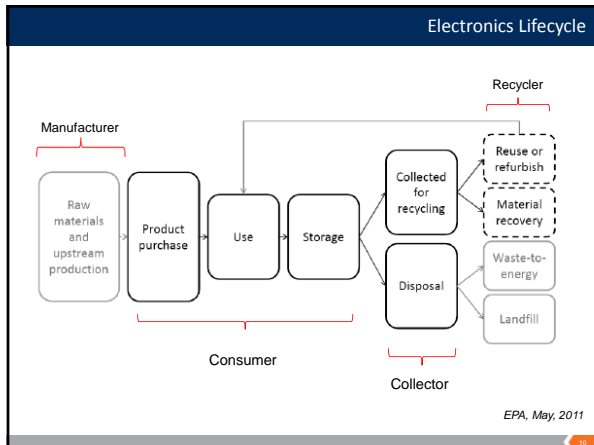
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### Why is Electronic Waste an Issue?

- Environmental and health concerns from the elements found in electronic devices:
  - Lead & lead phosphor powder in CRTs
  - Lead solder in circuit boards
  - Mercury in switches
  - Antimony trioxide as a flame retardant
  - Polybrominated flame retardants in plastic casings, cables, and circuit boards
  - Selenium & cadmium in circuit boards
  - Chromium and cobalt in steel
- Toxicological effects: Brain damage, reproductive disorders, kidney disease, mutations, and cancer
- Environmental impacts to air, water, and land



*The Electronics Wasteland*  
November 9, 2008

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## Regulatory Framework



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### Regulatory Framework – International Regulations

#### International

- United Nations Basel Convention Treaty – 1989
  - Control the transboundary movements of hazardous wastes and their disposal in developing countries
  - Initiated in response to numerous international scandals of hazardous waste trafficking from developed to developing countries
- 1995 – Basel Ban Amendment
  - Ban to export “all” hazardous waste to developing countries
- Present– Basel Convention ratified by over 69 countries
  - In 1990 the U.S. signed the Basel Convention, but has yet to ratify



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### Regulatory Framework – National Regulations

#### National

- At present, there is no Federal mandate to recycle e-waste
  - EPA encourages the reuse and recycling of electronics where possible
    - Exclusions and exemptions under RCRA
  - HR 2791 – Responsible Electronics Recycling Act (RERA); Introduced July 24, 2013
- 2010 – President Obama established the Interagency Task Force on Electronic Stewardship
  - National Strategy for Electronics Stewardship
- 4 Key Recommendations from National Strategy Report (2011):
  - *Build Incentives for Design of Greener Electronics, and Enhance Science, Research and Technology Development in the United States*
  - *Ensure that the Federal Government Leads By Example*
  - *Increase Safe and Effective Management and Handling of Used Electronics in the United States*
  - *Reduce Harm from US Exports of E-Waste and Improve Safe Handling of Used Electronics in Developing Countries*

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**Regulatory Framework – State Regulations**

**State**

- At present, 25 States have e-waste laws on disposal and recycling of electronics
- Program Types:
  - Producer Responsibility Program
  - Consumer Advanced Recycling Fee Program - California
  - Landfill/Disposal Ban – Several states
- Legislation Timeline:
  - 2003: California
  - 2004: Maine
  - 2005: Maryland
  - 2006: Washington
  - 2007: Connecticut, Minnesota, Oregon, Texas, North Carolina
  - 2008: New Jersey, Oklahoma, Virginia, West Virginia, Missouri, Hawaii, Rhode Island, Illinois, and Michigan
  - 2009: Indiana, Wisconsin
  - 2010: Vermont, South Carolina, New York, Pennsylvania
  - 2011: Utah

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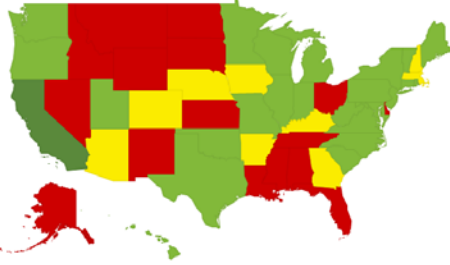
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**Regulatory Framework – State Regulations**

- Red States – No E-Waste Regulation
- Yellow States- Legislation introduced/proposed
- Green States – Producer Responsibility Program
- California – Consumer Advanced Recycling Fee Law




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**Regulatory Framework – California Regulations**

September 24, 2003

- CA passed the Electronic Waste Recycling Act – SB20/SB50
  - Established a statewide e-waste collection and recycling program
  - Established the Consumer Advanced Recycling Fee Law
    - Imposes fee (\$3-5) at point of sale of new covered electronic devices (CED)
    - Fee used to reimburse recyclers/collectors of covered electronic waste (CEW)
  - Only 1/3 of CA collectors/recyclers participate in the CEW program
  - Goals of Program:
    - Limit the amount of toxic substances in electronics sold in CA
    - Establish funding system for collection and recycling of CED
    - Provide a means for proper reuse and recycling of used electronic devices

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**Regulatory Framework – California Regulations**

What is a CED under the Advanced Recycling Fee Program?

- CED is defined as, **“a video display device containing a screen greater than 4 inches, measured diagonally”**
- Examples of CED managed under the Advanced Recycling Fee Program:
  - CRT Devices
  - Laptop computers with liquid crystal display (LCD)
  - LCD containing desktop monitors
  - Televisions containing cathode ray tubes
  - Plasma televisions
  - Portable DVD players with LCD screens
- Fee imposed on consumer at point of sale
- Recyclers/Collectors will manage other e-waste in addition to CEDs



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**Regulatory Framework – California Regulations**

- Department of Toxic Substances Control (DTSC) adopted regulations designating e-waste as a universal waste
  - (Chapter 23 of Title 22 CCR)
  - Establishes standards for:
    - Managing and accumulating e-waste
    - Training personnel who handle e-waste
    - Recordkeeping
    - Reporting
    - Labeling of containers
  - Establishes standards for:
    - Small and Large Quantity Handlers
    - Recyclers
    - CRT handling, removal, and treatment



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**Recycling Industry**



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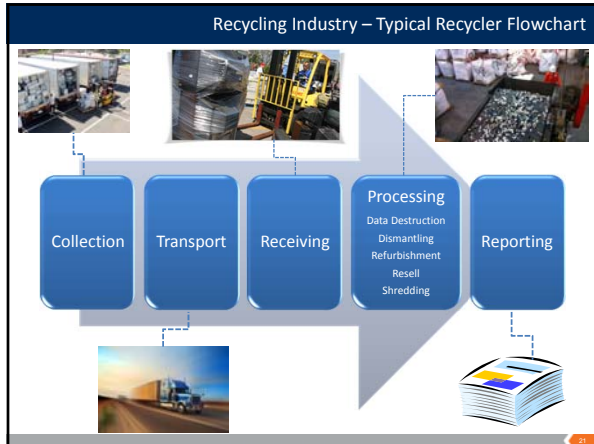
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### Electronic Recycling Industry- Recycler Selection Challenges

A recycler may be a "recycler" in the name only

- Unscrupulous recycler and broker business practices
- Lack of a financial incentive to "do the right thing"
- Greater costs for proper recycling domestically
  - Intensive labor needs
  - Health and safety risks
  - Quality control measures
- Sophisticated and costly recycling technologies with long term ROI
- Limited downstream infrastructure for processing domestically
  - Examples:
    - Circuit Board smelters in Canada, Germany, Japan, Belgium, Sweden
    - CRT glass smelters in India, Malaysia, Mexico



**Video Clip**  
 "Colorado E-Scrap Company Fined \$4.5 M for Illegal Exporting"

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### Electronic Recycling Industry- Challenges for a Business

How does a business select a reputable electronics recycling partner?

- Business Challenge:
  - DTSC's Registered Recyclers Database
    - 1,120 electronics recyclers in Los Angeles County
  - CalRecycle's Approved CEW Recyclers Database
    - 101 approved collectors and 46 recyclers in Los Angeles County
      - This only account for recyclers participating in the Advanced Recycling Fee Program under the Electronic Waste Recycling Act

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**Electronic Recycling Industry- Business Assurance**

Business Assurance of Environmentally Sound Recycling Practices by Recyclers:

- Independent 3<sup>rd</sup> party accreditation
  - Responsible Recycling (R2)
  - E-Stewards
- Insurance Requirements
- Listing of downstream vendors
- Data Security/Data Management Procedures
- Vendor Audits
- Financial Assurance
- Performance Bond
- Reporting and Tracking
- Compliance with business policies/procedures


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**Business Case Studies**




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**Business Case Study – Retailer Example**

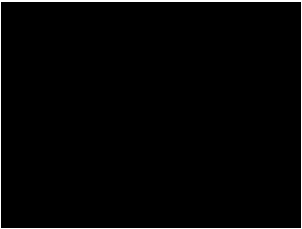
**Best Buy**

Goal – Recycle 1 billion pounds of electronics by end of 2014

*“Committed to the communities we serve”*

Program – Launched in February 2009

- In-store recycling kiosks
- In-store drop-off program
- Haul Away Program
  - Appliance and TV recycling program
- 1-800-Recycling Hotline



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### Business Case Study – Retailer Example

Successes:

- Well defined Recycling Standards
- Free to the consumer
- Accessible
- Available nationwide at every Best Buy
- Transparent and responsible
- 3<sup>rd</sup> Party Audits
- Established recycling partners
  - Reporting and recordkeeping requirements

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### Business Case Study - Manufacturer Example

**Dell**

- Goal - Increase Dell electronic take back volume to 1 billion pounds by 2014

Program –

- Mail Back Recycling
  - Partnership with Fed-Ex
- Dell Reconnect
  - Partnership with Goodwill Industries
- Dell Use-and-Return Program

Successes:

- Electronics Disposition Policy
- Free to the consumer
- Accessible
- Transparent

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### Closing Thoughts

- At present:
  - There is no Federal mandate to recycle e-waste
  - There are 16 states with no electronic recycling legislation and 9 states with propose electronic recycling legislation
  - The 25 states that have implemented electronic recycling programs have done so with various degrees of enforcement
- What is an e-waste? → Loosely defined
- Selecting a reputable recycler can be challenging
- There are monetary implications for collectors, recyclers, and businesses that illegally export to developing countries or mishandle electronics domestically
- Businesses have been successful
  - Brand and business protection
  - Proactive
  - Bottom line enhancements

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Thank you

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