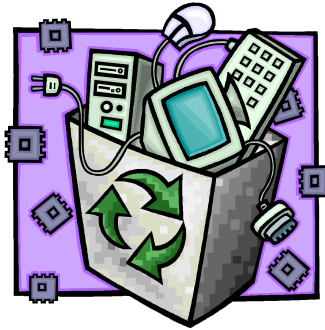


Overview of the Electronics Recycling Industry



New Hampshire Solid Waste Facility Operator Training
March 28, 2017

Workshop Overview

- ▶ What do we mean by electronics?
- ▶ Electronics recycling in New Hampshire & around the region
- ▶ Types of electronics recyclers
- ▶ Videos of electronics recycling
- ▶ Electronics recyclers - certification & why it matters
- ▶ Electronics recyclers serving New Hampshire
- ▶ Other opportunities for recycling electronics
- ▶ Recycling markets

Learning Objectives

- ▶ Familiarity with how the electronics recycling industry works
- ▶ Knowing who the electronics recyclers are in New Hampshire
- ▶ Understanding the role of certification in the electronics recycling industry
- ▶ Getting your questions answered

Setting the Context

What are Electronics?

- ▶ Computers, televisions, monitors, printers & peripherals
 - Including CRTs
- ▶ Cell phones, iPods, tablets & e-readers



New Hampshire Law

- ▶ Disposal ban for video displays larger than 4 inches
 - All televisions, computers monitors
 - Whether CRT, LCD, LED or plasma screens
- ▶ Universal Waste Rule
 - CRTs
 - Batteries: nickel-cadmium, small sealed lead acid, & lithium

Why the Disposal Ban

- ▶ Disposal capacity
- ▶ Hazardous constituents, such as lead
 - CRTs contain 4 - 8 pounds lead each



Permit Requirements

- ▶ New Hampshire:
 - Solid Waste - Transfer Facility
 - Hazardous Waste - Universal Waste
- ▶ Federal:
 - There are *no federal permit requirements*
 - EPA ID number is a shipping number

Electronics Recycling in the Region

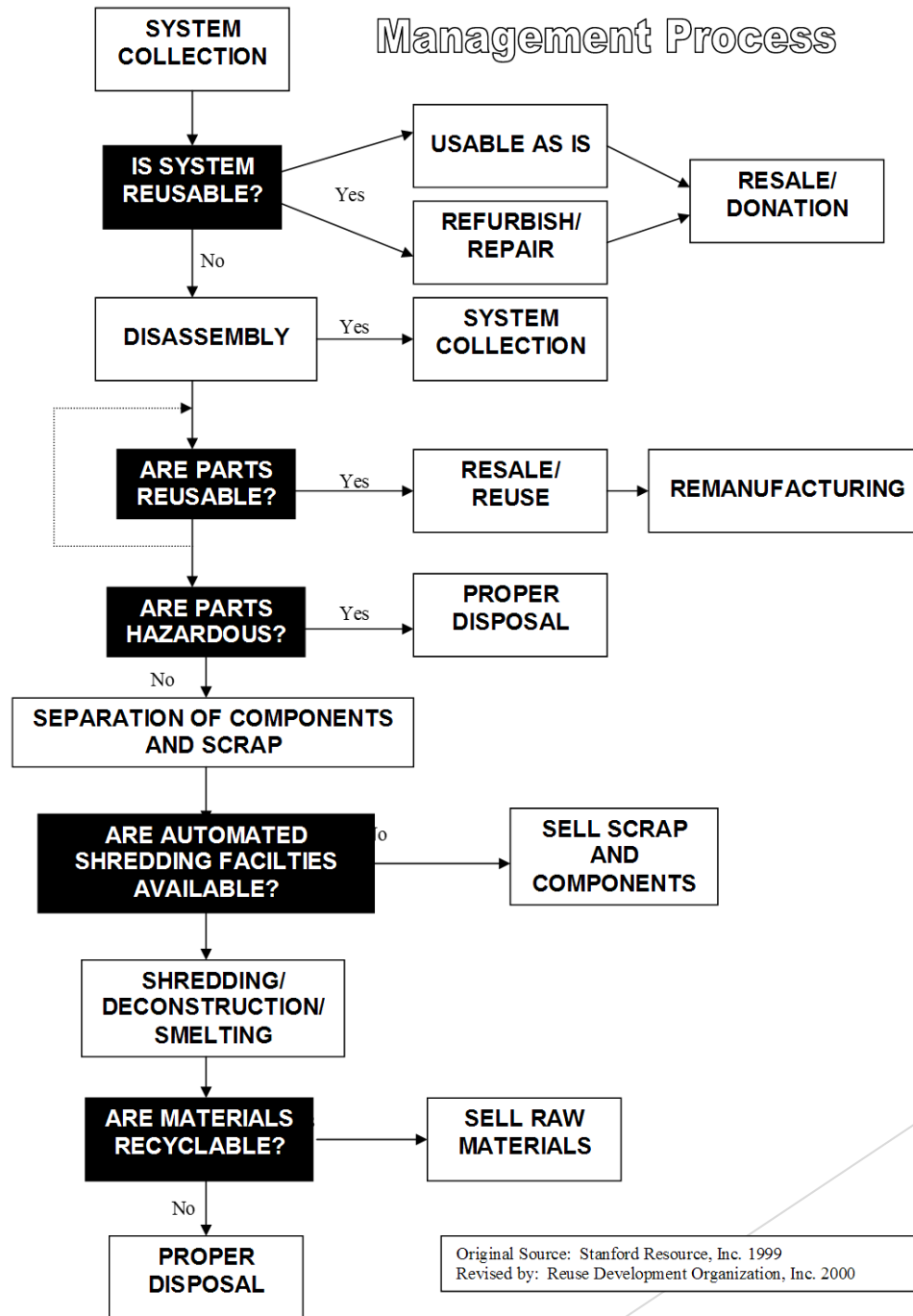
- ▶ Most New England states have manufacturer take-back laws for consumer electronics
 - Not Massachusetts & New Hampshire
- ▶ All New England states have disposal bans

Types of Recyclers

Different Types of Recyclers

- ▶ Asset recovery
- ▶ Reuse/Repair/Remanufacture
- ▶ Demanufacturing
- ▶ Shredding
- ▶ Broker

Flowchart of Electronics Management Process



Original Source: Stanford Resource, Inc. 1999
Revised by: Reuse Development Organization, Inc. 2000

Asset Recovery

- ▶ Manages surplus property from government & large companies
- ▶ May remanufacture, demanufacture, &/or sell units “as is”, or resell components & parts

Reuse/Repair/Remanufacture

- ▶ **Reuse:** Sells whole unit electronics or parts for use for original purpose
- ▶ **Repair:** Repairs electronics for resale to consumers
- ▶ **Remanufacture:** Builds whole unit electronics from components or rebuilds electronics for resale to consumers, retailers or brokers

iFixit.org



Articles

News

Explore

Pledge

WHY REPAIR?

Repair saves you money. It saves the environment. And it connects us to our things. Ditch the throwaway economy. Join the repair revolution.



Demanufacturing

- ▶ Takes electronics apart
 - Resale of components & commodities
 - Preparation for shredding

- ▶ May sell workable devices “as is” to brokers, retailers, public

- ▶ Nominal repair/remanufacture

Courtesy of *Paula Sands Live* /
KWQC (Iowa)

<https://www.youtube.com/watch?v=ugJfQit4-YQ>

Shredding

- ▶ Electronics or parts through a shredder
- ▶ Shredder breaks up into smaller pieces
- ▶ Material separated & sold as commodities for recycling

URT Recycling Technologies

<https://www.youtube.com/watch?v=Gls92qpNwck>

Broker

- ▶ Buys & sells
 - Whole unit electronics
 - Processed materials, such as circuit boards
- ▶ Can include specialization in reselling specialized or 'exotic' equipment
- ▶ Often, material goes overseas

Electronics Should be Recycled, But by Who?

Answer:

- ▶ Certified electronics recyclers

Electronics Recycler Certification

What is a Certified Electronics Recycler?

Recycler that has been assessed by an independent, 3rd party organization that is qualified & licensed to issue certifications to a specific standard.

- ▶ Either R2 or e-Stewards

What Does That Mean?

A certified electronics recycler is a *facility* that has received a 3rd party audit that verified that it meets the requirements of either the R2 or e-Stewards Standard.

Elements of Both Standards

- ▶ Worker health & safety
- ▶ Environmental performance
- ▶ Testing for reuse
- ▶ Downstream due diligence
- ▶ Data security
- ▶ Regulatory & permitting compliance
- ▶ Insurance, Facility Closure Plans, & Financial Assurances

Worker Health & Safety

- ▶ Training
- ▶ Personal protective gear
- ▶ Air emissions
- ▶ Preventing breakage
- ▶ Avoiding toxic dust & particulates

Environmental Performance - Focus/Hazardous Materials Management

► e-Stewards

- Hazardous materials/waste as defined by international & domestic laws
- Problematic materials:
 - Alkaline & other non-hazardous batteries
 - Glycolant coolers
 - Inks, toners & uncleaned cartridges & containers
 - Plastics with halogenated materials

► R2

- Focus materials:
 - CRTs
 - Batteries
 - Circuit boards
 - Mercury-containing devices
 - PCBs
- Toner cartridges require special handling as well

No Incineration or Land Disposal

- ▶ Must be reused or recycled
- ▶ Except PCBs & certain other materials disposed as hazardous waste

Testing for Reuse

- ▶ Concerned about sham movement of materials
- ▶ Requires testing of key functions before reuse
- ▶ Requires warranty & return policy

Downstream Due Diligence

Recycler is responsible to be sure that downstream vendors meet same requirements as certified recycler

Data Security

- ▶ Ensure physical security of data
- ▶ Sanitize all data

Legal Compliance

All local, domestic, exporting, transboundary & importing countries

- Environmental
- Health & safety
- Import/export laws
- Stormwater management & zoning

Closure Plan/ Financial Assurance

- ▶ Liability & pollution insurance
- ▶ Closure plan with financial assurances in control of 3rd party

Why it is Important to Use a Certified Electronics Recycler

- ▶ Only way to ensure not “self-certifying” or making unsubstantiated claims
 - No federal laws or requirements specific to electronics recyclers
- ▶ Known set of best management practices that recycler is meeting
- ▶ Practices meet your expectations
- ▶ Data destruction
- ▶ Financial assurances, insurance & closure plans

Certified Electronics Recyclers Serving New Hampshire

- ▶ NRRA “approved vendor” list
 - Good Point Recycling
 - RMG
 - URT

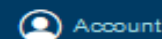
- ▶ Out-of-state options

Other Electronics Recycling Options – Manufacturer Take-Back Programs

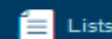
- ▶ Staples
- ▶ Best Buy
- ▶ Goodwill/Dell Reconnect
- ▶ Call2Recycle - cell phones & batteries
 - Lowes, Staples, Radio Shack, Sears, Home Depot, Ace Hardware
- ▶ Wireless carrier stores - such as Verizon, AT&T
- ▶ Brand owner mail back programs



Search Best Buy



Account



Lists



Cart

PRODUCTS

BRANDS

DEALS

SERVICES

Weekly Ad

Deal of the Day

Gift Cards

Gift Ideas & Registry

Electronics and Appliances Recycling at Best Buy

RECYCLING MADE EASY

We will take all kinds of used tech,¹ no matter where you bought it or how old it is.



Products We Recycle



TV and Video



Computers & Tablets

Cell Phones &
Radios

Appliances



Ink & Toner

Rechargeable
Batteries

Audio



Home



Music & Movies

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GadgetsCameras &
CamcordersCar Audio, Video &
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FREE DATA TRANSFER WITH SELECT PCs

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and Trade-In offer available in store only.



15% OFF AN HP INKJET PRINTER

when you bring in any used printer to
a Best Buy store for recycling.

[Learn more >](#)

In store only. Terms and conditions apply.

Additional Resources

[Best Buy Recycling Standards](#)

[Recycling Program FAQs](#)

[Recycling for Businesses and
Organizations with RecycleNation](#)

Recycling Markets

Recycling Markets for Electronics

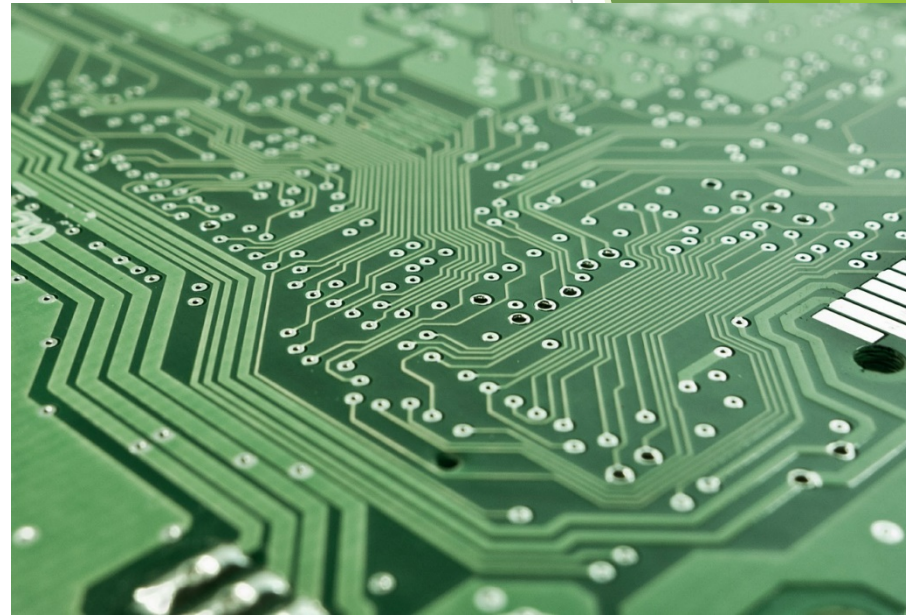
- ▶ Parts & components
- ▶ Circuit Boards
- ▶ Hard drives
- ▶ Plastic
- ▶ Metals
- ▶ CRT glass
- ▶ Other glass
- ▶ Batteries
- ▶ Hazardous components

Parts & Components

- ▶ Fans
- ▶ Motherboards
- ▶ Circuit boards
- ▶ Hard drives & memory
- ▶ Cables/plugs

Circuit Boards

- ▶ Low grade & high grade
- ▶ Fate
 - Reused
 - Smelted for metals



Hard Drives & Memory



► Fate

- Reused
- Metal recovery

Cables & Plugs

- ▶ Fate
 - Reused
 - Smelted for metals



Plastic

- ▶ Plastic used in electronics is valuable & recyclable
 - Demanufactured into pieces - such as casing
 - Shredded
- ▶ Fate
 - Post-consumer content in electronics & other
 - Burned for energy



Metals

- ▶ Aluminum, copper, steel, precious metals, rare earths
- ▶ Fate
 - Recovered & recycled for new uses



DOWNSTREAM FOR CRTS



TREATING GLASS
AND PLACING IN A
DEDICATED CELL IN
LANDFILL



USING AS A FLUX
IN COPPER AND
LEAD SMELTING



SEPARATING
LEAD AND
GLASS THROUGH
SMELTING

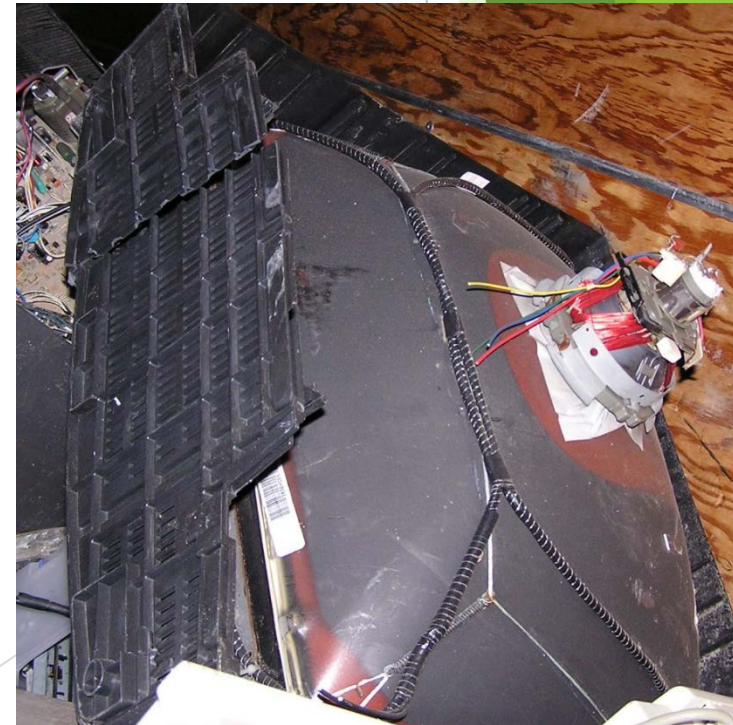


PRODUCING
CERAMICS FROM
PROCESSED
GLASS

*Not allowed with
R2 certification

CRT Glass

- ▶ ~~Glass to glass recycling~~
- ▶ Tile manufacturers/glaze
- ▶ Abrasives, road reflectors
- ▶ Lead & copper smelters
 - Flux & metal recovery
- ▶ Whole CRTs reused
- ▶ Exported



Other Glass

- ▶ Panel glass from CRTs
- ▶ Glass from other types of devices - like cell phones, e-readers
- ▶ Fate
 - Asphalt, abrasives, industrial applications

Rechargeable Batteries

- ▶ Fate
 - Reused
 - Recycled



Hazardous Materials

- ▶ Mercury containing lamps
- ▶ Batteries
- ▶ Toner cartridges



Conclusion & Questions

This Is Not A Simple Industry

- ▶ Significant differences between doing the “right thing” & “the cheap thing”
- ▶ Significant worker health and safety, & environmental risks
- ▶ Making a profit can be hard
 - Changing markets & material streams
 - Lightweighting of products
 - Decreased use of precious metals, metals at all

Contact Information

- ▶ Lynn Rubinstein, Executive Director
- ▶ Northeast Recycling Council (NERC)
- ▶ lynn@nerc.org
- ▶ 802-254-3636

See you at the next training - best management practices for collecting electronics for recycling

April 6, 2017