

What's the Fuss about CRT Glass?

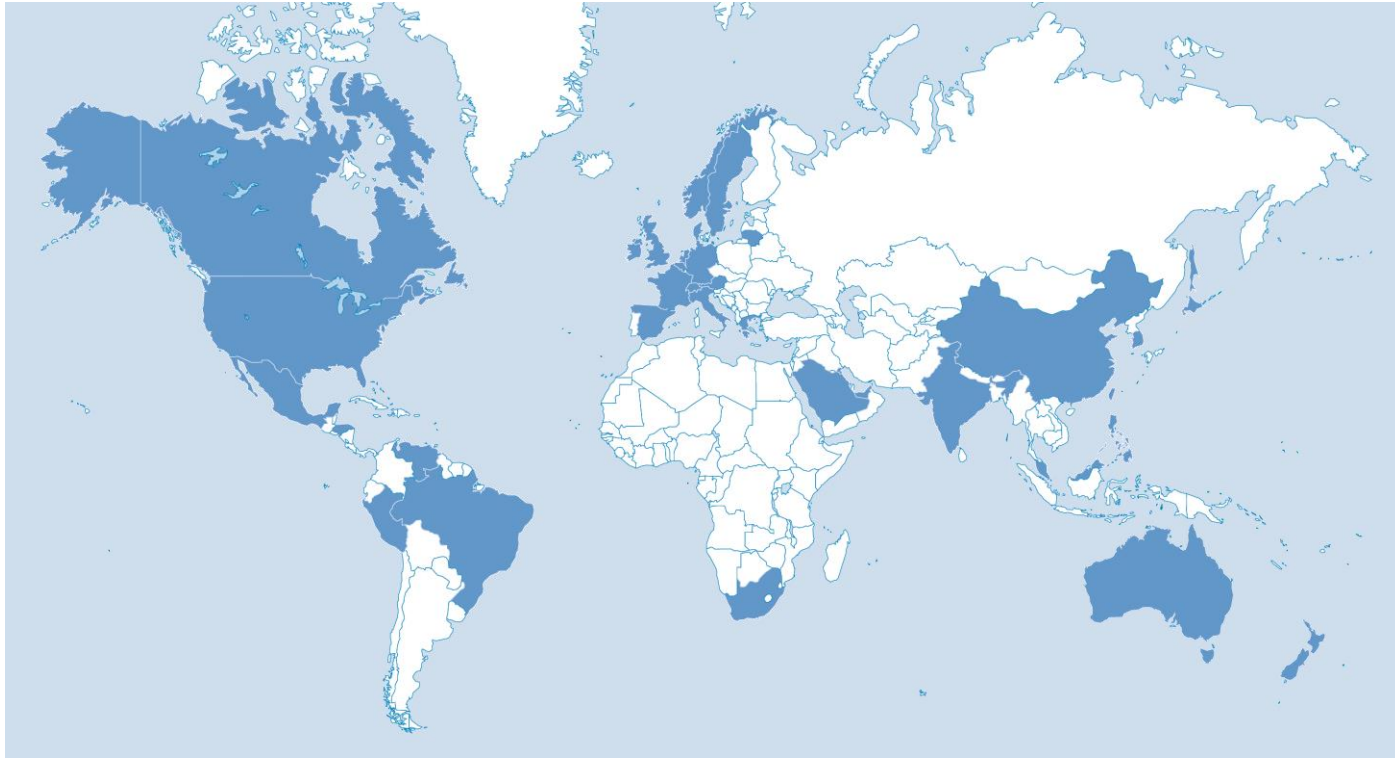
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Institute of
Scrap Recycling
Industries, Inc.



1,700

Member companies

7,000+

Recycling facilities
worldwide

38

Countries

U.S. Electronics Recycling Market



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- \$20+B (Industry in Value)
 - Available for Recycling ~ 6-7 M tons
 - Volume Processed ~ 4.4 M tons
 - Disposed in landfills ~ 3 M tons
 - Employment (FTE) up to 45,000
 - CAGR ~ 20%
-
- US ITC Report: *Used Electronics Products (UEP): An Examination of U.S. Exports*, February 2013
 - MIT-NCER US Used Electronics Flows Report - December 2013
 - International Data Corporation *Inside the US Electronics Recycling Industry*, September 2011, IDC #229786, Volume: 1

Cathode Ray Tubes (CRTs)



- Federal CRT rule
 - Conditional exclusion from solid waste definition if...
 - Enforced at the State level, except exports
- 25 states include monitors and TVs in recycling programs
- Landfill bans in 20 states
- Negative costs to responsibly recycle
 - CRT glass v. laptops, desktops and game consoles
- 3.5 million tons of CRT glass remaining in U.S.*

*Consumer Electronics Association 2014 study

What is CRT Glass?

- Cathode Ray Tube constitutes 60-70% of volume
- Panel glass (~70% of tube)
 - low lead levels, phosphors, non-hazardous
- Funnel glass (~30% of tube)
 - high lead levels, hazardous
 - average 4 pounds of lead
- Recoverable commodities
 - steel, copper, aluminum, plastic, low grade circuit board



State of CRT market conditions



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- Commodity markets (e.g. steel, copper, lead, plastic) worse in six years, cannot recover the cost to break down and process panel and funnel glass from CRTs
- Stockpiling of whole monitors/TVs growing concern
- Product take back programs (OEMs) underpaying for actual costs
- Recyclers are starting to not accept monitors/TVs
- Costs to responsibly recycle are likely to increase
- Reclamation of panel and funnel glass capacity shifting from glass manufacturing to raw material substitute
- Still a question of cost, not capacity for CRT glass

Yesterday's CRT glass market



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- Historically, dominated by **CRT glass to glass manufacturing**
 - Market has essentially ended
- **Lead Smelters**
 - Smelting flux agent, lead recovery

Today's CRT glass market*



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- **Shift to “Use as Raw Material Substitutes”**
 - Ceramics, lighting fixtures, tiles, building materials
- **Lead smelters**
 - Smelting flux agent, lead recovery
- **Copper smelters**
 - Smelting flux agent
- **New technologies?**
 - Unlikely with diminishing source

*all approved technologies by U.S. EPA

Is there ample CRT glass capacity?



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-Yes, but it's not free

- Responsible CRT glass recycling costs money

- Municipalities are used to positive recycling values, negative waste values

 - CRT glass has a negative recycling value

-Every market option has a cost

-Ample markets exist domestically and internationally

- unlimited capacity

Red flags in the marketplace

- **Certain “Recycling” Companies** are undercharging or dramatically underestimating the cost of responsibly recycling the [CRT] glass
 - No capacity to breakdown monitors and sort and separate the glass
 - No records for the final recycling/reclamation of the panel and funnel glass
- **OEMs and agents are forcing companies** to go to certain “recycling” companies
- **OEMs and agents unwilling to pay** actual costs to collect and responsibly recycle/reclaim the glass
- **No state law enforcement** over the OEMs
 - Must ensure CRT glass is actually recycled/reclaimed

- **ISRI policy:** No landfilling if the CRT glass can be safely and economically recycled
- **R2:2013 [Recyclers] shall not:**
 - (1) direct material to land disposal facilities unless no reuse or recycling options are viable
 - (2) use land disposal as a management strategy for FMs (CRT glass is an FM)
- **e-stewards:** allows landfilling/“retrievable storage”
- **20 state laws have landfill bans in place**
 - **U.S. EPA** federal law allows CRTs in solid waste landfill
- **Illinois EPA** allows OEMS to count CRT-to-ADC to annual goals

Moving forward



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- Stockpiling is not recycling
- Landfilling is not recycling
- If it's not recycled, why should OEM's get recycling credit?
- If you're certified, you shouldn't be able to stockpile CRTs
- It's challenging but a question of cost, not capacity
- Responsibly recycling/reclaiming CRT glass is sustainable materials management
- Precedent for flat panels

Thank You



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