

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

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**Global E-Waste Management (GEM)
Network Workshop**

Daniel T. Gallo, US EPA



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

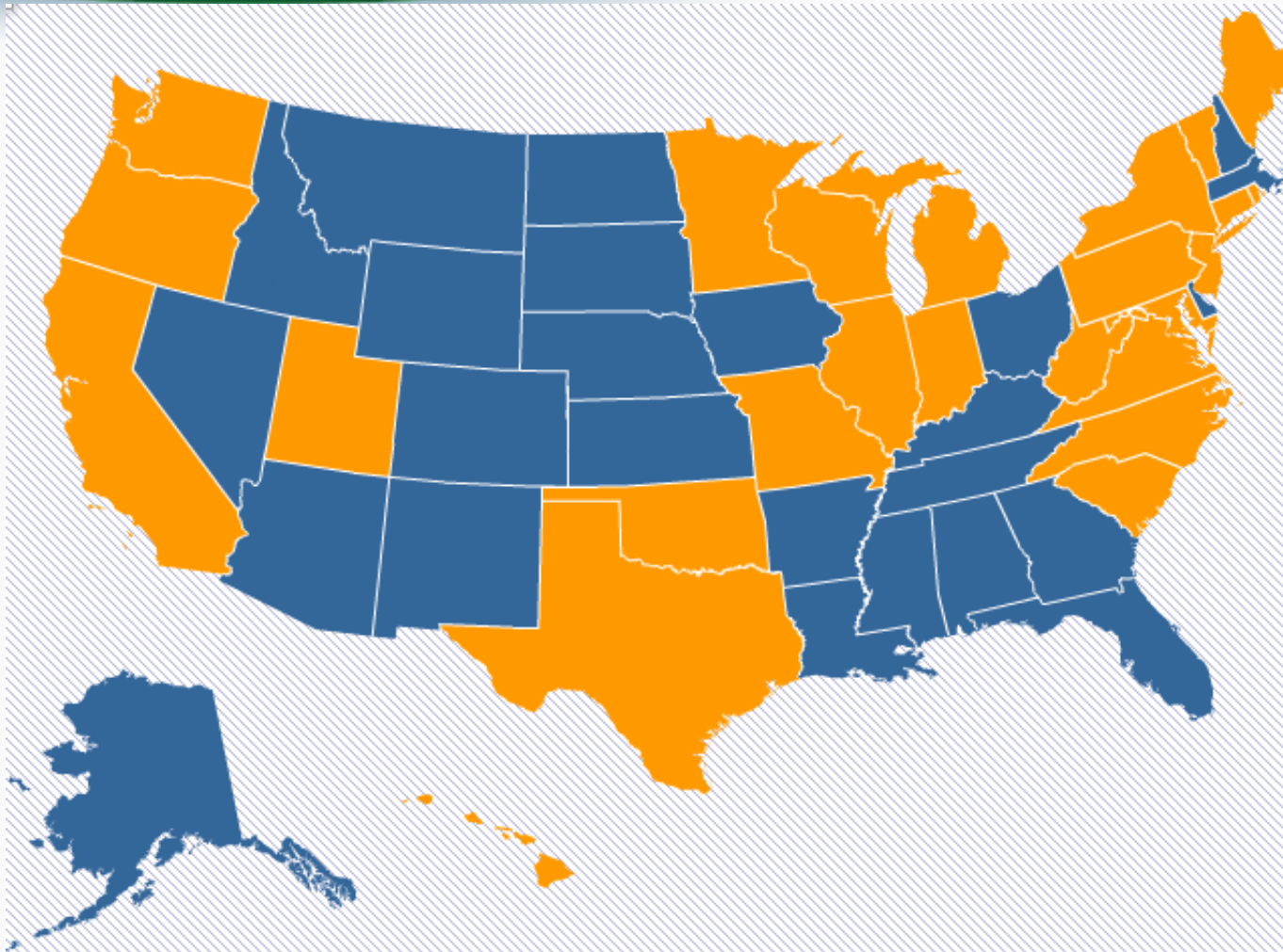


State Laws

- **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 With E-Scrap Laws*

*Courtesy of Jason Linnell, Executive Director, National Center for Electronics Recycling (NCER)



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)

2010 Per Capita Rates*



State	Products Collected	Entities Collected From	2010 Lbs Per Capita
CA	Televisions, computer monitors , laptop	All	4.9
HI	Computer monitors, laptops, printers (no TVs until 2011)	All	2.4
IL	Computer, computer monitor, television, printer, mobile phones, telephone, others	Households only	2.4
IN	TVs, computer monitors, laptops, desktops, printers, computers, peripherals, fax machines, DVD players, VCRs	Households, public schools, small business	2.5
ME	TVs, computer monitors, laptops, printers, video game consoles, dig pic frames	Households (others added 2011)	4.0
MI	Computer, computer monitor, television, printer	Household and small business	0.8

*courtesy of Jason Linnell, Executive Director, National Center for Electronics Recycling (NCER)

2010 Per Capita Rates*

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State	Products Collected	Entities Collected From	2010 Per Capita
MN	TVs, computer monitors, laptops, desktops, printers, computers, peripherals, fax machines, DVD players, VCRs	Households	6.7
OR	TVs, computer monitors, laptops, desktops	Households, small bus., non-profit, 7 or fewer	6.3
OK	computer monitors, laptops, desktops	Households	0.7
TX	computer monitors, laptops, desktops	Households	1.0
VA	computer monitors, laptops, desktops	Households	0.6
WA	TVs, computer monitors, laptops, desktops	Households, small gov'ts, small businesses, school district and charities	5.9
	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	Households, k-12 public schools	4.2



Generation and Recycling of Used Electronics in the U.S.

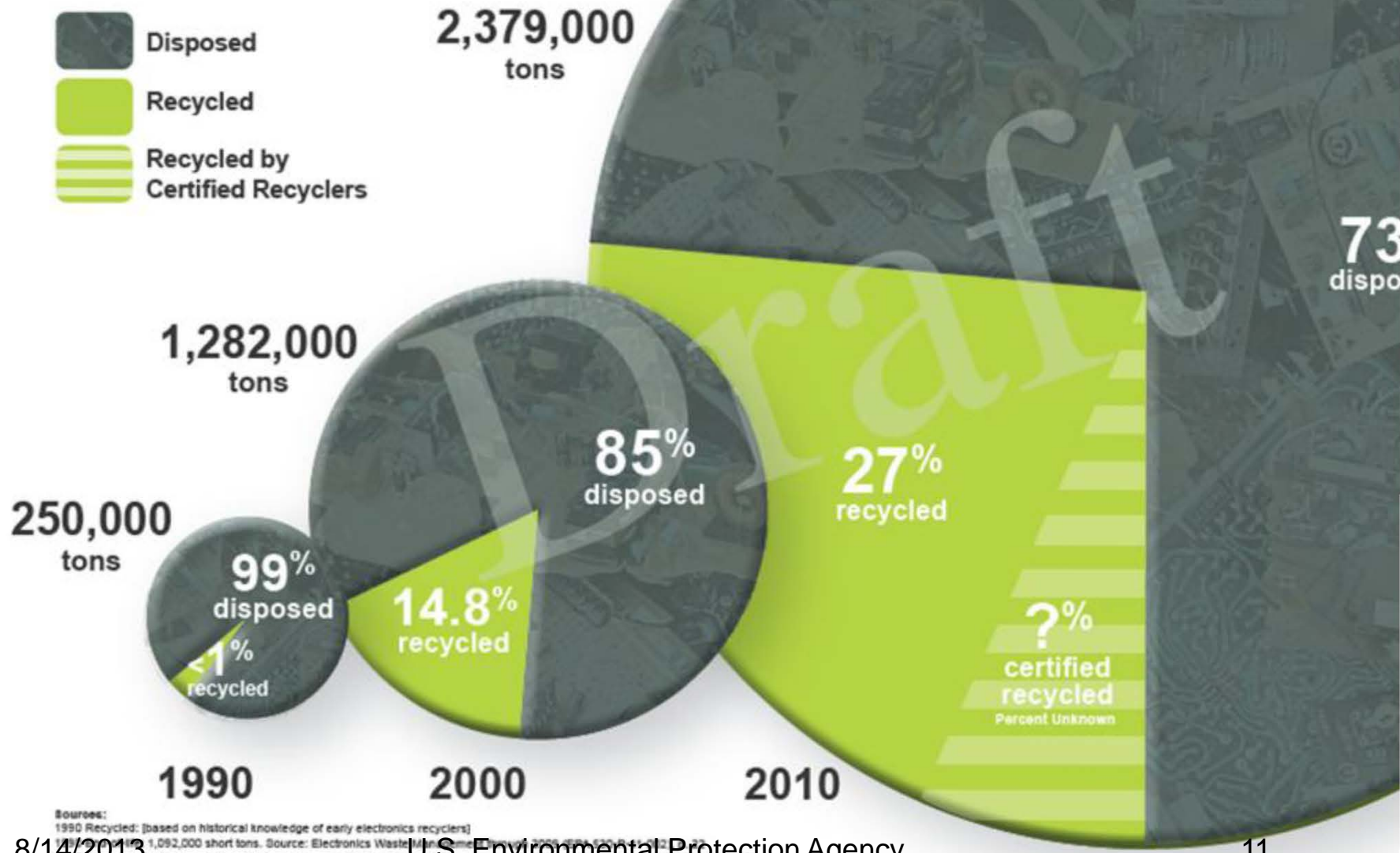
- E-Waste makes up 1-2% of total waste stream in U.S.
- 2011 EPA Waste Characterization Report
 - Used data from 1980-2010
 - Estimated number of products reaching end-of-life (EOL) annually and how many were recycled, landfilled or stored
 - PCs (desktop and laptop), monitors, keyboards, mice, hard-copy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



Sources:
 1990 Recycled: [based on historical knowledge of early electronics recyclers]
 1990 End-of-life: 1,092,000 short tons. Source: Electronics Waste Management in the United States (EPA 530-R-11-002), p. 22
 2000 Recycled: 14.8 percent (190,000 tons). Source: Electronics Waste Management in the United States (EPA 530-R-11-002), p. 22
 2000 End-of-life: 1,092,000 short tons. Source: Electronics Waste Management FINAL July 2008 (EPA530-R-08-009), p. 23
 2010 Recycled: 27 percent through 2009 (2010 projected). Source: Electronics Waste Management in the United States (EPA 530-R-11-002), p. 22
 2010 End-of-life: 2.37 million short tons through 2009 (May 2011). Source: Electronics Waste Management in the United States (EPA 530-R-11-002), p. 5

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

tv's and displays,
VCR/DVD players
projectors
video and audio 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
CD's
tape, hard, thumb flash and zip drives
data backup systems
disk arrays
SAN

Mainframes

mid-range and servers
power conditioning/UPS systems
cabinets,
relay racks

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
cabinets
cameras
video games
ipods, iphones, ipads



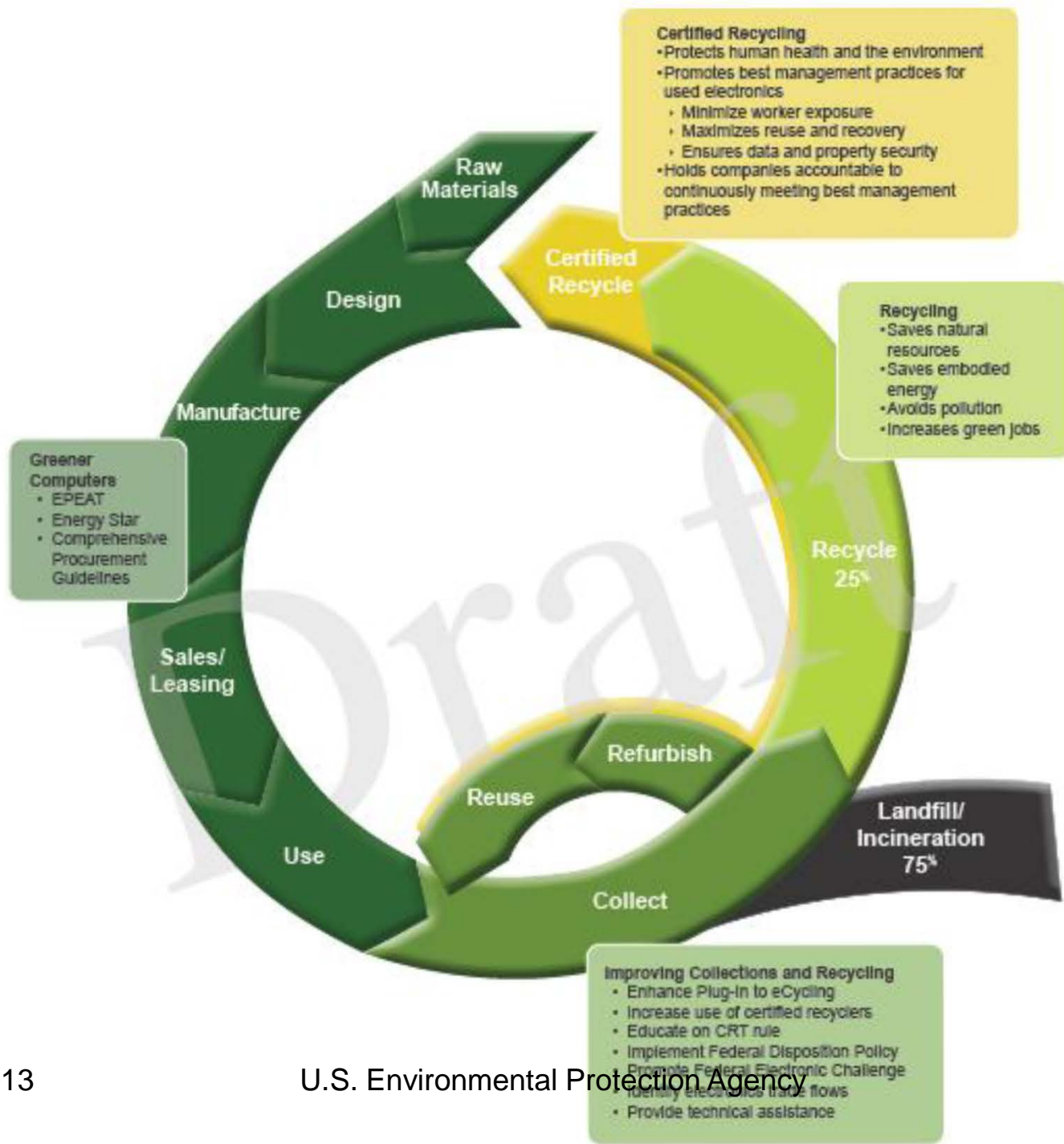
Summary of U.S. E-Waste Scenario

- **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
- 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)





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.

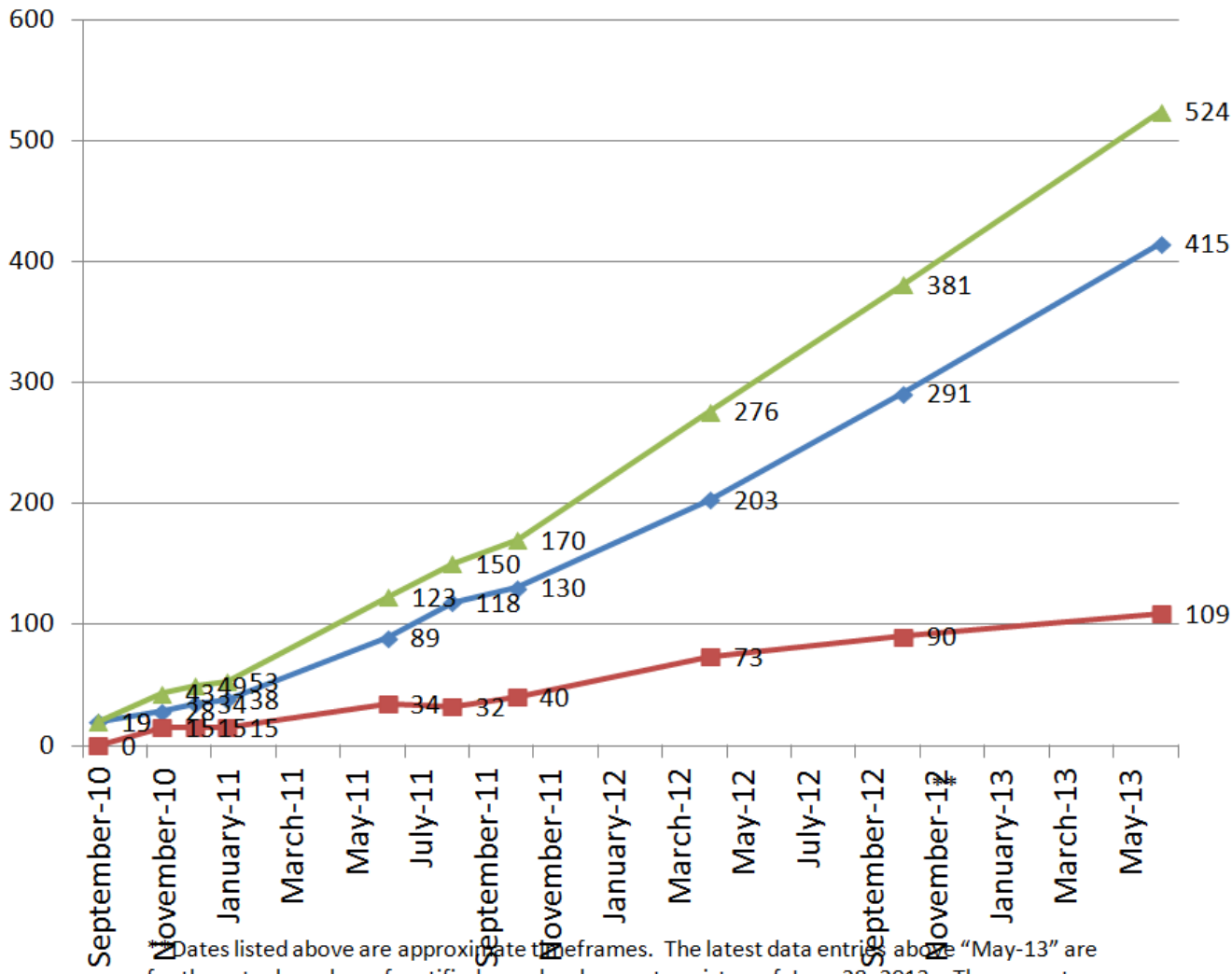
- **Federal Electronics Challenge (FEC):**
 - **1) Acquisition and Procurement (EPEAT)**
 - **2) Operations and Maintenance**
 - Power Management, ENERGYSTAR
 - **3) End-of-life Management**
 - Use certified electronics recyclers
 - E-Stewards certified
 - R2 certified

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/>
 - E-Stewards® <http://e-stewards.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.

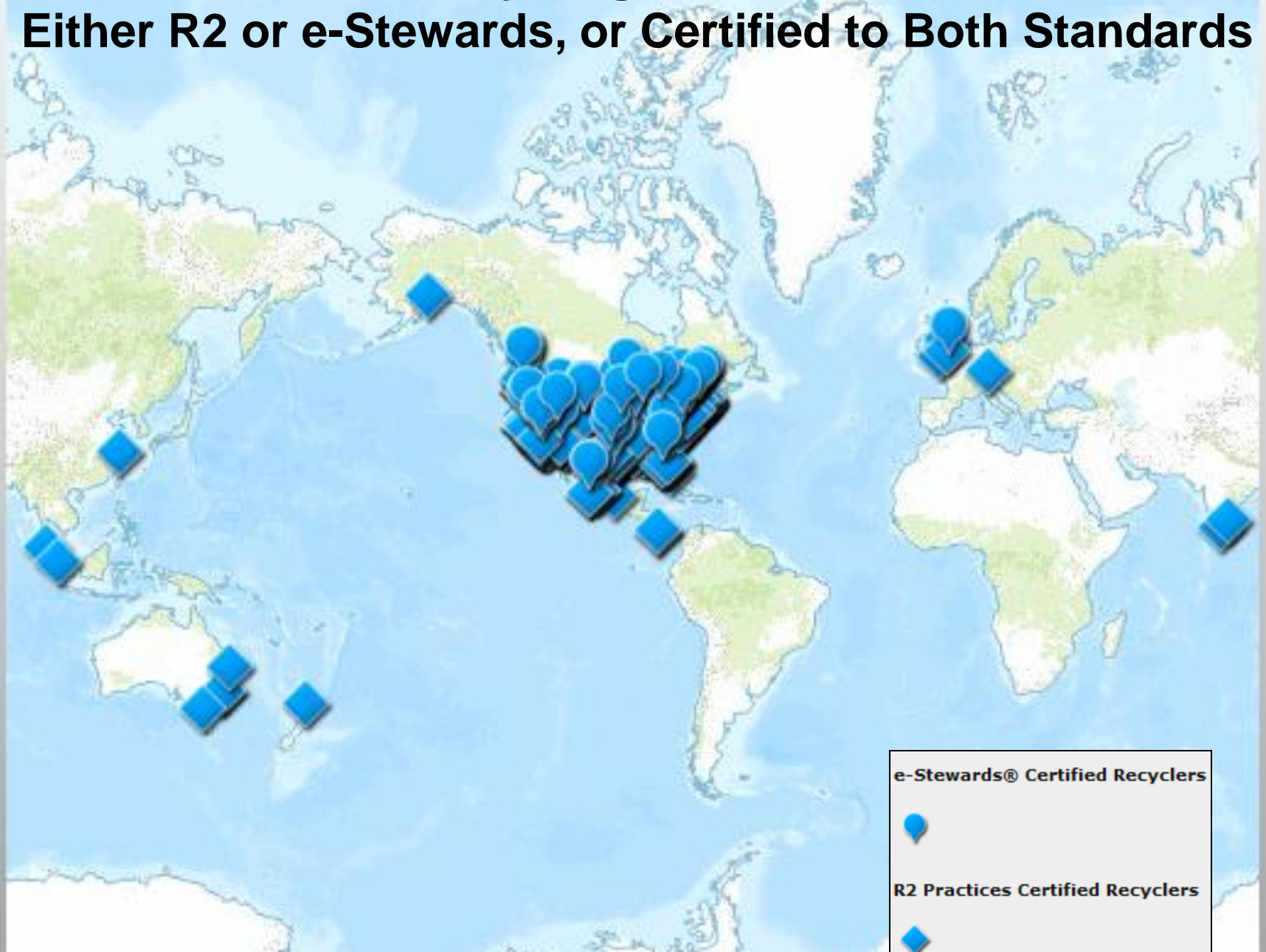
Certified Electronics Recyclers



- ◆ R2 Practices
415 R2-certified facilities as of June 2013
- e-Stewards
109 e-Steward-certified facilities as of June 2013
- ▲ Total Certified Facilities*
524 certified facilities as of June 2013

* Dates listed above are approximate to the frames. The latest data entries 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





U.S. International Trade Commission (ITC) Survey

- **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

Dan Gallo

Electronics Recycling Coordinator

EPA-Region 3

Land & Chemicals Division/

Office of Materials Management (3LC40)

1650 Arch Street

Philadelphia, PA 19103

Phone: 215-814-2091

email: gallo.dan@epa.gov