The Anatomy of a Computer Recycling Process

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Sponsored by:
The California Integrated Waste Management Board (CIWMB)
and
The Department of Toxic Substance Control (DTSC)

Keeping Recycling in Balance with the Environment

Why Recycle?

Main Entry: [1]re·cy·cle

Pronunciation: rE-'sI-k&l Date: 1926

transitive senses

1 : to pass again through a series of changes or treatments: as a : to process in order to regain material for human use b : RECOVER

2 : to adapt to a new use : ALTER

3 : to bring back : REUSE 4 : to make ready for reuse

intransitive senses

2 : to return to an original condition so that operation can begin again -- used of an electronic device

Webster's 9th Collegiate Dictionary

What is Electronics Recycling?

Safe storage and sorting?

Mechanical vs. Manual Separation

Not in Your Back Yard?

We have it pretty good here in the U.S.

Proper downstream recycling!

It’s really all about air and water – life doesn’t exist when they’re dirty.

What's the Problem?

Iron, Plastics, Aluminum, Copper,
Fiberglass, Tin, Lead, Arsenic, Beryllium
Mercury, Cadmium, Lithium, Nickel,
Bismuth, Antimony, Tantalum, Gold
Silver, Palladium, Platinum, …

CRT Glass
Plastic, Copper
Circuit Board
Iron, Aluminum,…

Plastics – keyboard
mouse, speakers, printer, fax

- "…but it still works!"
- "What do you mean this costs money to recycle? Isn't there gold and silver in this computer?"
- Where?
- How do we get it out?

What's the Value?

Metals Value – Ferrous, Non-Ferrous
Precious and Heavy metals

What's in a computer	Percentage
Iron	44%
Aluminum (non-ferrous)	9%
Plastics	31%
Glass (Fiberglass,…)	4%
Copper Wiring	9%
Circuit Boards (PCBA)	3%
Copper content of PCBA	(18-25%)

Plastics Recycling and Glass to Glass Recycling

Commodity	Percentage
CRT Glass	54%
Plastic	18%
LG PC Boards	11%
Scrap Iron	5%
Copper Yokes	5%
Copper Cables	4%
Aluminum	1%

fiberglass
aluminum
plastics
tin
lead
silver
gold
palladium
arsenic
cadmium
beryllium
bismuth
antimony

Flux Value – silica based materials are key ingredients in smelting and refining process (makes things flow nicely!)

BTU Value- organics such as plastics and petroleum materials create 20-25% reduction in natural resource requirements

Are you selling to the highest bidder or the lowest cost recycler first?

Courtesy of BAN

What's the Solution ?

NA
Norddeutsche Affinerie AG

ECS
REFINING

NEW BOLIDEN

noranda

umicore

Recovery Processes and Efficiencies

Mines over Matter!

Recycling facilities and secondary smelters prepare materials on a smaller footprint recovering a higher concentration of metals vs. mining from ore.

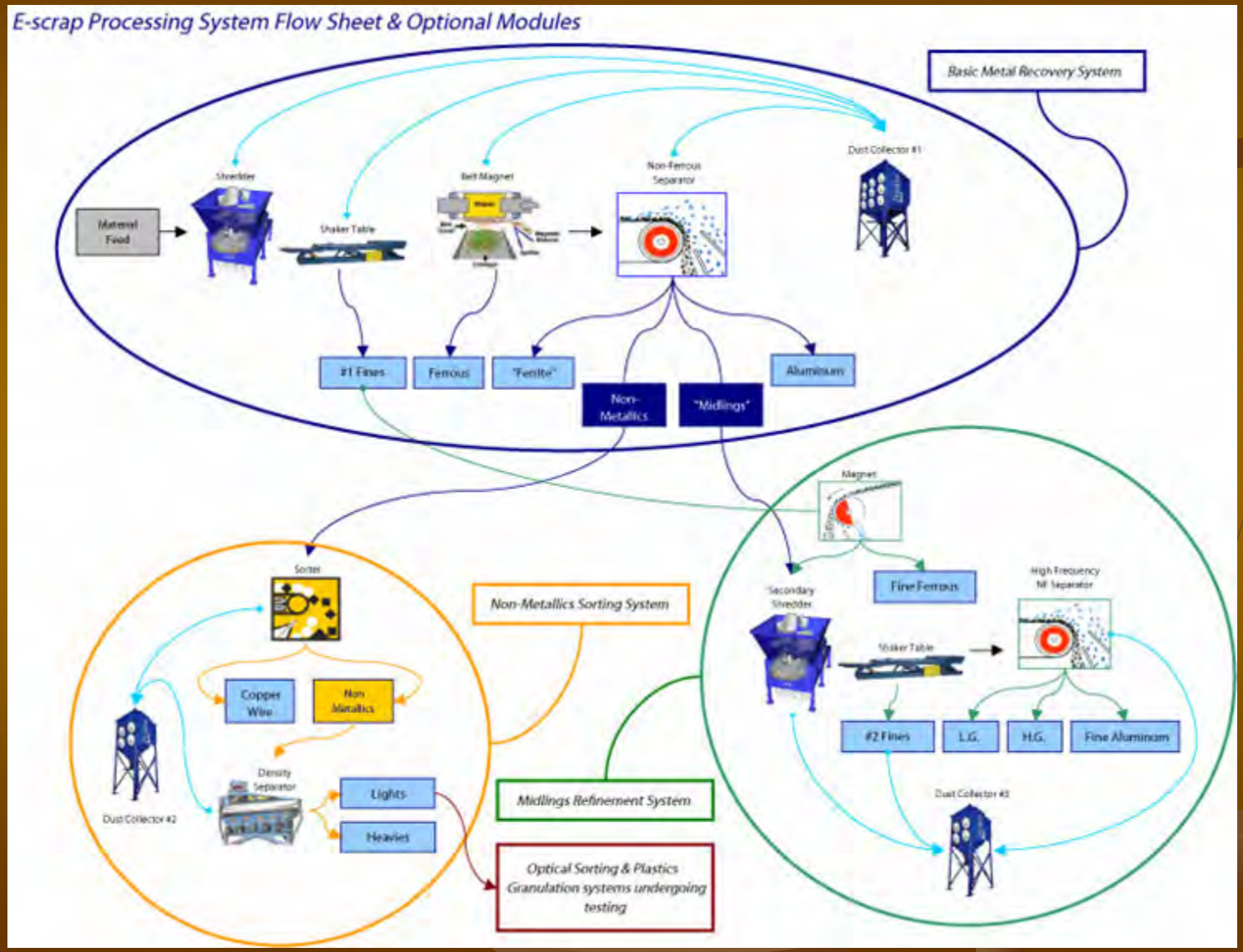
Types of Facilities for Reuse Recovery

- Warehouse may provide for receipt and sorting usable equipment from non-usable
- Provides dismantling for peripheral and component recovery
- Testing, data wipe and refurbishment lab space
- UWED's must be properly labeled. Reporting begins here.

Types of Recovery Practices

- Complete systems, peripherals, & components
- Data Security
- Recycling of printed circuit boards for component and P.M values
- Recovery for specific ferrous, non-ferrous alloys
- This type of recovery can be called “Treatment” by the DTSC and require additional reporting

Methods of Separation



Material Separation

- Shredders provide initial mechanical separation of metals, glass, plastics
- Shred size from a -3” to -1” particle size.
- Magnetic separation of Iron
- Movable conveyors for glass, paper and plastics (organics) separation and transport to eddy current or other separation methods
- Safe box dumper for minimum handling
- All dusts are collected in bag house

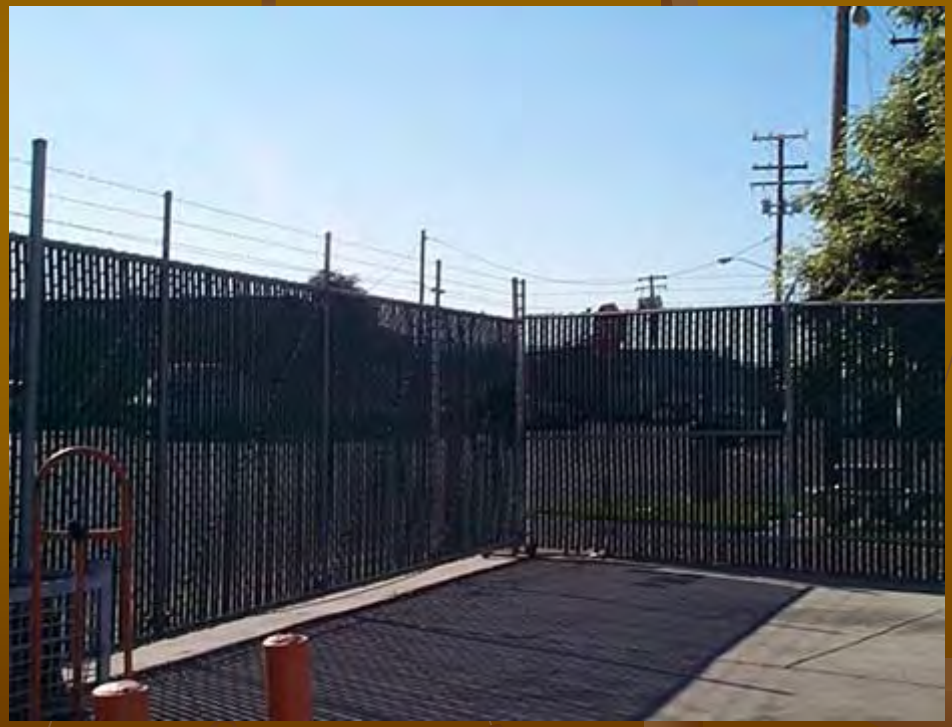
Furnace Line for Metals Assessment

- Different furnaces provide for sound metals assessment from Precious Metals bearing materials
- Secondary smelters in the U.S. utilize furnaces for the purposes of “sampling” and assessment of alloys prior to being shipped to primary smelters.
- Containment of heat/fumes for collection into bag house for further treatment.

These facilities are typically fully permitted “D” processors which are also a TSDF in California

Security

- Secure facilities help prevent theft or accidents
- Meets requirements of many companies environmental and security policies.
- Alarms
- Cameras
- Razor wire
- 8-10’ Fencing
- Card key entry

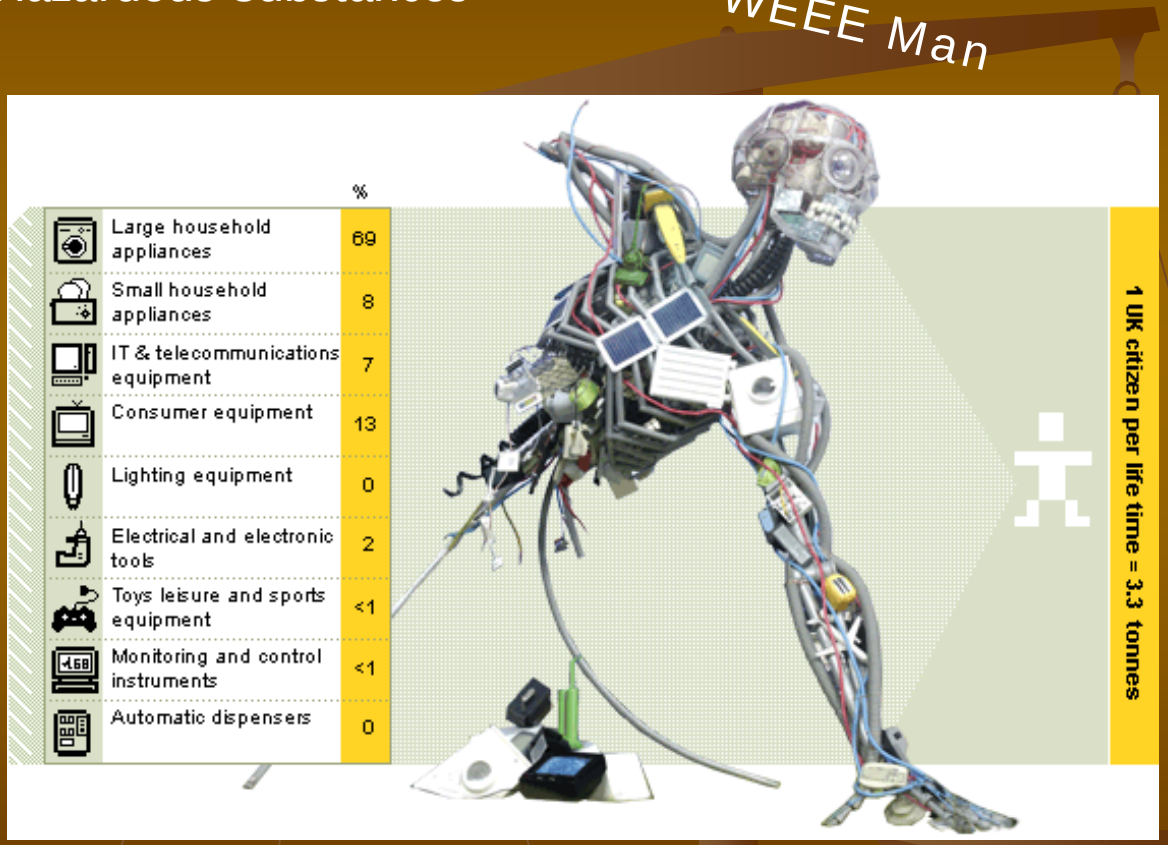


Producer Responsibility is Growing

RoHS

Restriction of the use of Certain Hazardous Substances

WEEE Directive



Manufacturers are choosing more environmentally sound methods of manufacturing, and making products that are more recyclable.

BUT – will it be recycled properly?

The WEEE man is made from electrical and electronic waste, such as washing machines, TVs, microwaves, vacuum cleaners and mobile phones. He represents the amount of waste electrical and electronic equipment (WEEE) the average British person throws away in their lifetime – over 3 tons per person.

So, why recycle – properly?

The balance of our Environment depends on it.

Remember: Anything worth doing right is never easy or cheap!

IS IT MY RESPONSIBILITY?

If you don’t take responsibility today, someone will make it your responsibility tomorrow.

Know your recycler well.