Electronics Recycling: Who pays? What do they get?

Thursday, February 15, 2018
Welcome, Introductions
and a little Admin

Our Moderator:
• Peter Houstle - MRN Executive Director

Our Presenters:
• Kitty McIlroy, Project Analyst for the Northeast Maryland Waste Disposal Authority
• Doug Kobold, Waste Management Program Manager for Sacramento County, CA

Mark Your Calendars:
• eEnd Tour - Tuesday, March 20, 2018
• Annual Conference - Tuesday-Wednesday, June 19-20, 2018

Admin:
• Post questions in chat box on left hand side of screen
• Recording will be posted on MRN website

Not a Member? Join Today to Support Recycling in Maryland!
www.marylandrecylingnetwork.org
Quick Poll

What best describes your organization or role in recycling?
Electronics Recycling Policy

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Overview

- Why do this webinar?
  - Many electronics recycling programs in Maryland and across the country are struggling due to a few reasons, with an increase in costs to manage end-of-life electronics being one of them.
  - Many states have updated their laws within the past few years to address the changing nature of electronics management.
Summary of National Trends

- 25 states have no state-wide electronics law (extended producer responsibility, product stewardship, etc.)
- 25 states have a variety of state-wide electronics laws, Maryland being one of them:
  - One product stewardship model (CA) where consumers are charged a fee at point of purchase which funds the recycling programs.
  - Utah has a law focused on education
  - The remaining 23 laws rely on manufacturers, on some level, to provide funding and/or infrastructure to support electronics recycling programs. This is extended producer responsibility (EPR)
E-scrap collection volumes per capita in states with recycling laws, 2013

Note: This chart presents available data on program collections performance, but does not provide an “apples to apples” comparison as the covered products and covered entities (residents, businesses, schools, etc.) vary from state to state.

Source: Electronics Recycling Coordination Clearinghouse
* 2012 data
** 2011 data
Extended Producer Responsibility

- **Convenience Standards:**
  - Fully funded EPR recycling programs generally use convenience standards: require manufacturers to operate enough collection sites in the state to meet a specific standard of convenience for consumers. The recycling service is paid for by manufacturers. Convenience standards can be found in Connecticut, Oregon, Washington, Vermont.

- **Performance Targets**
  - Other programs are based on performance targets. States provide each manufacturer with a target of how much electronics it must collect. Targets are generally determined by manufacturer quotas based on the weight of electronics sold annually. A lot of these states have updated their laws or have looked at doing so (Illinois, New Jersey, Pennsylvania, New York, Wisconsin, Minnesota, Michigan) by increasing the weight-based performance targets that manufacturers are required to fund.
Maryland’s Law: State Electronics Recycling Program (SERP)

- **Highlights:**
  - In 2005, MD became 3rd state to enact electronics recycling legislation.
  - Requires manufacturers of covered electronic devices (CED) to register with, and pay an annual registration fee to, the Maryland Department of the Environment (MDE) in order to sell their products in MD.
  - CED: computer or video display device with a screen that is greater than 4 inches measured diagonally.
    - Desktop computers (CPUs), laptops, monitors, TVs, media tablets, e-readers, digital picture frames.
    - Covered entities: households, all businesses, government agencies, non-profits/charities.
  - Since 2012, it bases the annual registration fee on the number of CEDs sold in MD the previous year. Other changes include additional requirements for an approved electronic takeback program, the date the registration is due to MDE and enforcement provisions.
Maryland’s Law: State Electronics Recycling Program (SERP)

- **Highlights:**
  - $10,000 annual registration fee for a manufacturer that sold at least 1,000 CEDs in MD in the prior year and $5,000 that sold at least 100 but not more than 1,000 CEDs.
  - The subsequent annual renewal registration fee can be reduced to $500 provided the manufacturer has a MDE-approved takeback program.
  - A MDE-approved takeback program must be free to MD customer; if applicable, include a free shipping container if requested; a way to contact the manufacturer free of charge; and include educational and instructional materials relating to the destruction and sanitization of data from a CED.
  - A retailer is prohibited from selling or offering for sale in MD a new CED manufactured by a manufacturer that has not registered and paid the registration fee.
  - Civil and administrative penalties may be assessed against manufacturers and retailers who fail to comply.
  - Grants to counties and municipalities (as funding is available) to assist with CED recycling activities may be awarded.
  - Counties are required to address methods for separate collection and recycling of CEDs in their recycling plans in order to be eligible for State grants.
  - Through June 30, 2014, 98 manufacturers registered with MDE and were authorized to sell their products in MD
Maryland’s Law: State Electronics Recycling Program (SERP)

- Intent of the SERP was never to fully fund electronics recycling programs.
  - Grants distributed up to once a year. CY 2016: Grants awarded up to $15,000 per County. Total of $250,000 distributed.
  - Under the Authority e-cycling contracts, Authority jurisdictions have paid a total of $799,966.75 for CY 2017.
  - 98 registered manufacturers paying $10,000 max registration fee = $980,000.
- MDE-approved manufacturer run takeback programs:
  - SERP enables manufacturers to qualify for a reduced annual renewal registration fee of $500 by offering MD customers free takeback of their end-of-life CEDs.
  - Details of the takeback program are available by calling the manufacturer’s phone number or going to its web page. MDE’s website provides links to manufacturer websites with MDE-approved takeback programs.
  - MD Recycles list of Manufacturer and Retailer Take-Back Locations in MD: [http://mdrecycles.org/residents/electronics-recycling-drop-off-2/](http://mdrecycles.org/residents/electronics-recycling-drop-off-2/)

Where does this leave MD jurisdictions?

- Bulk of electronics end up at municipal drop-off sites, with funding gap and burden (operational obligation and cost) of recycling left to Jurisdictions.
- Only 6/23 Jurisdictions are able to provide free, permanent residential recycling for all electronics, including both TVs and monitors, the bulk of material by weight in the electronic material stream.
In 2017 the Municipal Waste Management Association (MWMA), an environmental affiliate of The United States Conference of Mayors, drafted a resolution calling for the passage of a federal law mandating the recycling of electronic material. At its 2017 annual conference, the United States Conference of Mayors adopted an amended version of that resolution.

Resolution: “Establishing Statewide, Fully Funded Extended Producer Responsibility (EPR) Programs for Electronics”

Resolution Link: http://legacy.usmayors.org/resolutions/85th_Conference/proposedcommittee.asp?committee=Environment
United States Conference of Mayors
Resolution

WHEREAS, No federal law exists that mandates electronics recycling; and

WHEREAS, About 41% of discarded consumer electronics or “electronic material” are collected for recycling, according to the most recent data available from the United States Environmental Protection Agency (EPA); and

WHEREAS, Electronic material can be defined as, but limited to, televisions, computers, office equipment, portable communication/music devices and other computer or electronic related accessories; and

WHEREAS, The exorbitant costs of collection and handling of discarded electronics is borne by a combination of local governments, manufacturers and consumers; and

WHEREAS, Extended Producer Responsibility (EPR) is a mandatory type of product stewardship that includes, at a minimum, the requirement that the producer’s responsibility for their product extends to post-consumer management of that product and its packaging, shifting financial and management responsibility, with government oversight, upstream to the producer and away from the public sector and incorporates recycling and related costs into the price of new products; and providing incentives to producers to incorporate environmental considerations into the design of their products and packaging; and

WHEREAS, While many states and the District of Columbia have enacted various types of electronics recycling legislation, these laws vary greatly in their effectiveness and implementation, and furthermore, more than 20 states still have no statewide laws; and

WHEREAS, Even among the majority of states with such legislation, many states are dependent on electronics recycling performance standards which are generally based on tonnages that sometimes fall short of actual collection amounts; and

WHEREAS, The market for recovered CRT glass (the most significant component of CRT monitors and televisions by weight) has virtually disappeared with the advent of flat-screen technology, which has caused the cost of CRT management to increase steadily; and

WHEREAS, In total, an estimated 3.5 million tons of CRT devices will require management from 2015 to 2033, according to the National Center for Electronics Recycling; and

WHEREAS, Stockpiles of CRT material have been found sitting in warehouses, abandoned and with no plan for sustainable management ‘not only because of the market problem in which jurisdictions struggle to fund recycling programs with reputable recyclers, but because in many cases recyclers are difficult to audit by individual municipalities; and

WHEREAS, Without adequate funding and stringent electronics legislation electronic material collected for recycling in the United States may result in improper shipment to countries not approved by e-Stewards or R2 certification bodies, where they may be handled in a manner that endangers human health and the environment, since these countries tend to lack the necessary infrastructure to safely manage electronic material; and

WHEREAS, Improper disposal or recycling of electronics can result in serious public health and environmental impacts ‘for example, analog/CRT television sets and monitors contain large amounts of leaded glass; LCD flat screen monitors contain mercury in small fluorescent tubes all of which can be harmful to human health; and

WHEREAS, Where laws do exist, they rarely, if at all, provide incentives for manufacturers to design products that are easy to repair, refurbish, and/or recycle- which would be a significant step in reducing the amount of electronics that end up in the waste stream.
NOW, THEREFORE, BE IT RESOLVED, that The United States Conference of Mayors supports the passage of federal legislation that requires the recycling of electronic material funded by a visible fee incurred upon sale of new electronics established by electronics manufacturers, requires safe handling and recycling of collected electronics, certifications, and further incentivizes innovation in product design that will result in products that are refurbishable, repairable, reusable, and/or more easily recyclable; and

BE IT FURTHER RESOLVED, that The United States Conference of Mayors calls on each state to enact new or strengthen existing EPR legislation using visible fees established by manufacturers to finance harmonized statewide programs to sustainably manage electronic material within its borders (where manufacturer may be understood to include brand owners and/or product first importers and distributors); and

BE IT FURTHER RESOLVED, that each program should be designed and implemented to ensure that the full cost of sustainable electronics materials management is borne by product manufacturers in the fee they set on the products they sell rather than capped at specific tonnages or flat annual fees; and be it further; and

BE IT FURTHER RESOLVED, that to the extent such legislation establishes a “convenience standard” for ‘free and accessible’ collection of discarded electronics from consumers, it should ensure that collection is free to the consumer except in cases where municipalities hold may hold special electronics collections events and charge nominal fees to cover costs, provide collection options that make it as convenient to recycle a product as it is to purchase that product, and further, recognizing the difficulties surrounding CRT recycling in particular, establish accessible and convenient drop-off locations throughout the state, in both urban and rural areas to include existing municipal infrastructure if preferred, such as recycling drop-off centers at landfills and transfer stations, and be it further; and

BE IT FURTHER RESOLVED, that such legislation should establish a process that requires participating recyclers to carry certifications, such as e-Stewards OR the R2 standard in addition to RIOS (Recycling Industry Operating Standard) OR ISO 14001 (for environmental management), ISO 9001 (for quality management) and OHSAS 18001 (for occupational health and safety), and/or others that may exist, that affirm recyclers’ commitment to responsible management of electronics collected, and include monitoring and auditing controls to ensure sustainable materials management; and be it further; and

BE IT FURTHER RESOLVED, that such legislation should include a plan for implementing an outright landfill ban on electronic material separately collected for recycling; and be it further; and

BE IT FURTHER RESOLVED, that such legislation should in addition provide incentives for manufacturers to design products that are re-useable, refurbishable and/or repairable first and foremost; and be it further; and

BE IT FURTHER RESOLVED, that agencies and bodies at all levels of government 'local, state, and federal' are urged to adopt fully funded electronics EPR requirements on manufacturers in bids, contracts, and purchasing agreements; and be it further, and

BE IT FURTHER RESOLVED, that The United States Conference of Mayors calls on manufacturers to support, financially and otherwise, the development of markets for CRT glass and other hazardous electronics components.
Visible Fee can financially support existing municipal-run drop-off programs at transfer stations and landfills, allowing local government to control their existing recycling programs.

Manufacturers support a visible fee to ensure permanent funding for recycling programs. Consumer Technology Association (CTA) has issued support for the California model:

“As CalRecycle is aware, a robust California-based electronics recycling infrastructure is currently in place for covered devices due to implementation of California’s Electronic Waste Recycling Law. That program is funded by an advanced recovery fee (“ARF”) imposed at retail sale. It is imperative that any funds generated through the ARF for covered electronic devices remain dedicated exclusively to the implementation of the California Electronic Waste Recycling Law. CalRecycle should ensure that Electronic Waste Recycling funds-paid for by California consumers-are not raided to help finance increased recycling infrastructure for other products and remain dedicated to the collection and recycling of covered electronic products...there is already a successful electronic waste recycling program in effect in California that is supported through the imposition of an advanced recovery fee during retail sale. These funds have been sufficient to support the development of a robust California recycling infrastructure for covered electronic waste.”
Sources

- Brief Comparison of State Laws on Electronics Recycling, Electronics TakeBack Coalition
- CRT data: https://wasteadvantagemag.com/analysis-u-s-crt-glass-tsunami-recycling-challenge/
- CTA comments on CA program: http://docplayer.net/20054158-Cea-comments-re-california-s-new-goal-75-percent-recycling.html
Sources

- **Maryland data:**
  - Information on Maryland’s eCycling program on MDE’s website at [www.mde.state.md.us/eCycling](http://www.mde.state.md.us/eCycling)
  - Registered Manufacturers in MD: [http://www.mde.state.md.us/programs/LAND/RecyclingandOperationsprogram/Pages/registeredmanu.aspx](http://www.mde.state.md.us/programs/LAND/RecyclingandOperationsprogram/Pages/registeredmanu.aspx)
  - Link to original MD bill: [http://mlis.state.md.us/2005rs/bills/hb/hb0575t.pdf](http://mlis.state.md.us/2005rs/bills/hb/hb0575t.pdf)
Maryland programs:

- Allegany County: [http://alleganygov.org/298/Electronics](http://alleganygov.org/298/Electronics)
- Baltimore City: [https://publicworks.baltimorecity.gov/recycling-services](https://publicworks.baltimorecity.gov/recycling-services)
- Baltimore County: [https://www.baltimorecountymd.gov/Agencies/publicworks/recycling/ecycling.html](https://www.baltimorecountymd.gov/Agencies/publicworks/recycling/ecycling.html)
- Caroline, Kent, Queen Anne’s and Talbot Counties: [http://www.menv.com/pages/recycling/residentcollect.html](http://www.menv.com/pages/recycling/residentcollect.html)
- Carroll County: [http://ccgovernment.carr.org/ccg/recycling/Ecycle.aspx](http://ccgovernment.carr.org/ccg/recycling/Ecycle.aspx)
- Cecil County: [http://www.ccgov.org/home/showdocument?id=3354](http://www.ccgov.org/home/showdocument?id=3354)
- Frederick County: [https://frederickcountymd.gov/5598/Electronics-Recycling](https://frederickcountymd.gov/5598/Electronics-Recycling)
- Garrett County: [https://www.garrettcounty.org/solid-waste-recycling/garrett-county-recycling-program/electronics-recycling](https://www.garrettcounty.org/solid-waste-recycling/garrett-county-recycling-program/electronics-recycling)
- Montgomery County: [https://www2.montgomerycountymd.gov/DepHowDoI/material.aspx?tag=electronics&materia_key=37](https://www2.montgomerycountymd.gov/DepHowDoI/material.aspx?tag=electronics&materia_key=37)
- Prince George’s County: [https://www.princegeorgescountymd.gov/Facilities/Facility/Details/Brown-Station-Road-Sanitary-Landfill-7](https://www.princegeorgescountymd.gov/Facilities/Facility/Details/Brown-Station-Road-Sanitary-Landfill-7)
- St. Mary’s County: [https://www.stmarysmd.com/dpw/recycleprogramlist.asp](https://www.stmarysmd.com/dpw/recycleprogramlist.asp)
- Somerset County: [http://www.somersetmd.us/agencies/solidwaste.html](http://www.somersetmd.us/agencies/solidwaste.html)
- Washington County: [https://www2.washco-md.net/recycle/index.shtm](https://www2.washco-md.net/recycle/index.shtm)
- Wicomico County: [http://www.wicomicocounty.org/303/E-Cycling](http://www.wicomicocounty.org/303/E-Cycling)
- Worcester County: [http://www.co.worcester.md.us/departments/publicworks/recycling](http://www.co.worcester.md.us/departments/publicworks/recycling)
Questions?
Sacramento County’s E-waste Recycling System

Department of Waste Management & Recycling
February 15, 2018

**Presenter**
Doug Kobold
Waste Management Program Manager
Business Development & Special Waste
County Operations:

- **Facility Operations**
  - Kiefer Landfill
  - North Area Recovery Station (NARS)

- **Collection Operations**
  - South Collections
  - North Collections

- **Market Driven Contracts**
Market Driven Contracts

- Biomass Fuel (Federal Diesel Fuel Index)
- Metals (American Metals Market Index)
- Single Stream Recyclables (Recycled Commodities Index)
- eWaste (Recycled Commodities Index)
- Cardboard (Recycled Commodities Index)
- Curbside Containers
  - Old Containers (Recycled Commodities Index)
  - New Containers (New Plastic Resins Index)
California’s eWaste Program

- DTSC bans landfilling of CRTs in 2001
  - Ban on CRT glass in California landfills
  - Disposal costs in Hazardous Waste Landfills at ~$200-$300/ton
- Senate Bill 20 (Sher – 2003)
  - Defined Covered Electronic Waste (CEW)
  - SB 20 (2003) - Established Electronic Waste Recycling Program and visible fee of:
    - $6 for Screens of <15” and
    - $8 for 15”-35” and
    - $10 for >35”
- Senate Bill 50 (Sher – 2004)
  - Universal Waste Electronic Devices (UWED) - State
  - Recyclable Electronic Equipment Materials (REEM) - Sacramento County
California’s eWaste Program (cont’d)

- Program administered by CalRecycle
- Consumer Fee charged by Retailers at checkstand
- Fees remitted to Board of Equalization

  - Annual Gross Revenue from Consumer Fees (from Governor’s FY 16/17 Budget & Projections):
    - FY 2014/15 ~ $59.4M
    - FY 2015/16 est. ~ $58.0M
    - FY 2016/17 proj. ~ $58.5M
  - Covered Electronic Waste (CEW) Payment System (as of January 2017):
    - Approved Collectors: ~421
    - Approved Recyclers: ~31

http://www.calrecycle.ca.gov/Electronics/CEW/

### Electronic Waste Recycling Fee

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>More than four inches but less than 15 inches</td>
<td>$6</td>
<td>$8</td>
<td>$6</td>
<td>$3</td>
<td>$5</td>
<td></td>
</tr>
<tr>
<td>At least 15 inches but less than 35 inches</td>
<td>$8</td>
<td>$16</td>
<td>$8</td>
<td>$4</td>
<td>$6</td>
<td></td>
</tr>
<tr>
<td>35 inches or more</td>
<td>$10</td>
<td>$25</td>
<td>$10</td>
<td>$5</td>
<td>$7</td>
<td></td>
</tr>
</tbody>
</table>
California’s eWaste Program (cont’d)

- CalRecycle pays approved Recyclers; approved Recyclers pay Collectors.
- Effective July 1, 2016, the combined recovery and recycling payment rate to Recyclers is $0.49/lb paid to recyclers.
- Recyclers pay Collectors $0.19/lb or less if cost of recycling exceeds net revenue.
- Year to Year Comparison (based on claim reporting month):
  - 2005 total 225 claims submitted: $31 M (~65 M pounds)
  - 2006 total 298 claims submitted: $61 M (~128 M pounds)
  - 2007 total 351 claims submitted: $89 M (~185 M pounds)
  - 2008 total 412 claims submitted: $96 M (~218 M pounds)
  - 2009 total 315 claims submitted: $73 M (~186 M pounds)
  - 2010 total 254 claims submitted: $75 M (~194 M pounds)
  - 2011 total 303 claims submitted: $77 M (~198 M pounds)
  - 2012 total 318 claims submitted: $83 M (~212 M pounds)
  - 2013 total 279 claims submitted: $79 M (~202 M pounds)
  - 2014 total 275 claims submitted: $77 M (~184 M pounds)
  - 2015 total 247 claims submitted: $77 M (~175 M pounds)
  - 2016 thus far ~192 claims; ~$68.2 M (~145.1 M pounds) – Not a complete year

- Payment Statistics to Date:
  - Approximately 3,469 claims submitted by recyclers for payment since January 2005
  - Approximately $886 million (representing nearly 2.1 billion pounds of recycled covered electronic waste) have been claimed through the CEW payment system since January 2005
The County’s eWaste Program

• Contracting with California Electronic Asset Recovery (CEAR) since 2003.
• Revenue contract began in August 2005.
• Formal RFP with Fixed Price structure contract executed in September 2009 - $0.25/lb for CEW and $0.10/lb for UWED paid to County.
• Recyclable Electronic Equipment Materials (REEM) contract executed in March 2011 - $0.01/lb paid to County.
• Restructured contract with processor in August 2015 to a more Market Based structure.
For most eWaste, CEAR uses a centrifugal force separation technology to accelerate and separate e-waste. The physical collision of the material results in quick liberation and clean commodity outputs. The system processes up to 15,000 tons of electronic waste annually and uses 30% less energy compared to similar capacity knife shredders.
Certifications include:

- Basil Action Network (BAN) e-Stewards (set up to ensure that exports of hazardous electronic waste to developing countries are eliminated and replaced with responsible, green programs).
- ISO 14001 (sets out the criteria for an environmental management system, ensuring that environmental impact is being monitored and improved).
- R2 (a recycling operation that sets themselves apart as an industry leader, but also they become part of the movement to raise the overall industry standards for operations and material handling).
- OHSAS 18001 (applicable to organizations in all types of industries that wish to establish an occupational health and safety management system).
The County’s eWaste Program

eWaste materials accepted at both the Kiefer and NARS facilities free of charge for residents. Businesses charged at cost.
## The County’s eWaste Program (cont’d)

### Annual Tons by Type and Revenue to County

<table>
<thead>
<tr>
<th>Year</th>
<th>CEW (tons)</th>
<th>UWED (tons)</th>
<th>REEM (tons)</th>
<th>Total eWaste (tons)</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>602</td>
<td>285</td>
<td>45</td>
<td>602</td>
<td>$358,700</td>
</tr>
<tr>
<td>2012</td>
<td>530</td>
<td>245</td>
<td>112</td>
<td>530</td>
<td>$316,200</td>
</tr>
<tr>
<td>2013</td>
<td>482</td>
<td>194</td>
<td>134</td>
<td>482</td>
<td>$282,600</td>
</tr>
<tr>
<td>2014</td>
<td>463</td>
<td>208</td>
<td>125</td>
<td>463</td>
<td>$275,700</td>
</tr>
<tr>
<td>2015</td>
<td>572</td>
<td>177</td>
<td>146</td>
<td>572</td>
<td>$257,900</td>
</tr>
<tr>
<td>2016</td>
<td>693</td>
<td>221</td>
<td>129</td>
<td>693</td>
<td>$190,000</td>
</tr>
<tr>
<td>2017</td>
<td>663</td>
<td>144</td>
<td>108</td>
<td>663</td>
<td>$211,300</td>
</tr>
</tbody>
</table>

### 2017 (lbs)
- CEW: 1,326,200
- UWED: 287,200
- REEM: 216,800
- Total: 1,830,300

### Percent
- CEW: 64%
- UWED: 23%
- REEM: 13%
### The County's eWaste Program (cont'd)

The table below shows the material splits from the County's eWaste Program. The program started in September 2015.

<table>
<thead>
<tr>
<th>Year</th>
<th>CRT CEW (tons)</th>
<th>Non-CRT CEW (tons)</th>
<th>UWED - Premium (tons)</th>
<th>UWED - General (tons)</th>
<th>REEM (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>619</td>
<td>74</td>
<td>57</td>
<td>164</td>
<td>129</td>
</tr>
<tr>
<td>2017</td>
<td>574</td>
<td>89</td>
<td>53</td>
<td>91</td>
<td>108</td>
</tr>
<tr>
<td>Totals</td>
<td>1,193</td>
<td>163</td>
<td>109</td>
<td>255</td>
<td>237</td>
</tr>
<tr>
<td>Percent</td>
<td>61%</td>
<td>8%</td>
<td>6%</td>
<td>13%</td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td>69%</td>
<td>19%</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Material Splits - Started September 2015**
### Amendment No. 6 to Agreement No. 81217

#### Exhibit F-2

**January 2018 CEAR Monthly Invoicing Template - CRT CEW**

### FACILITY NAME: KIEFER

<table>
<thead>
<tr>
<th>CRT CEW</th>
<th>Total CRTs Processed</th>
<th>1.00 lbs</th>
</tr>
</thead>
</table>

**Rebate per lb. (July 2008 - Base Year)**: $0.25 lb

<table>
<thead>
<tr>
<th>CRT Components</th>
<th>% of total unit</th>
<th>Index Value / CEAR Billing (Per Ton)</th>
<th>Index Value / CEAR Billing (Per lb)</th>
<th>Value per lb. of Commodity as % of CRT</th>
<th>% of total unit</th>
<th>Index Value / CEAR Billing (Per Ton)</th>
<th>Index Value / CEAR Billing (Per lb)</th>
<th>Value per lb. of Commodity as % of CRT</th>
<th>Rebate Per lb.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare CRT</td>
<td>47%</td>
<td>$(97.44)</td>
<td>$(0.049)</td>
<td>55%</td>
<td>15%</td>
<td>$(80.36)</td>
<td>$(0.040)</td>
<td>2%</td>
<td>$(0.006)</td>
</tr>
<tr>
<td>Tin</td>
<td>18%</td>
<td>$256.25</td>
<td>$0.128</td>
<td>12%</td>
<td>4%</td>
<td>$90.00</td>
<td>$0.040</td>
<td>2%</td>
<td>$(0.006)</td>
</tr>
<tr>
<td>Al/Stainless</td>
<td>4%</td>
<td>$150.00</td>
<td>$0.080</td>
<td>8%</td>
<td>2%</td>
<td>$84.00</td>
<td>$0.040</td>
<td>4%</td>
<td>$(0.008)</td>
</tr>
<tr>
<td>Cu Bearing</td>
<td>5%</td>
<td>$4300.00</td>
<td>$2.150</td>
<td>10%</td>
<td>1%</td>
<td>$4020.00</td>
<td>$2.010</td>
<td>1%</td>
<td>$(0.003)</td>
</tr>
<tr>
<td>Plastics - HIPS</td>
<td>16%</td>
<td>$360.00</td>
<td>$0.180</td>
<td>8%</td>
<td>4%</td>
<td>$250.00</td>
<td>$0.140</td>
<td>8%</td>
<td>$(0.006)</td>
</tr>
<tr>
<td>Wood</td>
<td>10%</td>
<td>$35.00</td>
<td>$0.018</td>
<td>12%</td>
<td>6%</td>
<td>$80.00</td>
<td>$0.040</td>
<td>2%</td>
<td>$(0.008)</td>
</tr>
<tr>
<td>Subtotal</td>
<td>100%</td>
<td>$(154)</td>
<td>$(0.064)</td>
<td>100%</td>
<td></td>
<td>$(0.15)</td>
<td>$(0.006)</td>
<td>10%</td>
<td>$(0.006)</td>
</tr>
</tbody>
</table>

| CEAR Processing Cost | $0.36 | /lb     | State Combined CEW Payment | $0.49 | /lb     |

**Net Calculated Payment/Charge to the County**: $0.15

**State Electronic Waste Recovery Payment**: $0.19

**Net Unit Payment to the County** (greater of the two unit prices above): $0.19

**Total Payment to the County**: $0.19

---

### January 2018

<table>
<thead>
<tr>
<th>Components</th>
<th>Source</th>
<th>Level</th>
<th>Price (Per Ton)</th>
<th>Price (Per lb)</th>
<th>Unit</th>
<th>Adjusted Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bare CRT</td>
<td>AMM</td>
<td>High Side</td>
<td>$90.00</td>
<td>$0.42</td>
<td>/lb</td>
<td>$80.36 (US ton)</td>
</tr>
<tr>
<td>Tin</td>
<td>AMM</td>
<td>High Side</td>
<td>$42.00</td>
<td>$0.21</td>
<td>/lb</td>
<td>$15.00 (US ton)</td>
</tr>
<tr>
<td>Aluminum/Stainless</td>
<td>AMM</td>
<td>High Side</td>
<td>$80.00</td>
<td>$0.40</td>
<td>/lb</td>
<td>$60.00 (US ton)</td>
</tr>
<tr>
<td>Cu</td>
<td>AMM</td>
<td>High Side</td>
<td>$80.00</td>
<td>$0.40</td>
<td>/lb</td>
<td>$60.00 (US ton)</td>
</tr>
<tr>
<td>Plastics-HIPS</td>
<td>AMM</td>
<td>High Side</td>
<td>$80.00</td>
<td>$0.40</td>
<td>/lb</td>
<td>$60.00 (US ton)</td>
</tr>
</tbody>
</table>

**CEAR Processing Cost**: $0.36 /lb

**State Combined CEW Payment**: $0.49 /lb

**State Electronic Waste Recovery Payment**: $0.19 /lb

*minimum payment rate to Collectors pursuant to State law*
### January 2018 CEAR Monthly Invoicing Template - Non-CRT CEW

**Facility Name:** KIEFER

#### Amendment No. 6 to Agreement No. 81217

**Exhibit F-3**

<table>
<thead>
<tr>
<th>Non-CRT CEW Components</th>
<th>% of total unit</th>
<th>Index Values / CEAR Billing (Per Ton)</th>
<th>Index Values / CEAR Billing (Per lb)</th>
<th>Value per lb. of Commodity as Percent of CRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma (Haz Mat)/LCD Sheets (UW)</td>
<td>21%</td>
<td>$216.66</td>
<td>$0.128</td>
<td>0.126</td>
</tr>
<tr>
<td>Tin</td>
<td>36%</td>
<td>$222.22</td>
<td>$0.084</td>
<td>0.086</td>
</tr>
<tr>
<td>AV Stainless</td>
<td>4%</td>
<td>$55.55</td>
<td>$0.062</td>
<td>0.167</td>
</tr>
<tr>
<td>Cu Bearing</td>
<td>8%</td>
<td>$38.89</td>
<td>$0.064</td>
<td>0.172</td>
</tr>
<tr>
<td>Plastics - ABS Mix</td>
<td>25%</td>
<td>$86.66</td>
<td>$0.083</td>
<td>0.085</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>100%</strong></td>
<td><strong>$27.27</strong></td>
<td><strong>$0.27</strong></td>
<td><strong>0.19</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>July 2008 (Base Year)</th>
<th>January 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEAR Processing Cost</td>
<td>$0.03</td>
</tr>
<tr>
<td>Serial Number Documentation</td>
<td>$0.43</td>
</tr>
<tr>
<td>State Combined CEW Payment</td>
<td>$0.10</td>
</tr>
<tr>
<td><strong>Total Payment to the County</strong></td>
<td><strong>$0.19</strong></td>
</tr>
</tbody>
</table>

### Non-CRT CEW Monthly Valuation

**Components**

<table>
<thead>
<tr>
<th>Components</th>
<th>Source</th>
<th>Level</th>
<th>Price</th>
<th>Unit</th>
<th>Adjusted Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma (Haz Mat)/LCD Sheets (UW)</td>
<td>CEAR Billing</td>
<td></td>
<td>$0.00</td>
<td>/gross ton</td>
<td>or $80.36 (gross ton to US ton)</td>
</tr>
<tr>
<td>Tin</td>
<td>AMM</td>
<td>High Side</td>
<td>$0.42</td>
<td>/lb</td>
<td></td>
</tr>
<tr>
<td>Aluminum/Stainless</td>
<td>AMM</td>
<td>High Side</td>
<td>$0.42</td>
<td>/lb</td>
<td></td>
</tr>
<tr>
<td>Cu</td>
<td>AMM</td>
<td>High Side</td>
<td>$2.01</td>
<td>/lb</td>
<td></td>
</tr>
<tr>
<td>Plastics - ABS Mix</td>
<td>CEAR Billing</td>
<td></td>
<td>$0.42</td>
<td>/lb</td>
<td></td>
</tr>
<tr>
<td>CEAR Processing Cost</td>
<td></td>
<td></td>
<td>$0.76</td>
<td>/lb</td>
<td>*minimum payment rate to Collectors pursuant to State law</td>
</tr>
<tr>
<td>Serial Number Documentation</td>
<td></td>
<td></td>
<td>$0.04</td>
<td>/lb</td>
<td></td>
</tr>
<tr>
<td>State Combined CEW Payment</td>
<td></td>
<td></td>
<td>$0.19</td>
<td>/lb</td>
<td></td>
</tr>
</tbody>
</table>

**Sacramento County**

**Non-CRT CEW Monthly Valuation**
### January 2018 CEAR Monthly Invoicing Template - UWED Premium (Complete Computers)

**Facility Name:** KIEFER

**UWED D - Premium (Complete Computers)**

<table>
<thead>
<tr>
<th>Total UWED Premium Processed</th>
<th>1.00 lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rebate per Lb. (July 2008 - Base Year)</td>
<td>$0.10/lb</td>
</tr>
</tbody>
</table>

#### Amendment No. 6 to Agreement No. 81217

#### Exhibit F-5

<table>
<thead>
<tr>
<th>UWED Premium Components</th>
<th>July 2008 (Base Year)</th>
<th>January 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of total unit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Index Values / CEAR Billing (Per Ton)</td>
<td>Index Values / CEAR Billing (Per lb)</td>
</tr>
<tr>
<td>Tin</td>
<td>54%</td>
<td>$256.25</td>
</tr>
<tr>
<td>Aluminum/Stainless</td>
<td>7%</td>
<td>$600.00</td>
</tr>
<tr>
<td>Cu Bearing</td>
<td>15%</td>
<td>$4,300.00</td>
</tr>
<tr>
<td>Plastics - Mixed</td>
<td>24%</td>
<td>$380.00</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>100%</strong></td>
<td><strong>$0.47</strong></td>
</tr>
<tr>
<td>CEAR Processing Cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEAR Sorting and Pre-Processing Cost</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### January 2018

<table>
<thead>
<tr>
<th>Components</th>
<th>Source</th>
<th>Level</th>
<th>Price</th>
<th>Unit</th>
<th>Adjusted Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin</td>
<td>AMM</td>
<td>High Side</td>
<td>$90.00</td>
<td>/gross ton</td>
<td>or $80.36 (gross ton to US ton)</td>
</tr>
<tr>
<td>Aluminum/Stainless</td>
<td>AMM</td>
<td>High Side</td>
<td>$0.42</td>
<td>/lb</td>
<td></td>
</tr>
<tr>
<td>Cu</td>
<td>AMM</td>
<td>High Side</td>
<td>$2.01</td>
<td>/lb</td>
<td></td>
</tr>
<tr>
<td>Plastics - Mixed</td>
<td>CEAR Billing</td>
<td></td>
<td>$0.04</td>
<td>/lb</td>
<td></td>
</tr>
<tr>
<td>CEAR Processing Cost</td>
<td></td>
<td></td>
<td>($0.40)</td>
<td>/lb</td>
<td>53% $ (0.21)</td>
</tr>
</tbody>
</table>

**Sacramento County**

**UWED Premium Monthly Valuation**
### UWED General Monthly Valuation

#### Expense and Revenue Analysis

**Facility Name:** KIEFER

<table>
<thead>
<tr>
<th>UWED - General (Except Computers)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total UWED General Processed</td>
<td>1,000 lbs</td>
<td></td>
</tr>
<tr>
<td>Rebate per Lb. (July 2008 - Base Year)</td>
<td>$0.10/lb</td>
<td></td>
</tr>
</tbody>
</table>

**Commodity Valuation:**

<table>
<thead>
<tr>
<th>July 2008 (Base Year)</th>
<th>January 2018</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UWED General Components</strong></td>
<td><strong>% of total unit</strong></td>
<td><strong>Index Values / CEAR Billing (Per Ton)</strong></td>
</tr>
<tr>
<td>Rejects</td>
<td>8%</td>
<td>$750.00</td>
</tr>
<tr>
<td>Tin</td>
<td>40%</td>
<td>$256.25</td>
</tr>
<tr>
<td>AWS Stainless</td>
<td>21%</td>
<td>$800.00</td>
</tr>
<tr>
<td>Cu Bearing</td>
<td>6%</td>
<td>$4,300.00</td>
</tr>
<tr>
<td>Plastics - Mixed</td>
<td>25%</td>
<td>$380.00</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>100%</td>
<td>$1,050.00</td>
</tr>
<tr>
<td>CEAR Processing Cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEAR Sorting and Pre-Processing Cost</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Net Payment/Charge to the County:** $0.14

**Total Payment/Charge to the County:** $0.14

**January 2018 Adjusted Pricing:**

<table>
<thead>
<tr>
<th>Components</th>
<th>Source</th>
<th>Level</th>
<th>Unit</th>
<th>Adjusted Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejects</td>
<td>CEAR Billing</td>
<td>$274.07</td>
<td>/ton</td>
<td>or $80.36 (gross ton to US ton)</td>
</tr>
<tr>
<td>Tin</td>
<td>AMM</td>
<td>High Side</td>
<td>/gross ton</td>
<td></td>
</tr>
<tr>
<td>Aluminum/Stainless</td>
<td>AMM</td>
<td>High Side</td>
<td>/lbf</td>
<td></td>
</tr>
<tr>
<td>Cu</td>
<td>AMM</td>
<td>High Side</td>
<td>/lbf</td>
<td></td>
</tr>
<tr>
<td>Plastics - Mixed</td>
<td>CEAR Billing</td>
<td>$0.04</td>
<td>/lbf</td>
<td></td>
</tr>
</tbody>
</table>

---

**Sacramento County**

**UWED General Monthly Valuation**
### January 2018 CEAR Monthly Invoicing Template - REEM

**Facility Name:** KIEFER

#### Amendment No. 6 to Agreement No. 81217

**Exhibit F-6**

### REEM Components

<table>
<thead>
<tr>
<th>Components</th>
<th>Source</th>
<th>Level</th>
<th>January 2018 Price</th>
<th>Adjusted Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejected</td>
<td>CEAR Billing</td>
<td>High Side</td>
<td>$ (168.24)</td>
<td></td>
</tr>
<tr>
<td>Tin</td>
<td>AMM</td>
<td>High Side</td>
<td>$ 90.00/gross ton</td>
<td></td>
</tr>
<tr>
<td>Aluminum/Stainless</td>
<td>AMM</td>
<td>High Side</td>
<td>$ 0.42/ft</td>
<td>$ 80.36 (gross ton to U.S. ton)</td>
</tr>
<tr>
<td>Cu</td>
<td>AMM</td>
<td>High Side</td>
<td>$ 2.01/ft</td>
<td></td>
</tr>
<tr>
<td>Plastics - Mixed</td>
<td>CEAR Billing</td>
<td>High Side</td>
<td>$ 0.04/ft</td>
<td></td>
</tr>
</tbody>
</table>

### March 2011 (Base Year) vs January 2018

<table>
<thead>
<tr>
<th>REEM Components</th>
<th>% of total unit</th>
<th>Index Values / CEAR Billing (Per Ton)</th>
<th>Index Values / CEAR Billing (Per lb)</th>
<th>Value per lb. of Commodity as Percent of CRT</th>
<th>% of total unit</th>
<th>Index Values / CEAR Billing (Per Ton)</th>
<th>Index Values / CEAR Billing (Per lb)</th>
<th>Value per lb. of Commodity as Percent of CRT</th>
<th>Rebate Per lb.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejected</td>
<td>12%</td>
<td>$ (500.00)</td>
<td>$ (6.250)</td>
<td>$ (0.00)</td>
<td>10%</td>
<td>$ (166.24)</td>
<td>$ (0.064)</td>
<td>$ (0.000)</td>
<td>$ 0.022</td>
</tr>
<tr>
<td>Tin</td>
<td>55%</td>
<td>$ 214.29</td>
<td>$ 0.107</td>
<td>$ 0.009</td>
<td>47%</td>
<td>$ 80.30</td>
<td>$ 0.040</td>
<td>$ 0.019</td>
<td>$ 0.040</td>
</tr>
<tr>
<td>AV/Stainless</td>
<td>4%</td>
<td>$ 1,280.00</td>
<td>$ 0.630</td>
<td>$ 0.025</td>
<td>4%</td>
<td>$ 840.00</td>
<td>$ 0.420</td>
<td>$ 0.017</td>
<td>$ 0.008</td>
</tr>
<tr>
<td>Cu Bearing</td>
<td>6%</td>
<td>$ 6,500.00</td>
<td>$ 3.250</td>
<td>$ 0.195</td>
<td>9%</td>
<td>$ 4,020.00</td>
<td>$ 2.010</td>
<td>$ 0.172</td>
<td>$ 0.023</td>
</tr>
<tr>
<td>Plastics - Mixed</td>
<td>23%</td>
<td>$ 240.00</td>
<td>$ 1.120</td>
<td>$ 0.028</td>
<td>31%</td>
<td>$ 80.00</td>
<td>$ 0.040</td>
<td>$ 0.012</td>
<td>$ 0.015</td>
</tr>
</tbody>
</table>

**Subtotal**

<table>
<thead>
<tr>
<th>% of total unit</th>
<th>Index Values / CEAR Billing (Per Ton)</th>
<th>Index Values / CEAR Billing (Per lb)</th>
<th>Value per lb. of Commodity as Percent of CRT</th>
<th>Rebate Per lb.</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>$ (0.28)</td>
<td>$ (0.21)</td>
<td>$ (0.07)</td>
<td>$ (0.12)</td>
</tr>
</tbody>
</table>

**Net Payment/Charge to the County**

<table>
<thead>
<tr>
<th>Total Payment/Charge to the County</th>
<th>Price</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$ (0.22)</td>
<td>lb</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Components</th>
<th>Price</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEAR Processing Cost</td>
<td>$ (0.05)</td>
<td>lb</td>
</tr>
<tr>
<td>CEAR Sorting and Pre-Processing Cost</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What is on the horizon for eWaste management in California?

CalRecycle has held four workshops with stakeholders.

- September 14, 2016 - Start the conversation
- March 15, 2017 - Part 2 (discuss expanding e-waste programs by adding a product category, using printers as an example)
- June 20, 2017 - Part 3 (discuss prioritizing material types in a possible future program expansion)
- October 17, 2017 – Part 4 (discuss methods of selecting and adding products to different program structures, which could include a fee and payment model or product stewardship model):
  - Consideration of Adding New Products as Covered Electronic Devices
  - Concepts for Enhancing Existing Fee and Payment Model
  - Concepts for Electronic Waste Product Stewardship Model
  - How the Models Address Fundamental Goals and Essential Components

http://www.calrecycle.ca.gov/Electronics/Future/
Questions?
Quick Poll

Based on what you’ve heard today, which of the following electronics recycling models would you most prefer?
Contact Info

Kitty McIlroy
Project Analyst
Northeast Maryland Waste Disposal Authority
410-333-2730
kmcilroy@nmwda.org
www.nmwda.org

Doug Kobold
Waste Management Program Manager
County of Sacramento
(916) 875-7087
koboldd@SacCounty.net
www.sacgreenteam.com
Thank You!

P.S. Mark Your Calendars!
June 19-20, 2018 – Annual Conference