

# Practical trials on WEEE collection – Experiences and recommendations to increase efficiency and effectivity

Dr.-Ing. Sven Grieger

European Advanced Recycling Network  
EARN Elektroaltgeräte Service GmbH

- Outline of the CRM Recovery project
- Overview on collection methods and activities
- Experiences from the collection trials
- Overview on recovery trials activities
- Barriers for the successful capture of CRMs (critical raw materials)
- Draft policy recommendations

## Critical Raw Material Closed Loop Recovery

Huge quantities of waste electronic and electrical equipment (WEEE) are disposed of each year in the European Union. Although certain valuable materials are recovered in the recycling of waste electronic equipment (e.g. aluminium, copper), many “critical raw materials” (CRM) are not, and are lost from the system forever...



WEEE collection and recovery trials in four European countries with differing levels of infrastructure maturity



To test the link between collection methods and the (economic) recovery of target CRMs and to increase recovery of target CRMs by 5% by 2020



Development of policy infrastructure recommendations using trials and trial evaluation data

# The CRM Project

## Critical Raw Material Closed Loop Recovery



1 SEP-2015 – 31 MARCH 2019



@CRMRecovery  
[www.criticalrawmaterialrecovery.eu](http://www.criticalrawmaterialrecovery.eu)

With the contribution of the LIFE financial instrument of the European Community



- 5 trials hosts in 4 countries
  - UK (1 in England, 1 in Scotland)
  - Italy
  - Germany
  - Czech Republic



- **Retail takeback**

- Charity
- Major electrical retailer
- Other retail (grocery)

- **Education**

- Primary school hubs
- University halls
- School/Community events
- Re-use Olympics competition

- **Public places and entities**

- WEEE Reuse bins at HWRCs
- Public collection events in market squares
- Mobile collection units
- B2B Employee amnesty – 5 businesses and 2 social enterprises

- **Close to home**

- Kerbside sack collection
- Householder boxes

# Retail takeback

WEEE take-back at 4 British Heart Foundation stores in Greater Manchester (AXION, UK):

- Trusted brands offset security concerns
- WEEE is more likely to be collected whole and less damaged (condition is more suitable for re-use and manual disassembly)



26 September 2018

The advertisement features the British Heart Foundation logo at the top left, which consists of a red heart with a white heartbeat line. Below the logo, the text 'DONATE YOUR DEVICE, NOT YOUR DATA.' is displayed in large, bold, white letters on a red background. Underneath this, in smaller white text, it says 'HELP FUND LIFE SAVING RESEARCH'. A laptop and a smartphone are shown, both displaying the same red background with white text. The smartphone screen also shows a white padlock icon and the text 'ALL DATA PERMANENTLY ERASED'. Below the devices, the text 'We'll take your unwanted devices and securely erase them before reselling on eBay.' is written in black. A list of accepted devices follows: Desktop PCs, Laptop computers, Smartphones, and Tablets. At the bottom left, the text 'FIGHT FOR EVERY HEARTBEAT' is written in red, with 'bhf.org.uk' below it. At the bottom right, the 'CRM RECOVERY' logo is shown, which includes the text 'CRITICAL RAW MATERIAL'.

## Retail takeback

- Charity
- Major electrical retailer
- Other retail (grocery)

# Retail takeback

Collection containers in Co-op stores (ECODOM, Italy):

- loyal relationship with a particular grocery shop brand
- Good opportunity to drop WEEE: combination of convenience and advertisement effects



## Retail takeback

- Charity
- Major electrical retailer
- Other retail (grocery)

## Re-use Olympics (RecyclingBörse, Germany):

- Competition days in schools to encourage competition to collect the most items for re-use
- Good educational impact and advertisement effects



## Education

- Primary school hubs
- University halls
- School/Community events
- Re-use Olympics competition



# WEEE Reuse bins at HWRCs

WEEE take-back at Household Waste and Recycling Centres (Re-Tek, UK):

- Secure containers for housing re-usable WEEE are placed next to the existing containers for standard WEEE collections



## Public places and entities

- WEEE Reuse bins at HWRCs
- Public collection events in market squares
- Mobile collection units
- B2B Employee amnesty – 5 businesses and 2 social enterprises

# Public collection events in market squares

## WEEE collections in Milan (ECODOM, Italy):

- Large blue collection container is sited in a series of public squares across Milan on 4 consecutive Sundays in each square.
- Higher share of valuable WEEE (ICT, CE) compared to general collection at municipalities



### Public places and entities

- WEEE Reuse bins at HWRCs
- Public collection events in market squares
- Mobile collection units
- B2B Employee amnesty – 5 businesses and 2 social enterprises

## Mobile collection units (Asekol, Czech Republic):

- Accept textiles and WEEE
- Placed in specific areas of Prague for a 24 hour period that are not suited to permanent collection containers.
- Advertisements via posters, social media and news reports.



### Public places and entities

- WEEE Reuse bins at HWRCs
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# Kerbside sack collection

Combined clothes and WEEE collection (RecyclingBörse, Germany):

- Established collection system for second-hand clothes (already commercially viable)
- Good opportunity to „by-fish“ small WEEE items often disposed in mixed household waste



## Close to home

- Kerbside sack collection
- Householder boxes



## Re-Use boxes for households (RecyclingBörse, Germany):

- Combined method for different reusable items for the RecyclingBörse second-hand warehouse
- Distributed at public entities
- These boxes are returned to the RecyclingBörse depot or collection points.



### Close to home

- Kerbside sack collection
- Householder boxes



- De-soldering of printed circuit boards (PCBs) and concentration of components ([Axion](#))
- Electrochemical deposition with acid leaching and bio-leaching ([Re-Tek](#))
- Extracting cobalt from Li-ion batteries ([Ecodom](#))
- Increasing CRM concentration from WEEE reprocessing ([Asekol](#))
- Comparison of CRM-rich and non-CRM-rich fractions using existing precious metal recovery plant ([Ecodom](#))
- Extraction of Neodymium (NdFeB) from magnets for recycling into sintered magnets ([RecyclingBoerse, TUHH, Fraunhofer IWKS](#))
- Extraction of Tantalum from capacitors ([RecyclingBoerse, TUHH, Fraunhofer IWKS](#))

- Missing state action for accelerating CRM recovery
- Lack of reliable secondary materials market
- Missing disposal infrastructure / incorrect disposal of products containing CRMs
- Missing knowledge on CRM flows and recovery technology
- Missing focus on CRMs
- Missing conceptualization of global circular product value chain

1. **Re-design and harmonization of current collection infrastructure**
2. Increase awareness
3. Create incentives
4. Foster innovation, research and international collaboration
5. Include CRM-specific requirements for standards

- Obligations to monitor the WEEE flows per Member State
- Collaboration with all stakeholders involved
- Convenient take-back
- Minimum administrative burdens
- Bring back incentives (i.e. free data erasure)
- Penalties for incorrect disposal

- Minimize cherry-picking by certain stakeholders (scrappers, municipalities, illegal collectors) by awareness raising, cooperation, but also strict enforcement
- Obligatory hand-over of WEEE to producer compliance schemes or certified recycling facilities.

- Define collection groups considering WEEE processing routes and material-specific criteria including CRM content and concentration
- Controlled and defined routes for CRM containing fractions and products
- Re-think the current product related approach towards a holistic approach:
  - Collaboration between industries with similar CRM use/need, material flows and material suppliers, e.g. EEE, automotive, B2B-B2C, aerospace industry, ...)
  - Long-term and sustainable cooperation among actors

# Thank you for your kind attention!

**Dr.-Ing. Sven Grieger**

Manager WEEE Services

+49 175 583 5901

Sven.Grieger@earn-service.com

**European Advanced Recycling Network**

EARN Elektroaltgeräte Service GmbH

Landstrasse 91

D-38644 Goslar

[www.earn-service.com](http://www.earn-service.com)