

PANEL SESSION

Whose Responsibility Is It Anyway?



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www.criticalrawmaterialrecovery.eu



The LIFE 2014 CRM Recovery project has received funding from the LIFE Programme of the European Union

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Evaluation of Results and Impacts



Guiding Questions

1. What have been the environmental benefits of the collection and re-use activities?
1. What is the future economic viability of these trials?

Methodology

Development of Baseline

- Estimation of the potential to increase the collection amounts in each trial host region: WEEE 'put in the rubbish bin' represents the share of products, which is lost (waste incineration or landfilled) and could be re-directed by the activities
- Data on the number of items disposed per person/year, and disposal routes used, was gathered prior to the commencement of the trials with surveys

Synthesis of trial results

- Calculation of the amount of collected and re-used WEEE (quantity and mass) by product type and group as well as age class, per collection activity
- Data on the number of products collected and re-used as well as the age class was collected based on a template and trial partner were briefed on the use of the template
- Conversion of number from pieces into mass

Methodology

Environmental assessment

- Calculation of the resource requirements from the raw material extraction up to the provision of the final components (inclusion of selected CRMs)
- Used Indicators: Material footprint (Total Material Requirement, $TMR_{abiotic}$) and Carbon Footprint (CO₂-Equivalents, CO₂e).
- Calculation of indicators with WI method (see Saurat and Ritthof 2013)
- Databasis: Ecoinvent 3.3 (Allocation: cut-off)
- Modelling and calculating with the software OpenLCA 1.6

Economic assessment

- Estimating of costs and revenues based on:
 - data by the trial hosts;
 - interviews with responsible managers for the different steps of the trials;
 - additional sources from the literature
- Comparing the economic viability of the different approaches in their specific national/regional contexts

Results: Baseline for Gadgets



Represent the share of products, which otherwise (**without the activity**) would have been re-used or recycled

Old WEEE + the share of products, which could be re-directed **with the activity** (and would otherwise have been put in the rubbish bin)

Target group: people participated at the activity...	Old WEEE collection rate (pcs-%)	Potential WEEE collection rate (pcs-%)	Increase (%)
Asekol: general	53.38	61.86	15.89
Axion: Dixons	65.71	77.14	17.39
Axion: BHF	37.25	84.31	126.34
Axion. John Lewis	45.83	55.55	21.21
Ecodom: general	54.75	61.16	11.71
Recycling Boerse: ReBox	32.53	32.53	0.00
Retek: Halls	54.48	66.58	22.21
Re-Tek: B2B	55.92	67.77	21.19

Results:

Collection and Re-use Amount

	Asekol: Mobile Containers	Ecodom: Market Squares			Retek: HWRC			Retek: Schools		
Age class		0-3	3-6	>6	0-3	3-6	>6	0-3	3-6	>6
Collection, pieces	1311	40	448	657	40	240	129	1	43	22
Collection, kg	1570	40	293	988	227	1251	708	3	124	42
Re-use, pieces	5	13	78	236	10	83	18	0	12	8
Re-use, kg	9	13	92	391	43	406	84	0	48	15

Results:

Collection Profile, Mass-based

Ranges across the activities:

- TVM: 0 – 32 %
- CE: 0 – 30 %
- ICT: 5 – 94 %
- OTH: 0 – 84 %
- Gadgets: 0 – 100%
- Rest: 0 – 100 %

Age class: While in most of the activities devices in the age group younger than 3 years make up a maximum of 10% of the total, it is particularly noticeable that 29% of the 'Axion: John Lewis' collections were in this age group.

Ecodom: Market Squares			
	0-3	3-6	>6
%			
TVM	0	0	7
CE	0	7	1
ICT	29	19	38
OTH	0	0	0
%			
Gadgets	17	18	26
Rest	12	8	20
%			
TOTAL	29	26	46

Results:

Collection Profile, Mass-based (excerpt)

	Re-use Rate, %		Re-use Rate, %
Asekol: Mobile Containers	5	RecyclingBoerse: Re-Box	14
Axion: BHF	41	RecyclingBoerse: Schools	4
Axion: Dixons	60	Re-Tek: B2B	33
Axion: John Lewis	52	Re-Tek: Halls	0
Ecodom: Market Squares	37	Re-Tek: HWRC	24
Ecodom: Schools	19	Re-Tek: Schools	37
RecyclingBoerse: Re-Bag	10	Re-Tek: Social Enterprise	38

Comparability of data is limited, since re-use evaluation approaches differ →
context-specific re-use rates

Results: Re-use Amount

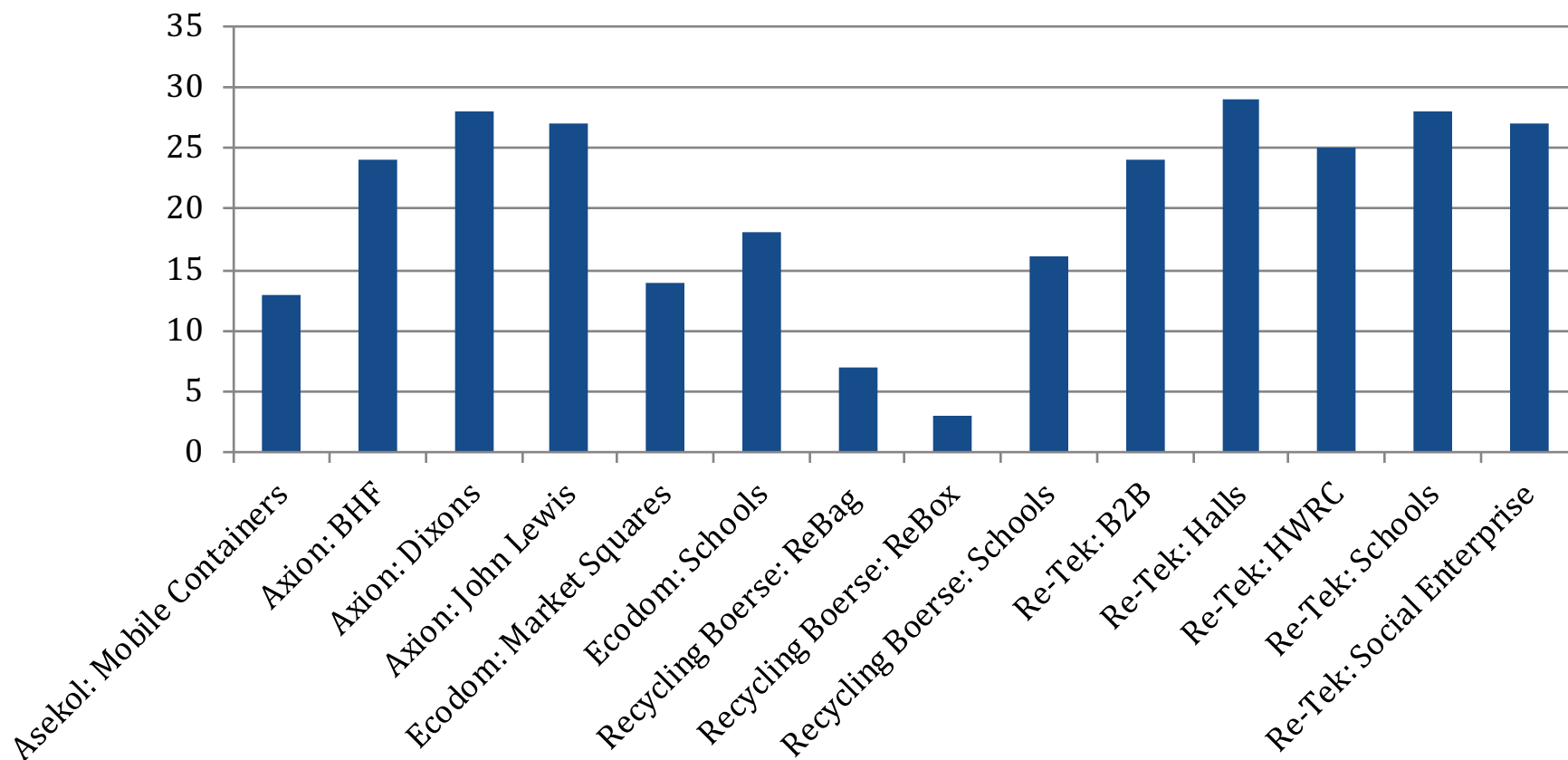
in relation to collection amount across the trials

Product Group	Re-use Rate*, %
Televisions and Monitors	43
Consumer Electronics	15
Information and Communication Technologies (ICT)	17
Small Household Appliances	8

* considering only assessments conducted by treatment operator

Age class	Re-use Rate*, %
0-3	36
3-6	37
>6	27

Results: Specific Material Footprint of Products Collected



Collection Trials in Total Figures

- ## 44 tons of products

10 tons have analysed in depth

- 1,8 kg CRM
- Xx tons of CO₂
- Xx tons of TMR

Conclusions

- 5% increase in collection would require ca 5.000 similar succesful trials
- Trade-off between higher reuse rates and collection amounts
 - Reduced demand vs increased supply with secondary resources
 - Job potentials
 - Incentives for improved product design and new business models?

Cost and Revenues (excerpt)



		Asekol: Mobile Containers	Recycling Boerse: Re-Box	Axion: John Lewis	Re-Tek
Costs, in Euro	Investments/ Permits	7000	5400		
	Media	3000	930	300	
	Labour costs	32000	1600	200	4660
Revenues, in Euro	Re-use	304.78	55	1633	1338
	Recycling	146.99	5		
Collection in kg		1570	95	66	3477
Costs per kg, in Euro		26.75	83.47	7.58	1.34
Revenues per kg, in Euro		0.29	0.63	24.74	0.38

Recycling chain efficiencies

Conclusions

- **High context-dependency of the potential to save resources** or to reduce the climate impact:
 - e.g. just because the specific TMR of the product mix collected is high, does not necessarily mean that the collection model also generates high resource saving potentials in another region (baseline showed the different absolute potential to generate new WEEE for the specific devices (e.g. gadgets) in the different regions).
- **Considerable uncertainties** in the calculation of both the quantities of CRM and the environmental indicators:
 - e.g. assignment of collected products to the representative products with their specific compositions and weights shows large uncertainties, and considerable differences between the collected goods and the representative products can exist

Conclusions

- **Large differences of costs** per collected kg of CRM relevant products between the trials, because of differences of the share of necessary investments, involvement of internal and external staff, expenditure for awareness raising activities, revenues per collected kg
- **Key success** factor is the **sale of second hand products**
- **Economic viability clearly depends on successful coordination** with other collection activities (e.g. the combined collection of WEEE and textiles) or the cooperation with existing infrastructures (e.g. household recycling centres) or the retail sector.
- Establishing of **additional collection infrastructures** just for CRM rich products will be difficult due to **insufficient economic viability**.
- **Learning curve effects** might lead to more positive effects in the long run, at the same time it should be considered that the average value of products might decrease if the 'good products' are returned to begin with, motivated by (for example) communications on positive environmental benefits.



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Pan-European Policy Recommendations



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Objective

Produce a suite of pan-European policy recommendations and enabling actions, made in-line with the findings of the CRM Project's CRM collection and recovery trials

Barriers

- 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 CRM recovery within policy and at the point of collection
- Missing conceptualization of global circular product value chain



Policy Recommendation 1

Redesign and Harmonise WEEE Collection Infrastructure

- Build on the infrastructure already in place and to allocate funding to ensure that an increase of collection and recovery infrastructure can be built, that is tailored for collection to include CRM recovery.
- Counteract the currently missing disposal infrastructure for CRM-rich WEEE and lack of recovery infrastructure tailored specifically to recover CRMs.



Policy Recommendation 2

Increase Awareness

- Increase awareness amongst policymakers, organisations and citizens to convey the importance of CRM recovery to ensure their successful recovery.
- Missing knowledge on the potential supply risks and the associated impacts may be due to a lack of available information or research in this area but an online platform for knowledge exchange would be one practical method counteract this.



Policy Recommendation 3

Create Incentives

- Incentives must be created for each of the various stakeholders involved to ensure CRMs are recovered. Incentivised trade-in for example is a proven method to encourage citizens to donate high-quality CRM-rich electrical items in a good condition for re-use and targeted recovery.
- Prohibitive financial or administrative burdens placed on organisations seeking to invest in CRM-collection infrastructure may have a knock-on effect reducing the number of available collection points or stop collection initiatives completely.



Policy Recommendation 4

Foster innovation, research and international collaboration

- Continuing support for research projects to keep up with technology and policy developments that specifically relate to CRMs would help to progress the recovery of CRMs from WEEE.
- International and cross-sectorial collaboration, funding and a sustained platform to exchange knowledge and research being undertaken in this field. Due to the time between product sale and disposal, product stewardship initiatives and innovation in designing products for disassembly and recycling should be encouraged.



Policy Recommendation 5

CRM-specific requirements added to new and existing standards

- If CRM-specific collection and recovery is not embedded within policies, there is little incentive for organisations to prioritise them.
- Without explicit allocation of responsibilities, stakeholders across the value chain can become confused or misinformed about their obligations.
- Missing legal frameworks for CRM-specific collection and recovery means those responsible are not empowered to issue penalties or sanctions in the case of non-compliance.

Summary



The EU is largely reliant on imports of CRMs from non-EU countries, it is important to ensure CRMs are recovered from WEEE so as to continue their circulation within European markets, reducing the need to extract more resources.

Engaging consumers and waste handlers with targeted actions and campaigns highlighting the importance responsibly disposing of CRM-rich WEEE will be vital in catalysing change.

Ensuring traceability and transparency of the recovery process will increase citizen trust, especially for personal data-bearing products such as mobile phones, where data protection is a concern.

Authorities and policy makers must play an active role in the redesign and implementation of infrastructure that supports the collection and preparation of CRM-rich WEEE for re-use.

Products must be designed with end-of-life in mind to ensure the CRMs locked up inside are recoverable.



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What Next?



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