



COLLECT MORE, COLLECT BETTER

Working Towards a Second Life for Critical Raw Materials in Italy

The Critical Raw Material (CRM) Closed Loop Recovery Project aims to increase the recovery of target CRMs by 5% by 2020 and by 20% by 2030. To achieve this, the project has invested in trials exploring novel ways to boost the collection and recovery of CRMs from household waste electrical and electronic equipment (WEEE).

Held across the UK, Italy, Germany and the Czech Republic, the collection trial mechanisms included retailer take-back schemes; reuse containers at household waste recycling centres, business collections, university drop-off hubs, school collections and other collection events.

Power to the People

One such CRM recovery trial was managed by ECODOM. Founded in 2004 and operational since 2008, ECODOM is the largest Compliance Scheme in Italy with 30 members and approximately 67% of the Italian market share in large household appliances. In 2017 ECODOM collected and treated more than 105,000 tons of WEEE (more than 35.5% of all such items collected in Italy through the whole WEEE system).

Within this trial, ECODOM aimed to test out an innovative collection methodology based on the concept of 'Collect More' and 'Collect Better'. *Collect more* by locating WEEE



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receptacles close to citizens as part of dedicated, large-scale collection activities in Milan, with the aim of increasing the collection of **target products**. These products included displays, IT equipment, consumer electronics and small household appliances, which citizens are used to either hoarding at home or disposing of improperly. The assumption behind the project activities design was that it is possible to increase the amount of **target materials** recovered (including graphite, cobalt, gold, silver and platinum group metals), encouraging people to dispose of WEEE with a high CRM content. *Collect better* because the separation of e-waste in appropriate clusters makes successive treatment steps less difficult, less time-consuming and thus more convenient. What's more, as the implementation of accurate collection procedures reduces the cannibalization and the damaging risk of the collected waste, it increases the chance of giving the collected products a second life.

Innovative Collection Solutions

To maximise the collection opportunities of the trial, ECODOM put in place activities designed to fit in with citizens' everyday life.

Public Square Collections – on consecutive Sundays, across a six-month period, from September to December 2016 and from May to June 2017, a large blue collection container (fig.1) was placed in a series of public squares across Milan to collect the citizens' e-waste.



Figure 1. Container being placed in public square



Figure 2. WEEE bin inside a COOP grocery store



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Grocery Store Collections – over a seven-month period, two WEEE ‘bring-banks’ were placed permanently indoors, in two COOP Grocery Stores in Milan (fig.2). The design of the container was developed by ECODOM, specifically for the collection of small WEEE and to avoid any cherry-picking of valuable components, particularly those rich in CRM.

School collections - two days of collection and awareness-raising about CRM issues were carried out in a Milanese school (A. Manzoni High School of Cormano).

During the collection activities, the e-waste was sorted into categories, according to the product type and reusability potential (judged by citizens disposing the equipment):

- **displays and monitors** (reusable/not reusable). N.B. these were collected specifically to support research by ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development) who were developing a dedicated procedure to establish the preparation for reuse potential of flat panel displays
- products with **high content** of critical raw material (reusable/not reusable) such as smartphones, tablets, laptops, decoders, cameras etc.
- products with **low content** of critical raw material (reusable/not reusable) such as toasters, blenders, vacuum cleaners, coffee machines, printers etc.

Trial Logistics

This trial demonstrated the benefits of a varied collection infrastructure and the use of (and need for) a diverse range of supporters performing the following activities.

| Location | Team | Activity | Timing |
|-----------------------------------|---|---|---------------------------------|
| Public Squares and Schools | Operator of the waste collection company (AMSA) | <ul style="list-style-type: none"> • Sorting and clustering of the collected WEEE, according to the information provided by citizens disposing the products. • Prevention of damage and cannibalization of items. | Throughout the collection event |
| | Host | <ul style="list-style-type: none"> • Raising citizens’ awareness. • Providing guidance around collection. • Undertaking surveys. | Throughout the collection event |

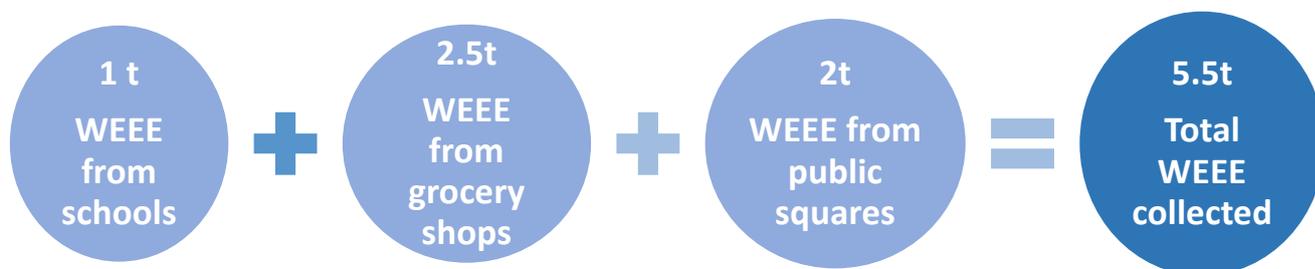


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|----------------------|------------------------------|--|---|
| | Logistic company operator | <ul style="list-style-type: none"> Transporting containers to the collection event site. Transporting collected WEEE from the collection point to the treatment plant. | Before and after the collection event |
| | ECODOM | <ul style="list-style-type: none"> Coordinating the collection activities. Communication activities. | Throughout the entire trial |
| Grocery Shops | Operator of the grocery shop | <ul style="list-style-type: none"> Monitoring the filling level of the containers. | Twice a week |
| | Logistic company operator | <ul style="list-style-type: none"> Removing and replacing containers when full. Transporting collected WEEE from the collection point to the treatment plant. | When the collection service is required |
| | ECODOM | <ul style="list-style-type: none"> Coordinating the collection activities. Communication activities. | Twice a week Throughout the entire trial |

Fig 3. Trial collection logistics

Trial Results in Numbers



Lessons Learned

- **Leverage citizen interest.** Being close to citizens had a significant positive impact on the collection performance, both in quantitative and in qualitative terms. The amount of collected WEEE increased in comparison with usual day-to-day activities. Bringing collection points to citizens meant that the disposal of WEEE, which is typically hoarded at home, rose significantly. Moreover, people disposed WEEE with high CRM content (ICT and mobile phone equipment) that is not usually present in the day-to-day e-waste flows.
- **Communicate, communicate, communicate.** Communication efforts were extremely important to reach the achieved results. Dissemination and educational activities in schools can be an invaluable starting point to increase social awareness about CRM issues. Furthermore, the high visibility of the container used for the collection in the squares (large blue container of 30m²) and of the small bring-banks placed at the entrance of the grocery shops functioned well as an attraction point, and stimulated people's curiosity. Additionally, word-of-mouth played a large part in participants' engagement.
- **Don't assume.** Being close to citizens provided ECODOM with a unique opportunity to investigate their opinions and attitudes towards a theme that is still not well known; i.e. what WEEE is and how to properly dispose of it. Some interesting and unexpected findings emerged; in particular, that a majority of people would agree to their WEEE being reused instead of treated for material recovery purposes. It should be taken into account that participants already had a good awareness level of the issues. However, a low concern regarding management of personal data is unusual given that data security issues commonly prevent consumers from recycling their broken and unused electrical products.



Business Benefit

Recognizing the improvement achieved in terms of the quantity and quality of the collected WEEE, the municipal collection company, AMSA, decided to continue the collection service in the two pilot COOP grocery shops once the recovery trial had ended. The possibility to expand the same collection system to other COOP sites is under evaluation. In fact, it is possible to imagine the design of a dedicated WEEE collection model, such as the one implemented in the trial, throughout the regional and national COOP networks. Collecting a higher amount of WEEE per event and organizing WEEE transportation for a high number of collection points would increase the economic sustainability of the experimented collection model.

Additionally, the economic feasibility of the adopted innovative collection approach would be supported by the improvements achievable in terms of treatment performance. In fact, only bringing improvements to the whole system could we bring an effective recovery of CRMs: on one hand increasing the amount of CRM in the waste flow increasing the amount of CRM-rich related products collected in a separate way; on the other hand achieving a 100% 'recycling' rate of the CRMs contained within products, as flat panel displays, through the identification of a reliable and accurate methodology to test the preparation for reuse potential, considering that the reuse approach allows to keep CRMs in the product's second life, avoiding CRMs losses that currently occur through traditional WEEE recycling routes, and it also produces a business opportunity in the reselling.

