Helsinki, Finland

Figure 1. Helsinki Capital Region. Map data: Google, SIO, NOAA, U.S. Navy, NGA, and GEBCO.

This summary presents the main conclusions of one of the regional case studies conducted during the COLLECTORS project. The studies included a life cycle assessment, a cost-benefit assessment, and a circularity assessment. Social aspects were analysed on a general level based on information provided by the municipality and using focus group discussions in different European regions. References to original research reports are provided at the end of this document.

The case studies were focused on collection of three specific categories of WEEE, namely small household appliances, information technology (IT) equipment and lamps. These categories were selected as high quantities of these materials are still ending up in residual waste.

Description of the region

Finland has 5.43 million inhabitants with an average population density of less than 18 inhabitants/km^2. The distance between the southernmost to the northernmost points of Finland is almost 1,200 km. The majority of Finns live in the southern and western parts of the country. The most populous area is the Helsinki Capital Region (see Figure 1), including the cities of Helsinki, Espoo, Vantaa, Kauniainen and Kirkkonummi in the southern coast, with about 1.2 million

inhabitants in total covering 1,157 km^2, i.e. 1,037 inhabitants/km. 79% of the population lives in multi-family houses, 21% in (semi)detached houses. The average household size is 1.9 persons. The GDP amounts to 50,741 €/capita.

WEEE collection system

In Finland, the collection of WEEE is arranged mainly as a permanent collection. In 2011, approximately 450 collection points existed around the country. Permanent collection points are in most cases collectively financed by the producer associations, provided by the municipality and, in some cases, by private companies or social enterprises. Private users and households can bring their end-of-life products to the collection points free of charge.

However, permanent collection systems are not always efficient, due to e.g. long distances and low quantities of returned devices. Therefore, WEEE collection in Finland is also organized as a mobile collection in the 50 smallest or least populous municipalities. In the Helsinki region, mobile collection of small WEEE is organized twice a year, in addition to the permanent bring points and civic amenity site (CAS). While one round is organized by the regional waste management company HSY, the other one is organized by the regional recycling centre (Kierrätyskeskus). The recycling centre collects only functional devices (169 tons/year).

In addition, the amounts of WEEE received in retail stores have also increased. Since 2007, the overall WEEE capture rate in Finland has exceeded 9 kg/inhabitant/year ranking third best in the European Union. The transportation of WEEE from reception points and registered stores to the regional treatment plants is managed by the producer associations. The logistics services are typically sourced from private regional operators. At the collection points, the WEEE is divided into four different categories with lamps and batteries being collected separately: cooling devices (fridge and freezers), large domestic appliances, small WEEE and IT. Lamps are collected separately by FLIP Association, a producer organization responsible for the producer responsibility of lamps falling within the scope of the WEEE directive.

At the regional sorting plants, WEEE is separated based on brands, not on product categories or source, for different product cooperatives, weighed, and sorted into reusable and not reusable materials. Functional devices are manually separated and directed for preparation for reuse. The rest of the WEEE is sorted out according to WEEE categories and is pre-treated before sending to the various treatment plants for final treatment. The companies offering sorting and dismantling services to producers associations are typically social economy enterprises but a few private companies also exist in the field. Some of the dismantling and pre-treatment plants provide final treatment services for particular WEEE categories; however, most of the sorted and pre-treated WEEE is forwarded to detached recovery and/or final treatment plants located mainly in Finland. While all WEEE of a certain brand is treated at the same pre-treatment stations, all WEEE of the same category are sent to the same final recycling plants.

Actions to improve collection

The main challenges of WEEE collection in the Helsinki region are related to the size of permanent collection points. In the smallest, the physical space for collection cages is limited and the amounts of returned devices is low. Therefore, mobile collection and retail stores as WEEE bring points were introduced in 2013. The use of the retailers' take-back option has been very limited in Finland due to strong resistance from the Finnish retail businesses. However, in accordance with the Directive 2012/19/EU, the retailer take-back option has been extended throughout Finland. Since 2013, electrical and electronic devices can also be returned to the retailers in association with buying a new, corresponding device. Furthermore, small WEEE and lamps (all dimensions no more than 25 cm) can also be returned with no purchase obligation to electronics shops with area larger than 200 m^2 or to grocery shops of 1000 m^2 minimum. Additionally, fluorescent lamps and LEDs, as well as portable batteries and accumulators, can also be returned to the retail shops with no purchasing obligations.

There are no exact guidelines for the implementation of in-store reception, however, shops are required to finance and organise the place, the requisites, and the work contributions needed to receive WEEE. Distributors may forward the received WEEE to the reception points of official collection networks by themselves or, alternatively, they may enrol in a distributors register in order to obtain free unloading services financed by producers associations.

4,126 tonnes of WEEE (3.5 kg / capita) are collected at the CAS and 8,957 tonnes of WEEE (7.6 kg / cap) are collected at 2,000+ retail bring points. Another reason for the increased collection quantities is the improved reporting and reporting accuracy thanks to new treatment operators.

Material flows in the region

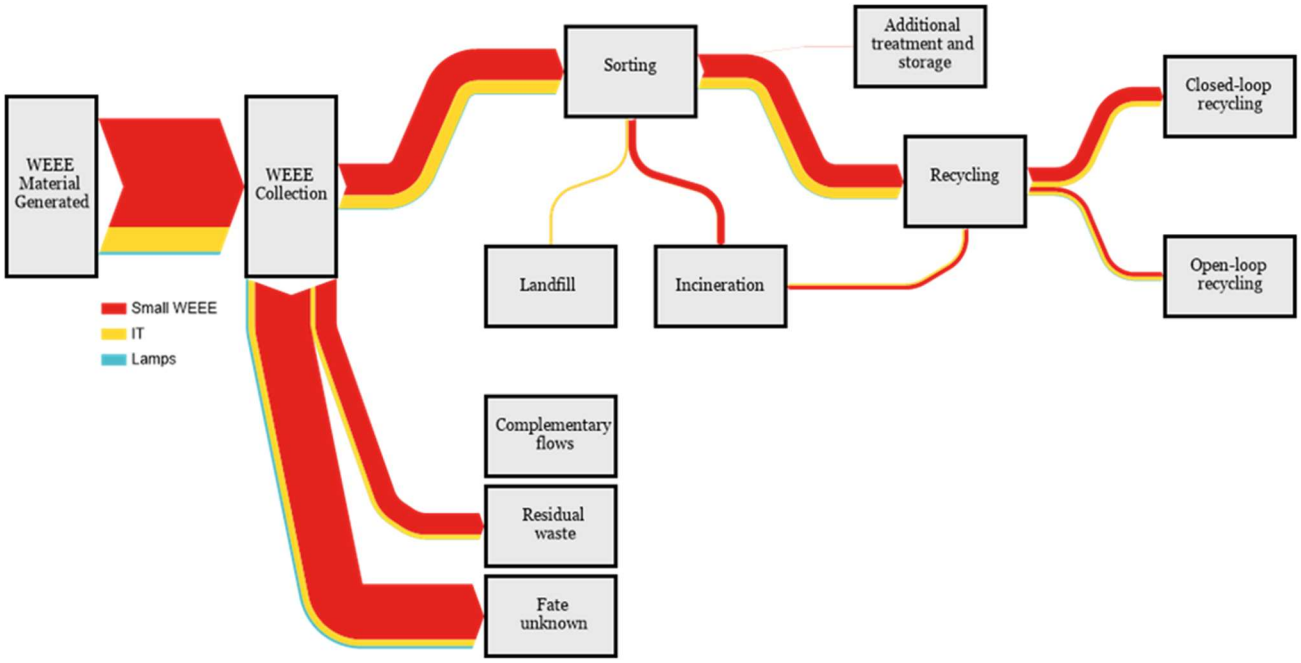

Figure 2 Material flows in the Helsinki region reflecting the situation after improvements (Source COLLECTORS D3.3)

The municipality of Helsinki reported to have collected an estimated 2,136 tonnes and 2,625 tonnes of small WEEE in 2011 and 2015 respectively, meaning that the capture rate for small WEEE increased from 36% to 41% in this timeframe. An estimated 752 tonnes and 1,113 tonnes of IT equipment were collected in these years with a capture rate of 42% and 61% respectively. An estimated 47 tonnes and 63 tonnes of lamps were collected in these years with a capture rate of 18% and 23%. Of the WEEE that is not collected by a designated WCS, 71% of WEEE has an unknown fate. Higher collection quantities achieved over this period are likely due to diversification of bring points and an increased collection network density. Helsinki also increased the efficiency of the transportation of WEEE by 30% over this period.

Findings from environmental assessment

In most cases, the production of the constituent materials of electrical and electronic equipment is the largest contributor to the environmental impacts of the WEEE. However, in some cases the disposal is the most important factor. The environmental impacts associated with collection and sorting of WEEE is only a small portion of the overall environmental impact for each assessed environmental impact category (ranging between 0.01-0.8% for small WEEE, 0.6-2.6% for IT equipment and 2.6-8.9% for lamps). When comparing the assessed WEEE categories, lamps have the lowest environmental impacts, and IT equipment has the highest impacts except for the marine

eutrophication potential (MEP) impact category, in which highest impacts were related to small household appliances.

There were some difficulties in assessing the environmental benefits related to increasing capture rates of WEEE. This relates to the fact that the fate of large shares of the assessed WEEE categories is still unknown. Evaluating impacts from re-use was not within the scope of the project, but it was assumed that directing functional devices to re-use could create significant environmental benefits. However, in order to include these benefits in system level assessment, the amount of re-used devices should be known.

Findings from economic assessment

Assuming the operational costs have not increased due to the implementation of the new WEEE collection system, we can assess the cost effectiveness of the investment. Considering the investment of € 125,000 made by Serty, we can assess the cost effectiveness of the collection practice. Assuming 2011 as reference year, with 2,888 tons of SHA and IT and 47 tons of lamps collected, the 2015 collection values show an increase in collection numbers to 3,944 tons of SHA/IT and 63 tons of lamps. Taking the full investment, we find a price of € 116.67/ton of additional WEEE collected.

For more information, please see

D2.4 Report on solutions for tackling systemic and technical boundary conditions. Available at: https://www.collectors2020.eu/results/analysis-of-boundary-condition/

D2.5 Report on implemented solutions and key elements in selected cases for societal acceptance. Available at: https://www.collectors2020.eu/wp-content/uploads/2020/06/Collectors-Deliverable2.5.pdf

D3.2 Report on the economic and financial performance of waste collection systems. Available at: https://www.collectors2020.eu/wp-content/uploads/2020/04/Deliverable3.2_COLLECTORS-project-1.pdf

D3.3 Report of recommendations for improvement of single systems and optimum operation conditions. Available at: https://www.collectors2020.eu/results/environmental-impact/

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