



WEEE in metal scrap

Issues associated with the treatment of WEEE as metal scrap and
how to address them

Issues paper

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Article 7 of Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE) (henceforth “the Directive”), which entered into force in 2012, states “the minimum collection rate to be achieved annually shall be 65% of the average weight of EEE placed on the market in the three preceding years in the Member State concerned, or alternatively 85% of WEEE generated on the territory of that Member State”.

Studies such as CWIT¹ and ProSUM², have identified and estimated unofficial flows of electrical and electronic equipment (EEE) that have reached its end of life. One of these flows refers to WEEE that is collected and treated as metal scrap.

Research undertaken by UNITAR³ in a report commissioned by WEEE Forum in 2020 estimates that in 2018 in EU (EU28 plus Norway, Iceland and Switzerland) approximately 2.1 kg/inh of WEEE is in metal scrap and not declared as WEEE.

In this paper, the WEEE Forum explains why WEEE that is collected and treated with metal scrap gives rise to all sorts of issues, in particular failure in the attainment of the collection targets set by the Directive and improper treatment of the WEEE.

Main messages

The practice of collecting or purchasing WEEE and handling it together with metal scrap is, unfortunately, a common practice in Europe and globally. This situation gives rise to environmental, health and safety issues because hazardous substances may likely not have been adequately removed or extracted. It also gives rise to compliance issues because WEEE collected and treated as metal scrap escapes the official routes that count towards reaching the collection targets set in WEEE legislation; attaining these targets has become very hard.

The attainment of the collection targets requires a redirection of WEEE tonnages into the officially reported flows. Competent authorities must prohibit the practice of purchasing and processing metal scrap that contains WEEE, unless they are treated and processed by facilities that are officially permitted or certified to do so. They must develop targeted, systematic enforcement actions to identify facilities that treat WEEE as scrap and penalize them. A lot of the issues result from failure of the operator permitting system; policies which mandate the scrap sector in the reporting of WEEE are called for.

Due to low levels of enforcement activity, and PROs not having access to scrap facilities for data collection, reliable information on the WEEE tonnages affected by these practices is scarce. Finding an appropriate, harmonized methodology to collect data about how much WEEE disappears in the metal scrap stream is crucial to understand what is going on in the e-waste market.

Member States can use substantiated estimates, as referred to in Article 16 of the Directive, provided WEEE not properly treated stays out of the equation, otherwise it creates an unlevel playing field for the other Member States in achieving the collection targets in Europe.

¹ Countering WEEE Illegal Project (2015, FP7 programme)

² Prospecting Secondary Raw Materials in the Urban Mine and Mining Wastes (2018, Horizon 2020 programme)

³ The UNITAR report will be published in the week commencing on 23 November 2020.

Existing data regarding WEEE in scrap

Desk research for data of WEEE in scrap concludes that information is currently scarce, and the data available is highly uncertain. Here are some of the reports and studies identified by the WEEE Forum:

<p>(FR) ADEME report⁴ – 2013</p>	<p>Based on surveys addressed to FEDEREC, the study concluded that there are around 10% of WEEE in the municipal scrap metal containers, or 0,7 kg per inhabitant, representing 47,000 tons country-wide. It was estimated that at least 200 000 tonnes of WEEE in the mixed scrap metal is shredded in France, or 3,1 kg per year and per inhabitant. Moreover, an estimated 120 000 tonnes of WEEE is found in the exported mixed scrap metal, which is the equivalent of 1,8 kg per year per inhabitant⁵. This report indicated that the types of WEEE collected as scrap are usually large household appliances, such as boilers, and small appliances.</p>																
<p>(UK) Evidence of large domestic appliances recovered in the UK light iron stream, WRAP – 2014⁶</p>	<p>The research sampled 485t from the entire 4,5 Mt light iron population at nine Approved Authorised Treatment Facilities (AATFs)⁷ selected from across England. This sample size resulted in a margin of error of 2,83%, which is within statistically acceptable limits. The sampling, when combined with the results from an existing WRAP study implemented to test the methodology, suggested that the large domestic appliances content of UK light iron is 10,87% (+/- 2,4%). It is therefore 95% likely that there is between 381 000t and 597 000t of large domestic appliances in UK light iron. This is comparable to previous studies carried out by two of the participating AATFs that had sample sizes in excess of 1 500t.</p>																
<p>(UK) UK EEE Flows study⁸, WRAP – 2015</p>	<p>This report published by WRAP in 2016, estimated that activities occurring outside PROs in the UK are estimated to be 475 000t (31%) of the WEEE generated. This included large household appliances being treated within the light iron stream - 57% (273 000t).</p> <table border="1" data-bbox="539 1032 1305 1458"> <thead> <tr> <th>Flow</th> <th>Estimate</th> <th>Total Shredder in feed</th> <th>Non evidenced LDA</th> </tr> </thead> <tbody> <tr> <td>Domestic cooling and freezing mixed with scrap metal</td> <td>264 kt (of which 31kt is evidenced LDA (11.6%))</td> <td rowspan="5">4 085 kt</td> <td rowspan="5">273 kt</td> </tr> <tr> <td>Small equipment and displays from authorised treatment facilities</td> <td>75 kt</td> </tr> <tr> <td>End of life vehicles</td> <td>1 085 kt</td> </tr> <tr> <td>Domestic cooling and freezing evidenced large domestic appliances (LDA)</td> <td>179 kt</td> </tr> <tr> <td>Other sources</td> <td>2 482 kt (of which 11% is LDA= 273kt)</td> </tr> </tbody> </table>	Flow	Estimate	Total Shredder in feed	Non evidenced LDA	Domestic cooling and freezing mixed with scrap metal	264 kt (of which 31kt is evidenced LDA (11.6%))	4 085 kt	273 kt	Small equipment and displays from authorised treatment facilities	75 kt	End of life vehicles	1 085 kt	Domestic cooling and freezing evidenced large domestic appliances (LDA)	179 kt	Other sources	2 482 kt (of which 11% is LDA= 273kt)
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<p>(EU) CWIT project deliverable 4.2 – Market assessment⁹ – 2015</p>	<p>This report, based on literature research, estimated the concentration of WEEE in ferrous metal scrap:</p> <ul style="list-style-type: none"> In the Netherlands, the concentration of WEEE (parts from professional and large household appliances, small household appliances, central heating and IT appliances), was estimated to be around 110 000t¹⁰; In Belgium, at least 15 000t¹¹ (not all volumes are likely documented in the study); 																

⁴ Study on the quantification of WEEE in France – Household and similar WEEE arising and destinations, Dec. 2013 - Study carried out on behalf of ADEME and OCAD3E by BIO Intelligence Service S.A.S.

⁵ Data based on survey of 31 shredders

⁶ WRAP, 2014, Banbury, WEEE in the light iron stream, Prepared by LRS Consultancy

⁷ The most common type of site processing such material, the input stream of which is assumed to be representative of all site types

⁸ WRAP, 2016, Banbury, UK EEE Flows 2016, Prepared by Carys White, Valpak

⁹ Countering WEEE Illegal trade project. WEEE Market Assessment, Deliverable 4.2

¹⁰ Huisman, J., et al.,(2012). The Dutch WEEE Flows. Bonn, Germany, United Nations University, ISP-SCYCLE.

¹¹ Wielenga, K., Huisman, J., (2013) (W)EEE Mass balance and market structure in Belgium, Recupel - 2013

	<ul style="list-style-type: none"> In France it is estimated in 200 000t¹², <p>The table below shows weight percentage of product categories of the WEEE in ferrous metal scrap (source CWIT)</p> <table border="1"> <thead> <tr> <th>WEEE category (WEEE Directive)</th> <th>Average of NL, UK, FR, BE</th> </tr> </thead> <tbody> <tr> <td>Temperature exchange equipment</td> <td>8%</td> </tr> <tr> <td>Screens</td> <td>3%</td> </tr> <tr> <td>Lamps</td> <td>0%</td> </tr> <tr> <td>Large equipment</td> <td>62%</td> </tr> <tr> <td>Small equipment</td> <td>20%</td> </tr> <tr> <td>Small IT</td> <td>6%</td> </tr> </tbody> </table>	WEEE category (WEEE Directive)	Average of NL, UK, FR, BE	Temperature exchange equipment	8%	Screens	3%	Lamps	0%	Large equipment	62%	Small equipment	20%	Small IT	6%
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<i>(EU) Data from the ProSUM project Urban Mine Platform</i>	The Urban Mine Platform ¹³ developed under the ProSUM project, provided estimates for total WEEE in the scrap stream, and concluded that in European countries the range goes from 0 kg/inh in Switzerland, to 4,3 kg/inh in the United Kingdom. The ProSUM project could not assess the WEEE mixed in metal scrap for all countries in the EU, and few information was available for the other countries, so the quality of the estimates provided is low.														
<i>(UK) Unreported WEEE Flows in the UK, Joint Trade Association – 2018¹⁴</i>	<p>This report sought to specify waste streams with deficits and identified what happens to them. Scrap was indicated as a likely destination for the following streams:</p> <ul style="list-style-type: none"> Commercial display refrigeration and A/C units EEE installed in buildings Electrical & construction tools (Category 6) Vending machines (Category 10) due to high metal value operators may choose to send machines to scrap instead. – estimated in 7 400 tons Gym equipment (Category 7) - disposed of via the scrap metal due to the high value of containing materials – 10 100 tons 														
<i>(BE) (W)EEE 2016 Mass balance and market structure in Belgium – 2018</i>	In 2018 a report performed by Deloitte ¹⁵ and mandated by Recupel, the extended producer responsibility organization in Belgium, estimated between 24,13kt – 43,08 kt in WEEE in scrap (data referring to 2016).														
<i>(PT) Sampling campaign in Portugal by Electrão</i>	Between 2016 and 2018, Electrão, the Portuguese producer responsibility organisation in the WEEE Forum, ran 16 sampling campaigns at scrap yards in Portugal (two technical verifications per plant per year). A specific sampling protocol was developed to run the sampling exercise. Results obtained concluded that 22,8% of the scrap sampled was WEEE, 13,5% corresponded to large household appliances and 9,3% represented small household appliances.														
<i>(UK) Electrical Waste - challenges and opportunities - 2020¹⁶</i>	The Anthesis group investigated 21 different flows that influence the UK recycling rate for WEEE. The year 2017 was used as the baseline year for this assessment. Reporting for the WEEE Directive suggests that 1 615 Kt of EEE were sold in the UK in 2017, and 653 Kt of WEEE were collected for recycling. The study estimated the approximate annual amount of WEEE considered to be captured in light iron is 215 Kt for 2017. This would differ year to year based on other scrap metal flows and reported volumes but assumes a consistent 11% composition but does not include an additional 1,2% of small domestic appliances from recent research.														

Finally, research conducted by UNITAR in a report commissioned by WEEE Forum in 2020 estimates that in 2018 in EU (EU28 plus Norway, Iceland and Switzerland) approximately 2,1 kg/inh of WEEE is in metal scrap and not declared as WEEE, and despite being recycled, this WEEE may be treated at sites that do not comply with the WEEE Directive requirements and which may not meet the Waste Framework Directive requirements.

¹² Magalini, F. et al., (2015), Study on collection rates of waste electrical and electronic equipment (WEEE), Possible measures to be initiated by the Commission as required by Article 7(4), 7(5), 7(6) and 7(7) of Directive 2012/19/EU on Waste Electrical and Electronic Equipment

¹³ <http://www.urbanmineplatform.eu/homepage>

¹⁴ Joint Trades Association - Final: Unreported WEEE Flows in the UK - 2018

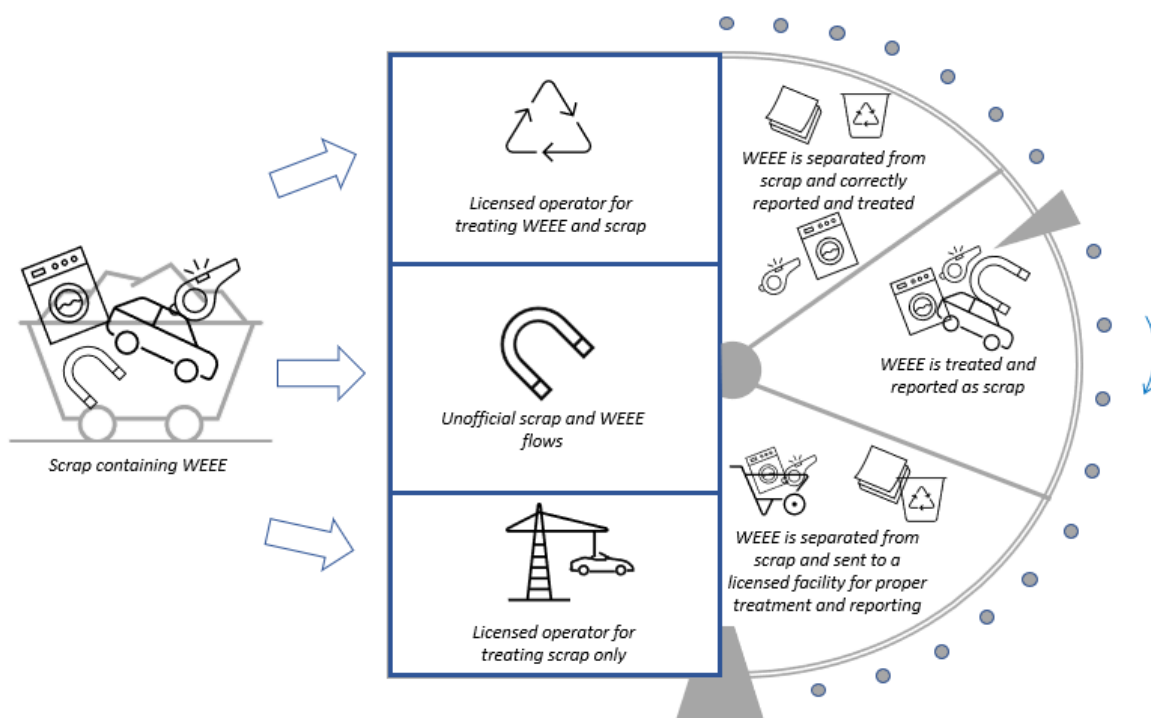
¹⁵ Deloitte Consulting & Advisory CVBA/SCRL, '(W)EEE 2016 Mass balance and market structure in Belgium - Final report', Recupel - 2018.

¹⁶ Anthesis, Mark Sayers and Richard Peagam. Electrical Waste - challenges and opportunities - 2020

Issues around the collection of WEEE in scrap data and accessing WEEE

PROs are typically interested in data from scrap treatment facilities because a) they provide insights on the different existing flows for WEEE and b) they support strategies aimed at increasing collection of WEEE. However, PROs lack the competences and rights for accessing facilities' data. A procedure designed to obtain data regularly from scrap facilities, and reporting this information to a national database, would improve the situation. This situation should be supported by setting targeted and systematic inspections to the identified scrap operators. Data provided should be monitored and regularly checked for consistency by competent authorities with sampling campaigns.

In some instances, competent authorities do not allow scrap facilities to treat WEEE, yet WEEE mixed with scrap may still arrive to them and be processed. Data collection in such facilities becomes a sensitive issue that could only be addressed by enforcers and legislative measures requiring facilities to separate the WEEE received and ship it to a licensed facility.



In some Member States, PROs have made commercial agreements with scrap operators. The agreements are usually based on compensation paid to scrap facilities in exchange of reporting the WEEE received at their facilities. However, not all scrap operators are willing to make this type of agreement, given that this information is sometimes commercially sensitive, and requires the implementation of sorting and reporting procedures that alter the company's existing management processes. Moreover, PROs financing "compensation costs" to other actors are outside of the spirit and requirements of the WEEE Directive.

To require scrap dealers permits to include reporting of separated WEEE from scrap received at their facilities may improve the two situations described above. A broader policy approach in this sense is the implementation of mandatory handover of WEEE collected (either mixed with scrap or not). This means that WEEE collected must be exclusively managed by authorised collectors and treatment operators that have contracts with PROs. WEEE originating at non permitted facilities is to be handed over to PROs or permitted facilities contracted by them.

In general, regular sampling or sorting are required to collect accurate figures on the percentage of WEEE arriving at scrap facilities. The share of WEEE in metal scrap is usually low, compared to the huge amounts of scrap collected, thus sampling of this flow needs to be done carefully in order to reduce statistical sampling errors. These are complex and resource consuming practices that require a methodology allowing for harmonized data collection. A proactive approach to consider for solving this issue would be the banning on mixing WEEE and scrap. This approach may be implemented gradually, with an initial phase in which WEEE mixed with scrap is either returned back to the originator for separation, or a notice is sent informing that WEEE mixed with scrap will not be accepted anymore from a certain date. This approach requires high enforcement investment in order to avoid the creation of new parallel unreported flows of WEEE mixed with scrap.

Finally, WEEE that is not properly treated should not count towards achieving collection targets. This includes WEEE that may be included in the substantiated estimates used by some Member States when reporting collected amounts because this practice relies on and tolerates WEEE treated as scrap. In addition to this, in Member States where PROs are the sole actors appointed for meeting collection targets, in some cases leads to costly bidding for WEEE treated as scrap.

Ensuring proper treatment

WEEE contains substances, mixtures and components that need to be removed, in accordance with Annex VII of the Directive. For instance, cables, capacitors, or components containing mercury may be present in the WEEE collected as scrap and require appropriate treatment and removal. WEEE collected and treated as scrap may not follow appropriate handling and depollution processes.

The CEN-CENELEC EN 50625 series of standards were developed upon the Commission's mandate for supporting WEEE treatment operators in meeting the Directive's requirements and apply state of the art treatment practices. The WEEE Forum urges Member States authorities to make these standards legally binding and enforce them. The EN 50625 standards lay down defined, uniform and clear WEEE treatment requirements for operators, and level the playing field in the market.

Challenges in reaching collection targets

The ProSUM project estimated that, on average, WEEE collected and treated with scrap may represent up to 11% of the WEEE Generated in some Member States. When PROs and Member States are struggling to achieve collection targets, this flow becomes extremely relevant for raising national collection rates.

PROs in the WEEE Forum will gladly support practices implemented for regular and harmonized data collection that will make part or the totality of this WEEE accountable for reaching collection targets.

Conclusion

The attainment of the minimum WEEE collection rates has proven to be extremely challenging for most Member States due to the existence of unreported (complementary) WEEE flows. The WEEE Forum believe that competent authorities need to be aware of the factors leading to this situation and:

- *Prohibit the practice of purchasing and processing metal scrap that contains WEEE, unless they are treated and processed by facilities that are officially permitted or certified to do so.*
- *Develop enforcement actions and inspection plans targeted at facilities that treat WEEE as scrap and penalize them.*
- *Set out reliable data collection procedures for estimating WEEE in scrap, and*
- *Ensure that WEEE following these routes is appropriately treated and monitored by mandating the scrap sector to report their processes and volumes.*

About the WEEE Forum a.i.s.b.l.

The WEEE Forum a.i.s.b.l., set up in 2002, is a Brussels-based international association representing forty producer responsibility organisations across the globe. Together with our members, we are at the forefront of turning the extended producer responsibility principle into an effective electronic waste management policy approach through our combined knowledge of the technical, business and operational aspects of collection, logistics, de-pollution, processing, preparing for reuse and reporting of e-waste. Our mission is to be the world's foremost e-waste competence centre excelling in the implementation of the circularity principle.

The producer responsibility organisations of the WEEE Forum are based in Australia, Austria, Belgium, Bosnia, Canada, Czechia, Cyprus, Denmark, Estonia, Italy, France, Greece, Iceland, India, Ireland, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Nigeria, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

The WEEE Forum is the biggest organisation of its kind in the world. In 2019, its member organisations reported collection and proper de-pollution and recycling of 2,500,000 tonnes of WEEE. Members in 2020: ANAKYKΛΩΣΗ ΣΥΣΚΕΥΩΝ, ASEKOL, Australia New Zealand Recycling Platform, Cobat RAEE, Ecodom, Ecologic, ecosystem, Ecotic, ECOTIC, Ecotrel, EES-Ringlus, EGIO, Electrão, Electrocyclosis Cyprus, Electronic Products Recycling Association, ElektroEko, Elektrowin, El-Kretsen, elretur, Environ, EPRON, Φωτοκύκλωσης, Karo Sambhav, Norsirk, Recyclia, Recipo, Recupel, Remedia, RENAS, Repic, RoRec, SENS eRecycling, SWICO, UFH, Úrvinnslusjóður, Wecycle, WEEE Ireland, WEEE Malta, WEEE Recycle and Zeos. Find out more on www.weee-forum.org.