Business Electrical Waste: Challenges and Opportunities

Summary report

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MATERIAL FOCUS

Report for Dan Nima and Scott Butler, Material Focus

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Version Control Table

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0.2	10/02/22	Eunomia	Final draft submitted
0.3	11/03/22	Eunomia	Final
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Executive Summary

This summary report presents the findings of a research project to investigate the flows of business to business (B2B) Electronic and Electrical Equipment (EEE) and Waste Electronic and Electrical Equipment (WEEE) in the UK. This includes officially recorded flows and those that are not recorded under the Extended Producer Responsibility (EPR) system.

E.1.0 Research Objectives and Methodology

E.1.1 Selected Research Topics

The project focused on areas where there is most need to gather better evidence. The following research topic were identified:

- Assess B2B EEE Put on Market (POM) including consideration of:
  - B2B EEE that is considered 'dual use' (for example laptops, phones, kitchen equipment) and counted in the official figures as household equipment;
  - The use of the opt-out which allows producers to make contractual arrangements that exempt them from financing WEEE collection and treatment or physically taking back used EEE or WEEE (Article 12 of the WEEE Regulations); and
  - Companies or individuals not registered with a WEEE Producer Compliance Scheme (PCS), who place EEE on the market in the UK (i.e. "free-riders").
- Assess reported and unreported B2B WEEE including consideration of:
  - WEEE recorded by Approved Authorised Treatment Facilities (AATFs) and other such organisations;
  - Unreported WEEE, including in small mixed loads, and the residual stream
  - WEEE inappropriately dumped, fly-tipped, or exported by unlicensed waste carriers.
- Assess the carbon emissions resulting from the handling of B2B WEEE.

A full mass flow analysis of all B2B EEE/WEEE at a national level was not the intention of this research given the anticipated data gaps and uncertainties. There is no comprehensive statutory monitoring or reporting system in place to track the flow of B2B EEE through sale, use, reuse, recycling and disposal.

E.1.2 Methodology

A number of methods to gather evidence to inform the assessment of the research topics identified were applied:

- **A Literature review** to assess the current understanding of B2B waste flows, paying particular attention to the reliability of the existing data and the gaps that remained.
- **Quantitative analysis** of data recorded by the regulator, purchased POM data, and collection and analysis of data from producers through a survey. Site audits were conducted to gather evidence from WEEE treatment sites.
- **Qualitative research** to gather testimony on the key research themes from stakeholders via interviews.
- **A Carbon assessment** to model the carbon impacts across different WEEE categories, to estimate current emissions, and potential savings.

E.2.0 Key Findings

The key findings from the research are presented below.

E.2.1 Literature Review

It is evident that in most of the literature there are significant uncertainties in figures and assumptions made. For example:

- The UK regulatory databases (i.e. quarterly figures from the Environment Agency) do not provide a reliable source for tonnages of non-household equipment, and yet these quantities are used by many of the other sources as starting points for further WEEE estimations.
- Data are limited by small sample size, lack of producer feedback and assumptions needed to be made to bridge gaps in feedback.
- The failure to distinguish between B2B and B2C. For example, this was an issue in the 'Electrical Waste – Challenges and Opportunities report (Anthesis for Material Focus, 2020).
- Uncertainty in the quantification of hoarded EEE.

E.2.2 Quantitative Research

The principal quantitative findings, taken from analysing numerical datasets and data provided by stakeholders, are presented below. Whilst the key quantitative findings are summarised this should not be considered a comprehensive mass balance. This is due to potential double counting between categories, and some routes (e.g. hoarding, reuse) for which no quantitative estimates have been made due to lack of data.

Table 1-1: Quantitative Estimates of B2B EEE and WEEE, UK 2019

EEE/WEEE Flows		2019 UK Estimate (kt)	Confidence
Placed on Market	B2B EEE Reported POM	300	Medium
	Dual Use (reported as B2C)	140	Low - Medium
	Free-riders	14 to 44	Low
Estimate of Total Placed on Market		**444 to 484**	**Low - Medium**
Collected and Treated	Collected (reported as B2B)	9	High
	Collected Dual Use (reported as B2C)	186	Low
	Treated (site returns)	80	Medium
	Non obligated WEEE Treated at AATFs	0-50	High
Unreported	Small mixed WEEE at AATFs (reported as B2C)	2 to 49	Low
	B2B WEEE mixed with light iron at ATFs	66 to 109	Low
	B2B WEEE in commercial residual Waste	200	Medium
Illegal Activity	Fly-tipping	5	Low
	Illegal Exports	10 - 29	Medium

E.2.3 Qualitative Research

The principal findings from interviews and surveys undertaken with stakeholders were:

- There is a general sense of confusion and frustration regarding classification and reporting of B2B WEEE.
- Stakeholders felt that a lack of enforcement and monitoring of the reporting of obligated B2B WEEE meant that often producers and operators were not fully reporting.
- The general consensus among interviewees was that the majority of B2B used EEE and WEEE is going through appropriate routes. However, this contrasts with some of the quantitative results from this study, for example, that large quantities of B2B WEEE are thought to be going to residual waste (estimated at 200kt).
- It was noted that large quantities of WEEE pass through what might be considered less professional and non-WEEE specialist waste management routes, including WEEE from SMEs, WEEE handled by 'jobbers' that broker used IT and other EEE (as a tier below the ITADs), and major domestic appliances (MDAs) via kitchen and office fit-out contractors, that often use mixed waste skips as a cheap way to deal with waste from a refit.
- The problem of 'free-riding' and the subsequent lack of enforcement for those who are acting illegally was an issue for some interviewees.
- Circular economy models are felt to play a significant factor in the B2B EEE/WEEE market; although mostly in the ITT space.

E.2.4 Carbon Emissions

The carbon assessment estimated that recycling of B2B WEEE currently avoids **~175kt** of carbon dioxide equivalent (CO_2e). If 100% of B2B WEEE was sent for recycling, **~663kt** of CO_2e emissions would be avoided. The difference in the modelled outcomes - i.e., the potential for further carbon abatement through significantly improved recycling - between the current and maximum benefit recycling scenarios is **~488kt** of CO_2e.

E.3.0 Conclusions

The research highlighted the paucity of data, from both public sources and held individually by organisations. There is a significant difference between the POM figures for B2B EEE and the B2B collected and treated via official WEEE Extended Producer Responsibility (EPR) routes. This research has identified the following key conclusions:

- POM data for B2B EEE is significantly underreported due to 'dual use' reporting as B2C of equipment that is sold B2B. MDAs are more important than ITT EEE in terms of B2B sales by weight, since large quantities are sold to landlords (social and private) and into the new build housing market, as well as private offices and other non-household organisations. Small Domestic Appliances are also likely to be sold in large quantities for use in the above settings and in home offices.
- B2B WEEE is known to form a small fraction of a large quantity of residual C&I waste, making it unavailable for direct collection or recycling (other than metal recovery from pre-treatment or incinerator bottom ash).
- Reuse, of ITT EEE in particular, is likely to be very significant and mostly managed through ITADs but could not be estimated due to a lack of data. It is noted that not all ITADs are signed up to the Asset Disposal and Information Security alliance (ADISA) standards, and there are also intermediaries (so-called 'jobbers') that may also work to lower standards (see bullet below).
- B2B WEEE in scrap metal is likely to be in the tens of thousands of tonnes, including some 'professional equipment' that have come from businesses (including landlord-owned residential properties) via refits of kitchens and offices.
- Illegal export and routing of B2B WEEE via mixed WEEE at HWRCs/DCFs, are both likely to be significant but far smaller streams than those identified above.
- Fly-tipping of B2B WEEE on public land, while also likely to be significant, is most often dealt with through local authorities which will use AATFs, although refrigeration equipment could have been tampered with before-hand allowing inappropriate degassing to the atmosphere.
- Overall, there is a clear need to better record, report and manage B2B WEEE, getting it out of residual and scrap metal routes, and bringing it into the formal collection routes and through AATFs for treatment. This would improve environmental outcomes significantly.

E.4.0 Opportunities

Improving data reporting and related enforcement is one significant step towards better outcomes for B2B WEEE. It is recommended that future research might consider using a market research company to enable a large and representative sample, with a focus on B2B users of EEE (in order to gain insight into non-household purchase, use and disposal behaviours). In the longer-term, structural changes will be required to the existing system of reporting, to truly understand B2B product and material flows. This research highlights a range of issues that would need to be addressed by any such changes. Opportunities for interventions to improve the system are outlined below.

Practical Measures

- Encouragement of circular economy business models for producers, including full lease service models (as opposed to lease financing).
- Making it easier for organisations to access appropriate disposal routes for EEE/WEEE and incentivising the use of official routes to AATFs rather than scrap/light iron processing or other unreported disposal e.g., residual waste. This could include the provision of free or low-cost business WEEE collections for SMEs with WEEE above a given weight threshold, for example.
- Improved communications across the value and user chain to ensure appropriate disposal channels are well understood and easy to access, to reduce hoarding and disposal to residual waste.
- Measures to ensure that major domestic and commercial appliances, for residential properties owned by landlords, as well as offices, hospitality and retail applications, particularly refrigeration equipment, are collected by the supplier of replacement equipment (even if this is some time after the delivery of the new equipment).

Reporting and Compliance

- Requirement for producers, retailers and other intermediaries to report the destination of dual use EEE as either household or non-household according to the transaction (B2C vs B2B).
- Improved regulation and enforcement to deter free-riding, particularly in regard to online sellers of EEE.
- Greater scrutiny of the kitchen and office fit out sector to ensure appropriate reporting and treatment of used appliances coming from business premises, including those from private and social landlords.
- Review of the Article 12 opt-out which allows producers to make contractual arrangements that exempt them from financing WEEE collection and treatment or physically taking back used EEE or WEEE.
- A tightening of standards in the ITADs and WEEE intermediaries' sector, to ensure appropriate practices are employed across the sector. For example, it would be helpful to see all in this sector having to have ADISA certification to operate, notably the ICT Asset Recovery Standard. It would also be extremely helpful to have mandatory reporting to quantify the amount of activity, reuse and otherwise, in the ITAD sector.
- Introduction of a data recording framework that includes reuse, repair, refurbishment/remanufacture and cannibalisation of EEE/WEEE to ensure a better understanding of activities further up the waste hierarchy than recycling and disposal.

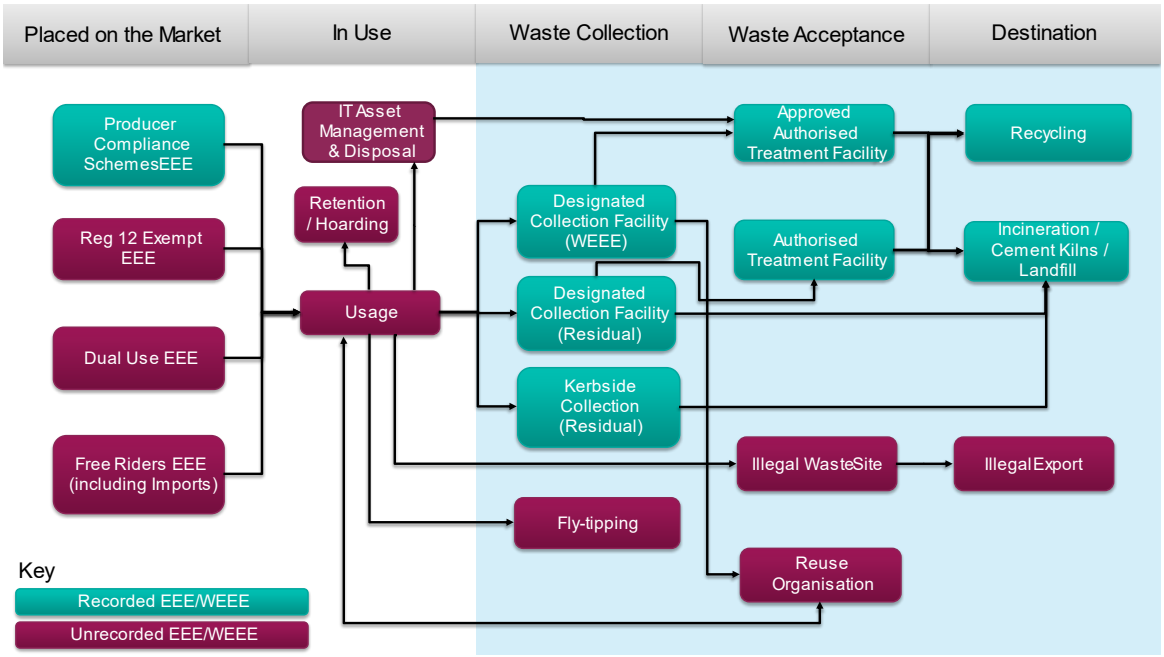
Contents

1.0 Introduction

This summary report presents the key findings of a research project to investigate the flows of business to business (B2B) Electronic and Electrical Equipment (EEE) and Waste Electronic and Electrical Equipment (WEEE) in the UK. A supporting technical report provides further detail on the approach and findings of this research.

The research considers officially recorded flows and those that are not recorded under the Extended Producer Responsibility (EPR) system. These are summarised in Figure 1-1.

Figure 1-1: B2B EEE and WEEE Interim and Final Destinations



Products that can be used by both households and non-households, such as laptops, kitchen appliances and vacuum cleaners, are known as 'dual use' and these are reported within the household goods placed on the market (POM) data. It is therefore known that a proportion of EEE categorised as household is subsequently purchased by non-households (i.e., mostly businesses). Equally, how non-households deal with EEE/WEEE when no longer needed (from selling the goods, to making direct arrangements with recyclers or disposing of them with residual waste) is not well understood.

This study therefore set out to provide a better understanding of the flows of EEE into and out of non-households. A full mass flow analysis of all B2B EEE/WEEE at a national level, however, was not the intention of this research given the anticipated data gaps and uncertainties.

2.0 Research Objectives

2.1 Selected Research Topics

The project focused on areas where there is most need to gather better evidence. The following research topics were identified:

- Assess B2B EEE Put on Market (POM) including consideration of:
  - B2B EEE that is considered 'dual use' (for example laptops, phones, kitchen equipment) and counted in the official figures as household equipment;
  - The use of the opt-out which allows producers to make contractual arrangements that exempt them from financing WEEE collection and treatment or physically taking back used EEE or WEEE (Article 12 of the WEEE Regulations); and
  - Companies or individuals not registered with a WEEE Producer Compliance Scheme (PCS), who place EEE on the market in the UK (i.e. "free-riders").
- Assess reported and unreported B2B WEEE including consideration of:
  - WEEE recorded by Approved Authorised Treatment Facilities (AATFs) and other such organisations;
  - Unreported WEEE, including in small mixed metal loads, and the residual stream
  - WEEE inappropriately dumped, fly-tipped, or exported by unlicensed waste carriers.
- Assess the carbon emissions resulting from the handling of B2B WEEE.

A full mass flow analysis of all B2B EEE/WEEE at a national level was not the intention of this research given the anticipated data gaps and uncertainties. There is no comprehensive statutory monitoring or reporting system in place to track the flow of B2B EEE through sale, use, reuse, recycling and disposal.

3.0 Methodology

A number of methods to gather evidence to inform the assessment of the research topics identified were applied:

- A literature review to assess the current understanding of B2B waste flows, paying particular attention to the reliability of the existing data and the gaps that remained.
- Quantitative analysis of data recorded by the regulator, purchased POM data, and collection and analysis of data from producers through a survey. Site audits were conducted to gather evidence from WEEE treatment sites.
- Qualitative research to gather testimony on the key research themes from stakeholders via interviews.

- A carbon assessment to model the carbon impacts across different WEEE categories, to estimate current emissions, and potential savings.

4.0 Key Findings

The key findings from the assessment are presented below.

4.1 Literature Review

It is evident that in most of the literature there are significant uncertainties in figures and assumptions made. For example:

- The UK regulatory databases (i.e. quarterly figures from the Environment Agency) do not provide a reliable source for tonnages of non-household equipment, and yet these quantities are used by many of the other sources as starting points for further WEEE estimations.
- Data are limited by small sample size, lack of producer feedback and assumptions needed to be made to bridge gaps in feedback.
- The failure to distinguish between B2B and B2C. For example, this was an issue in the 'Electrical Waste – Challenges and Opportunities report (Anthesis for Material Focus, 2020).
- Uncertainty in the quantification of hoarded EEE.

4.2 Quantitative Research

The principal quantitative findings, taken from analysing numerical datasets and data provided by stakeholders, are presented in Table 1-1. The official EA B2B POM data is known to be a significant underestimate of the number of products placed on the market, since many items are dual use and will be recorded as B2C, whilst free-riding will not be included. The report has generated approximations for that higher figure; these account for an extra **140kt** of dual use products, plus up to **44kt** of products from free-riding and exemption on top of the 300kt in the EA data – giving an overall B2B estimate of **~484kt**.

EEE then follows a number of routes that are partially quantified in the report using the available data. Some material will not be recycled at all; material in the residual stream is estimated at **200kt**, while illegal export and fly-tipping which could be burnt, are estimated to be up to **34kt**. This gives a figure for the inaccessible/uncollected WEEE of **234kt**, i.e. around 48% of the 484kt total, suggesting that around **52%** is collected. Some of this collected material will be scrap metal going to an ATF by various means. The remainder will be reuse or hoarded (mostly ITT).

Table 4-1: Quantitative Estimates of B2B EEE and WEEE, UK 2019

EEE/WEEE Flows		Quantity (kt)	Source / Commentary	Confidence
Placed on Market	B2B EEE Reported POM	300	Producer Compliance Schemes (PCSs) and small directly registered producers reported to the Environment Agency (EA) that in 2019, ~300kt (~20%) of the 1.7 million tonnes of EEE placed on the market (POM) was categorised as non-household EEE.[1]	Medium
	Dual Use	140	A survey of WEEE Scheme Forum members, whose respondents together represent ~127kt of B2B EEE POM indicated that in 2019, on average 9.3% of dual use EEE that was reported as household EEE (i.e., B2C) was actually sold to non-households. Applying this percentage to the EA reported data, provides an estimate of ~130kt of the 1.4 million tonnes of EEE reported as sold to households were actually sold B2B. Separately, it is estimated that around 80kt of major domestic appliances (MDAs) are fitted in privately owned residential establishments by kitchen fitters and recorded as dual use. In addition, wider retail replacement sale of MDAs to this category of property may well be in the region of 50kt, bringing the figure to 130kt. A further 10kt is estimated as being fitted in offices. As such the dual use figure overall could be greater than 140kt (and more than this if we consider additional small domestic appliances).[2]	Low- Medium
	Free-riders	14 to 44	It is estimated that free-riders could contribute an additional 4% to 10% of the total products placed on the market (not just B2B) for the relevant product groups, taking estimates from the Valpak EEE Flow report 2018, and the 'EPR and the Impact of Online Sales' Report.[3] Applying these estimates to our estimate of B2B EEE POM (incl. dual use, i.e. 440kt) indicates that between 14kt and 44kt may be B2B EEE POM supplied by free-riders (i.e. those not EPR registered under the WEEE Regulations). No further primary data estimates were obtained from this study, however qualitative analysis indicated that the consensus is that free-riders tended to be the smaller, and/or newer, companies and those operating online.	Medium

[1] https://www.gov.uk/government/statistical-data-sets/waste-electrical-and-electronic-equipment-weee-in-the-uk
[2] Stakeholder interviews, Non-domestic National Energy Efficiency Framework 2020
[3] Setting robust and realistic PCS targets for WEEE to support the transition to a Circular Economy - an Industry White Paper (A. Stowell et al., 2018)

EEE/WEEE Flows		Quantity (kt)	Source / Commentary	Confidence
	Article 12	Unknown	Whilst efforts were made to obtain estimates of the quantity of B2B EEE POM sold under Article 12 of the UK WEEE Regulations, there was a lack of responses in regard to this question to give any accurate estimation. It is known that at least one very large IT producer, with a large B2B market share, does not use this opt-out, however we have no information about smaller suppliers in IT or other categories.	Medium
Collected and Treated	Collected (reported as B2B)	9	In 2019 PCSs reported to the EA that ~9kt of WEEE categorised as non-household was collected. This represents 1.8% of the total ~505kt of obligated WEEE collected, as reported by Producer Compliance Schemes (PCS), and just 1.9% of the estimated 470kt of B2B POM (as indicated above using mid range average figures).[4]	High
	Collected Dual Use	186	Whilst the exact quantity of WEEE that is from businesses but recorded under household WEEE is unknown, an estimate based on the proportion of dual use POM can be made. Applying the 9.3% dual use estimate gathered from the WSF survey indicates that approximately 46kt of the collected household WEEE (497kt) could actually be from B2B sources. In addition, it is estimated that MDAs going into businesses, as above, are likely to be ~140kt per year. Given a relatively slow growing market for appliances over the last decade (the approximate lifespan of an MDA), this implies that non-household MDA WEEE arisings should also be of this order of magnitude, a significant proportion of which is likely to go via scrap metal routes to authorised facilities (ATFs). Taken together, this suggests around 186kt of dual use WEEE may have been collected and sent to either AATFs or ATFs in 2019.	Low
	Treated (site returns)	80	Analysis of site returns data, showing wastes received at permitted sites, by European Waste Code (EWC) indicated that the *total* tonnage of WEEE treated in the UK in 2019 was ~572kt, with 80kt (14%) of the treated WEEE recorded under industrial EWC codes.[5] [6] [7]	Medium

[4] https://www.gov.uk/government/statistical-data-sets/waste-electrical-and-electronic-equipment-weee-in-the-uk
[5] Environment Agency (2019), Waste Data Interrogator. https://data.gov.uk/dataset/d409b2ba-796c-4436-82c7-eb1831a9ef25/2019-waste-data-interrogator
[6] Scottish Environment Protection Agency (2019), Site Returns Data. https://www.sepa.org.uk/data-visualisation/waste-sites-and-capacity-tool/
[7] Natural Resources Wales (2019), Waste Permit Returns Data.
https://naturalresourceswales.sharefile.eu/share/view/s7e7f14f42634b4e9/fo32643a-bb38-4031-b6a8-ae66a79b848e

EEE/WEEE Flows		Quantity (kt)	Source / Commentary	Confidence
	Non obligated WEEE treated at AATFs	0-50	The proportion of the 50kt of non-obligated WEEE received by AATFs in 2019 that is from non-households, versus households, is not known. And whilst currently there are no reliable data to support this, it is assumed that the majority is from non-households. This is because household WEEE received by AATFs would have an evidence value, and hence AATFs are incentivised to make arrangements with PCS's to recover this evidence value. The remaining WEEE received by AATFs is then more likely to come from non-households, with some of this being reported as 'non-household' WEEE and the rest reported as non-obligated.	High
Unreported	Small mixed WEEE at AATFs	2 to 49	A site audit carried out at one AATF (SWEEEP) estimated that between 2% and 2.7% of the SMW received in the audit sample loads from households was identifiable as business WEEE. This indicates that at least 2.2kt to 3kt of the 112kt SMW collected from DCFs as household (B2C) WEEE is actually B2B WEEE, although there will also be dual use B2B WEEE that is not detectable as such, making this figure a low-end estimate. The Dual Use Collected figure above indicates that there could in fact be a further 46kt of dual use business equipment treated at AATFs, suggesting a possible maximum figure of 49kt.	Low
	Light iron at ATFs	66 to 109	Data obtained from a site audit undertaken at an ATF (S. Norton), found that 0.5% of all incoming light iron loads, by weight, comprised of B2B WEEE. If this figure, and data obtained from a recent Irish study (which showed 1.13% of scrap metal was 'professional equipment' WEEE) is applied to UK light iron tonnages (estimated at 2.45 million tonnes in 2017), this represents between 12kt and 28kt of B2B WEEE potentially unreported as such.[8] It should be noted, however, that the ATF work at S. Norton was only identifying items that were suspected of being B2B. All domestic appliance scrap metal was ignored, however earlier studies have shown that 11% of scrap metal at ATFs (270kt) is MDAs (LDAs and refrigerators) and much of this could be from B2B sources, particularly relating to kitchen and office fit outs as discussed in this report.[9] This quantity is likely to be in the region of 20% to 30% (rounding down from the maximum likely figure of 32.5%) of this 270kt of MDAs at ATFs, i.e., a further 54kt to 81kt, bringing the total B2B WEEE in ATFs to between 66kt and 109kt. It is also worth noting that in a previous UK report, scrap metal was also indicated as a likely destination for the following streams,	Low

[8] Quantifying WEEE arising in scrap metal collections: Method development and application in Ireland (Ryan-Fogarty et al., 2021)
[9] Evidence of large domestic appliances recovered in the UK light iron stream (WRAP, 2014)

EEE/WEEE Flows		Quantity (kt)	Source / Commentary	Confidence
			most of which are B2B streams: Commercial display refrigeration and A/C units; EEE installed in buildings; Electrical and construction tools; Vending machines; and Gym equipment. [10] This wide range of potential professional equipment makes the higher figure more plausible.	
	Residual Waste	200	The WRAP report 'Commercial and Industrial Waste in Wales (2020)' reported that in 2019 1% of C&I residual waste was estimated as WEEE, in Wales. Defra UK data give some indication that there were ~20 million tonnes of residual UK C&I waste in 2019. Applying 1% equates to the potential for ~200kt of B2B WEEE in the residual C&I waste stream. It is worth noting that, given the inherent value of scrap metal, the large size of MDAs, and data concerns over digital equipment, this residual WEEE is unlikely to include MDAs or ITT equipment. Some metals may be recovered at incinerators or from incinerator bottom ash, although this has not been quantified.	Medium
	Re-use	Unknown	There is no sufficient data to support an estimate for re-use. However, many interviewees across the supply chain believed that this may account for a significant portion of the B2B WEEE that is unaccounted for. This seems very likely in the ITT space, where IT asset disposal organisations (ITADs) are known to data wipe and refurbish most of what they handle and sell it on, some via export.	Unknown
Illegal Activity	Fly-tipping	5	By applying the proportion of EEE that is sold to businesses (estimated at 470kt or 28% as reported above) to the amount of WEEE (~20kt in 2019/20) that was fly-tipped, it is possible to estimate that 5kt of B2B WEEE was potentially fly-tipped in 2019/20.[11] It should be noted that most of this should end up in ATFs and AATFs via local authorities who clear up the fly-tipping.	Low
	Illegal Waste Sites	Unknown	The percentage of Illegal Waste Sites (IWS) used for WEEE is fairly low, less than 10% across the differing types of sites. No further detail was available to analyse the quantity of WEEE. Of those IWS that have been stopped by regulators, between 4% and 5% are reported as processing WEEE.[12]	Low

[10] Joint Trades Association - Final: Unreported WEEE Flows in the UK - 2018

[11] *https://www.gov.uk/government/statistics/fly-tipping-in-england and Environment Agency: Waste Crime Summary Data to 2019/20. https://assets.publishing.service.gov.uk*

[12] Environment Agency: *Waste Crime Summary Data to 2019/20*. https://assets.publishing.service.gov.uk.

EEE/WEEE Flows		Quantity (kt)	Source / Commentary	Confidence
	Illegal Exports	10-29	For the EU, illegal WEEE shipment estimates range between 250kt and 700kt.[13] Scaling these figures down to a UK level based on GDP and apportioning the 28% B2B assumption from EA POM data, results in a range of 10kt to 29kt.	Medium

[13] Countering WEEE Illegal Trade Summary Report (Huisman et al., 2015)

4.3 Qualitative Research

The principal findings from the interviews and surveys with stakeholders were:

- There is a general sense of confusion and frustration regarding classification and reporting of B2B WEEE, owing to a system that is felt to be over-complicated and focused on household WEEE recycling targets over incentives to pursue circular economy solutions. The fact that at least 140kt of dual use EEE is estimated to be B2B rather than B2C illustrates the mis-classification point.
- Stakeholders felt that a lack of enforcement and monitoring of the reporting of obligated B2B WEEE meant that often producers and operators were not fully reporting due to the time and cost commitment of doing so outweighing any perceived benefit. In addition, of course, is a wide range of unobligated WEEE that is also unreported.
- The general consensus among interviewees was that the majority of B2B used EEE and WEEE is going through appropriate routes, such as reuse and scrap metal recycling, and they would like to see a way to record and report this. However, this contrasts with some of the quantitative results from this study, for example, that large quantities of B2B WEEE are thought to be going to residual waste (estimated at 200kt) and that scrap metal recycling is often not managed to the same standards as WEEE that is collected for, and treated at, AATFs. In particular, two relevant stakeholders noted the particular issue with major domestic appliances that are removed when kitchens, offices and the like are given a refit (see bullet point below).
- It was noted that large quantities of WEEE pass through what might be considered less professional and non-WEEE specialist waste management routes, including WEEE from SMEs, WEEE handled by 'jobbers' that broker used IT and other EEE (as a tier below the ITADs), and MDAs via kitchen and office fit-out contractors, that often use mixed waste skips as a cheap way to deal with waste from a refit. This in turn can potentially result in refrigeration equipment not being appropriately de-gassed due to copper removal prior to ATF treatment.
- The problem of 'free-riding' and the subsequent lack of enforcement for those who are acting illegally was an issue for some interviewees. Many feel that holding free-riders to account would be a significant step towards achieving an accurate picture of the EEE POM, and the subsequent recording and responsibilities for the WEEE collected.
- Circular economy models are felt to play a significant factor in the B2B EEE/WEEE market; although mostly in the ITT space. Most interviewees reported that the waste hierarchy is followed, with organisations wanting to extract maximum value after use, although our research and supporting data indicates that this approach does not result in optimised waste management, with MDA WEEE being the most significant concern alongside the large volumes that appear to end up in residual waste to landfill and EfW.

4.4 Carbon Emissions

The principal findings were:

- The current total avoided emissions of recycling WEEE across all of the categories was estimated to be ~175kt of CO2e. IT and Telecoms Equipment (Category 3) has the largest impact; this category also has the highest tonnage. Cooling Appliances (Category 12) is the only category where recycling actually generates emissions. This is because of the hydrofluorocarbon (HFC) gases (the dominant refrigeration gases), which have a very high global warming potential – which are assumed to be released where products are not properly recycled.
- The total modelled carbon savings of the hypothetical high recycling scenario, where 100% of B2B WEEE is recycled, is ~663kt of CO2e. The difference in the modelled outcomes - i.e., the potential for further carbon abatement through significantly improved recycling - between the current and maximum benefit recycling scenarios is ~488kt of CO2e.
- The carbon assessment uses a different approach to calculating recycling and is based on the Anthesis estimate of between 24% and 52% for the various product categories. Our analysis suggests an overall B2B recycling rate (collection and reprocessing) of 38% based on the findings of the report.
- The calculations do not allow for any potential mis-handling (illegal de-gassing to atmosphere) of refrigeration equipment. The carbon impacts calculated should therefore be regarded as a very high-level estimate rather than one based on any highly granular or precise data.

5.0 Conclusions

The research highlighted the paucity of data, from both public sources and held individually by organisations, resulting in ongoing challenges in understanding quantities of B2B EEE POM and details around both the make-up and management of B2B WEEE.

Key conclusions were, however, as follows:

- There is a huge gulf between the POM figures for B2B EEE and the B2B collected and treated via official WEEE Extended Producer Responsibility (EPR) routes, ending in treatment at an AATF. This gulf cannot be explained purely by delays between EEE being placed on the market and arising as waste, or reuse, which ultimately has to result in WEEE for recycling or disposal (although this may occur outside the UK). The issues are more numerous and in particular relate to large quantities of B2B WEEE that are unobligated under EPR, large quantities going into residual waste, and large quantities going via various routes into scrap metal with the potential for improper or sub-optimal treatment.
- POM data for B2B EEE is significantly underreported due to ‘dual use’ reporting as B2C of equipment that is sold to businesses. This was estimated to be at least 140kt (MDAs only) on top of the official figure of 300kt, i.e., at least 46%

underestimated. This effectively means that a large quantity of what is normally thought of as 'household' WEEE may not be available through the official DCF routes to help meet collection targets.

- Major domestic appliances (MDA) are more important than ITT EEE in terms of B2B sales by weight, since large quantities (140kt estimated) are sold to landlords (social and private) and into the new build housing market, as well as private offices and other non-household organisations. Small Domestic Appliances (such as kettles and microwaves) are also likely to be sold in large quantities (additional to the 140kt noted above) for use in the above settings and in home offices (where the line can be blurred in terms of what should be considered 'household' vs 'non-household').
- Permitted waste site data shows that there is 67kt more WEEE reported as treated as against collected. Furthermore, 80kt (14%) of the treated WEEE was recorded under industrial EWC codes. Some of the difference will be explained by WEEE being non-obligated or coming from mixed waste streams.
- B2B WEEE is known to form a small fraction of a large quantity of residual C&I waste, resulting in an estimated 200kt of B2B WEEE going via this route and therefore being unavailable for collection or recycling (other than metal recovery in incinerator bottom ash).
- Reuse, of ITT EEE in particular, is likely to be very significant and mostly managed through ITADs but could not be estimated due to a lack of data. It is noted that not all ITADs are signed up to the Asset Disposal and Information Security alliance (ADISA) standards, and there are also intermediaries (so-called 'jobbers') that may also work to lower standards (see bullet below).
- Large quantities of WEEE pass through what might be considered less professional and/or non-WEEE specialist waste management routes, although this has not been quantified due to a lack of data. This would include WEEE from SMEs, WEEE handled by some ITADs and 'jobbers' that broker used ITT EEE (as a tier below the more professional ITADs, governed by the ADISA code/standards for example), and MDA WEEE via kitchen and office fit-out contractors, that often use mixed waste skips as a cheap way to deal with waste from a refit. T11 exemptions for repairing and refurbishing WEEE may play a part in this although this has not been quantified.
- B2B WEEE in scrap metal is likely to be in the tens of thousands of tonnes (estimated as 66kt to 109kt), including some 'professional equipment' (estimated at 12kt to 28kt), and large quantities of MDAs (estimated at around 54kt to 81kt)) that have come from businesses (including landlord-owned residential properties) via refits of kitchens and offices. This is an issue since scrap metal recycling is not managed to the same standards as WEEE at AATFs, with particular concerns over the potential for refrigeration equipment not being appropriately de-gassed due to copper/compressor removal prior to non-AATF light iron recyclers obtaining the material.
- Illegal export and routing of B2B WEEE via mixed WEEE at HWRCs/DCFs, are both likely to be significant but far smaller streams than those identified above.

- Fly-tipping of B2B WEEE on public land, while also likely to be significant, is most often dealt with through local authorities which will use AATFs, although refrigeration equipment could have been tampered with before-hand allowing inappropriate degassing to the atmosphere. Fly-tipping on private land is instead often the responsibility of the landowner, though this is unquantified.
- Overall, there is a clear need to better record, report and manage B2B WEEE, getting it out of residual and scrap metal routes, and bringing it into the formal collection routes and through AATFs for treatment. This would improve environmental outcomes significantly.

6.0 Opportunities

Improving data reporting and related enforcement is one significant step towards better outcomes for B2B WEEE. In order to fill this quantitative data gap, it is recommended that future research might consider using a market research company to enable a more representative sample, with a focus on B2B users of EEE (in order to gain insight into non-household purchase, use and disposal behaviours). This approach is challenging, however, relying as it does on the market research company being able to target individuals within organisations that have sufficient knowledge of B2B EEE/WEEE practices, and those companies being willing to admit to what may, at times, be illegal practices.

In the longer-term, it is likely that, in order to improve the level of quantifiable data associated with B2B EEE/WEEE, structural changes will be required to the existing system of reporting. This research highlights a range of issues that would need to be addressed by any such changes.

Opportunities for interventions to improve the system are outlined below.

Reporting and Compliance

- Requirement for producers, retailers and other intermediaries to report the destination of dual use EEE as either household or non-household according to the transaction (B2C vs B2B).
- Improved regulation and enforcement to deter free-riding, particularly in regard to online sellers of EEE.
- Greater scrutiny of the kitchen and office fit out sector to ensure appropriate reporting and treatment of used appliances coming from business premises, including those from private and social landlords.
- Review of the Article 12 opt-out which allows producers to make contractual arrangements that exempt them from financing WEEE collection and treatment or physically taking back used EEE or WEEE.

- A tightening of standards in the ITADs and WEEE intermediaries' sector, to ensure appropriate practices are employed across the sector. For example, it would be helpful to see all in this sector having to have ADISA certification to operate, notably the ICT Asset Recovery Standard. It would also be beneficial to have mandatory reporting to quantify the amount of activity, reuse and otherwise, in the ITAD sector.
- Introduction of a data recording framework that includes reuse, repair, refurbishment/remanufacture and cannibalisation of EEE/WEEE to ensure a better understanding of activities further up the waste hierarchy than recycling and disposal.

Practical Measures

- Encouragement of circular economy business models for producers, including full lease service models (as opposed to lease financing).
- Making it easier for organisations to access appropriate disposal routes for EEE/WEEE and incentivising the use of official routes to AATFs rather than scrap/light iron processing or other unreported disposal e.g., residual waste. This could include the provision of free or low-cost business WEEE collections for SMEs with WEEE above a given weight threshold, for example.
- Improved communications across the value and user chain to ensure appropriate disposal channels are well understood and easy to access, to reduce hoarding and disposal to residual waste.
- Measures to ensure that major domestic and commercial appliances, for residential properties owned by landlords, as well as offices, hospitality and retail applications, particularly refrigeration equipment, are collected by the supplier of replacement equipment (even if this is some time after the delivery of the new equipment).

Further Study

- To get a more accurate quantitative estimate for the actual input to the system (amount of EEE purchased by non-households), undertake more detailed studies of EEE POM and purchased by non-households, working with a representative sample of producers, trade associations, major retailers (including wholesalers, distributors, fitted appliance/ kitchen retailers etc), since there are many interconnected product flows into the system.
- More detailed studies of the amount of B2B EEE reuse currently taking place, working with ITADs (e.g., via ADISA), other reuse organisations, refurbishment organisations, but also platforms where this EEE is resold (eBay, Amazon Refurb, specialist marketplaces etc). This could also help improve export estimates.
- A representative survey of 'users' (i.e. non-household organisations that purchase, use and dispose of EEE/WEEE), to better understand current attitudes and understandings of their and producers' obligations for the EEE they purchase,

the channels by which they purchase different types of EEE (by type of EEE and according to size of the user organisation), their habits around hoarding and reuse of different types of EEE, as well as how they tend to dispose of various kinds of WEEE. This study should look to be representative of a range of groups, including the many types of small and micro enterprise, as well as large private rental organisations, public sector organisations, office management companies, holiday rental organisations etc. It is recommended that future research might consider using a market research company to enable a more representative sample, with a focus on B2B users of EEE (in order to gain insight into non-household purchase, use and disposal behaviours). This approach is challenging, however, relying as it does on the market research company being able to target individuals within organisations that have sufficient knowledge of B2B EEE/WEEE practices.

- It is believed that some major waste contractors, but also local authorities that service non-households waste and recycling needs may hold more data on the types and quantities of WEEE that arise from a range of types of organisations, A detailed study, working with these organisations would help formulate a better understanding of this area of B2B activity.
- Larger studies of sampling of WEEE loads (including SMW but also other categories) arriving at other AATFs to validate how much B2B WEEE arrives at AATFs, whether under the guise of household WEEE or that which is clearly non-household WEEE.
- Larger studies of sampling of WEEE loads arriving at other ATFs to validate how much B2B WEEE arrives here as scrap/light iron.
- Work with 3rd parties upstream in the EEE/WEEE flow to understand the sources of the material observed at these facilities and identify the business fraction within all dual use EEE.
- More sampling of residual and DMR waste arising from non-households to obtain better UK-wide estimates of WEEE going into these improper disposal channels.
- ADISA members are believed to handle the end-of-life disposal of the majority of non-household IT equipment. Therefore, further follow up work with ADISA and its members could be helpful to better understand the amount of activity happening here, much of which may be aligned with circular economy aims but not reported within the formal EPR system.
- Similar work to this study targeted at other major areas of non-household (specialist) WEEE, including such as commercial catering and hospitality, to better understand flows of non-household LDA and cooling appliances, especially in terms of reuse of products, components and eventual disposal.

A.1.1 Glossary

Term or Acronym	Definition
AATF	**Approved Authorised Treatment Facility.** A site that is appropriately licensed to treat WEEE and provide evidence notes for WEEE treatment and recovery which may be required by PCSs.
AE	**Approved Exporter**. An exporter who is approved by the appropriate authority under the Regulations to issue Evidence Notes for WEEE that is exported out of the UK for treatment, recovery and recycling.
ATF	**Authorised Treatment Facility**. A site that is appropriately licensed to treat WEEE.
B2B	**Business-to-Business**. The trade in products and services between businesses.
B2C	**Business-to-Commercial.** The process of selling products and services directly between a business and consumers who are the end-users of its products or services.
CBD	**Carrier, Broker and Dealer.** A registration system which determines who can move waste in England is central to the security of waste streams.
DCF	**Designated Collection Facility.** A place where some household waste electrical and electronic equipment (WEEE) is collected before being sent for treatment, reuse and recycling.
DTS / Takeback	**Distributor Takeback Scheme.** An initiative whereby the distributor (manufacturer or retailer) offers customers a service to return and dispose of their old electrical and electronic equipment.
Dual Use	Products which are designed for either business-to-business (non-household) or business-to-consumer (household), but which can be used by both.
EEE	**Electrical and Electronic Equipment**. Equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields and designed for use with a voltage rating not exceeding 1,000 volts for alternating current and 1,500 volts for direct current
EPR	Enhanced Producer Responsibility. A policy approach under which producers are given a significant responsibility (financial and/or physical) for the treatment or disposal of post-consumer products.
EOL	**End of Life.**
Evidence	WEEE evidence is proof of reuse or treatment by an approved authorised treatment facility (AATF) or export of whole appliance by an approved exporter (AE). AATFs and AEs issue evidence in the form of evidence notes on the WEEE Settlement Centre.

Term or Acronym	Definition
E-waste	EEE once it has been discarded by its owner as waste without the intent of reuse i.e., WEEE.
Exempt	Exempt EEE is exempt from the scope of the WEEE regulations, such as military equipment, filament bulbs, and certain component items and therefore is not accounted for within registered reported EEE POM.
Free Riders	A company or individual, not registered with a WEEE Producer Compliance Scheme, who places EEE on the market in the UK.
ITAD	**IT Asset Disposition.** An industry built around disposing of redundant, obsolete or unwanted IT equipment, in a safe and environmentally friendly way. ITAD companies specialise in minimising the costs in disposing unwanted equipment.
ITAM/ITAD	**IT Asset Management/ IT Asset Disposition.** Businesses that dispose of obsolete or unwanted IT equipment.
ITT	**Information technology and telecommunications**
IWS	**Illegal Waste Site.** Sites which are treating or disposing of waste without the correct permit or appropriate exemption to accept or manage a particular waste.
LDA	Large domestic appliances, including washing machines, dryers, cookers, dishwashers.
LHA	**Large household appliance**
Light Iron	**Light iron** is generally considered to be white goods such as appliances, along with other very thin gauged steel that is found across all types of household goods and small appliances.
MDA	Large domestic appliances (LDA) plus refrigeration.
Non-household WEEE	**Non-household WEEE** is WEEE arising from users other than consumers (i.e., WEEE from businesses and other organisations). See Business-to-Business.
Non-obligated	**Non-obligated WEEE** is WEEE that is received by an AATF or approved exporter that has not been collected on behalf of a producer compliance scheme.
Obligated	**Obligated WEEE** is collected on behalf of a producer compliance scheme and has been proven to have gone to reuse or treatment by an Approved Authorised Treatment Facility.
PCS	**Producer Compliance Scheme.** Producers of EEE must join a PCS to report the EEE it places on the market and use the scheme to fulfil its obligations to fund the treatment of WEEE.
POM	**Products placed on the market**
POPs	**Persistent Organic Pollutants.** A hazardous organic chemical compound that is resistant to biodegradation and thus remains in the environment for a long time.
SDA	**Small domestic appliances**

Term or Acronym	Definition
SMW	**Small Mixed WEEE.** SMW comprises of a wide range of waste electrical items including small household appliances, IT and communications equipment, powered tools, toys and sports equipment, medical devices, control instruments, smoke detectors and dispensers. It does not include other WEEE items which should be separately collected in their own right such as: CRT and flat screen TVs and monitors, refrigeration equipment, large domestic appliances, and fluorescent lamps.
Unregistered	**Unregistered** companies do not report data to a PCS
UNU Keys	**United Nations University Keys.** 54 code categories that describe a range of products with a uniform average weight.
WEEE	**Waste Electric and Electronic Equipment**. Electrical or electronic equipment which is waste within the meaning of Article 3(1) of the Waste Directive including all components, subassemblies and consumables which are part of the product at the time of discarding
WEELABEX	**Waste Electrical and Electronic Equipment Label of Excellence.** A European certification that sets standards and monitors the processing and disposal of WEEE**.**

About us

Material Focus is a not-for-profit organisation – our vision is of a world where materials are never wasted.

Three I's inform and guide everything we do: inspiration, investment and insight.

Inspiration

We inspire people to change their behaviour. We do this through our Recycle Your Electricals campaign by revealing the hidden value of the materials in our electricals and by making it feel both easy (and normal) to reuse and recycle them.

Investment

We work with partners to expand the number and type of collection points, making it easier for everyone to reuse and recycle their old electricals.

Insight

We fund technical research to overcome the barriers to reusing and recycling old electricals. Insight from this research galvanises new and innovative approaches to reuse and recycling, and supports enhancements to the UK waste electrical and electronic equipment (WEEE) system.

MATERIAL FOCUS