UK electricals and portable batteries - collections review

Assessing the impact of publicly available drop-off points on electrical and portable battery collection rates in the UK

January 2026

Project background

Material Focus, Joint Trade Associations (JTA) and DEFRA worked together to review the effectiveness of small mixed WEEE and portable battery public collections in the UK.

Executive summary

Do local collection services such as kerbside, public drop-off and retailer take-back encourage higher collection rates for small electrical items and batteries?

This report assesses the impact of publicly available drop-off points on electrical and portable battery collection rates in the UK.

The collection options analysed include kerbside services, local authority household waste recycling centres (HWRCs), and local retailer drop-offs. Over 100 local authorities currently offer kerbside services for small electricals across the UK, and at least 130 offer a portable battery kerbside collection. For this particular report, the impact of electricals recycling bring banks was not included. We plan to include this in future analysis.

The findings revealed that kerbside collection services and access to different types of recycling locations both impact the amount of recycling collected, but the picture is complex, and other factors may be important for determining the 'best collection method' for each local authority.

The data shows that offering a kerbside collection for small electricals seems to boost collections - however the impact is *very variable*, suggesting that other factors may be more important. Councils who offer kerbside services collect on average 15–22% more small electricals than those that don't. For batteries, kerbside collection services had a stronger effect, increasing collections by about 49% more than those without the service.

For both electricals and batteries, local authorities with better walking access to retailer recycling locations often saw lower council collection rates. This may be due to people using more convenient retailer take-back initiatives instead. Better driving access to local authority recycling centres was linked to higher recycling rates for both waste types for most authorities.

Note: This research does not look at the cost, operational and communication challenges associated with the introduction of new kerbside and public collection services. Research conducted in 2022 did look at a possible costing model but further work is needed in this area.

We have also published results of our funded pilot studies testing reuse, repair and recycling across the UK.

Overall, while kerbside services and recycling access clearly help, they explain only part of the variation in collection rates across local authorities.

Technical Summary

This analysis uses linear regression models to investigate how local recycling infrastructure (kerbside collection and access to drop-off locations) influences the amount of electricals and battery recycling collected across UK local authorities. *Recycling collected* is measured in kg/person, collected by authorities, as reported to WasteDataFlow in 2023.

Small electricals

- For small electricals, availability of kerbside collection is associated with an average 15-22% increase in per-person recycling, although the effect is highly variable (95% CI: ~1% to 46%)
- Greater walking access to retailer recycling locations is linked to reduced council collections. A 10% increase in population with 'easy access' (≤ 15 min walk) corresponds to ~15-27% *decrease* in small electricals collected for most authorities
- Better driving access to Local Authority Recycling Centres has mixed effects although it does seem to be positively correlated with an increase in recycling rates
- There is a significant interaction between access to Retailers and Local Authority Recycling Centres, so for example the effect of access to retailers varies with differing proximity to Local Authority Recycling Centres.

Portable batteries

- For batteries, kerbside collection services had a stronger effect, increasing battery recycling collections by about 49% (95% CI: 26%–76%).
- Similar patterns as for small electricals were observed for access to drop-off (Recycling Centres and retailers) locations, though no significant interactions were found in the battery models.

Overall explanatory power of the models was moderate, with R^2 values of ~0.21 for small electricals and ~0.28 for batteries, indicating that substantial variation remains unexplained and suggesting important roles for other systemic, behavioural, or socio-economic factors.

These results highlight that while infrastructure and service provision significantly influence recycling rates, they form only part of the complex drivers shaping recycling rates.

Key Findings for Small Electrical collections

Kerbside collection helps: Authorities offering kerbside collection for small electricals collect on average around *15–22% more electricals*, though the impact is highly variable.

Retail drop-off access has a significant effect: Easier walking access to shops accepting electricals for recycling is linked to *lower* council-collected waste, possibly because people use retailer schemes instead.

Access to Local Authority recycling centres has mixed effects: Better driving access to Local Authority Recycling Centres is linked to *higher* amounts of small electricals collected, except in Local Authorities with poor walking access to retailers.

Income plays a role: Wealthier areas tend to report slightly less small electrical waste collected by councils, suggesting income influences how and where people recycle. However, including income in the model explains only slightly more variation in the data.

Key Findings for Battery collections

Kerbside collection has a big impact: Councils offering kerbside battery collection collect about *49% more batteries* than those without, showing kerbside services strongly boost battery recycling.

Retail drop-off access lowers council collections: Areas where people can easily walk to shops accepting batteries for recycling tend to see *lower amounts collected through council systems,* suggesting people may use retailer schemes instead.

Council recycling centre access helps: Better driving access to local authority recycling centres is linked to collecting *more batteries,* highlighting the value of accessible council-run facilities.

Stable results despite outliers: These patterns remain strong even after adjusting for extreme data points, giving confidence that the findings are robust.

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1. Introduction

This report supports the *UK electricals and portable batteries - collections review*, a project undertaken by Material Focus in collaboration with the Joint Trade Associations (JTA) and DEFRA.

This study is a national-level analysis of the impact of publicly available drop-off points on electrical and portable battery collection rates in the UK. The goal was to specifically to answer the questions:

1. How is the provision of kerbside collection correlated with the amount of small electrical recycling AND batteries collected in kg per head of population?
2. How is the provision of recycling locations (Recycling centres, retailer take-back, kerbside) correlated with the amount of small electrical recycling AND batteries collected in kg per head of population?

Understanding how local infrastructure and service provision influence recycling outcomes is critical for improving the collection of small electrical items and batteries across the UK. Although many local authorities provide kerbside collection, public awareness is low, and the impact on collection rates remains unclear. The aim of this analysis is to explore how electrical and battery kerbside collections in the UK impact the amount of waste collected and how this varies with proximity to retail & council recycling locations.

Central to the analysis is data from WasteDataFlow (sourced via the Resource Efficient Data (RED) platform), which records the quantities of small electrical and battery waste collected by authorities at the local authority level. Data from Material Focus provides information on the presence of kerbside collection services, and previous research with Material Focus provides local authority-level proximity of populations to recycling locations.

2. Data Collection and Preparation

Data Sources

Data for this analysis was compiled from several sources:

- **WasteDataFlow, via Resource Efficient Data (RED):** Local authority-level data on quantities (tonnages) of small electrical and battery waste collected.

- **Material Focus (Local Authority Infrastructure Data):** Data on the presence or absence of kerbside collection services for small electricals and batteries. Also measures of public access to recycling locations, expressed as the percentage of the population within 'easy access' (a 15-minute walk or drive) of these facilities.

- **Office for National Statistics (Population and Household Estimates):** Used to standardise collected weights to kg per person / kg per household. 2021 population data sourced from the Office of National Statistics (ONS).

Time Period for Analysis

In WasteDataFlow, local authorities in England, Wales, and Northern Ireland report data annually by quarters (released annually for the year April to March). In contrast, authorities in Scotland report annual data for January to December. For this study, the period January–December 2023 was selected as the timeframe for analysis, as it represented the most recent complete dataset available for the entire UK when the analysis was conducted in May 2025. Material Focus provided information on which local authorities offered kerbside collection services for small electricals during this period.

Spatial Units for Analysis

This analysis uses Local Authority boundaries as units, the smallest units for which Waste tonnages are reported, and for which data on kerbside collection services, access to recycling locations, income etc could be sourced.[1]

2.1 Kerbside Data Overview

Data on which Local Authorities have a kerbside recycling service was provided by Material Focus, for both small electricals (sWEEE) and batteries. For sWEEE there is a dataset specifically for 2023, for batteries the services in 2023 are not known, and the 2025 dataset is used as a best approximation.

Using these datasets, of 361 local authorities in the UK, 95 have kerbside recycling collections for Small Electricals in 2023, and 131 have kerbside recycling collections for Batteries. Figure 4 (see Appendix A 6.1) shows the distribution of kerbside services across the UK.

2.2 Access to Recycling Locations Data Overview

Material Focus maintains a database of locations that accept small electricals and batteries for recycling and reuse across the UK. In a previous study for Material Focus we calculated accessibility of recycling locations[2], using the metrics:

- % population within 15 minute drive of recycling locations
- % population within 15 minute walk of recycling locations

and similar metrics for subsets of all recycling locations such as:

- Locations that are Retailers
- Local Authority Recycling Centres
- Locations that accept batteries

[1] In April 2023 boundary changes were made to a small number of local authorities in England, merging some together to create new larger local authorities. We use the new boundaries (with LAD24CD codes), and data has been summed from the merged authorities to approximate values for the first quarter of 2023 where necessary. Local Authorities affected are: Cumberland Council, Westmorland and Furness Council, North Yorkshire Council, and Somerset Council.

[2] The metrics were calculated using a locations dataset current as of September 2024

The metric for each Local Authority was calculated by:

1. Calculating isochrones for all subset locations representing the area within a 15 minute walk (or drive) to each location
2. Summing the population contained within the combined isochrones within the local authority boundary (using gridded population data for the UK)
3. Calculating the percentage of population 'with access' by dividing by the total population within the boundary

For the majority of Local Authority Recycling Centres access by foot is not allowed so the 15 minute drive access metric was used. For retailers we used the 15 minute walk metric. We found such a large overlap between 'locations that accept batteries' and 'locations that are retailers' that for the purpose of this study only the retailer metric was used. More specific location metrics could be added in future studies, but these two variables chosen to represent 'Access to Recycling Locations' in this study:

- % population within a 15 minute walk of retailer locations ('accessRetail'
- % population within a 15 minute drive of Local Authority Recycling Centre locations ('accessLARC')

2.3 RED Data Overview: Tonnages

The RED data contains tonnage values for each Authority, broken down by:

- Time Period (quarters for England, Wales and Northern Ireland; year for Scotland)
- Collection Source
- Material
- Household / Non Household

For this analysis only tonnages reported as 'Household' were included.

Tonnages by Materials

Table 1 shows total tonnages for each country in the UK reported for the six 'Material' categories of interest for domestic electrical recycling (plus totals for all WEEE).

For this study we concentrate on 'sWEEE' or 'small electricals' (WEEE – Small Domestic App) and 'batteries' (Post consumer, non automotive batteries).

Tonnages by Collection Source

Tonnages are reported with one of 5 Collection Sources, the large majority being 'Civic Amenity Sites': 98% of small electricals and 84% of batteries are reported with Collection Source as Civic Amenity Sites. The second highest source category is 'Regular Kerbside', with 1.5% for small electricals and 15.6% for batteries, across the UK. Table 2 shows the detailed breakdown for all materials we looked at.

These statistics reflect the tonnages reported to WasteDataFlow, but it should be noted that they may not reflect the actual tonnages collected from kerbside services and bring sites: it is possible that, for some authorities, kerbside/bring site waste is taken to Civic Amenity Sites before being reported and is therefore counted within the Civic Amenity Sites entries.

For this study we take the total of all collections from any sources.for each material - sWEEE (WEEE – Small Domestic App) or batteries (Post consumer, non automotive batteries).[3]

*Table 1 Total tonnages reported, for 7 categories of waste of interest, totals reported for 2023 by country (*All WEEE is a sum of the 5 WEEE subcategories)*

Material	UK	England	Northern Ireland	Scot land	Wales
All WEEE *	259,844	218,847	12,053	12,210	16,734
WEEE - Small Domestic App	122,268	104,583	4,230	4,715	8,741
WEEE - TVs & Monitors	31,783	26,892	1,439	1,700	1,753
WEEE - Large Domestic App	37,526	29,979	3,584	2,321	1,642
WEEE - Fridges & Freezers	67,072	56,329	2,714	3,461	4,568
WEEE - Fluorescent tubes and other light bulbs	1,195	1,065	88	12	31
Post consumer, non automotive batteries	2,083	1,793	130	32	127

Table 2 Percentage of reported waste by 'Collection Source', for each Material (all UK)

Material	Bring Sites - Voluntary Commun-ity	Civic Amenity Sites	Kerbside - Voluntary Commun-ity	Regular Bring Sites	Regular Kerbside
WEEE - Small Domestic App	0.01%	97.72%	0.10%	0.63%	1.54%
WEEE - TVs & Monitors	0.01%	98.63%	0.01%	0.07%	1.28%
WEEE - Large Domestic App	0.06%	94.53%	0.57%	0.15%	4.68%
WEEE - Fridges & Freezers	0.02%	85.79%	0.42%	0.41%	13.36%
WEEE - Fluorescent tubes and other light bulbs	0.02%	98.02%	0.03%	0.12%	1.81%
Post consumer, non automotive batteries	-	83.95%	0.03%	0.41%	15.61%

Local Authority Definitions

The RED Data on waste tonnages is reported by Collection Authorities, which largely correspond to Councils within the UK. For each entry the data contains a column for 'Authority', 'Authority Collate'. For authorities corresponding to Local Authorities with LAD24CD codes these columns match, for disposal authorities that cover multiple local authorities (e.g. County Councils), the 'Authority' column contains the waste disposal authority name, the 'Authority Collate' contains the

[3] Household only, 'Non-household' tonnages were omitted for this study.

Local Authorities that tonnage entry relates to. For the purposes of this analysis the 'Authorities' used are 'Local Authorities', and all tonnages (Authority or Authority Collate) are aggregated to the local authority where the waste was collected.

Local Authorities: Normalising tonnages

To be able to compare local authorities of different sizes, for each local authority '*kg per person*' (kg/p) and '*kg per household*' (kg/hh) measures were calculated from the RED data tonnages, plus ONS population and household estimates from 2021. Figure 1 shows the distributions of kg/person (and logged kg/person) for both battery and sWEEE collections for authorities in the UK. See Table 3 for comparisons of average values for the UK, each separate country and London.

Logged kg/person was chosen as the response variable for the study, ie as the measure of 'amount' of collection, when modelling which factors correlate with amounts of small electrical and battery collections.

Table 3 Mean annual tonnages, kg/household (kg/hh) and kg/person (kg/p) for local authorities within each Region. Waste reported by each authority in 2023 for small electricals (WEEE - Small Electrical App) or batteries (Post Consumer, non automotive batteries).

Region	Mean tonnes Small Electricals	Mean tonnes Batteries	Mean kg/hh Small Electricals	Mean kg/hh Batteries	Mean kg/p Small Electricals	Mean kg/p Batteries
All UK	370.74	7.13	5.12	0.10	2.18	0.04
England	368.25	7.03	4.97	0.10	2.10	0.04
N Ireland	384.59	11.86	5.62	0.18	2.26	0.07
Scotland	362.72	4.62	5.26	0.08	2.46	0.04
Wales	400.77	6.58	6.69	0.12	2.93	0.05
Greater London	167.01	3.54	1.68	0.03	0.65	0.01

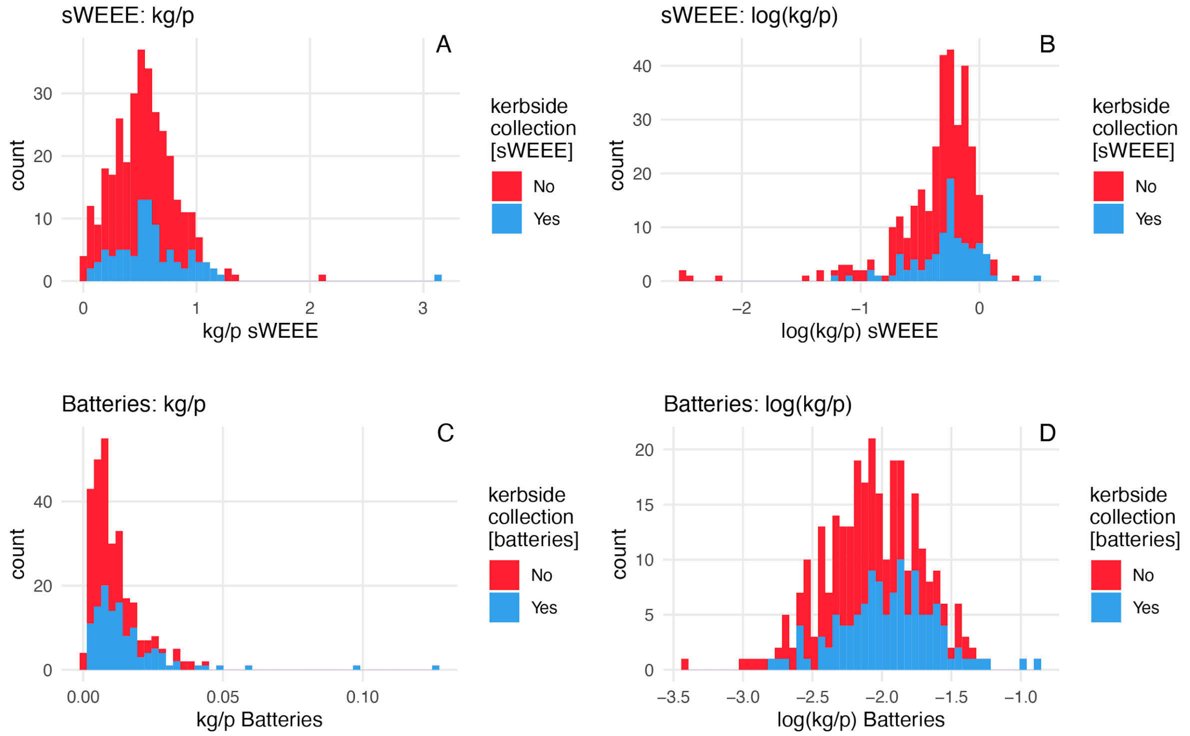


Figure 1 Distributions of kg/person, and logged kg/person, of sWEEE and battery recycling collections for local authorities in the UK. Colours represent whether the local authorities have a kerbside collection service (for sWEEE or batteries respectively).

3. Statistical Analysis

Linear models were chosen for the analysis, as a widely used statistical approach for exploring the relationship between one of more explanatory variables (predictors) and a continuous outcome variable. In this case, the outcomes - amount of small electrical and battery waste collected per person (or household) - are continuous and approximately normally distributed after log-transformation. The explanatory variables here are chosen to investigate kerbside collection availability, and access to recycling locations.

Two sets of linear regression models were fitted separately-one each for:

- Small electricals (logged kg_electricals_per_person)
- Batteries (logged kg_batteries_per_person)

3.1. Small Electricals (sWEEE)

We considered models including the impact of kerbside collection, and accessibility of recycling locations, as predictors. We considered the additive impacts of these factors, but also allowed all variables to interact. Including interactions can increase the complexity of the model but allow it to describe more nuanced effects (e.g. does providing kerbside collection have a different correlation with how much recycling is collected for those with good access to retailers and those with poor access to retailers?) This gave us the global model:

log(kgpp_sWEEE) ~ β + kerbside_sWEEE * accessRetail * accessLARC

where:

- **log(kgpp_sWEEE)** is the log transformed kg per person of sWEEE collected, as the response variable
- **kerbside_sWEEE** is the categorical variable denoting whether the local authority had a kerbside collection service during 2023 (Yes/No)
- **accessRetail** is the % population with access to a retail location that accepts electrical recycling within a 15 minute walk
- **accessLARC** is the % population with access to a Local Authority Recycling Centre within a 15 minute drive
- **β** is a global intercept

and the '*' symbol shows interactions between terms.

All possible sub models of this global model were compared using 'dredge' from the R-package MuMIn to explore whether possible simpler sub-models provided better explanations for the patterns observed. Models were ranked by corrected AIC (AICc) and the best model (the model with lowest AICc with difference of 2 less than simpler models) was selected.

3.2 Batteries

The same process was repeated for battery tonnage data, using logged kg/person of batteries as the response variable in the linear model, and repeating the same 'dredge' process using the global model:

log(kgpp_battery) ~ β + kerbside_battery * accessRetail * accessLARC

where:

- **log(kgpp_battery)** is the log transformed kg/person of batteries collected, as the response variable
- **kerbside_battery** is the categorical variable denoting whether the local authority has a kerbside collection service for batteries (Yes/No)

and other variables are as above. The sub models were ranked and compared as for small electricals.

4. Results: Small Electricals (sWEEE)

Table 9 (see Appendix 7.1) shows comparisons of the top ten models predicting kg/person small electricals collected. The best performing model included additive terms for kerbside collection **(kerbside_sWEEE)**, walking access to retail recycling locations (**accessRetail**) and driving access to Local Authority Recycling Centres (**accessLARC**), as well as interactions between accessibility of retail and Local Authority locations:

log(kgpp_sWEEE) ~ kerbside_sWEEE + accessRetail * accessLARC

Graphs of key factors in the model are shown in Figure 2, and Table 4 shows the estimates and significance of all factors.

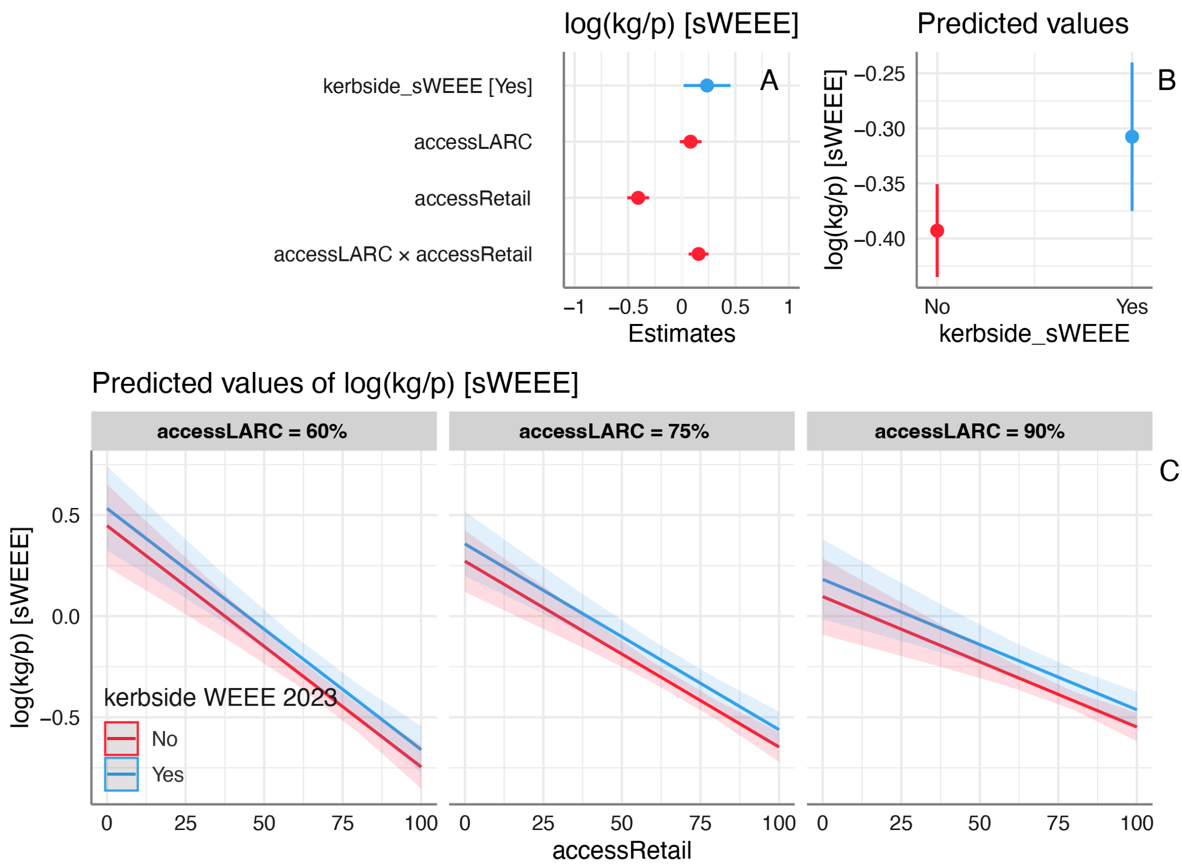


Figure 2 Key factors in the best model predicting kg/person Small Electricals (sWEEE) collected by Local Authorities. A) Standardised coefficients of all terms in the model, B) Effect of kerbside collection, C) Effect of access to Retailer recycling locations at three values of access to Local Authority Recycling Centres (different slopes show the interaction between the two variables). Shaded areas show 95% confidence intervals.

Effect of kerbside collection

We find that provision of kerbside collection is associated with an **increase** in sWEEE (*unlogged* kg/person) collected of on average 22%, but its effect is highly variable (95% confidence intervals between 1% and 46%).

Effect of access to recycling locations

We find that better access to retail locations is associated with **less** sWEEE being recorded, while better access to local authority recycling locations is associated with **more** sWEEE being recorded. However, this relationship is complex with a significant interaction (see Table 4). To explore the effects on *unlogged* kg/p sWEEE we can look at the effect of one variable with the other fixed:

- For *accessLARC*=60%: a 10 unit increase in *accessRetail* is associated with an average **decrease** in kg/pp sWEEE collected of -27% (95% CI: -33% - -21%)
- For *accessLARC*=75%: a 10 unit increase in *accessRetail* is associated with an average **decrease** in kg/pp sWEEE collected of -21% (95% CI: -25% - -16%)
- For *accessLARC*=90%: a 10 unit increase in *accessRetail* is associated with an average **decrease** in kg/pp sWEEE collected of -15% (95% CI: -20% - -9%)

where
- 95% CI is the 95% confidence interval,
- *accessLARC* is the % people within a 15 minute drive of a Local Authority Recycling Centre, and
- *accessRetail* is the % people within a 15 minute walk of a Retailer recycling location,
- so a 10 unit increase in *accessRetail* corresponds to the 10% more people within a local authority being able to access a retail recycling location within a 15 minute walk.

So, as shown in Figure 2C, increasing access to retail recycling locations **decreases** sWEEE collected as reported to WasteDataFlow, but the effect varies according to access to Local Authority Recycling Centres. Since the waste reported to WasteDataFlow includes all sources from Local Authorities, but not from retailers, it seems likely that this decrease in sWEEE collection may be, at least in part, explained by an associated (unmeasured) increase in waste collected by retailers.

Increasing access to Local Authority Recycling Centres has a mixed effect, but generally increases sWEEE collected for most authorities, and again the effect varies according to access to retailers within the authority:

- For *accessRetail* =60%: a 10 unit increase in *accessLARC* is associated with an average **decrease** in kg/pp sWEEE collected of -2% (95% CI: -8% to 4%)
- For *accessRetail* =75%: a 10 unit increase in *accessLARC* is associated with an average **increase** in kg/pp sWEEE collected of 5% (95% CI: 0% to 10%)
- For *accessRetail* =90%: a 10 unit increase in *accessLARC* is associated with an average **increase** in kg/pp sWEEE collected of 11% (95% CI: 5% to 17%)

where a 10 unit increase in *accessLARC* corresponds to 10% more people within a local authority being able to access a Local Authority Recycling Centre within a 15 minute drive.

4.1 Model Robustness

We note that there are some outliers in the data which may influence the results. To explore the impact of outliers on the results of our best model we performed a robust linear regression (designed to minimise the impact of outliers). This showed similar results, but with a marked reduction in the effect of kerbside collection (see Table 5). With this model the impact of kerbside collection is an (unlogged) average increase in sWEEE collected of 15% (95% CI: 1% to 30%).

Table 4 Model coefficient table for sWEEE (best model)

	log kgp av Q		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	1.15	0.50 – 1.80	**0.001**
kerbside_sWEEE [Yes]	0.085	0.007 – 0.164	**0.034**
accessLARC	-0.012	-0.020 – -0.003	**0.006**
accessRetail	-0.023	-0.032 – -0.014	**<0.001**
accessLARC x accessRetail	0.0002	0.0001 – 0.0003	**0.001**
Observations	328		
R^2 / R^2 adjusted	0.215 / 0.205		

Table 5 Model coefficient table for sWEEE (best model, robust linear model)

	log kgp av Q		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	1.13	0.67 – 1.59	**<0.001**
kerbside_sWEEE [Yes]	0.059	0.004 – 0.115	**0.035**
accessRetail	-0.022	-0.028 – -0.016	**<0.001**
accessLARC	-0.012	-0.018 – -0.006	**<0.001**
accessLARC x accessRetail	0.0002	0.0001 – 0.0003	**<0.001**
Observations	328		

4.2 Extension: Including income

Average income within a local authority was suggested as a possible additional explanation for variation in the data (the above model above explains roughly 20% of the variance, with an adjusted R^2 of 0.205). Income data was sourced as:

- **Income**: Gross Disposable Household Income for 2022 sourced from ONS.

and added to the general model as an additional factor to explore its effect:

$$\log(\text{kgpp\_sWEEE}) \sim \beta + \text{kerbside\_sWEEE} * \text{accessRetail} * \text{accessLARC} + \log(\text{income})$$

where:

- log(income) is the log transformed gross disposable household income per person

and all other variables are as before.

Table 6 Model coefficient table for sWEEE (linear model including income)

	log kgp av Q		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	2.86	1.27 – 4.45	**<0.001**
kerbside_sWEEE [Yes]	0.099	0.020 – 0.178	**0.014**
log_income	-0.431	-0.797 – -0.065	**0.021**
accessLARC	-0.010	-0.019 – -0.002	**0.017**
accessRetail	-0.019	-0.029 – -0.010	**<0.001**
accessLARC x accessRetail	0.0001	0.0000 – 0.0003	**0.01**
Observations	328		
R^2 / R^2 adjusted	0.228 / 0.216		

4.3 Summary of Key Findings for Small Electrical Collections

Kerbside collection helps: Authorities offering kerbside collection for small electricals collect on average around *15–22% more* waste, though the impact is highly variable.

Retail drop-off access has a significant effect: Easier walking access to shops accepting electricals for recycling is linked to *lower* council-collected waste, possibly because people use retailer schemes instead.

Access to Local Authority recycling centres has mixed effects: Better driving access to Local Authority Recycling Centres is linked to *higher* amounts of small electricals collected, except in Local Authorities with poor walking access to retailers.

Income plays a role: Wealthier areas tend to report slightly less small electrical waste collected by councils, suggesting income influences how and where people recycle. However, including income in the model explains only slightly more variation in the data.

5. Results: Batteries

Table 10 (see Appendix B) shows comparisons of the top ten models for predicting kg/person batteries collected. The best model included additive terms for kerbside collection, walking access to retail recycling locations and driving access to local authority recycling centre locations (with no increase in predictive strength by allowing interactions):

log(kgpp_battery) ~ kerbside_battery + accessRetail + accessLARC

Graphs of key factors in the model are shown in Figure 3, and Table 7 shows the estimates and significance of all factors.

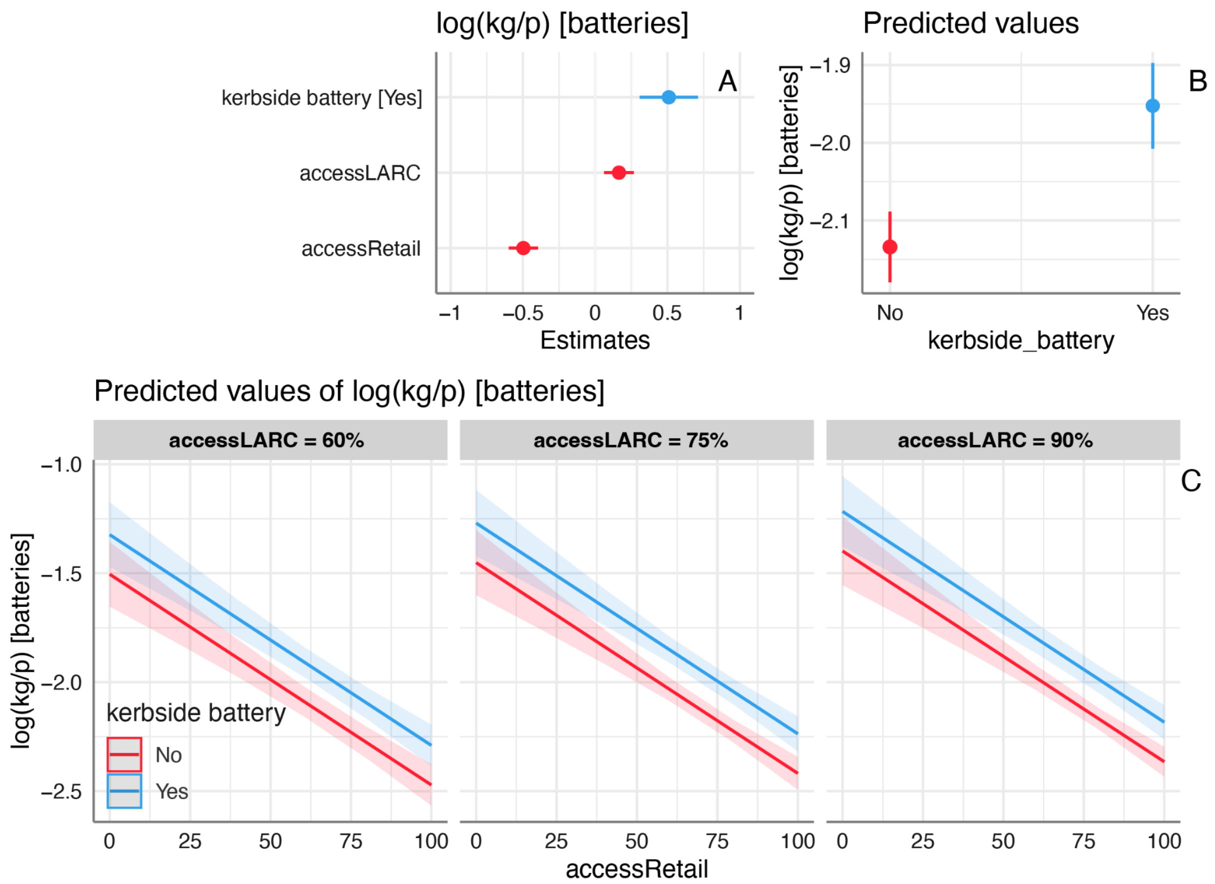


Figure 3 Key factors in the model predicting kg/person Batteries collected by Local Authorities: A) Standardised coefficients of all terms in the model, B) Effect of kerbside collection on predicted logged kg/p batteries, C) Effect of access to Retailer recycling locations at three values of access to Local Authority recycling centres, blue and red showing predictions with and without kerbside battery collection. Shaded areas show 95% confidence intervals.

Figure 3 shows the finding that provision of kerbside is associated with significantly greater amounts of batteries ($p < 0.001$). As for small electricals, we find that greater access to retail locations is significantly associated with less batteries being collected ($p < 0.001$). Greater access to local authority recycling locations is significantly associated with more batteries being collected ($p = 0.002$). In this model we don't find any interaction between access to retailers and access to local authority recycling centre locations. See Table 7 for details of all model coefficients.

Table 7 Model coefficient table for Batteries (best model)

	log kgp av Q		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	-1.72	-1.93 – -1.51	**<0.001**
kerbside battery [Yes]	0.172	0.100 – 0.245	**<0.001**
accessLARC	0.004	0.001 – 0.006	**0.002**
accessRetail	-0.010	-0.012 – -0.008	**<0.001**
Observations	290		
R^2 / R^2 adjusted	0.284 / 0.276		

In this model the impact of kerbside collection on battery collection is positive and significant, with an average **increase** of 49% (95% CI: 26% - 76%) in batteries collected (kg/person).

The effect of a 10 unit increase in *accessRetail* (ie. the number of people within a 15 minute walk of a retail recycling location increases by 10%) is an average **decrease** in batteries collected (kg/person) of -22% (CI -26% - -17%).

The effect of a 10 unit increase in *accessLARC* (ie. the number of people within a 15 minute drive of a Local Authority Recycling Centre increases by 10%) is an average **increase** in batteries collected (kg/person) of 8% (CI 3% - 13%).

5. 1 Model Robustness

As before, we performed a robust linear regression to check on the possible impact of outliers. For batteries this showed similar results (see Table 8), e.g. with the robust model the impact of kerbside collection is an average increase in kg/person batteries collected of 49% (95% CI: 26% to 76%). This provides some evidence that outliers are not unduly influencing the results for batteries.

Table 8 Model coefficient table for Batteries (best robust linear model)

	log kgp av Q		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	-1.69	-1.90 – -1.48	**<0.001**
kerbside battery [Yes]	0.173	0.100 – 0.247	**<0.001**
accessRetail	-0.009	-0.011 – -0.007	**<0.001**
accessLARC	0.003	0.001 – 0.005	**0.009**
Observations	290		

5.2 Summary of Key Findings for Battery Collections

Kerbside collection has a big impact: Councils offering kerbside battery collection collect about **49% more batteries** than those without, showing kerbside services strongly boost battery recycling.

Retail drop-off access lowers council collections: Areas where people can easily walk to shops accepting batteries for recycling tend to see **lower amounts collected through council systems**, suggesting people may use retailer schemes instead.

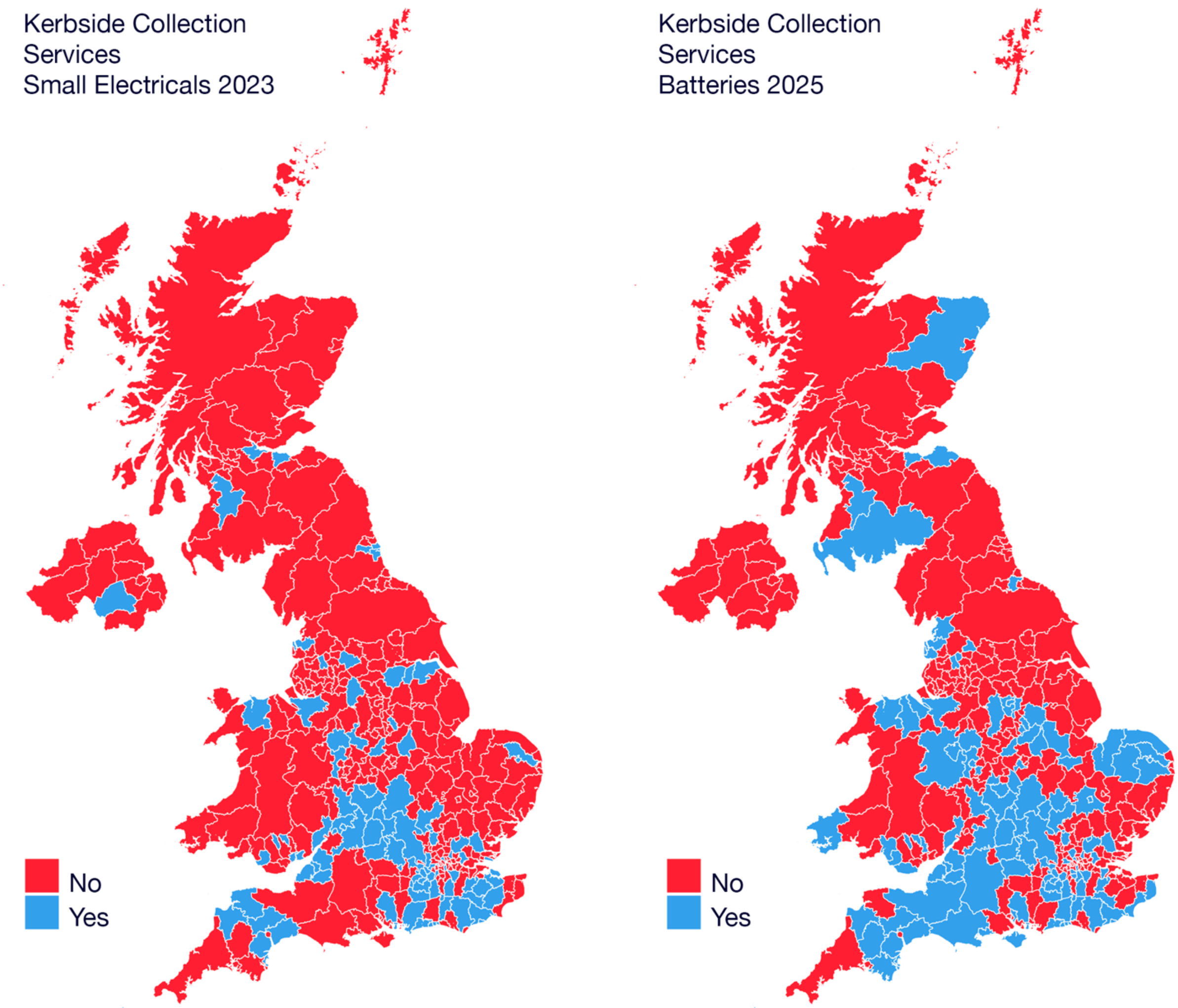
Council recycling centre access helps: Better driving access to local authority recycling centres is linked to collecting **more batteries**, highlighting the value of accessible council-run facilities.

Stable results despite outliers: These patterns remain strong even after adjusting for extreme data points, giving confidence that the findings are robust.

6. Appendix A: Data

6.1. Kerbside Collection Data

Figure 4 Maps of kerbside collection services for Local Authorities across the UK. Left: Kerbside collection for Small Electricals (2023 data), showing the 95 Local Authorities with kerbside collection in blue. Right: Kerbside Collection for Batteries (2025) with the 131 Local Authorities with kerbside collection in blue.. Both datasets are collected and maintained by Material Focus.



7. Appendix B: Model Results

7.1. Model Comparisons: Small Electricals (sWEEE)

Table 9 shows results for the top ten models found using the global model:

log(kgpp_sWEEE) ~ β + kerbside_sWEEE * accessRetail * accessLARC

where:

- log(kgpp_sWEEE) is the log transformed kg per person of sWEEE collected, as the response variable
- kerbside_sWEEE is the categorical variable denoting whether the local authority had a kerbside collection service during 2023 (Yes/No)
- accessRetail is the % population with access to a retail location that accepts electrical recycling within a 15 minute walk
- accessLARC is the % population with access to a Local Authority Recycling Centre within a 15 minute drive
- β is a global intercept

Table 9 Comparison of top ten linear models that best predict kg/p small electrical collections (sWEEE), where df is degrees of freedom, and models are ranked by corrected AIC, a standard measure of model performance.

Model	df	AICc	Δ AICc	AICc Wt
kerbside_sWEEE + accessLARC + accessRetail + accessLARC:accessRetail	6	195.19	0.00	0.39
kerbside_sWEEE + accessLARC + accessRetail + kerbside_sWEEE:accessRetail + accessLARC:accessRetail	7	196.22	1.03	0.23
kerbside_sWEEE + accessLARC + accessRetail + kerbside_sWEEE:accessLARC + accessLARC:accessRetail	7	197.25	2.06	0.14
accessLARC + accessRetail + accessLARC:accessRetail	5	197.69	2.49	0.11
kerbside_sWEEE + accessLARC + accessRetail + kerbside_sWEEE:accessLARC + kerbside_sWEEE:accessRetail + accessLARC:accessRetail	8	198.32	3.12	0.08
kerbside_sWEEE + accessLARC + accessRetail + kerbside_sWEEE:accessLARC + kerbside_sWEEE:accessRetail + accessLARC:accessRetail + kerbside_sWEEE:accessLARC:accessRetail	9	200.19	4.99	0.03
kerbside_sWEEE + accessLARC + accessRetail	5	204.30	9.10	0.00
kerbside_sWEEE + accessRetail	4	205.46	10.27	0.00
kerbside_sWEEE + accessLARC + accessRetail + kerbside_sWEEE:accessRetail	6	205.63	10.44	0.00
kerbside_sWEEE + accessLARC + accessRetail + kerbside_sWEEE:accessLARC	6	205.93	10.74	0.00

7.2 Model Comparisons: Batteries

Table 10 shows results for the top ten models found using the global model:

log(kgpp_battery) ~ β + kerbside_battery * accessRetail * accessLARC

where:

- log(kgpp_battery) is the log transformed kg per person of batteries collected, as the response variable
- kerbside_battery is the categorical variable denoting whether the local authority has a kerbside collection service for batteries (Yes/No)
- accessRetail is the % population with access to a retail location that accepts electrical recycling within a 15 minute walk
- accessLARC is the % population with access to a Local Authority Recycling Centre within a 15 minute drive
- β is a global intercept

Table 10 Comparison of top ten linear models that best predict kg/p batteries (Post consumer non automotive batteries), where df is the degrees of freedom, and models are ranked by corrected AIC, a standard measure of model performance.

Model	df	AICc	Δ AICc	AICc Wt
kerbside_battery + accessLARC + accessRetail	5	136.79	0.00	0.17
kerbside_battery + accessLARC + accessRetail + accessLARC:accessRetail	6	137.16	0.38	0.14
kerbside_battery + accessLARC + accessRetail + kerbside_battery:accessLARC + kerbside_battery:accessRetail + accessLARC:accessRetail + kerbside_battery:accessLARC:accessRetail	9	137.40	0.61	0.12
kerbside_battery + accessLARC + accessRetail + kerbside_battery:accessLARC + accessLARC:accessRetail	7	137.50	0.71	0.12
kerbside_battery + accessLARC + accessRetail + kerbside_battery:accessRetail + accessLARC:accessRetail	7	137.56	0.77	0.11
kerbside_battery + accessLARC + accessRetail + kerbside_battery:accessRetail	6	137.68	0.89	0.11
kerbside_battery + accessLARC + accessRetail + kerbside_battery:accessLARC	6	137.69	0.90	0.11
kerbside_battery + accessLARC + accessRetail + kerbside_battery:accessLARC + kerbside_battery:accessRetail + accessLARC:accessRetail	8	138.58	1.79	0.07
kerbside_battery + accessLARC + accessRetail + kerbside_battery:accessLARC + kerbside_battery:accessRetail	7	139.08	2.29	0.05
kerbside_battery + accessRetail	4	144.50	7.71	0.00

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