



RESOURCE RECOVERY AND CIRCULAR ECONOMY Assessment 2

TOPICAL WASTE REPORT

“The WEEE directive is meant to make electrical equipment producers responsible for taking back old products when new ones are purchased. With small portable items most retailers tell purchasers to take these items to recycling centres. Most small WEEE therefore ends up in the residual waste bin as this is easier than taking it to these sites. How best can this failure be addressed?”

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Executive Summary

Globally, in 2022 over 16.5 billion kilograms of WEEE classified as “Small Equipment” or “Small IT and Telecommunications Equipment” was unaccounted for. This number is set to rise by another 32% by 2030 with the UK having some of the worst per capita collection and recycling rates across the developed world.

The report addresses the failings of The Waste Electrical and Electronic Equipment Regulations (2013). This piece of legislation requires that producers and retailers of electrical and electronic equipment, including small electrical and electronic equipment are responsible for recycling small WEEE when new products are purchased. However, due to the complexity surrounding these schemes, often small WEEE items end up in household waste bins which are then either landfilled or incinerated.

The UK sits near the bottom of several European small WEEE recycling tables, missing all its targets and collecting under one-third of the WEEE it produces. The UK lags behind several EU and EEA countries such as Switzerland and Austria as well as Bulgaria, Croatia and Poland. All mentioned countries have a far higher collection and recycling rate than the UK due to a combination of governmental policies such as Switzerland “Advanced Recycling Fee”, which covers the cost of retailers collecting all small WEEE, whether purchased from that store or not, or by investing in the correct recycling infrastructure nationwide like Poland and Austria, who have over 5000 e-waste recycling containers or 2300+ municipal recycling centres respectively.

The report highlights the need for the UK Government to implement policy drivers as part of the ongoing review of EPR for small WEEE. This should include advance recycling fees for all EEE purchases to fund nationwide collection of small WEEE. In addition to this there should also be nationwide campaigns educating businesses and consumers on the value of small WEEE.



Furthermore, devolved administrations and local authorities also need to invest in local small e-waste collection points, and make household recycling centres more accessible to all, as currently these are very car centric facilities.

In conclusion, the UK has made small strides in collection and recycling of small WEEE, however it's falling well short of some European counterparts. With 94% of the average small WEEE being recyclable, and just 1% of rare earth minerals coming from recycled tech, through government legislation and infrastructure investment, the UK government could quickly increase small WEEE recovery, contributing to the United Kingdom becoming a more sustainable and circular economy.

List of abbreviations

UK	United Kingdom of Great Britain and Northern Ireland
EU	European Union
EEA	European Economic Area
UN	United Nations
UNITAR	United Nations Institute for Training and Research
WEEE	Waste Electronic and Electrical Equipment
EEE	Electronic and Electrical Equipment
GDP	Gross Domestic Product
GDP PPP	GDP by purchasing power parity

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Introduction

In 2022, a record breaking 62 billion kg of electrical waste was generated globally which amounts to an average of 7.8kg per person. Europe was the region with the highest per capita of e-waste with 17.6kg followed by Oceania with 16.1kg per capita and the Americas with 14.1kg per capita. The lowest regions were Asia and Africa with 6.4kg and 2.5kg of e-waste per capita respectively.

Around 20 billion kg of this e-waste is classified as “small equipment” such as electrical toys and electronic cigarette devices as well as other small devices such as vacuum cleaners and microwave ovens amongst other domestic appliances like kettles and electric shavers.

A further 5 billion kg of the total e-waste generated in 2022 comprised of “Small IT and Telecommunications Equipment” and included items such as laptops, tablets, mobile phones, GPS devices, printers and routers.

Out of this combined 25 billion kilograms of electrical waste classified as “Small”, a total combined 34% (12% for “Small Equipment” and 22% for “Small IT and Telecommunications Equipment”) was documented as being “formally collected and recycled in an environmentally sound manner”, however it should be noted that typically it’s the larger and bulkier items that tended to be recycled (UNITAR, 2024).

This means that 66%, or 16.5 billion kg of small e-waste is unaccounted for and potentially sent to landfill, resulting in billions of kilograms of resources such as metals and plastics being incinerated or landfilled instead of being recovered and re-used in future products (Cornelis P. Baldé et al., 2024).

Topic Description

Electronic and Electrical Equipment (EEE) is regulated by UK legislation to reduce the amount of Waste Electrical and Electronic Equipment (WEEE) being landfilled or incinerated. This was to be achieved by the 3 “R’s” of recovery, re-use and recycling as much of the components as possible (DEFRA, 2023). It’s enforced by The Office for Product and Safety and Standards and DEFRA and underpinned by The Waste Electrical and Electronic Equipment Regulations (2013) (UK Government, 2013).

It was hoped that by distributors and retailers of Electronic and Electrical Equipment (EEE), who met certain criteria, being obliged to offer free take back of Waste Electrical and Electronic Equipment (WEEE), that it would increase the amount small electrical equipment being recovered and recycled (UK Government, 2013).

However, it appears some retailers don’t have collection points in place and are telling customers to take these items to local recycling centres, therefore small waste electric items are ending up in general household waste bins as this is often the quickest and easiest solution for consumers. This report will look at these issues and these failures and how it can be addressed.

Small WEEE – Facts and Figures

Global Overview

The United Nations Global E-Waste report states that on average, around 34% of electrical wastes are classified as small items.

Small electrical waste is a growing global problem. Figure 1 shows small electrical waste generated for each main region per capita with Europe having the highest number.

Table 1 is a breakdown of regions and sub-regions across Earth that shows how much small electrical waste is generated, and how much of it is collected.

Table 1 also shows the populations of the regions used for the per-capita calculations. With this data a percentage of small electrical waste recycling was calculated

Table 1 shows that there are 2 problems with regards to WEEE affecting both developed and developing nations and regions.

While developed nations have a much higher collection and recycling rate on small electric waste than developing countries, they still generate far more small electrical waste than developing countries.

Small Electrical Waste Generated per capita

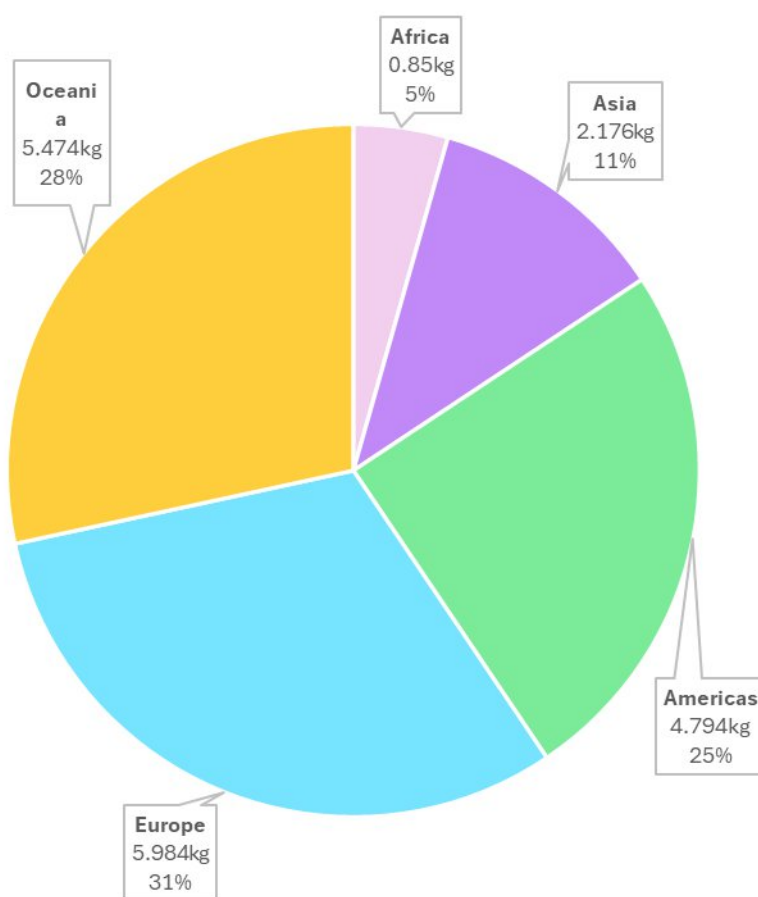


Figure 1 - Small electric waste generated by each region per capita

Table 1 shows that Europe, a region with a population of 742 million, even after collection and recycling rates of 43%, still generated 255m kilograms more small electrical waste than Africa, which has a far larger population of 1.01 billion.

However, while developing regions such as parts of Africa, Americas, Asia and Oceania have lower small electrical waste to begin with, the collection and recycled rate for small electrical items is very low, often single digits, with some entire regions having no recycling rates for small electrical waste items at all (Cornelis P. Baldé et al., 2024).

Table 1 - Regions and sub-regions with total small electric waste generated and recycling levels (Cornelis P. Baldé et al., 2024)

Region/Country	Total Small E-Waste Million (KG) [1]	Total Small E-Waste Recycled M (KG) [1]	Total Small E-Waste Recycled (%)
East Africa	146.2	0.816	1
Central Africa	105.4	0.034	0
Northern Africa	510	0	0
Southern Africa	197.2	7.82	4
Western Africa	255	0	0
Population – 1.01 billion	Total	1213.8	8.67
Caribbean (Americas)	81.6	0.034	0
Central America	612	20.4	3
Northern America	2720	1394	51
South America	1496	78.2	5
Population – 1.02 billion	Total	4909.6	1492.634
Central Asia	136	4.42	3
Eastern Asia	5440	1088	20
South-Eastern Asia	1496	0	0
Southern Asia	2074	20.4	1
Western Asia	1020	91.8	9
Population - 4.57 billion	Total	10166	1204.62
Eastern Europe	1258	340	27
Northern Europe	850	340	40
Southern Europe	918	374	41
Western Europe	1428	850	60
Population – 742 million	Total	4454	1904
Australia & New Zealand (Oceania)	231.2	98.6	43
Melanesia (Oceania)	7.14	0	0
Micronesia (Oceania)	0.272	0	0
Polynesia (Oceania)	0.374	0	0
Population – 44 million	Total	238.986	98.6

[1] Calculation based on UNITAR report that small e-waste is 34% of total e-waste

Regional Overview

As Table 1 shows, Europe has the highest percentage of WEEE per capita. For consistency, small electrical waste figures are assumed to be 34% of total electrical waste figures published, as per the UN's Global E-Waste Monitor 2024 (Cornelis P. Baldé et al., 2024). This has been because since 2020, the EU have reduced their waste categories from 10 to 6, and have included clear definitions of what is considered large electronic waste and small electronic waste (external dimensions <50cm) (EU, 2024). Meanwhile, the UK is still currently operating on the 10-14 electrical waste categories with no clear definition of what is considered small WEEE (Environment Agency, 2023).

Table 2 shows a comparison of how much electrical equipment was placed on the market and how much electrical equipment was collected between the EU (European Commission, n.d.) and UK (Environment Agency, 2024).

Table 2 - Amount of electrical equipment placed on the market and returned for EU and UK 2022

Country/Union	Electrical equipment place on the market (tonnes)	Electrical equipment collected and recycled (tonnes)
EU	13.5m	4.98m
UK	1.34m	0.47m

Assuming 34% of the data in Table 2 is classified as Small Electrical Equipment, Table 3 shows the total amount of Small Electrical Equipment placed that was placed on the market and how much small WEEE collected for 2022. Table 3 also shows that the EU placed 64% more small electrical goods on the market than what was collected, while the UK placed 66% more small electric equipment on the market than was collected.

Table 3 - Amount of small EEE placed on the market and collected/recycled, with percentage differences, for EU and UK 2022

Country/Union	Small Electrical equipment placed on the market (tonnes)	Small Electrical equipment collected and recycled (tonnes)	Percentage difference placed on the difference compared to recycled
EU	4.59m	1.69m	64%
UK	0.46m	0.16m	66%

To further see how the UK compares to the EU, Table 4 shows how much small electrical equipment was placed on the market per capita, and how much small waste electrical equipment was collected per capita. Per capita figures calculated by 2022 EU population of 448.4m (EU, 2023) and mid-2022 UK population of 66.6m (ONS, 2024).

Table 4 - How much small EEE was placed on the market and small WEEE collected per capita for EU and UK 2022

Country/Union	Small Electrical equipment placed on the market (tonnes)	Per capita (tonnes and KG)	Small Electrical equipment collected and recycled (tonnes)	Per capita (tonnes and KG)
EU	4.59m	0.010 tonnes or 10kg	1.69m	0.003 tonnes or 3kg

UK	0.46m	0.006 tonnes or 6kg	0.16m	0.002 tonnes or 2kg
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With the EU being such a large economic union with 27 countries each with varying cultural and economic differences, Figure 2 and 3 shows how the UK compares to each member state of the EU as well as Switzerland, Iceland and Norway.

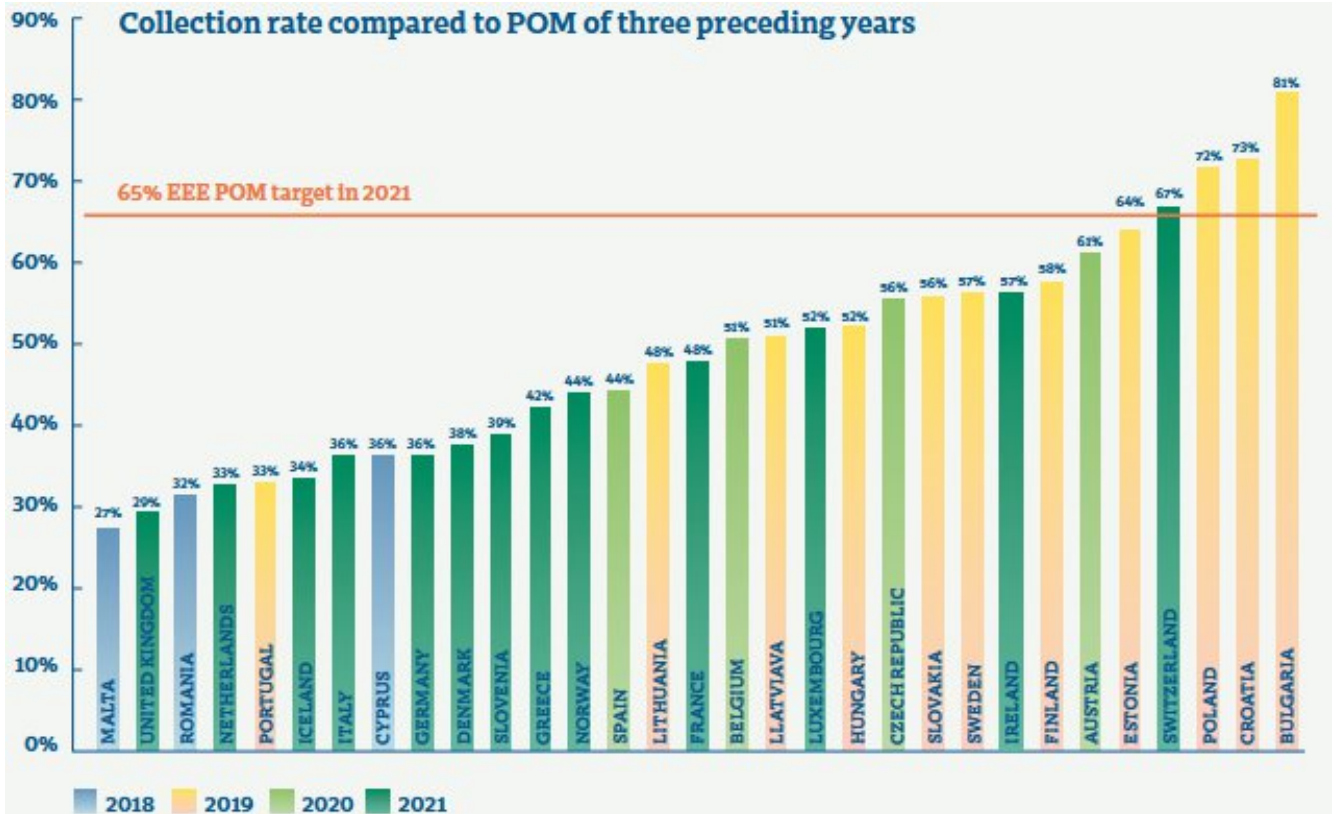


Figure 2 - Overview of collection rate compared to EEE POM of three preceding years for each country listed in the table

Figure 2 is from a 2022 report showing much EEE is placed on the market compared to what is collected and recycled for 32 European countries. EU, EEA and UK have a 65% target and only 4 countries at this stage achieved that rate. The UK was only at 29%, still 36% off the target and was 2nd worst performing country in the list (Baldé et al., 2021).

Figure 3 is from the same report, showing the same 32 European countries but showing how much WEEE is generated compared to how much WEEE is collected. UK is the 3rd worst performing country and 55% off the target of collecting 85% of WEEE (Baldé et al., 2021).

It should be noted that Figures 2 and 3 are for all electrical EEE and WEEE as there is no specific data for “small” EEE and WEEE.

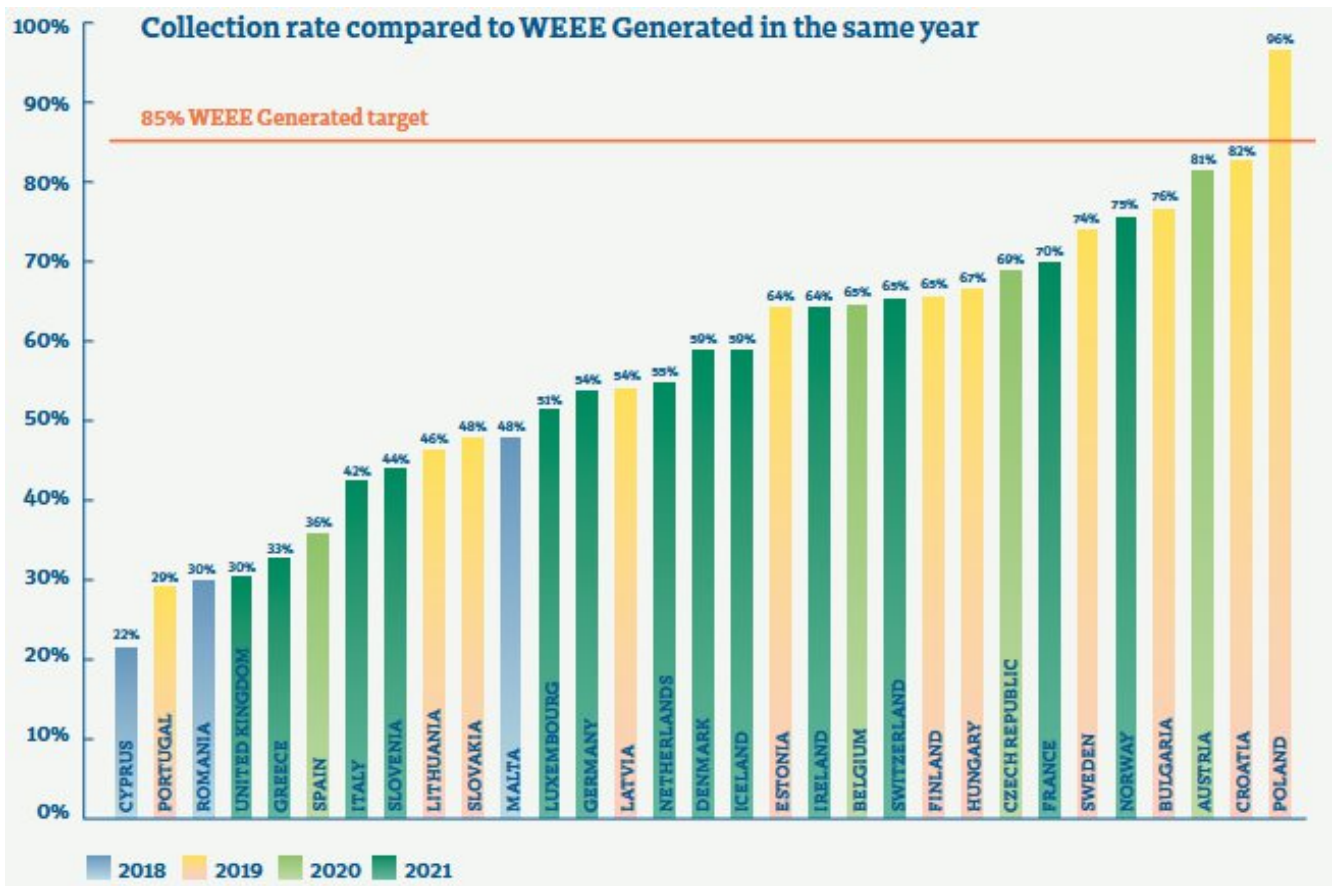


Figure 3 - Overview of collection rate compared to WEEE Generation each country listed in the table

Discussion

UK versus other European countries

While the UK performs very well in small WEEE collection and recycling compared to all developing nations across the world and performs very similar to the EU as one unit with both the UK and EU only recovering 34% and 36% of EEE placed on the market respectively as Table 1 demonstrates, when comparing the UK to individual countries within the EU and EEA, it starts to perform very badly.

When it comes to collection rate compared to EEE placed on the market (see Figure 2), the UK is 29% with the top performing countries performing at 81% Bulgaria, 73% Croatia, 72% Poland and 67% Switzerland. With regards to collection rate compared to WEEE Generation (see Figure 3), UK collects 30% of its WEEE compared to Poland 96%, Croatia 82%, Austria 81% and Bulgaria 76%.

It's interesting to see Poland, Croatia and Bulgaria occupy positions 1-4 for both Figures 2 and 3 as the top performers out of the 32 countries with WEEE collection rates are 2-3 times that of the UK.

Perhaps one reason is economic differences between those 3 countries and the UK both historically and presently. The UK 's current GDP per capita is currently over \$52,000. Whereas Poland is \$23,000, Croatia \$23,000 and Bulgaria \$17,000 (IMF, 2024). A report concludes that for every \$1000 increase in GDP PPP, 0.5kg of WEEE is created (Kusch & Hills, 2017).

Further historical economic differences could also explain the differences in WEEE collection. During Thatcher's terms as Prime Minister, the UK went through a social and cultural change. With easier finance, consumerism increased (Saunders & Saker, 1994). Today, 60% of the UK economy is consumer spending (ONS, n.d.). Spending is encouraged which could explain why UK citizens have a more linear approach to small electrical items, whereby citizens may buy the item, use it, replace it with something newer and then dispose of the original.

At the time, UK capitalist and consumerist economic model was at complete contrast of Communist Bulgaria and Croatia. Due to differences of economic systems and trade, and abundance and scarcity of materials historically, particularly when there were difficulties under communism, governments and citizens may have seen waste as a resource and wanted to recover as much material as possible (Pál & László, 2005).

However, GDP and historical economic systems doesn't explain the differences between the UK and Switzerland. With GDP per capita of \$100k (IMF, 2024) they are a global leader in e-waste recycling, with a recycling rate of 90% (Kamasa, 2023).

The difference between Switzerland and the UK is government policy. Since 2003, Switzerland has a clear plan for the collection and recycling of all e-waste, including small portable items. Over 21 years later, the UK still does not have any comprehensive plan, although consultation is underway (UK Government, 2023).

In Switzerland, all manufacturers, retailers and distributors must accept small electronic items for free, even if the customer didn't purchase it from them. This compares to the complexity of the UK where one of the largest electronic retailers, Argos, can only recycle a small electrical item in-store if they sell a similar item to the one you are recycling, and have bought it from them and have proof it was purchased in the last 28 days (Argos, n.d.). For

online purchases, Amazon’s recommendation with regards to small WEEE is to donate unwanted items to charity while sharing a hyper-link to recycling facilities. Underneath this they do offer a collection service for small WEEE, however the customer needs a printer for the label, the item needs to be packed, it can take 15 working days for collection and items will only be collected from the ground floor (Amazon, n.d.). Both retailers demonstrating why collected small WEEE is so low in the UK.

In Switzerland, collection and recycling is mandatory. The costs incurred by this are covered by an “ARF Fee”. This is when the purchase price of all electronic items includes an “advanced recycling fee” which is collected and distributed amongst those participating in the scheme (Kamasa, 2023). This demonstrates that government legislation is a key way e-waste recycling can be drastically increased.

Austria is another country the UK has fallen well behind. With GDP per capita of \$56k (IMF, 2024), it’s an economy similar to the UK. Austria is now the EU’s leader on how much e-waste they collect per capita, 15.46kg or 5.25kg for small e-waste (assuming small e-waste is 34% of total e-waste). This compares to 3kg and 2kg for the EU and UK respectively (See Table 4).

While Austria doesn’t appear to have governmental drivers like Switzerland’s levy, they have become a global leader in small WEEE collection by the sheer quantities of recycling points. There are over 2300 municipal recycling points in Austria, with further recycling points at electronic retailers who have to take small WEEE that was purchased there (elektro-ade, n.d.).

For Austria, as Figure 4 shows, all 2300+ municipal recycling centres are listed on one webpage map, with directions and opening times. There appears to be no such resource for this for Scotland, with each local authority listing their own recycling centres.

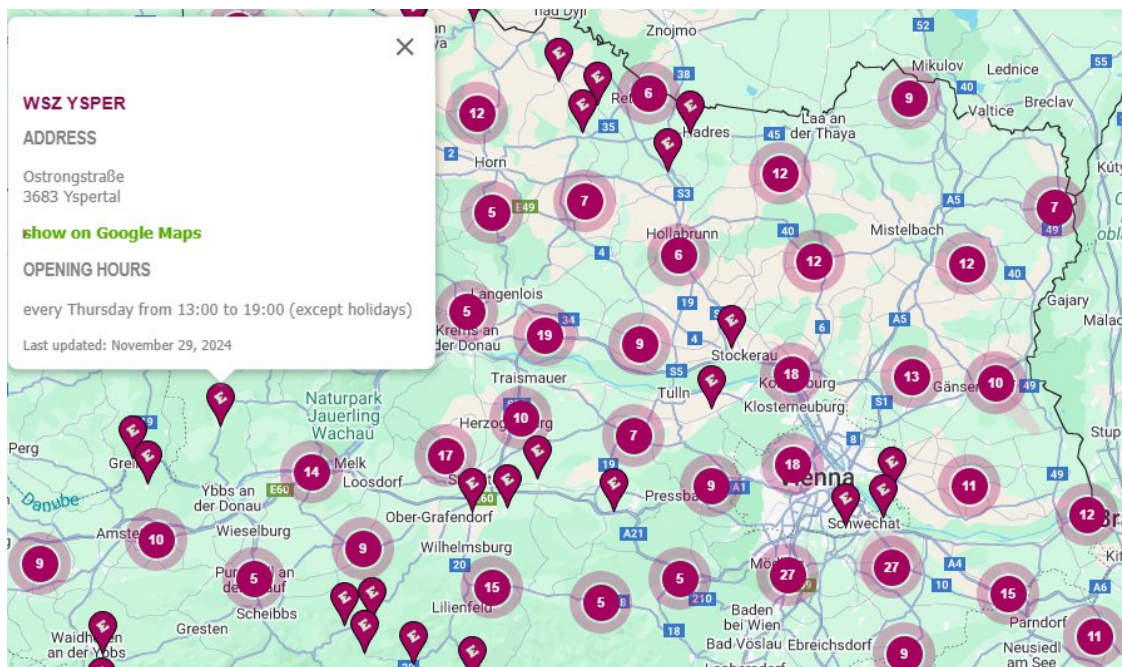


Figure 4 - All municipal recycling points and centres available in Austria with directions and opening times

Further complexity is added in the UK by each local authority having different rules. Glasgow for example forbids vans and cars over 1.8m high (Glasgow City Council, n.d.), while to

access Edinburgh's recycling centres, you need to book in advance (Edinburgh Council, n.d.-a).

Furthermore, typically you can only use recycling centres in the local authority you reside in, so even if a recycling centre in a neighbouring local authority is closer to you, you can't use it. In addition to this, recycling centres across the UK and Scotland are very car centric. North Lanarkshire (North Lanarkshire Council, n.d.) council forbids walk-ins to their facilities, access is by car only. Aberdeenshire Council (Aberdeenshire Council, n.d.) allows car-free access but only between 12pm and 12.30pm and to access a Cumberland Council operated facility on foot you need to apply for a pedestrian permit (Cumberland Council, n.d.). Again, further demonstrating the complexity in recycling.

One way to overcome the current car-centric approach to recycling in the UK would be to follow Poland, another EU leader in WEEE collection. Via the installation of over 5000 small WEEE recycling containers in supermarkets, public buildings and residential areas (Figures 7&8), and education campaigns such as "International e-waste day" research shows 83.4% of Poles know that WEEE (and thus small WEEE) contain valuable materials and resources (Banaszkiewicz et al., 2022) resulting in Poland collecting 96% of WEEE (weeeforum, n.d.) (Figure 3).



Figure 7 - Pop-up electrical waste collection point in residential area (source: <https://www.elektroeko.pl/>)



Figure 8 - Permanent small WEEE point in supermarket carpark (source: <https://www.dreamstime.com/>)

In the city of Poznan with a population of 541,000 (Zaręba et al., 2021), which is similar to Edinburgh, there are over 73 electronic waste containers across the city as Figure 5 demonstrates (ecomode.pl, n.d.). In Edinburgh, as Figure 6 demonstrates, there are no communal bins to recycle small electronic waste (Edinburgh Council, n.d.-b).

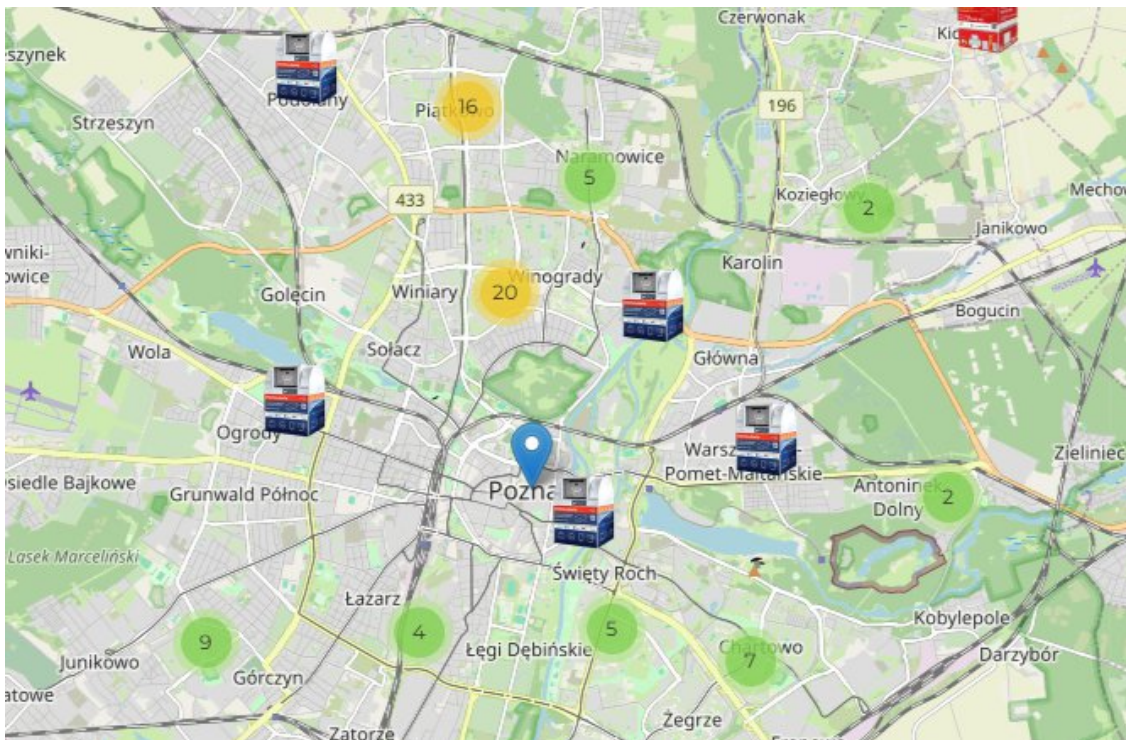


Figure 5 - Location of communal small WEEE containers in Poznan, complete with map, directions and information about that is accepted (source: <https://elektrycznesmieci.pl/mapa-pojemnikow/>)

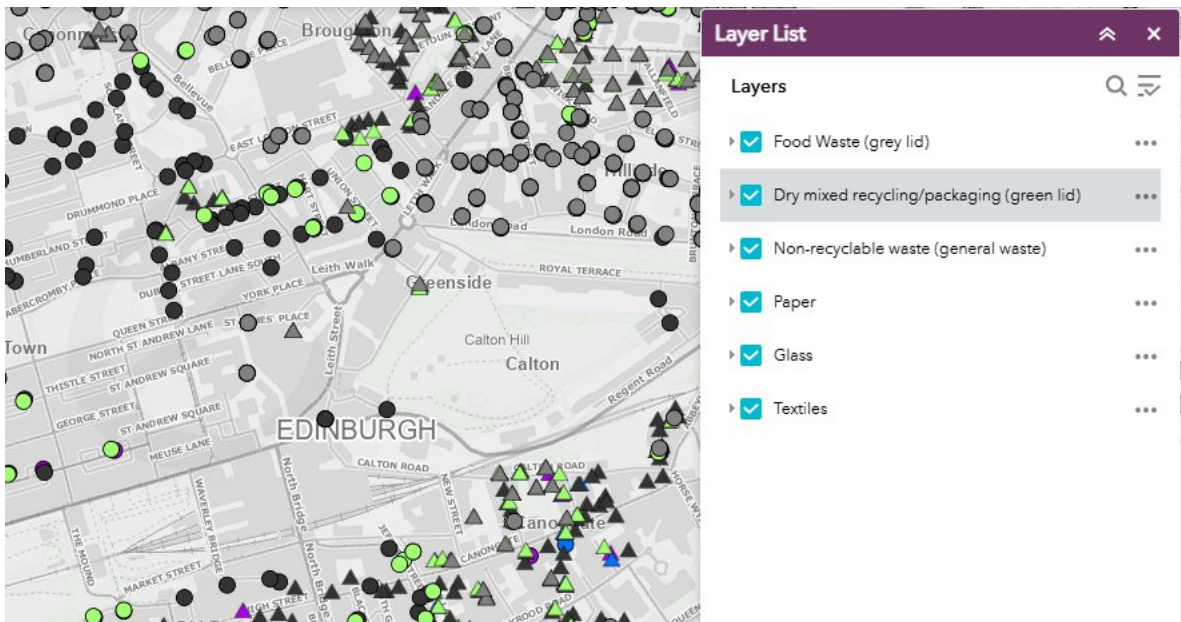


Figure 6 - Communal bins in Edinburgh showing there are non for recycling small WEEE (source: <https://cityofedinburgh.maps.arcgis.com/>)

Recommendations for UK

On the reforming of the producer responsibility system for all WEEE including small WEEE.

We recommend any amendments should include at least the following:

- 1) Reduce number of electronic waste categories from current 10-14 down to 6, with clear definitions of e-waste type and size (larger greater than 50cm in size, small less than 50cm in size), in-line with EU
- 2) Introduce a levy/fee for all electrical products sold within the UK (in-store and online) as well items imported from foreign online retailers, similar to what Switzerland has achieved
- 3) Media campaigns to educate businesses and consumers on their legal responsibilities for accepting small WEEE and the value of small WEEE as a resource. Despite what it states on their corporate website, currently it feels that untrained staff don't know how to deal with small WEEE in-stores
- 4) A huge increase in the number of recycling points available for consumers for small WEEE. Pop-up recycling vans for rural areas (Figure 4), or permanent re-cycling containers for urban areas (Figure 5).
- 5) Support and create legislation that should reduce the creation small WEEE. Support and implement measures such as: standardisation of cables to USB-C (European Parliament, 2022), consumers right to repair (Nigam, 2023), extending produce lifecycle by reducing corporations planned obsolescence (Nagase & Uehara, 2024).

Conclusion

The UK's collection and recycling rates of small WEEE is far superior to most, if not all developing countries, but is failing compared to some counterparts in the EU and EEA.

A 2021 report concluded that the UK was 2nd bottom of the collection of EEE placed on the market in the preceding 3 years. 4 countries surpassed the target of 65%, with a further 8 countries missing out by 1-9%. The UK missed out on that target by 36%.

The 85% collection of WEEE generated tells a similar story with the UK sitting 3rd bottom, missing that target by 50%. Poland surpassed this target by 11% with 5 countries narrowly missing out by 3-10%, showing how far behind the UK is.

While the UK has made improvements in dealing with small WEEE, its evident these improvements don't go far enough with thousands of tonnes of small WEEE ending up in household bins every year.

This can be because of restrictive and complex drop-off and collection for the recycling small WEEE by high street and online retailers. The UK's low rate of WEEE recycling is also caused by completely inadequate municipal and public e-waste recycling infrastructure. Currently, there are little to no communal recycling points for small WEEE, and local authority waste and recycling centres are completely car centric.

The lack of education for businesses and consumers on the value of small WEEE also contributes to landfilling of small WEEE. To quickly improve upon the current rates of small WEEE recycling, the UK Government needs to implement the recommendations above.

References

- Aberdeenshire Council. (n.d.). *Westhill recycling centre*. Retrieved November 29, 2024, from <https://www.aberdeenshire.gov.uk/waste/recycling/household-waste-recycling-centre-hwrc-opening-times/westhill-recycling-centre/>
- Amazon. (n.d.). *How to dispose of Electrical and Electronic Equipment*. Retrieved November 29, 2024, from <https://www.amazon.co.uk/gp/help/customer/display.html?nodeId=GZ8UKWT6JBYRDJJA>
- Argos. (n.d.). *Installation and recycling*. Retrieved November 29, 2024, from <https://help.argos.co.uk/help/installation/installrecycle>
- Baldé, C. P., Iattoni, G., Xu, C., & Yamamoto, T. (2021). *Update of WEEE Collection Rates, Targets, Flows, and Hoarding–2021*.
- Banaszkiewicz, K., Pasiiecznik, I., Cieżak, W., & Boer, E. den. (2022). Household E-Waste Management: A Case Study of Wrocław, Poland. *Sustainability*, 14(18). <https://doi.org/10.3390/su141811753>
- Cornelis P. Baldé, Ruediger Kuehr, Tales Yamamoto, Rosie McDonald, Elena D'Angelo, Shahana Althaf, Garam Bel, Otmar Deubzer, Elena Fernandez-Cubillo, Vanessa Forti, Vanessa Gray, Sunil Herat, Shunichi Honda, Giulia Iattoni, Deepali S. Khatriwal, Vittoria Luda di Cortemiglia, Yuliya Lobuntsova, Innocent Nnorom, Noémie Pralat, & Michelle Wagner. (2024). *THE GLOBAL EWASTE MONITOR 2024*. https://www.researchgate.net/profile/Innocent-Nnorom/publication/379226356_GEM_2024_18-03_web_page_per_page_web/links/6602825ca8baf573a1df225f/GEM-2024-18-03-web-per-page-web.pdf#page=106.16
- Cumberland Council. (n.d.). *Apply for a permit to bring waste to a Household Waste Recycling Centre*. Retrieved November 29, 2024, from <https://www.cumberland.gov.uk/bins-recycling-and-street-cleaning/recycling/apply-permit-bring-waste-household-waste-recycling-centre>
- DEFRA. (2023, December 11). *Regulations: Waste Electrical and Electronic Equipment (WEEE)*. <https://www.gov.uk/guidance/regulations-waste-electrical-and-electronic-equipment>
- ecomode.pl. (n.d.). *Elektrośmieci, czyli porażająco niebezpieczne odpady!* Retrieved November 29, 2024, from <https://www.ecomode.com.pl/elektrosmieci>
- Edinburgh Council. (n.d.-a). *Book a visit to a household waste recycling centre*. Retrieved November 29, 2024, from <https://www.edinburgh.gov.uk/bookrecycling>
- Edinburgh Council. (n.d.-b). *Find your on street recycling and non recyclable bins*. Retrieved November 29, 2024, from <https://www.edinburgh.gov.uk/streetrecyclingandnonrecyclablebins>
- elektro-ade. (n.d.). *List of collection points*. Retrieved November 27, 2024, from <https://www.elektro-ade.at/elektrogeraete-sammeln/liste-der-sammelstellen-in-oesterreich/>
- Environment Agency. (2023, August 2). *Electrical and electronic equipment (EEE) covered by the WEEE Regulations*. <https://www.gov.uk/government/publications/electrical-and-electronic-equipment-eee-covered-by-the-weee-regulations/electrical-and-electronic-equipment-eee-covered-by-the-weee-regulations>
- Environment Agency. (2024, September 3). *Statistical data set - Waste electrical and electronic*

equipment (WEEE) in the UK. <https://www.gov.uk/government/statistical-data-sets/waste-electrical-and-electronic-equipment-weee-in-the-uk>

EU. (2023, July 11). *EU population increases again after two years decrease*. <https://ec.europa.eu/eurostat/web/products-eurostat-news/w/edn-20230711-1>

EU. (2024, October). *Waste statistics - electrical and electronic equipment*. Eurostat. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Waste_statistics_-_electrical_and_electronic_equipment

European Commission. (n.d.). *Waste from Electrical and Electronic Equipment (WEEE)*. Retrieved November 26, 2024, from https://environment.ec.europa.eu/topics/waste-and-recycling/waste-electrical-and-electronic-equipment-weee_en

European Parliament. (2022, October 4). *Long-awaited common charger for mobile devices will be a reality in 2024*. <https://www.europarl.europa.eu/news/en/press-room/20220930IPR41928/long-awaited-common-charger-for-mobile-devices-will-be-a-reality-in-2024>

Glasgow City Council. (n.d.). *Household Waste Recycling Centres*. Retrieved November 29, 2024, from <https://www.glasgow.gov.uk/article/1529/Household-Waste-Recycling-Centres>

IMF. (2024). *GDP per capita, current prices*. <https://www.imf.org/external/datamapper/NGDPDPC@WEO/GBR/DEU/GRC>

Kamasa, J. (2023). *Mind the E-Waste: A Case for Switzerland*. https://css.ethz.ch/en/publications/css-policy-perspectives/details.html?id=/m/i/n/d/mind_the_ewaste_a_case_for_switzerland

Kusch, S., & Hills, C. D. (2017). The Link between e-Waste and GDP—New Insights from Data from the Pan-European Region. *Resources*, 6(2). <https://doi.org/10.3390/resources6020015>

Nagase, Y., & Uehara, T. (2024). The potential impact of the new 'Right to Repair' rules on electrical and electronic equipment waste: A case study of the UK. *Waste Management*, 182, 175–185. <https://doi.org/https://doi.org/10.1016/j.wasman.2024.04.032>

Nigam, S. (2023). Right to Repair: A Sustainable Solution for E-Waste Reduction. *Jus Corpus LJ*, 4, 627.

North Lanarkshire Council. (n.d.). *Recycling centres*. Retrieved November 29, 2024, from <https://www.northlanarkshire.gov.uk/bins-and-recycling/recycling-facilities/recycling-centres>

ONS. (n.d.). *GDP and me*. Retrieved November 27, 2024, from <https://www.ons.gov.uk/visualisations/dvc396/index.html>

ONS. (2024, March 26). *Population of UK at mid-2022*. <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2022#:~:text=We%20estimate%20the%20UK%20population,for%20the%20four%20constituent%20countries>.

Pál, G., & László, T. (2005). On the Problem of Scarcity. *Transylvanian Review of Administrative Sciences (Online)*.

Saunders, J., & Saker, J. (1994). The changing consumer in the UK. *International Journal of Research in Marketing*, 11(5), 477–489. [https://doi.org/https://doi.org/10.1016/0167-8116\(94\)00007-7](https://doi.org/https://doi.org/10.1016/0167-8116(94)00007-7)

- UK Government. (2013, December 10). *The Waste Electrical and Electronic Equipment Regulations 2013*.
- UK Government. (2023, December 28). *Electrical waste: reforming the producer responsibility system*. <https://www.gov.uk/government/consultations/electrical-waste-reforming-the-producer-responsibility-system>
- UNITAR. (2024, March 20). *Global e-Waste Monitor 2024: Electronic Waste Rising Five Times Faster than Documented E-waste Recycling*. United Nations Institute for Training and Research.
- weeeforum. (n.d.). *IEWD Poland*. Retrieved November 27, 2024, from <https://weee-forum.org/international-waste-country/pl/>
- Zaręba, A., Widawski, K., Kołodziejczyk, K., Krzemińska, A., Marek, A., & Rozenkiewicz, A. (2021). City profile: Poznań – One of the “normals” in the centre of Europe. *Cities*, *111*, 103095. <https://doi.org/https://doi.org/10.1016/j.cities.2020.103095>