

Study on behalf of the
European Portable Battery Association (EPBA)

The collection of waste portable batteries in Europe

in view of the achievability of the collection rates
stipulated by the EU Batteries Directive and
EU Batteries Regulation

Short update with 2021 and 2022 data - June 2024



SHORT UPDATE COVERING 2021/22 DATA

Introduction

The collection of portable primary and rechargeable batteries in Europe is mandated by Directive 2006/66/EC which requires Member States to achieve a collection rate of 25% in 2012 and 45% in 2016. The European portable power industry commissioned consultants Perchards/Sagis (since 2022 Landbell Sagis) to carry out a study investigating and advising on the achievement of mandatory collection rates for portable primary and rechargeable batteries in EU Member States, plus Iceland, Norway and Switzerland. The first study was published in August 2013. In 2014/5/6/7, EPBA commissioned an update of the study considering the previous year's data. For 2017, 2018, 2019/20 and **2021/22 data, a short update was agreed upon**. Industry intended to use the study as a basis for dialogue with the European Commission, Member State Governments, their agencies, and other stakeholders to highlight the limitations of the current regulations and practices as a basis for suggested improvements. **This short update includes comments on the provisions of Batteries Regulation (EU) 2023/1542, which was published in July 2023.**

Methodology

The study's findings rely on primary research of publications of collection organisations (notably annual reports) and national authorities, supported by questionnaires and interviews with representatives from these organisations between May 2012 to August 2013. The consultants have attempted to explain the stated collection rates quantitatively by collecting hundreds of data points for each country and trying to identify correlations between them. This has proven challenging for several reasons: A) The sheer magnitude of variables with multiple interdependencies; B) Incomplete and incomparable historical data (prior to Batteries Directive 2006/66/EC there were no requirements at EU level to report on portable batteries, and if data were collected they were based on varying definitions); C) Diverging national terminology for key parameters of the schemes and organisations, such as collection sources; and D) Changes in national legislation and the rapid development of scheme implementation.

Data sources and accuracy

Accuracy of portable battery collection rates in this report: In the absence of the official collection rates that may be adjusted by statistically significant estimates,¹ the collection rates used in this report are calculated using unadjusted POM and collection volume data released by member states and / or organisations. Where current data are not available, earlier data or estimates based on earlier years or partial data from organisations are used. In September 2016, EUROSTAT released portable batteries data reported by member states to the European Commission for the first time. A new section in the report compared these data with those in previous versions of this report. **Data for successive updates of this study have increasingly relied on the data reported by Member States to EUROSTAT, which last published 2021 data in December 2023.**

Per capita volume data: To allow for meaningful cross-country comparisons, it is necessary to use battery collection and POM data on a per capita basis. For consistency, this report only uses EUROSTAT population data to arrive at per capita volumes. Battery organisations and national authorities often use other data sources or data from a single base year. Thus, per capita data in this report may vary slightly from those released nationally. All updates use the EUROSTAT population datasets of the relevant year.

Sources for WEEE data: Eurostat EEE and WEEE data are used for comparative purposes.

Acknowledgements

The authors would like to thank the numerous individuals and organisations that have provided valuable data and input to this study. Any errors or omissions remain the responsibility of the authors.

¹ Batteries Directive 2006/66/EC requires Member States to calculate the collection rate for the first time for the calendar year 2011 and report results of the four-year period 27 September 2008 to 26 September 2012 to the Commission by 26 June 2013. Commission Decision 2008/763/EC allows Member States to base their calculation of battery sales (POM, placed on the market) volumes on 'collected data or statistically significant estimates based on collected data'. For many countries, these estimates may have a significant impact on the official collection rates, especially in those that did not have POM reporting procedures for batteries in EEE in place throughout the 2009-2012 period and those with high uncertainty about the reported collection volumes.

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Terminology

'Scheme'	is used to refer to the overarching regime in view of the parties responsible for the management (consumer awareness, collection, and treatment) of waste portable batteries.
'Scheme models'	can be distinguished by the parties held financially and/or organisationally responsible for waste battery management. For the purpose of this study, the following main scheme models are identified: 'State fund model', a 'Single organisation model' (also 'Environmental agreement model') and a 'Competing organisations model'.
'Organisation'	is used to refer to entities engaged in coordinating waste battery management and involved in assisting to fulfil producer responsibility obligations. Subject to the national context, 'organisations' may be referred to as 'compliance systems', 'producer compliance schemes', 'producer compliance organisations', 'collective schemes' or 'approved waste managers' which may be subject to licensing or approval requirements, restriction on their ownership, profit objective and business activities, etc.
'POM'	(Placed On the Market) refers to sales volumes of portable batteries that producers are obligated to report.
'Collection rate'	refers to the use of the calculation methodology of Directive 2006/66/EC which divides the collection volume in the current year by the average weight placed on market in current and two preceding years. If, due to unavailability of 3 years of POM data, only the current year POM is used, the text states 'collection rate on current year basis'.
'Batteries Directive'	refers to Batteries Directive 2006/66/EC ... on batteries and accumulators and waste batteries and accumulators ...
'BBWR'	refers to Regulation (EU) 2023/1542 ... concerning batteries and waste batteries ...
'AfC'	refers to waste batteries 'available for collection' as an alternative denominator to batteries "placed on the market" in the calculation methodology of the collection rate. In view of the increased lifetime of some portable and LMT batteries, an AfC based calculation methodology may better reflect the performance of a collection system. The BBWR empowers the Commission to amend the calculation methodology for portable and LMT batteries by Aug-27.

Country short codes

Austria	AT	Greece	GR	Poland	PL
Belgium	BE	Hungary	HU	Portugal	PT
Bulgaria	BG	Iceland	IC	Romania	RO
Croatia	HR	Ireland	IE	Slovakia	SK
Cyprus	CY	Italy	IT	Slovenia	SI
Czech Republic	CZ	Latvia	LV	Spain	ES
Denmark	DK	Lithuania	LT	Sweden	SE
Estonia	EE	Luxembourg	LU	Switzerland	CH
Finland	FI	Malta	MT	UK	UK
France	FR	Netherlands	NL		
Germany	DE	Norway	NO		

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COLLECTION RATE ACHIEVEMENT

Development of EEA²+Switzerland+UK wide reported POM and collection volumes

Data available for this study suggest that in **2022 around 295,000 tonnes** of portable batteries were reported to have been **placed on the market** in the EEA plus Switzerland and the UK, **after an all-time peak of 301,000 tons in 2021, following strong increases since 2019. About 134,000 tonnes** of waste portable batteries were reported as **collected in 2022, 0.5% more than in 2021, which is the lowest ever collection rate increase** (except for the collection decline in 2020 due to Covid related lockdowns). **Due to the elevated level of POM since 2019 and slowing collection growth, the collection rate decreased to 46% in 2022, down from a peak of above 50% in 2019.**

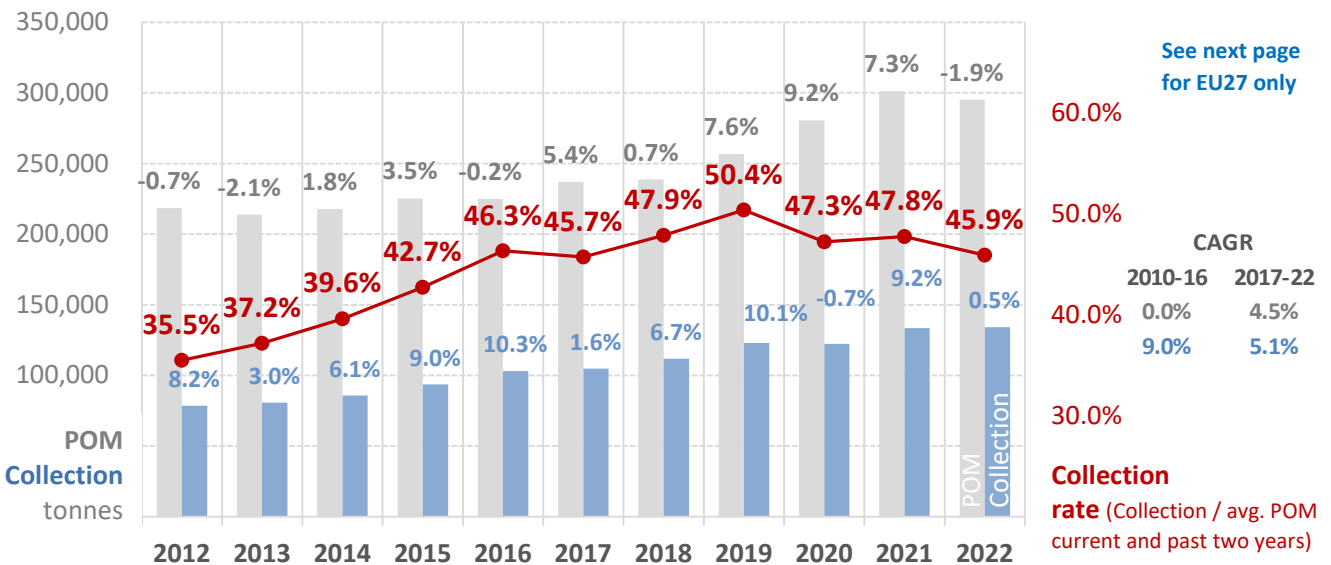


Figure 1: EEA + UK + Switzerland, portable battery POM and collection tonnages 2012 – 2022.

POM: From 2010 to **2022**, the total mass of portable batteries POM increased by an **annual average of 2.3%** (the population of the covered countries grew by 0.2%). Following the 2008 global financial crisis, POM fell to a low of 412 g per capita in 2013. It has since increased, however, and **peaked at 570 g per capita in 2021**. In unit terms, around 23 portable batteries per capita were placed on the market in 2020, up from 19 portable batteries per capita in 2013.

Collection: From 2010 to **2022**, reported collection increased by an **annual average of 6.3%**, from 119 g in 2010 per capita to a peak of **254 g in 2022**. Strong year-on-year growth was observed in 2011 and 2012 (+18.1% and +8.2%), as well as in 2015 and 2016 (+9% and +10.2%) to meet the collection rates mandated for these years. This led **to an average annual growth rate of 9% from 2010 to 2016, significantly above the 5.1% annual average growth from 2017 to 2022.**

Portable Batteries, EEA + UK + Switzerl.	2012	2014	2016	2017	2018	2019	2020	2021	2022
POM (Grams per capita)	422	418	430	451	453	487	530	570	558
Collection (Grams per capita)	152	165	197	199	212	233	231	253	254
Collection / POM	35.9%	39.4%	45.9%	44.2%	46.7%	47.9%	43.6%	44.3%	45.4%
Collection rate³	35.5%	39.6%	46.3%	45.7%	47.7%	50.4%	47.3%	47.8%	45.9%

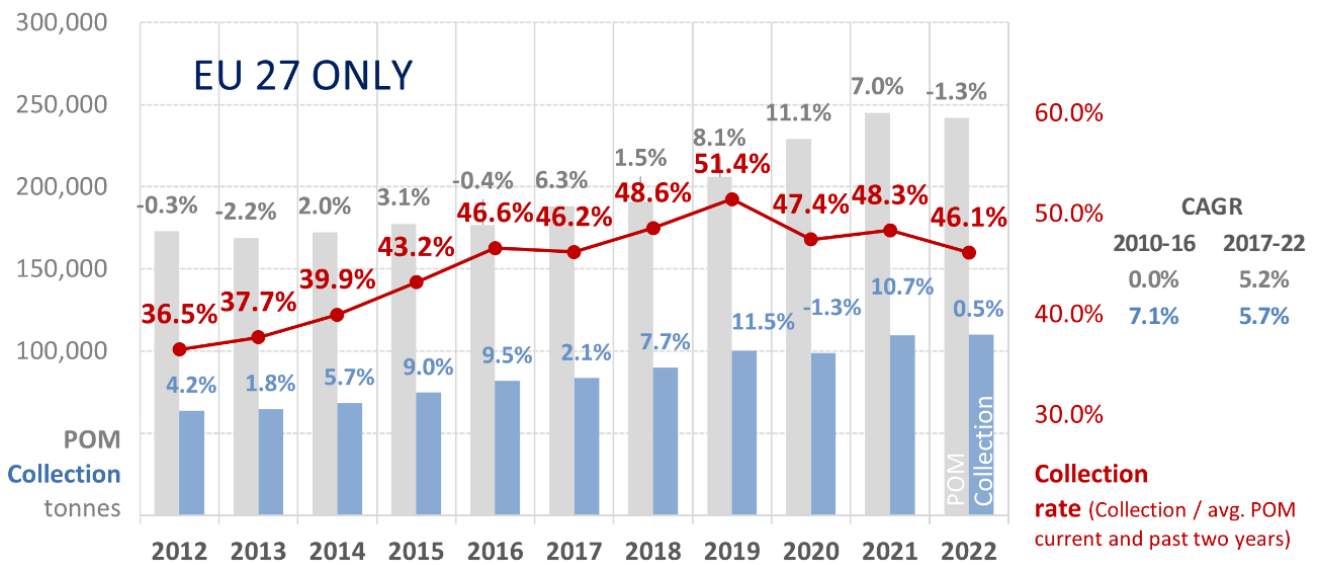
Table 1: EEA + Switzerland + UK, portable battery POM and collection, gram and units per capita

² 30 countries are signatories to the European Economic Area (EEA) agreement post Brexit. However, EEA member **Liechtenstein** is part of the Swiss customs territory and thereby subject to a large part of Swiss legislation, including waste legislation, and the Swiss producer responsibility organisations operate on its territory. **Switzerland** is not a member of either the EU or the EEA but has adopted broadly similar rules on batteries as the EU. It is included in this study for the sake of completeness.

³ Collection rate calculation methodology of Batteries Directive: Collection / avg. POM of current year and past two years

Development of EU27 POM and collection volumes

Data available for this study suggest that in **2022 around 242,000 tonnes** of portable batteries were reported to have been **placed on the market** in the EU27, **after an all-time peak of 245,000 tons in 2021, following strong increases since 2019**. About 110,000 tonnes of waste portable batteries were reported as **collected in 2022, 0.5% more than in 2021, which is the lowest ever collection rate increase** (except for the collection decline in 2020 due to Covid related lockdowns). **Due to the elevated level of POM since 2019 and slowing collection growth, the collection rate decreased to 46% in 2022, down from a peak of above 51% in 2019.**



Portable Batteries, EU27	2012	2014	2016	2017	2018	2019	2020	2021	2022
POM (Grams per capita)	392	389	397	422	427	461	512	548	541
Collection (Grams per capita)	144	154	184	187	201	224	221	245	246
Collection / POM	37%	40%	46%	44%	47%	49%	43%	45%	46%
Collection rate ⁴	36%	40%	47%	46%	49%	51%	47%	48%	46%

⁴ Collection rate calculation methodology of Batteries Directive: Collection / avg. POM of current year and past two years

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National portable batteries collection rates 2022

Batteries Directive 2006/66/EC mandates a collection rate for portable batteries of 25% by 2012 and 45% by 2016 and going forward. Data available from the 31 countries investigated suggest that

- **23 countries** have reported a collection rate close to or above 45%⁵ in the 3 years 2020/21/22:
 - 5 countries - Austria, Belgium, Luxembourg, Sweden and Switzerland - exceeded 45% since before 2011.
 - 8 countries - Denmark, Slovakia, Bulgaria, Finland, Hungary, Netherlands (36% in 2022 but back at 46% in 2023), Germany and Poland - **reached 45% for the first time between 2011 to 2015**;
 - 10 countries - Croatia, the Czechia, Ireland, France, Latvia, Lithuania, Norway, **Romania**, Spain, UK - **reached 45% for the first time between 2016 to 2019**.
- The remaining **8 countries'** collection rates have fallen or remain **below 45%**:
 - Slovenia and Cyprus have fallen to or remain **around 40%**;
 - Iceland, **Greece, Italy** and **Estonia** have fallen to or remain **around 30%**;
 - **Portugal**, Malta have fallen to or remain **around 20%**.

Outlook: For 2025, the collection rate calculation will continue to be based on the Batteries Directive's portable battery definition and calculation methodology. From 2026,⁶ the battery definitions and calculation methodology of the Batteries Regulation will apply. In 2026, the collection target for portable batteries will remain 45%, but will increase to 63% in 2027 and 73% in 2030.⁷ As of 2022, no country except Luxembourg and Norway⁸ is close to consistently reaching the 63% collection target mandated for 2027.

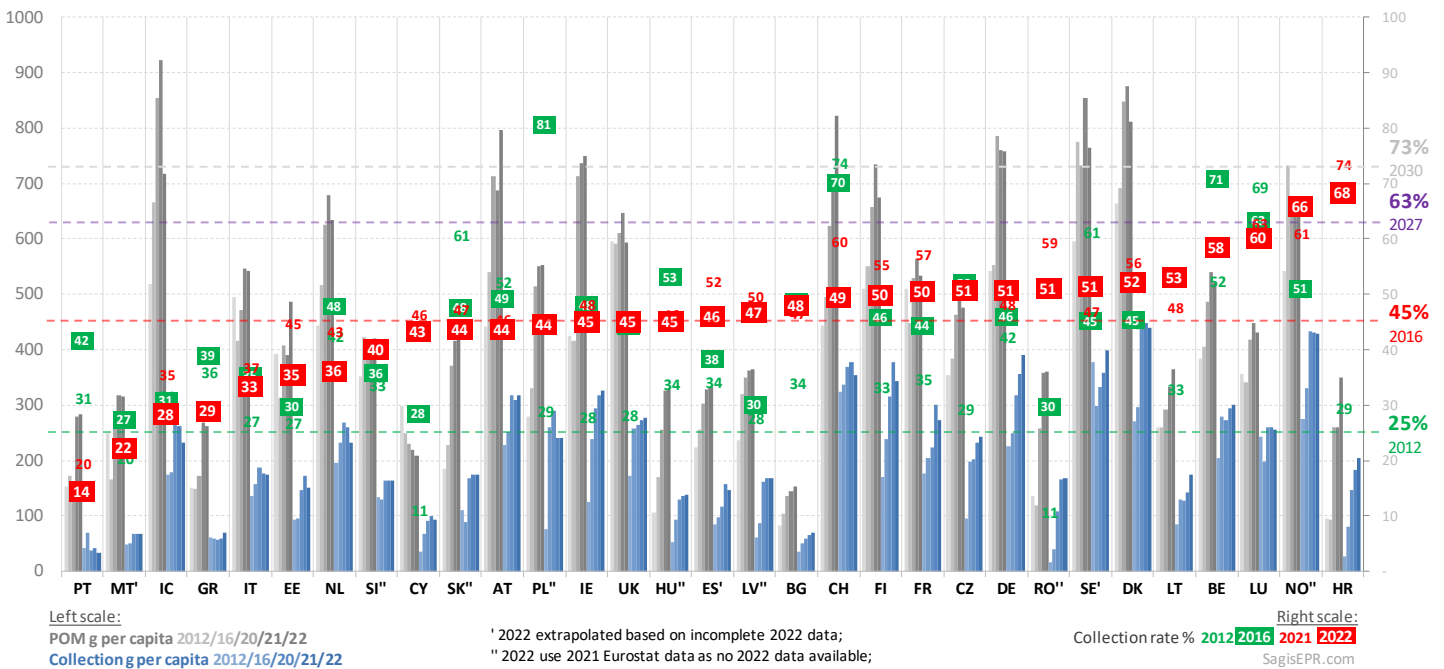


Figure 2: EEA + Switzerland + UK, portable battery POM and collection per capita and collection rates 2012/16/21/22
[Open large image in browser](#)

⁵ Taking into account rounded percentages: e.g. 44.5% is counted as 45%.
⁶ The first calendar year after entry into force of an act establishing reporting formats that the Commission must adopt by August 25 (BBWR Art. 75.7).
⁷ The Commission may adopt by August 2027 an act amending the methodology and collection targets (e.g. taking into account batteries available for collection) while maintaining equivalent ambition and timelines (BBWR Art. 59.7).
⁸ On the basis of Luxembourg's comparatively low POM and uncertain POM of embedded batteries in Norway.

Uncertainties about the collection rate for portable batteries

National collection rates have been subject to significant uncertainties, which severely limit them as a tool for comparing the performance of collection schemes:

1. **Implausible amount of waste portable lead batteries:** Rates would be substantially lower in some countries if measures were taken to ensure that only waste lead batteries are counted towards the collection rate that were declared as 'portable lead batteries' when POM. Note: Only a few countries have or publish data about the share of lead portable batteries in POM and collection (notably the UK, France, Poland and Germany).
2. **Estimates of batteries embedded in EEE:** Substantial uncertainties continue to exist about the weight of batteries embedded in EEE, for which data are not available in some countries.
3. **Varying categorisations of e-bike and similar batteries:** There is an increase in lithium accumulators in sporting and other applications, as well as different national practices of counting them as portable or industrial batteries at the POM and/or collection stages. Note: Switzerland publishes a separate collection rates for lithium batteries.
4. **Varying weight thresholds:** Rates would vary by an estimated +/- 3% if a common interpretation of the term 'portable battery' was applied in terms of the weight thresholds for portable batteries used in some countries. Note: Greece increased the threshold, UK lowered it.

The Batteries Regulation addresses the causes of these uncertainties

The Regulation Concerning Batteries and Waste Batteries (EU) 2023/1542 [BBWR], published in July 2023, addresses the shortcoming in the Batteries Directive that cause the above uncertainties:

Reporting by battery category and by chemistry at POM, collection, recycling stage (*addresses uncertainty 1, 3*): The BBWR requires Member States to report the mass flow of batteries at every stage by battery category and by chemistry⁹, which the Batteries Directive did not. This will allow the identification of implausible mass flows (i.e. more lead batteries and portable batteries collected than have been placed on the market).

The Commission is to review Member States' reports (*addresses all uncertainties*): The BBWR requires reports from Member States to be accompanied by a quality check report that explains methodologies, estimates used, etc. The Commission must review the report and publish an assessment of each Member State's data and methodologies.

LMT (light means of transport) batteries introduced as a new battery category (*mainly addresses uncertainty 3*): Under the Batteries Directive, these batteries were categorised as industrial batteries but - due to their nature of often becoming waste in private households or small businesses – may have been POM reported as portable batteries and found their way into portable battery collections.

5 kg threshold included in the definition of portable battery (*mainly addresses uncertainty 4*): The BBWR replaces the Directive's ambiguous "can be hand-carried" with a 5kg threshold, thus harmonizing Member States' interpretations.

In addition, the BBWR

- revises the calculation methodology for portable batteries: Collection in the current year is divided by the average sales in the previous 3 years (as opposed to by the sales in the current and the past 2 years). This should account for the larger share of long-life lithium batteries (in power tools, etc.). Note: The same methodology is used to calculate the collection rate for LMT batteries (51% in 2028, 61% in 2031).
- empowers the Commission to revise the calculation methodology and the collection target for portable batteries by Aug-27 to better reflect batteries available for collection.

⁹ The Commission is to establish the detailed reporting format by August 2025 (BBWR Art. 76.1,5).

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Countries' shares of EEA POM and collection volume

Largely correlating to population size, seven countries (DE, UK, FR, IT, PL, ES, NL, SE) account for nearly 80% of POM and collection of portable batteries. Adding the next five (AT, BE, CH, CZ, DK) brings the total to around 90%.

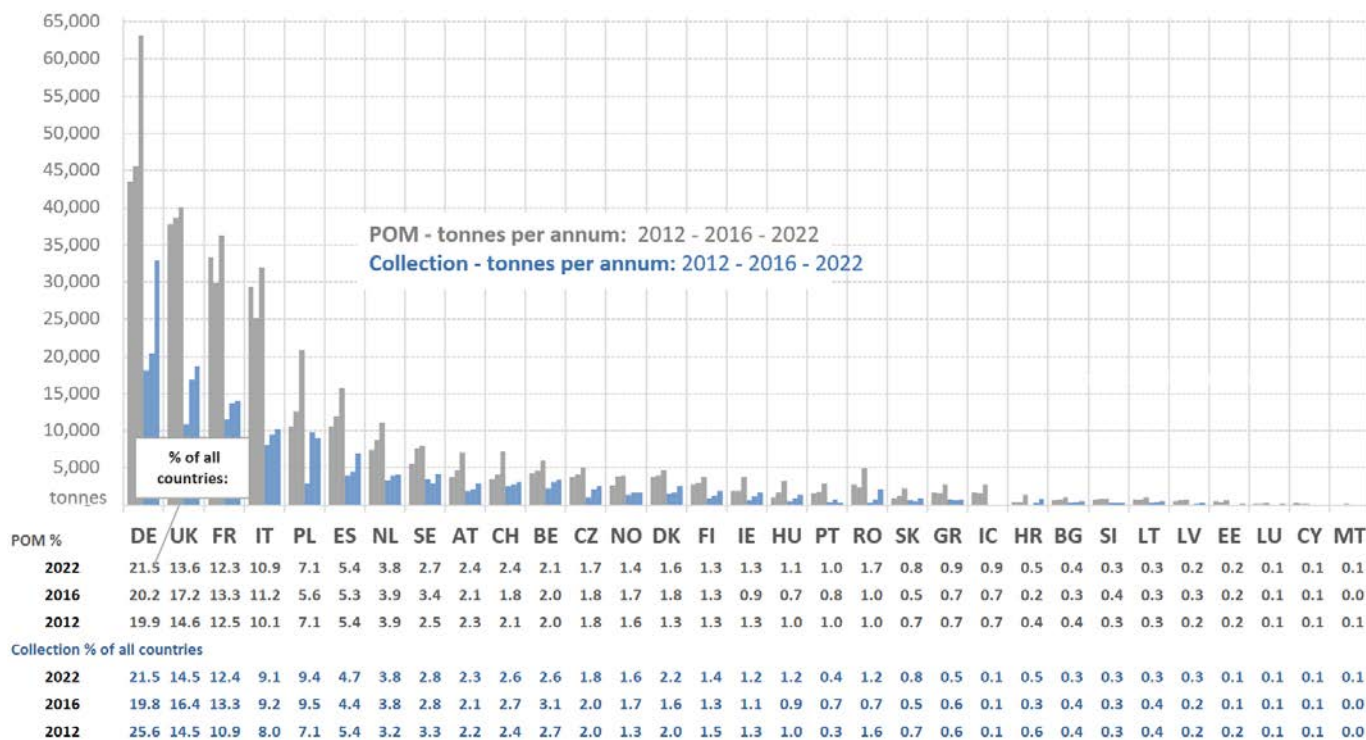


Figure 3: EEA + Switzerland, portable battery POM and collection tonnages per country 2012, 2016, 2022

COUNTRY ANALYSES

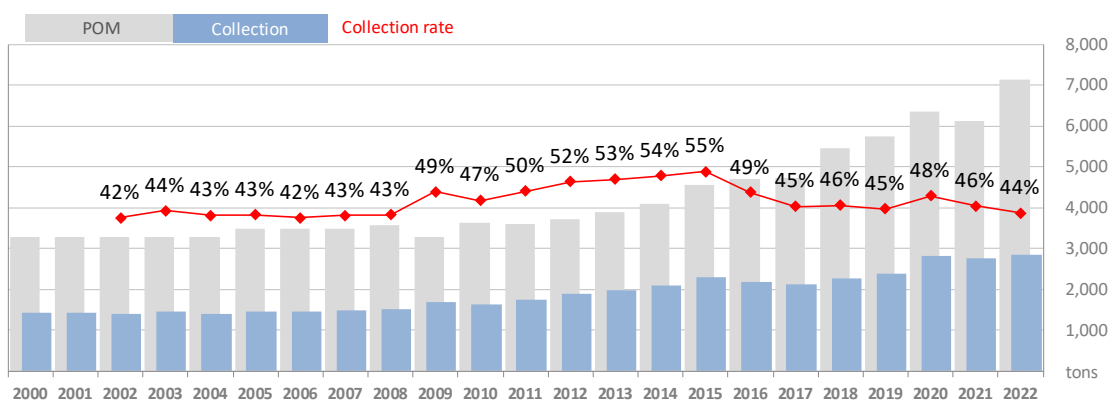
AUSTRIA

Legal and organisational developments: The Austrian battery collection scheme has been built up since the early nineties. In 2008, it transitioned from a single organisation model to competing organisations: around 900 producers comply through four WEEE compliance organisations that all contract waste management company *Saubermacher AG*, which takes back batteries from retailers and around 1,600 municipalities. Municipalities continue to play a key role in collection. The clearing house organises awareness creation measures effectively. In July 2021, an amendment to the Batteries Ordinance notably aligned the producer definition and registration requirements with those of the Waste Act and the WEEE Ordinance (tax number required, distance sellers now obligated) and removed the minimum market share requirement (5%) for PROs.

Government guidance on the demarcation of battery categories, issued in November 2017, categorises *industrial* batteries used in household EEE as *portable* batteries to ensure the financing of their waste management. This requires that batteries used for things such as e-bikes or wheelchairs be classified as portable batteries from 2018.

In October 2017, a new Waste Treatment Ordinance set out specific technical requirements for the handling of lithium batteries: lithium batteries must be removed from WEEE at the collection point if removable by the end-user. Moreover, certain lithium batteries, incl. those weighing over 500 g, must be collected and stored separately from all other batteries, including other lithium batteries. As such, a new separate collection infrastructure for lithium batteries became necessary (notably at retailers) and battery compliance organisations now require POM declarations (and recycling fee payments) to be split into lithium-containing and other batteries. Lithium battery collection is also operated by Saubermacher. In September 2018, the company established a lithium battery recycling plant in Bremerhaven, Germany and established a joint venture with German Interseroh to provide waste management services to end users of industrial lithium batteries in Germany.

Collection rate: Following a 55% peak in the collection rate in 2015, it fell to 49% in 2016 due a 5% drop in the collection volume, assumed to result from an increasing share of rechargeable batteries with longer live times. **From 2017 to 2022, POM increased by 47% (from 541 to 797 g per capita), while collection increased by 32% (from 241 to 318 g per capita). In 2022, the collection rate fell below 45% for the first time since 2009, as POM increased 17% over 2021, far exceeding the increase of collection (3%).**



Source: From 2011 EAK

Other issues: A February 2018 survey found a striking difference between younger and older respondents: 71% of over 50-year-olds said they always dispose of expired batteries in collection boxes at retailers or municipalities while only 38% of under 30-year-olds claimed to do so.

BELGIUM

Legal and organisational developments: Backed up by an eco-tax from 1996 (until 2012), all three Regions had transposed the 2006 EU Batteries Directive into regional legislation by late 2010. Single organisation BEBAT has been in operation since 1996 and has achieved high consumer participation (87%). BEBAT’s operations are based on Environmental Agreements (MBOs) between each of the three regional governments and sector associations.

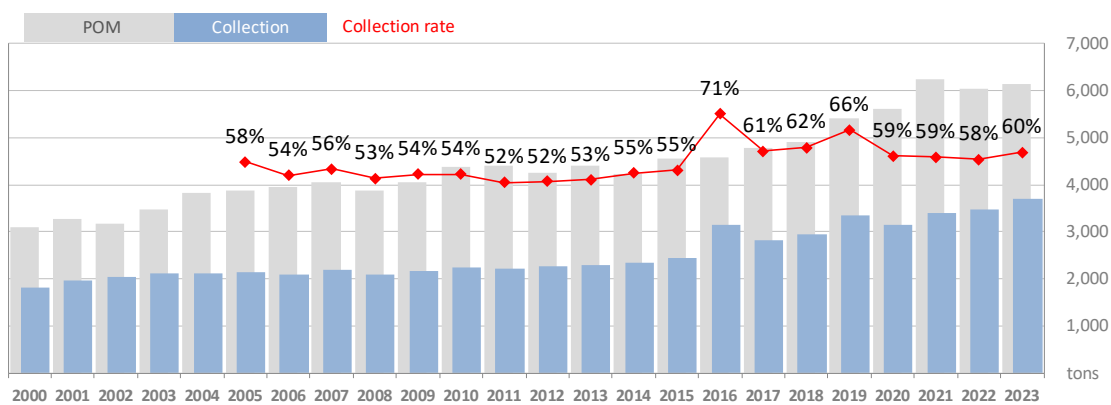
In December 2016, Bebat merged with Recybat, which had been the single organisation managing automotive batteries to streamline services for obligated producers. Bebat is now the only organisation responsible for all three battery categories (portable, industrial and automotive).

Since 2010, when Bebat established its sorting facility in Flanders, Wallonia has introduced various measures aimed at restricting Bebat’s operation in the region, notably 2016 legislation that would significantly change the waste batteries regime that remains unenforced. In March 2018, the Constitutional Court made it clear that Wallonia must consult with the other regions before doing so.

From around 2015, the Flemish and Walloon Government charged an annual tax of 3% on the financial reserves of BEBAT and the WEEE compliance organisation Recupel to accelerate their reduction. However, the collected taxes had to be returned after the constitutional court annulled them in 2017 and 2018. The Court i.a. argued that the regions did not have the authority to levy organisations not established in their territory and that the origin of the funds taxed could not be traced to only these territories.

In 2018/19, Flanders and Brussels Capital region signed 5-year MBOs governing Bebat, newly covering all battery types (after Bebat’s merger with Recybat). In addition, the Flanders Region signed an MBO for electric vehicle batteries governing the organisation Febelauto. Wallonia concluded an MBO with Bebat in 2013 (amended 2019) but has not renewed it. **The three regions are discussing a common approach to EPR. In July 2023, a draft 'Inter-regional framework for EPR' was released proposing common overarching EPR principles to all products subject to EPR, including batteries.**

Collection rate: In 2016, the collection rate increased sharply to 71% (2015: 55%) due to exceptional events: According to Bebat, the increase was mainly due to doubling of collection in Flemish schools (+548 tonnes – schools contributed 28% to total battery collection in 2016, vs 16% in 2015) and collection by companies (+35%) due, in part, to the acquisition of a battery brand. In 2017, the collection rate recorrected to 61%: POM increased by 4% over 2016 while collection fell 11% below the ‘exceptional event’ driven volume but was still 12% higher than in 2015. In 2018, a 3% rise in POM and 4% rise in collection increased the collection rate to 62%. In 2019, POM and collection increased by 10% and 14% respectively, pushing the collection rate up to 66%. **In 2021, POM peaked at 540 g per capita, and has remained at a high level since. Collection has consistently increased since 2020, having peaked at 315 g per capita in 2023. A collection rate of around 60% has been achieved since 2017.** According to Bebat, only 1 battery is found in every 100kg of residual household waste in Belgium, which means that Bebat collects 90% of all batteries that are available for collection as discarded by consumers.

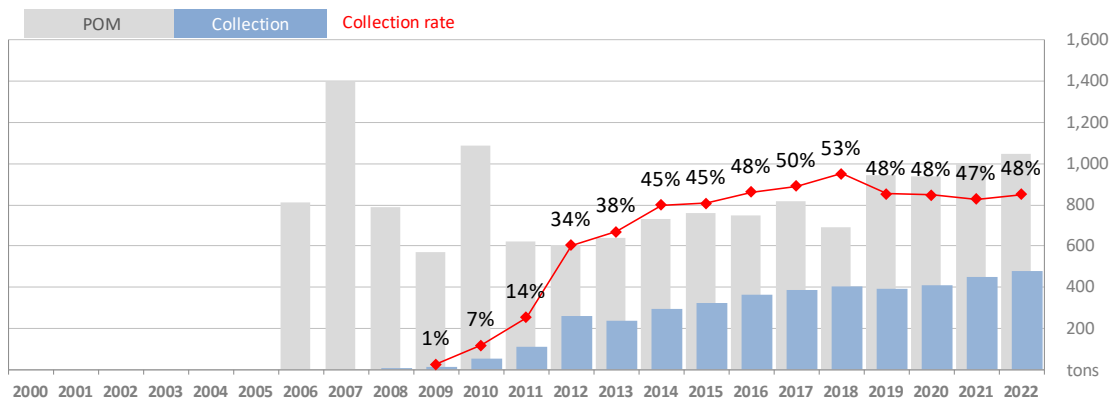


Source: BEBAT; Note: Pre-2010 BEBAT collection data are adjusted by us to account for portable batteries only: Based on confirmed data from 2010-12, the portable batteries share of all collected batteries by BEBAT is assumed to have been 86% in all years.

BULGARIA

Legal and organisational developments: Although batteries have been subject to mandatory take-back legislation and product fee legislation since 2006, the first battery compliance organisations were only approved in January 2009. Their number grew to 20 by 2011. Measures to reduce this number and ensure the targets are properly achieved came into force in 2013. Due to comprehensive legal requirements and good supervision, the regulatory mechanism appears to function solidly. In April 2016, a new Product Fee Ordinance replaced the 2008 ordinance but left the high product fee – to be paid if collection targets are missed – unchanged. As of 2022, around 390 registered portable battery producers comply collectively through eight approved battery compliance organisations. The **nine** organisations cover all battery types.

Collection rate: Volumes of portable batteries POM rose incrementally from 76g per capita in 2009 to a peak of 115g in 2017. The share of lead batteries in POM is low (2% in 2013). Collection volumes increased steadily from 2g per capita in 2009 to 56 g in 2019. From 2009 to 2011, Bulgaria missed its national collection targets. Although the overall collection rate has been above 45% since 2014, not every compliance organisation has met their assigned targets. In 2018, POM decreased by 9% to 98 g per capita, while collection increased by 4% to 57 g, resulting in a collection rate of 53% - the highest to date. Since 2019, In 2019, a 36% surge in POM over 2018 coupled with 2% decrease in collection lowered the collection rate to 48%. **From 2019 to 2022, POM and collection have consistently increased: POM by 14% (from 135 to 153 g per capita) and collection by 25% (from 56 to 70 g pr capita), which resulted in a collection rate of around 48%.**



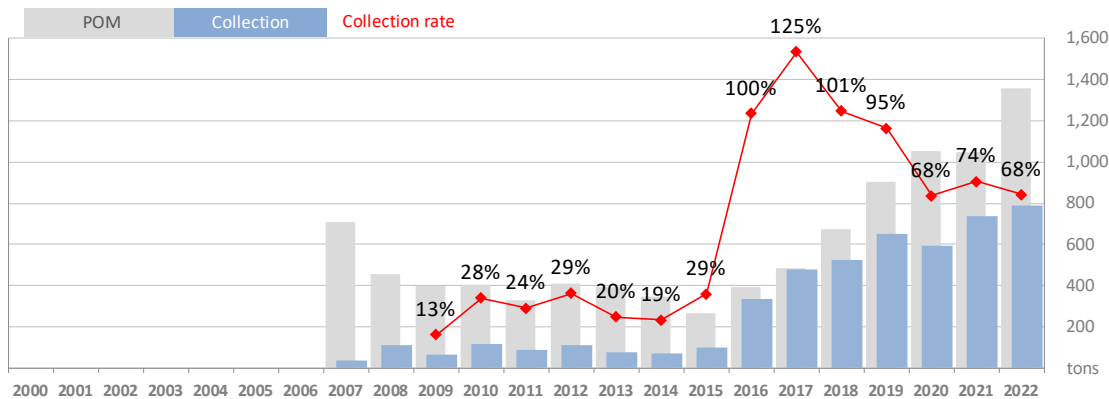
Source: Before 2013 EEA Register and Ministry of Environment; 2013/2014 EEA report; 2015 Eurostat (sum of Gov. order approved collection volumes for each compliance organisation results in 2% higher collection rate 2015); 2019 Eurostat; 2020 EEA (POM) and Sagis estimate based on partial data from PROs

CROATIA

Legal and organisational developments: Since late 2007, portable batteries (including those integrated into EEE) have been subject to fee payments to the Environmental Protection and Energy Efficiency Fund (EPEEF). In 2013, the option for producers to comply collectively or individually was implemented in framework legislation. In October 2015, a new Waste Batteries Ordinance removed industrial and automotive batteries from the fund financing regime. The new legislation lowered fees for portable batteries but remained subject to the fund regime. A May 2020 amendment to the Batteries Ordinance lowered the waste management fees on all batteries from HRK 8,400 (EUR 1,110) to HRK 7,900 (EUR 1,043) per tonne POM. A July 2021 waste management law transposing the EU CEP maintained the EPEEF at the centre of the EPR regime but enabled exemptions from the fees for approved collective compliance organisations. **A November 2023 Ordinance on the Management of Special Waste Categories in the Fund System replaced the batteries and other waste stream regulations with a single text that retained key provisions. In January 2024, the draft Law on the Implementation of the EU Batteries Regulation was released for public comment proposing national procedures, responsibilities, and enforcement mechanisms aligned with the requirements of the 2023 EU Batteries Regulation (2023/1542), while maintaining the existing fund-centric waste management model.** No compliance organisations have yet been granted exemptions.

Eight waste management companies are authorised to collect waste portable batteries and three of those companies are also authorised for waste battery treatment/export (all waste portable batteries are exported).

Collection rate: In 2015, the collection rate was 29% after 4 years of falling POM. The 100% collection rate in 2016 was considered to have been due to transition issues resulting from regulatory changes in 2015 and from the inclusion of 80 tonnes of waste portable batteries collected prior to 2016 and sorted out from the automotive and industrial batteries waste stream. However, the implausible collection rate persisted, presumably because declared POM volumes were far too low. **From 2016 to 2022, POM increased by 272% (from 94 to 271 g per capita), while collection increased by 153% (from 80 to 294 g pr capita). As collection increases preceded those of POM, collection rates of up to 125 were reported. Since 2020, the rate has been around 70%.**



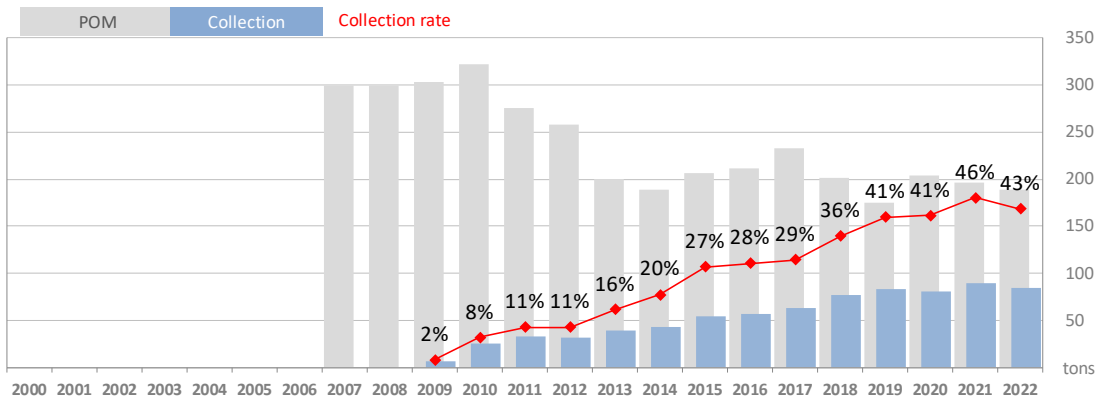
Source: Environment Agency

CYPRUS

Legal and organisational developments: The single organisation AFIS only began collection in late 2009, while collection facilities at municipalities ‘green points’ only became available after long delays. **As of 2024, AFIS serviced a network of about 6,000 collection points.** Cyprus’ CEP-transposition legislation of May 2021 had no effect on the batteries regime.

Collection rate: The collection rate climbed from 11% in 2012 to 27% in 2016 and 2017. In 2018, a 13% drop in POM over the previous year coupled with a 21% increase in collection pushed the collection rate up to 38%. In 2019, this trend continued and raised the collection rate to 41%. In 2020, a 16% increase in POM over the previous year and a 4% decrease in collection kept the collection rate flat at 41%. **In 2021, the collection rate exceeded 45% for the first time. In 2022, it fell back to 43%, as POM and collection decreased to 209 and 94 g per capita respectively.**

Note: We have revised the 2015 collection rate in the 2015 update of this report (25%) to 27% as newer data submitted to EUROSTAT have become available that show 15% lower POM for 2015.



Source: AFIS; 2014/5/6: EUROSTAT; 2017: Collection: AFIS, POM: Sagis estimate (+5% over 2016)

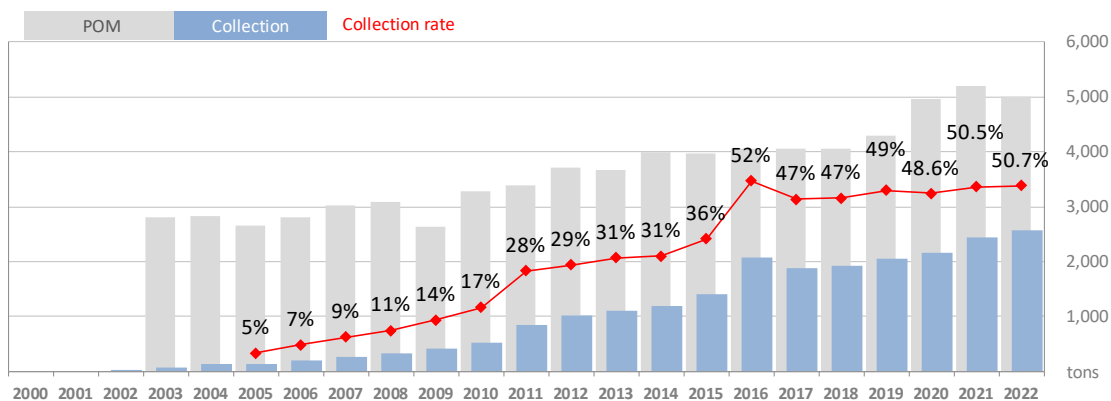
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CZECH REPUBLIC

Legal and organisational developments: In December 2020, a long-awaited Act on End-of-life Products – originally proposed in 2014 – enshrined the EPR provisions of the previous Waste Act and notably revised requirements on compliance organisations. **A January 2022 implementing Decree provided technical details concerning PRO and individual complier registration, authorisation, reporting, record-keeping and auditing requirements, take-back and information/public awareness obligations.**

Based on a 2001 voluntary agreement between the Government and industry, Ecobat was the single battery organisation from 2003 to 2009. Under legislation transposing batteries Directive 2006/66/EC, REMA Battery (related to WEEE organisation REMA) was approved as a second battery collection organisation. **2022 data suggest that Ecobat's share of POM and collection declined from around 90% to 76%, with REMA Battery responsible for the remainder. In 2022 ECOBAT was authorized for all battery categories, including EV batteries.**

Collection rate: In 2011, a 63% increase in volume collected over the previous year brought the collection rate up from 17% in 2010 to 28%. From 2012 to 2015, volume collected increased by an annual average of 13%, while POM increased by an average of 4%, pushing the collection rate up further to 36% in 2015. In 2016, the collection rate increased strongly to 52% in 2016 due to a 48% increase in collection to 200 g per capita. **From 2017 to 2022, POM increased by 24% (from 384 to 475 g per capita), while collection increased by 36% (from 179 to 244 g per capita). This resulted in the collection rate steadily edging higher, to around 50% in 2022.**



Source: EUROSTAT; Before 2009: Ecobat data, partial data from other organisations

Other issues: A survey conducted by Ecobat in mid-2016 discovered that 69% of Czechs were correctly separating their waste batteries from other household waste. 70% of those that did not separately dispose of waste batteries said they were too lazy to do so. The remainder commented that they believed their volumes to be insignificant and would not impact overall collection. In 2021, Ecobat reported that its collection network covers only 64% of Czech municipal territory.

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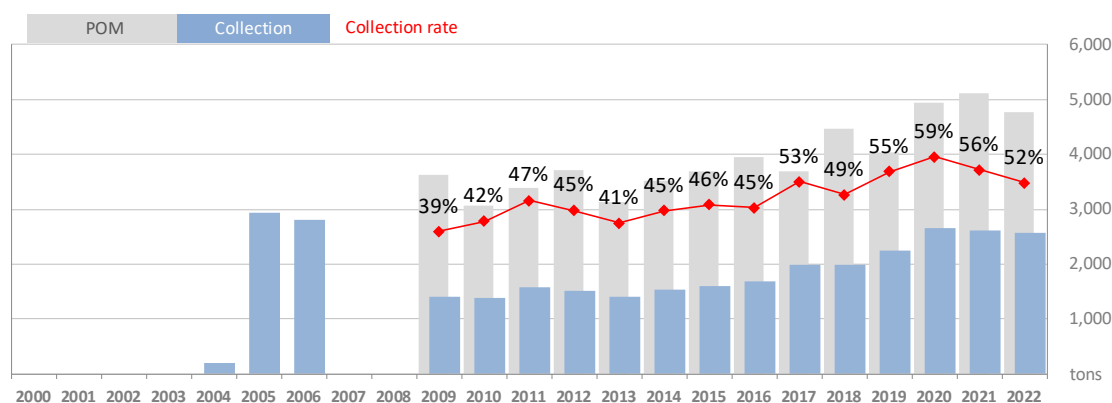
DENMARK

Legal and organisational developments: Municipalities have traditionally been responsible for the handling of household waste, including batteries. From the mid-nineties, the municipal collection of NiCd batteries was financed by producers. The implementation of the Batteries Directive in 2009 continued this approach: Municipalities have been made explicitly responsible for the collection of all portable batteries, while producers finance the municipal collection through a tax (which has increased annually since 2016) **of DKK 5,970 (EUR 800) per tonne POM.**

Four battery compliance organisations – Elretur (set up as non-profit WEEE PRO in 2005), ERP Denmark, Recipo (owned by Swedish WEEE organisation EAF), and more recently RENE (initiated by German-based RENE AG, **acquired by UK waste management group Reconomy in mid-2022**) – take-back waste batteries from municipalities, voluntarily-collecting retailers, and other organisations. The compliance organisations also finance and organise public awareness measures.

In view of the upcoming changes to Denmark’s EPR policies, Elretur created a separate PRO for its batteries services, Batteriretur, and initiated PROs for packaging (Emballageretur) and textiles (Textilretur) in 2023. All four operate under the umbrella entity “Retur”.

Collection rate: The collection rate for all portable batteries declined from 47% in 2011 to 41% in 2013. Thereafter, volumes collected increased annually and the collection rate peaked at 53% in 2017, driven by a POM decline of 6% and a collection increase of 18% over 2016. It should be noted that annual fluctuations of around +/- 15% for POM and +/- 8% for collection volumes have been common. In 2018, the collection rate dropped to 49% due to increasing POM over static collection. In 2019, POM declined by 10% to 695 g per capita while collection increased by 14% to 387 g, raising the collection rate to 55%. In 2020, POM jumped by 25% to 868 g per capita while collection increased 18 to 456 g, bringing the collection rate to 59%. Around 95% of waste portable batteries derive from municipal collection points. Retailers are not obligated to take back waste batteries. **POM peaked at 811g per capita in 2021.**



Source: Data after 2009: [DPA organisation](#)

Other: Elretur in 2015 ran an unusual awareness campaign entitled ‘Do not throw your batteries in the trash!’ ([website](#)), with the slogan ‘Skal du f**** med grundvandet!’ (You shall not f**** with groundwater!), emphasised in a 45 sec [YouTube spot](#)), arguing an important message must be communicated strongly. The campaign gained significant publicity but was met with mixed opinion.

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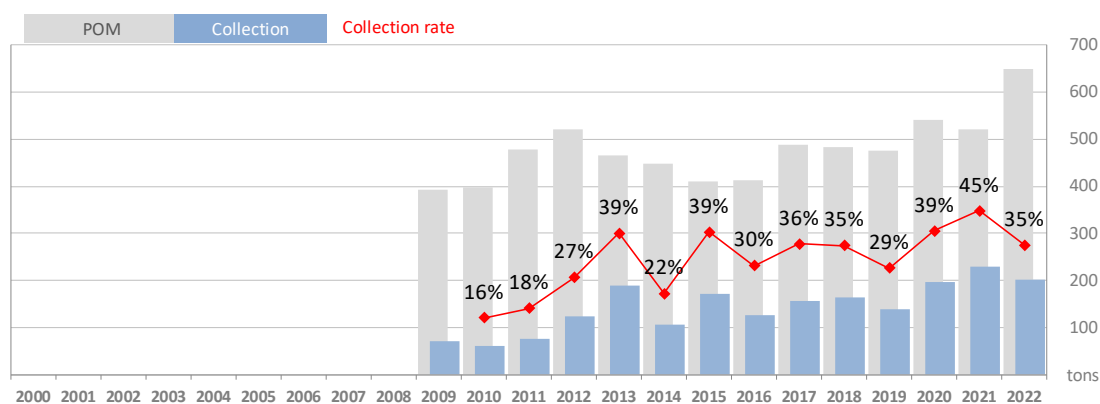
ESTONIA

Legal and organisational developments: Separate collection for portable batteries has been in place since the end of the nineties. Batteries could be returned free of charge to around 100 hazardous waste collection points managed by the municipalities. Since May 2004, producers have been legally responsible for waste portable batteries. However, no compliance organisations had been established until 2009, when two WEEE management organisations - EES-Ringlus and Elektroonikaromu - were approved as waste battery organisations.

In October 2017, the Government proposed the draft of a new Waste Act which i.a. would prohibit individual compliance for producers of portable batteries and tyres. The Government argued that its motive was a lack of capacity to inspect individual collection networks. The draft was ultimately abandoned.

All portable battery producers comply through two collective compliance organisations, EES-Ringlus and Elektroonikaromu. EES-Ringlus' POM share dropped from 80% in 2013 to about 25% in 2015 due to the exit of a large foreign producer (P&G). The Estonian importers that subsequently assumed the producer's obligations joined Elektroonikaromu. To improve collection performance, the activities of the battery PROs were consolidated into jointly coordinated activities under the brand name PATAREIRINGLUS in August 2021. This resulted in a substantial increase in battery recycling fees, which were initially low in comparison to other member states.

Collection rate: The collection rate more than doubled between 2011 and 2013 (from 18% to 39%). From 2014 to 2016, the annual collection rate strongly fluctuated due to strong variations in collection. The collection rate was 36% in 2017 with the strongly increasing POM (+24%). In 2019, a 14% drop in collection lowered the collection rate to 29%. **In 2021, the collection rate exceeded 45% for the first time. In 2022, it fell back to 35% due to a 31% POM increase (to 649 g per capita) over 2021, as collection decreased by 12% (to 152 g per capita).**

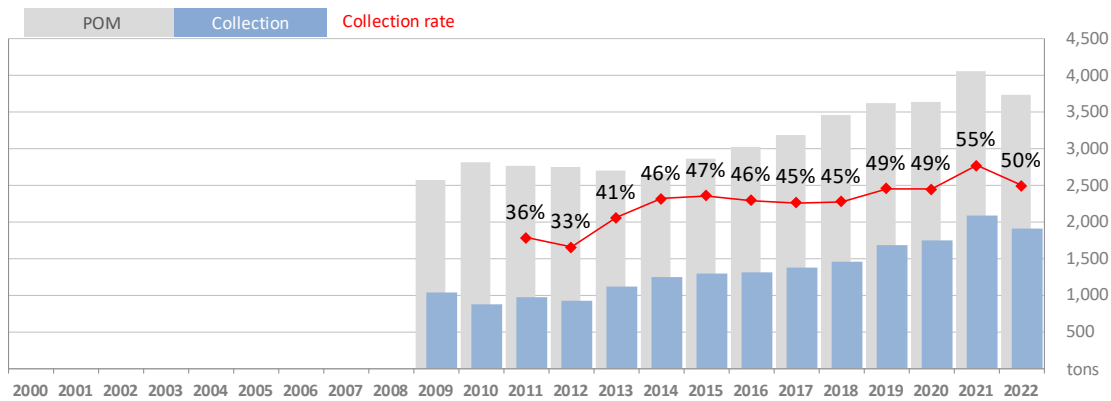


Source: EES-Ringlus, various; 2012-4: MoE; from 2015 Eurostat; 2020 no data

FINLAND

Legal and organisational developments: Finland transposed the EU Batteries Directive (2006/66/EC) in 2008. Since 2009, two producer-controlled organisations, Recser (owned by WEEE umbrella organisation Elker Oy) and ERP, have been approved as battery organisations. Both organisations are linked to WEEE organisations. Recser alone manages waste battery collection and awareness campaigns, with costs shared between the organisations. As municipalities are not obliged to – and do not – take part in the collection of waste batteries, the retailer take-back obligation plays an important role.

Collection rate: Since 2013, collection volumes have increased by an average of 6% annually. The collection rate increased from 33% in 2012 to 46% in 2014, driven by 2% annual decreases in POM coupled with rising collection. Between 2014 to 2018, the collection rate remained static at 45-46% as increases in POM offset the rises in collection. In 2019, the collection rate peaked at 49% as collection increased by 15%. The collection rate edged lower to 48% in 2020 as POM and collection rose by 1% and 3% respectively over 2019. **POM peaked at 674 g per capita in 2021.**



Source: From 2015 Eurostat; Pirkanmaan ELY-keskus.

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FRANCE

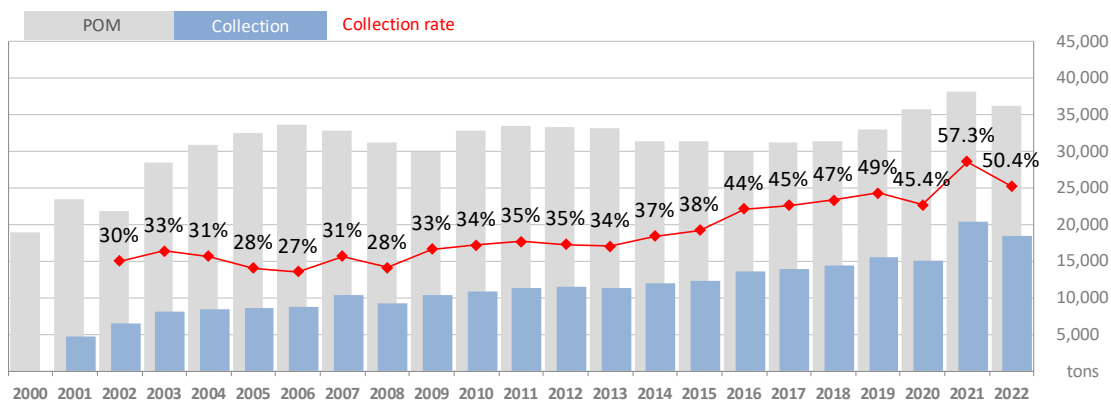
Legal and organisational developments: Since January 2001, producers have had to take-back waste batteries collected by distributors, municipalities, and other final holders. While large retailers initially ran individual compliance programs, only two producer-controlled battery compliance organisations remained by 2012: Corepile and Screlec. The licences of both PROs for the period 2016-2021 enabled the Government to set a collection target above 45% if one of the organisations exceeded 45% (Cahier des charges IV.1) and a 51% target was set for 2021. This provision was not carried over into the 2022-2024 licenses. In 2020, both organisations had about 900 producer members each, while Corepile represented 63% of POM. **In March 2024, Corepile announced a strategic merger with WEEE PRO ESR in view of upcoming licence approvals (2025 to 2030) for portable and LMT batteries, as well as that 60% of battery producers are also obligated as EEE producers. In July 2024, SCRELEC announced a strategic partnership with WEEE PRO Ecologic.**

Collection: In 2016, collection increased by 11% over 2015. Half of the increase was the result of an increase in collection volumes of battery compliance organisations, as both organisations continued to develop ‘multi-waste-stream collection partnerships’ with other EPR organisations. Corepile executed 3-4 times more marketing measures in 2016 than in 2012 and Screlec changed the branding of its Batribox collection boxes to ‘shock-pink’.

Additional Lead: Since 2016, the Government has adjusted the collection volume by adding waste portable lead batteries that were collected and processed by French recyclers - outside of the PROs’ collection network. The decision was based on a 2016 study by consultants Terra which estimated that 3,500 tonnes of waste portable lead batteries were treated that way. **The ‘additional lead’ volume increased gradually to 10% in 2020 and tripled to about 25% of total collection in 2021/22. Without additional lead, the collection rate would decline to 38% in 2022, due to stagnant or falling volumes in the PRO collection network (9% in 2022 to 206 g per capita).**

Additional lead	2016	2017	2018	2019	2020	2021	2022
- tons	682	833	956	1,336	1,474	5,037	4,513
- % of collection	5%	6%	7%	9%	10%	25%	24%
Collection rate incl. add. lead	44%	45%	47%	49%	45.4%	57.3%	50.4%
Coll. rate excl. add. lead	43%	43%	44%	44%	41%	43%	38%

Collection rate: From 2009 and 2013, the collection rate remained at 33%-35%. Since 2014, it has consistently increased and reached 49% in 2019, driven by a collection increase of 8% over 2018. In 2020, the collection rate declined to 46% driven by a 7% POM increase and a 2% decrease of collection in all channels (the collection mass passing through PROs decreased by 4%, blamed largely on Covid lockdowns blocking collection points). **Due to the increase of ‘additional volumes’ in 2021, the collection increased to above 57% in 2021 and declined to 50% in 2022, due to high POM (peak POM in 2021 at 557g per capita) and collection decline in 2022 (-9% to 272 g per capita in 2022).**



Source: ADEME annual battery reports until 2022 (example: 2016 report). Note: ADEME reports frequently adjust previous years’ data. For example, ADEME revised 2015 POM by -0.6% in its 2016 report due corrected producer declarations, etc.

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GERMANY

Legal developments: From 1988, industry operated a voluntary organisation collecting only ‘environmentally hazardous’ batteries. In response to the 1998 Batteries Ordinance, producer organisation GRS was established, and its special role as “joint organisation” was confirmed by the 2009 Waste Batteries Act. In addition, three “producers’ own take-back systems” were operating (under approvals from the state in which they are based that are valid nationwide). Amendments in 2015 required municipalities to a) hand over free-of-charge waste batteries - which they collect voluntarily - and b) remove batteries that are ‘not enclosed’ by EEE from WEEE - which municipalities must collect (they collect about 90% of household WEEE), and hand them over to GRS (who must take them back). Also in 2015, the option to require “producers’ own take-back systems” to participate in the financing of GRS information campaigns was activated for the first time under the neutral branding and jointly with municipalities. In response to competitive imbalances , a new Batteries Act, published in October 2020, had all organisations compete as “producers’ own take-back systems” on the same terms, and newly required them to be authorised by WEEE register EAR from 2022. The Act does not stipulate a clearing mechanism and does not ensure that all battery collectors are serviced by PROs. It introduces a common-sense requirement as regards lead batteries (see below), as well as 50% collection target on each PRO.

Organisation developments: Until 2017, GRS was operating as designated “joint system”, with a quite stable POM share of above 75%, besides three “producers’ own take-back systems”: CCR Rebat (POM share 20%), ERP (3.5%) and ÖcoReCell (0.3%). A dispute began in 2016 when a large battery importer switched from GRS to join ERP. This (and subsequent) switches led to substantial shortfall of GRS’ revenues, as the collection target of each PRO reflects a client’s POM for 2 years after the client left i.e. paid recycling fees. Following years of maneuvering and discussions on how the 2020 Batteries Act would resolve the market impedances, GRS decided to relinquish its status as ‘joint’ system and has operated as a “producer’s own take-back system” since January 2020, when its share of POM had halved to 31%. **Under the 2020 Batteries Act, 10 battery PROs are authorised by WEEE register EAR in 2023, all linked to the 4 incumbents:** a) Rebat and Rebat+ (with a POM share 47%, and only 1% of collection volumes deriving from municipalities in 2023); b) ‘GRS basic’ (2023 POM share 16%) and 4 GRS PROs that provide sector-specific take-back and pricing solutions: GRS Consumer targeting retailers (2023 POM share 11%), GRS Powertools collecting from DIY (2023 POM share 7%), GRS eMobility covering portable or industrial batteries from e-bikes and light vehicles and GRS Healthcare (each with a POM share of portable batteries of about 1% in 2023); c) Landbell’s DS Entsorgungs (2023 POM share 14%) and Landbell GmbH (2023 POM share 3%). The PROs achieve different collection rates and notably GRS basic remained below the 50% target. In November 2021, the non-sector specific PROs launched a new, joint common logo and [information platform \(now here\)](#).

POM share of PROs	2016	2017	2018	2019	2020	2021	2022	2023
GRS controlled	78%	75%	69%	43%	31%	32%	34%	36%
Rebat controlled	19%	18%	21%	41%	42%	48%	50%	47%
Landbell controlled	3%	7%	10%	12%	13%	17%	16%	17%
Ecobat (2019-21)				3%	13%	3%		
OkoreCell	0.3%	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%

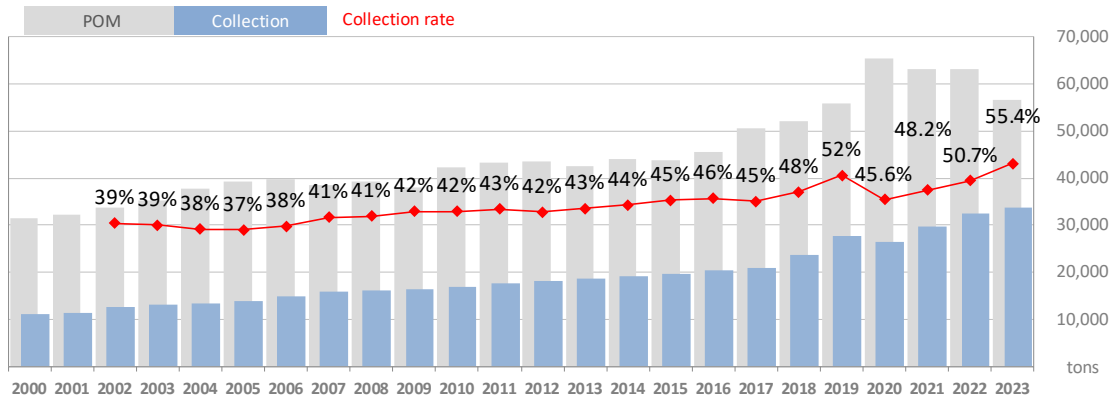
Lead portable batteries: Over all PROs, the return rate (collection/POM) of lead batteries has been plausible (it increased from 96% in 2016 to 144% in 2020) **and - following the 2020 Batteries Act - decreased to 70% in 2023**. However, in the 2018-20 period, there were vast differences between PROs: Quick POM share gains without access to collected batteries led to the stuffing of collection volumes with lead batteries to meet collection targets (allowed before the 2020 Act). **Removing lead from the calculation results in an overall collection rate that is nominal 4% lower in 2019 and 2020 than reported.**

	2016	2017	2018	2019	2020	2021	2022	2023
Collection rate	46%	45%	48%	52%	46%	51%	59%	55%
Coll. rate excl. lead*	44%	43%	45%	48% (-4)	42% (-4)	50%	59%	55

* all lead batteries removed from POM and collection

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Collection rate: Since 2012, the annual growth of POM has averaged 1.2% and that of collection 3.2%. The collection rate increased gradually from 37% in 2005 to 46% in 2016, before falling back to 45% in 2017, driven by an 11% increase in reported POM. In 2018, POM increased by 3% to 630g per capita, and collection by 12% (driven by Rebat, who achieved a 55% collection rate). In 2020, a 17% POM increase and a 4.5% decrease in collection reduced the collection rate to 46.6%. **With the new batteries Act in force, collection increased by 12%, 9% and 4% in 2021/22/23, while POM declined from the all-time high of 786 g per capita in 2020 to 672 g in 2023, leading to an increase in the collection rate to around 51% in 2022 and 55% in 2023.**



Source: Summary of volumes in annual reports of the compliance organisations

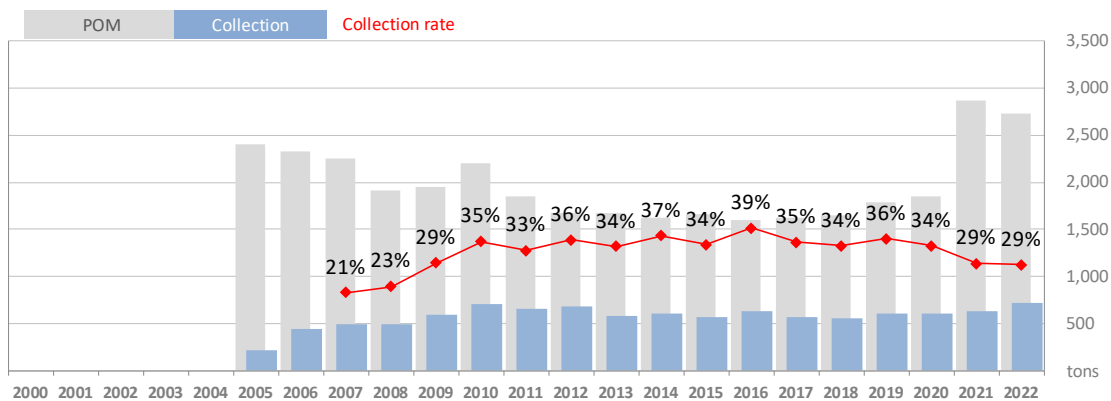
GREECE

Legal and organisational developments: A 2004 Presidential Decree required producers to set up battery organisations and achieve a collection rate of 30% by 2006. In response, AFIS, the only collective compliance organisation for batteries, was established by battery importers. A replacement Decree transposed Batteries Directive 2006/66/EC in 2010. It initiated a register of battery producers and allowed producers of batteries integrated into EEE to comply through their WEEE organisation, which meant that the weight of batteries placed on the market in EEE was no longer reported from 2011. **AFIS’ operating approval, renewed in November 2023, sets a collection target of 45% until 2025.**

There are over **74,000** of AFIS’ waste portable battery collection points or **one per 140 citizens**. About 75% of the total weight of batteries collected derive from supermarkets and shops. Despite a dense collection point network, AFIS acknowledges the need for awareness campaigns, **increasing its advertising spent from EUR 0.04 per capita in 2019 to EUR 0.15 per capita in 2024 (EUR 1.5m in total).**

Batteries embedded in EEE: Until end-2020, EEE producers did not have to report the weight of batteries placed on the market in EEE separately. Data suggested that the mass of embedded batteries in 2021 was around 900 tonnes, far higher than the estimated mass AFIS had added to POM in previous years. **The obligation for producers of embedded batteries added about 200 new clients to AFIS (521 in 2022) and increased revenues to almost EUR 4.5 million.**

Collection rate: The collection rate reached a peak of 39% in 2016 as collection increased 11% and POM decreased slightly to 148g per capita. **In 2021, POM jumped by 55% to 260 g per capita (from 1,850 in 2020 to 2870 tons) as a result of the increase of the weight threshold for portable batteries to 5 kg (from 2 kg) and the reporting batteries embedded in EEE. This depressed the collection rates in 2021 and 2022 to below 30%.**



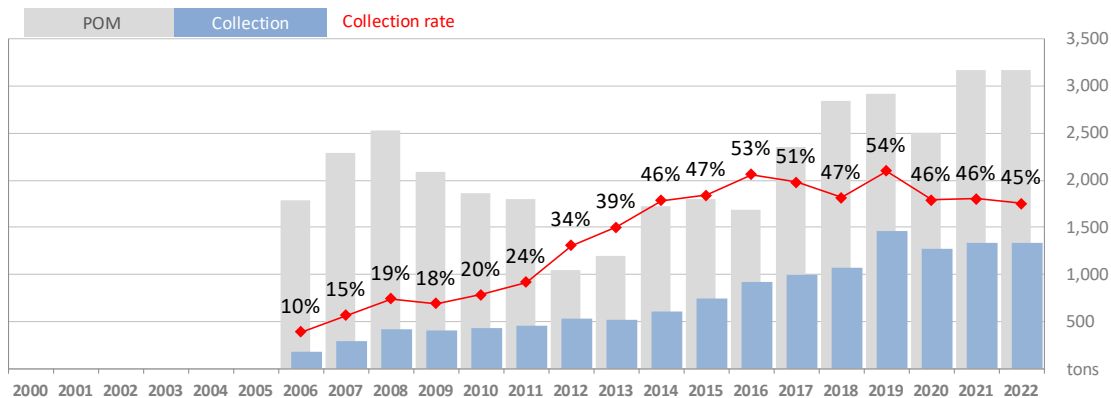
Source: AFIS

HUNGARY

Legal and organisational developments: Since 2000, the **Product Fee Act** has applied to accumulators (but not primary batteries). From 2005, collective compliance became feasible as a compliance option and three producers’ organisations, RE’LEM, Re-bat, and CCR Rebat have been operational since then. The management of waste batteries by ‘producer responsibility organisations’ has been working well, leading the Government to keep the waste producer responsibility scheme for batteries as is when it replaced the competing organisation model applied to most other waste streams with the state fund model from 2012. **However, from Jul-23 yet another waste management regime came into force: MOHU Mol – a subsidiary or MOL – was awarded a 35 concession to coordinate all MSW management and charge EPR fees - set in Decree 8/2023 - to producers. The intricate Product Fee legislation will be maintained, whereby the EPR fees paid to MOHU is to be deducted from the Product Fee payment. Individual compliance is only possible for industrial/automotive batteries.**

Collection rate: Data reported by the Hungarian government to Eurostat show that collection increased strongly from 2014 (2014: +14%, 2015 +19%, 2016 +19%), following the introduction of the obligation for producers to ensure at least one collection point in communities with over 100 inhabitants. The collection rate increased to 53% in 2016 and fell back to 51% in 2017 as a 40% POM increase offset the strong collection growth. In 2018, POM increased by 19% to 286g per capita, while collection increased by 8%. In 2019, the collection rate increased to 54% driven by a reported collection increase of 36%. **No data are available for 2022.**

Note: Our estimate of the collection rate in 2016/7 remains inconclusive: While RE’LEM (estimated POM share about 75%) notes that it has achieved the 45% collection target, we could not obtain any nominal POM or collection volumes that could be used to assess the Eurostat data.



Source: 2009-2021 Eurostat.

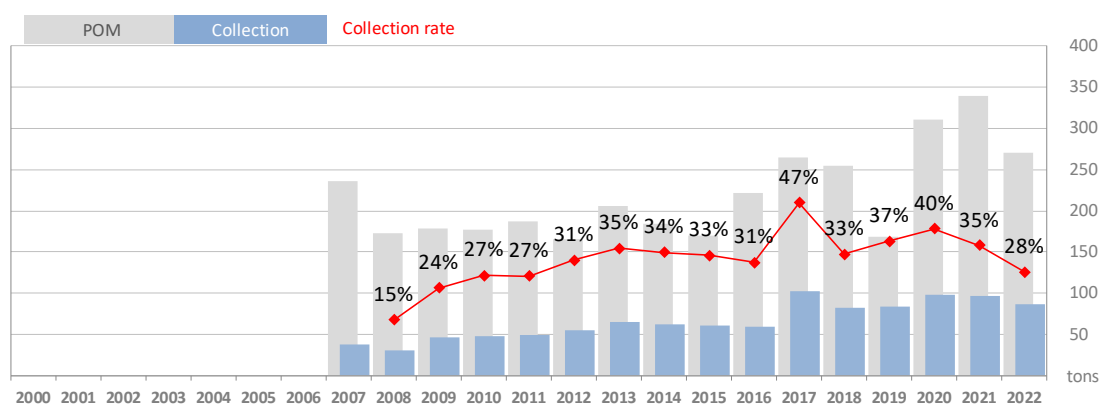
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ICELAND

Legal and organisational developments: Iceland's 1999 Regulation on Batteries imposed eco-fees on batteries to be charged by customs on the import of batteries. This was to fund the separate collection of hazardous wastes, including waste batteries, by the Government's Icelandic Recycling Fund. Legislation transposing Batteries Directive 2006/66/EC extended the scope of batteries covered and maintained the existing financing and collection mechanisms. The Fund must ensure that battery collection targets are met. From 2017, the Recycling Fund increased recycling fees for batteries by 120% as it had run into a deficit. **The fees were raised again from 2022.** A June 2021 amendment to the Waste Act transposing the CEP added industrial batteries to the scope of batteries subject to the Recycling Fund. Batteries embedded into EEE continue to be excluded.

The Customs Authority's 2022 list of producers showed 1,297 companies registered as battery importers.

Collection rate: In 2017, the collection rate exceeded 45% for the first time, driven by a 74% increase in collection over 2016 as funding became available again (see note under the graph). **In 2021 POM reached an all-time high of 922 g per capita, while collection remained below 100 g per capita, leading the collection rate to fall below 30% in 2022.**

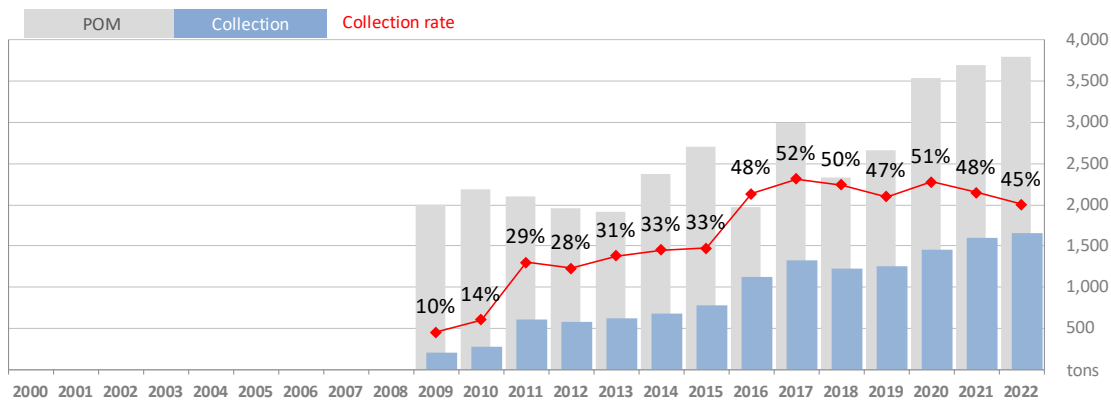


Source: Icelandic Recycling Fund. Note: The reported collection relates to the year in which collectors submitted data and requested compensation from the Fund, not the period in which collection occurred. **From 2023, the Fund has switched to using the dates of actual collection rather than the invoicing dates for recording collection data. This will likely lead to adjustments between different years, as collections will be attributed to the year they were actually collected rather than the year they were invoiced for recycling.**

IRELAND

Legal and organisational developments: In July 2008, Ireland became the fourth Member State to complete the transposition of Batteries Directive 2006/66/EC. The two approved WEEE compliance organisations - WEEE Ireland and ERP Ireland - were quickly approved as battery compliance organisations. To avoid duplication, each organisation is given responsibility for WEEE in different Irish counties and Dublin city districts. The allocated areas are adjusted periodically to reflect changes in POM share of the organisations. For 2020, WEEE Ireland data suggest its share of portable batteries POM was 71% (2016: 77%) and its collection share 64% (2016: 76%). **In April 2024, the government sought feedback on the elimination of the individual compliance option for batteries.**

Collection rate: The collection rate rose from 33% in 2015 to 48% in 2016 due to a fall in POM of 27% and an increase in collection of 46% over 2015. In 2017, volumes POM surged by 52% to 625 g per capita while collection continued its increase (+18%) to 278 g, resulting in a collection rate of 52% - the highest to date. **From 2020 to 2022, POM increased by almost 40% (to 750 g per capita), while collection also saw a strong, but lower, increase (30%). This led the collection rate to fall from 51% in 2020 to 45% in 2022.**



Source: Eurostat; 2022 data from compliance organisation

ITALY

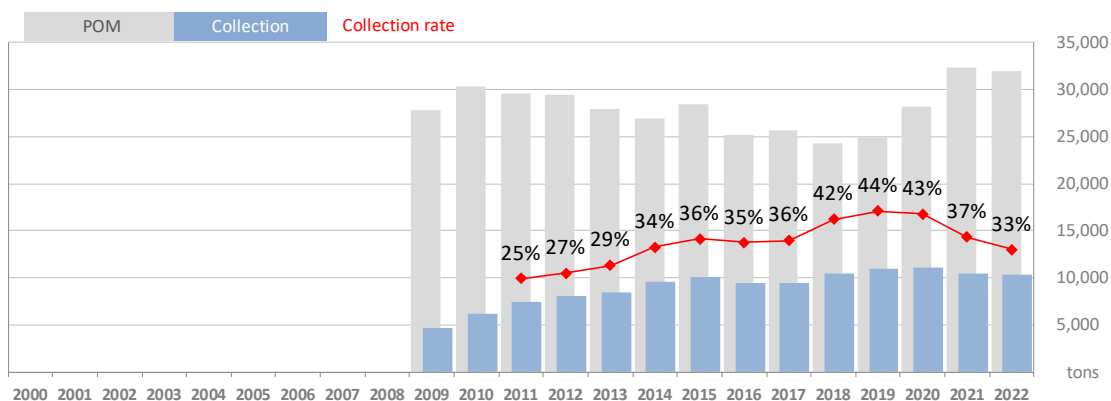
Legal and organisational developments: Decree 188/2008 transposing Batteries Directive 2006/66/EC entered into force on 18 December 2008. Subsequently, 13 organisations for portable batteries emerged, all of which all originated from WEEE organisations, excluding COBAT (established in 1988 as a national consortium for lead batteries and later extending its scope to other chemistries). The organisations are legally obligated to join a single Coordination Centre to ensure homogenous battery collection throughout Italy. The Centre (CDCNPA) became operational only in late 2012 after it had signed with the association of the Italian regions ANCI, which defined the operational parameters for take-back from, and the compensation paid to, municipalities. In July 2016, a revised agreement (2016-2019) with ANCI was signed. After 2019, CDCNPA unilaterally extended the agreement annually on the same conditions (as of Feb-22, not yet for 2022). **In November 2021, the CDCNPA released a qualification agreement requiring sorting, selection, and treatment companies to meet standardized preliminary operations for sending waste batteries to recovery and treatment plants.**

The three largest compliance organisations for portable batteries - COBAT, ERP and REMEDIA - represent a combined POM share of over 70%. COBAT **(which also provides compliance services for other products including WEEE)** retains the largest market share (30% in 2018) as it acquired large WEEE producers during the market exit of RAECYCLE, which ceased to provide compliance services in early 2016.

Collection points: The number of CDCNPA registered waste portable battery collection points increased to **almost 13,000 by end 2022, or one per 4,600 residents** (2020: 10,952; 2018: 7,500). In 2016, 80% of collected batteries originated from municipalities, of which 30% were collected by municipal waste management companies and 50% from voluntary collectors. **In 2022, about 60-80% of collected batteries originate from distributor collection points, and only 20-30% pass municipal collection centres.**

Distinction between battery categories: As of 2022, the national battery register lists about 6,500 entities as battery producers, 920 as individual compliers, and 20 compliance originations. A distinction by battery category - portable, industrial, and automotive - is not published. Compliance originations and individual compliers of all battery categories are obligated to join the CDCNPA. However, CDCNPA lists only 13 compliance organisations and 3 individual compliers as members. There is no information about the battery categories they put on the market.

Collection rate: National authorities' data show a collection rate of 25% in 2011. In 2018, POM reached an all-time low at 401 g per capita which helped lift the collection rate to 44% in 2019. **Since then, POM has increased and reached a high of 546 g per capita in 2021, while collection has remained flat at around 180 g per capita, leading the collection rate to drop to 33% in 2022.**



Source: Eurostat, 2020 CDCNPA; Note: Since the 2016 update, we have replaced the CDCNPA with those from Eurostat when available. As the Coordination Centre's data do not reflect the POM of up to 900 individual compliers, the Centre's collection rate is 2 to 4 percentage points higher.

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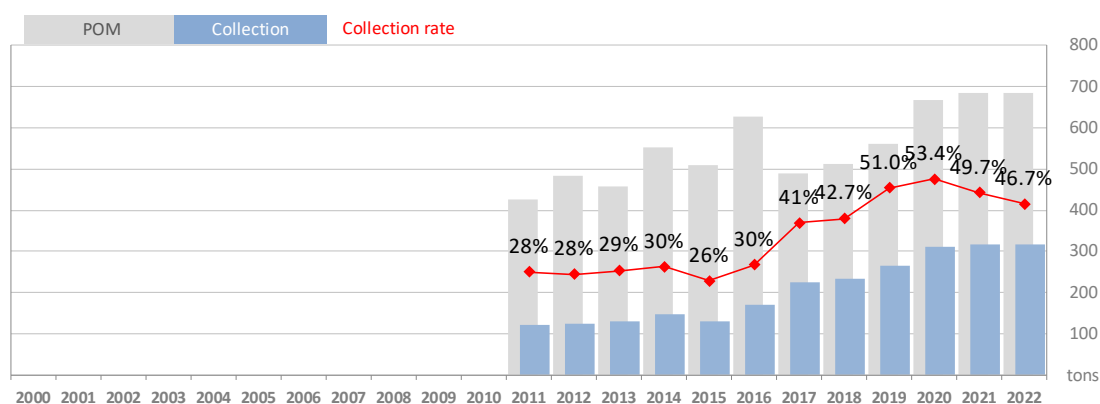
LATVIA

Legal and organisational developments: A separate collection organisation for batteries from households was introduced in 2001, managed by hazardous waste management company BAO. A Natural Resources Tax (NRT) has applied to separately sold batteries since July 2006 and batteries embedded into EEE since January 2011. Producers can be exempted from the tax by achieving collection targets. Legislation transposing Batteries Directive 2006/66/EC came into force in May 2011, while the NRT – significantly increased from 2014 – continues to be maintained as an enforcement instrument.

In 2017, most of the 650 registered producers comply through 15 organisations – both waste management companies, such as BAO, and producer-controlled organisations – that may act as battery compliance organisations for producers by having been granted an exemption from the NRT. In 2018, LZE and Nordic Recycling (Kuusakoski) had their approval as battery organisations withdrawn, following fines of a total of EUR 22 million for failing to properly recycle packaging and hazardous waste, mostly tyres but also batteries (10x the amount of the natural resource tax that would have applied). In June 2018, the Administrative District Court rejected LZE's appeal against the fine and the company appears to have closed. LZE and Nordic Recycling no longer operate.

As of 2024, 4 organisations have been granted an exemption from the NRT for batteries: The largest two represent 97% of POM: Zala Josta (52%) – established by a group of waste management companies – and packaging compliance organisation Zalais Punkts (45%).

Collection rate: Government data show the collection rate in 2015 fell to 26% from 30% the previous year due to a 12% decrease in collection. 2016 saw sharp increases in both POM and collection at 23% and 30% respectively, lifting the collection rate to 30%. **From 2017 to 2021, POM and collection have both consistently increased and peaked in 2021 at 685 g and 317 g per capita. The collection peaked in 2020 at 53% and has since declined.**



Source of underlying tonnage data: 2015-18 Eurostat; before Compliance organisations, MoE
2019 POM estimate

Other: There are 2 reporting obligations for all battery types: The natural resources tax is calculated based on chemistries (lead accumulators, Ni-Cd and Fe-Ni accumulators; Primary batteries; Other) but not battery type (portable, industrial, automotive), while the producer responsibility organisation requires distinction by battery type to be exempt from the NRT. As the NRT law is the overriding legislation, collection reporting focuses on the chemistries.

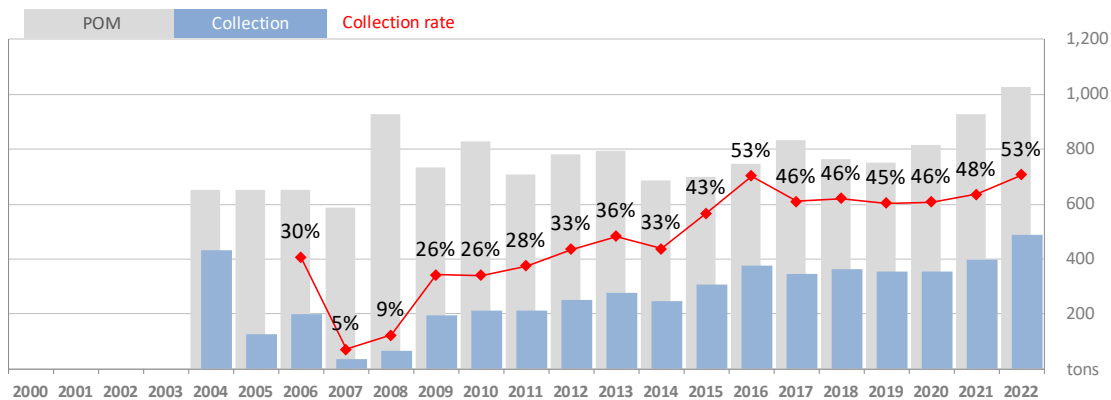
LITHUANIA

Legal and organisational developments: Since 2003, producers have had to pay an **environmental pollution tax (EPT)** on batteries. From 2008, producers could avoid the tax if they achieved collection targets by buying recycling notes from recyclers or through collective organisations. The collection target was lowered from 80% in 2011 to 25% in 2012, but the tax effectively increased by a factor of 6, which boosted the membership of the two producer-controlled compliance organisations. Since 2010, over 20 amendments and new legal texts have optimised the batteries EPR regime.

Prior to 2012, due to the low tax rate on batteries at the time, producers preferred to pay the tax rather than support organisations’ investments in collection infrastructure. Following a substantial increase in the tax in 2012 (and 2016) and the abolition of purchasing recovery notes (PRNs) as a compliance option from 2013, many producers joined collective compliance organisations.

Since 2017, **and as of 2024**, nearly all portable battery producers comply through three licensed compliance organisations: EEPA and GIA, originating from WEEE compliance organisations, and AGIA, licensed in June 2016 for all battery types and controlled by four automotive/industrial battery producers. Following a disputed temporary suspension of EEPA’s WEEE licence in 2016, GIA’s membership increased significantly, and its POM share of portable batteries grew to 43% in 2016 (up from 30% in 2014 and 2015).

Collection rate: The collection rate climbed from 26% in 2010 to 53% in 2016 as collection increased 21% over 2015, while POM grew by 7% only. In 2018, POM fell by 5% to 271 g per capita, collection increased by 5%, raising the collection rate to 46%. **From 2019 to 2022, POM increased by 33% from 354 to a peak of 390 g per capita. Collection increased at similar rates, bringing the collection rate to 53% in 2022.**



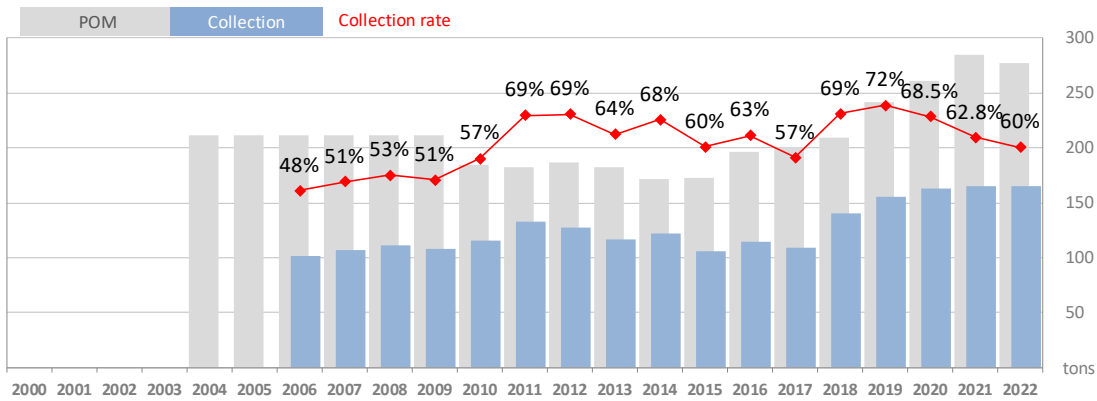
Source: MoE¹⁰ and other government sources; 2018/9 Eurostat

¹⁰ The Ministry of Environment attributes the wide fluctuation of collection data before 2009 to changes in the reporting organisation.

LUXEMBOURG

Legal and organisational developments: The 1994 Waste Management and Prevention Law, later replaced by the 2012 Waste Management and Prevention Law, made local authorities responsible for separately collecting the new waste category of ‘problematic wastes’ needing special treatment. This category included batteries and accumulators. The 2008 Law on Batteries and Waste Batteries, transposing Batteries Directive 2006/66/EC, required the existing public collection of batteries (through the SuperDrecksKëscht programme) to be preserved while also requiring producers to fund the organisation. Producer controlled battery compliance organisation Ecobatterien, established in 2009, thus replaced municipalities as the contracting party to the agreements with the private waste collection companies that operate the SuperDrecksKëscht programme. In January 2015, Ecobatterien was approved for another 5year period.

Collection rate: Since 2006, a collection rate of over 48% has been achieved. In 2018, the collection rate was 69% as collection increased by 28%. The Government appears to adjust POM reported to compliance organisation Ecobatterien by +5% to reflect the amount of batteries being ‘imported’ through purchases by Luxembourg residents in neighbouring countries. Luxembourg’s comparatively low POM – **having peaked at 450 g per capita in 2021** – suggests that the 5% adjustment maybe too low to fully reflect the private ‘imports’.



Source: 2010-14 Ecobatterien; 2015-8 Eurostat

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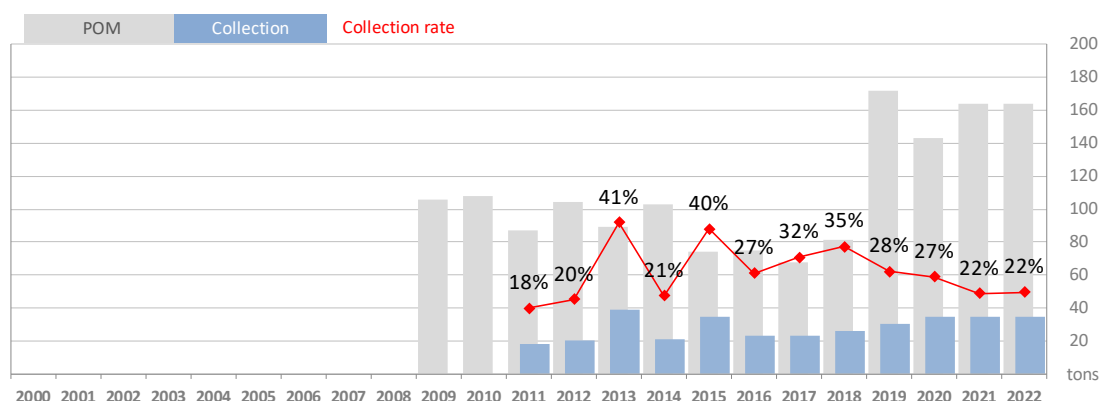
MALTA

Legal and organisational developments: From September 2004 to October 2016, the Eco-Contribution Act applied a tax to non-rechargeable batteries with a weight below 35g at a rate of EUR 0.06 per unit, and to rechargeable batteries with a weight above 35g at a rate of EUR 1.63. It did not apply to batteries embedded into EEE. The Government established WasteServ Malta Ltd. which operationally managed the collection of waste batteries. In 2007, Batteries Regulations transposed Batteries Directive 2006/66/EC (in force from 2010), while the existing financing mechanism continued.

In 2008, Eco-Contribution Regulations provided exemptions from the tax for members of an approved battery organisation. However, they never came into force. In consequence, industry did not establish battery compliance organisations, arguing that doing so would mean paying twice for battery waste management. From October 2016, the eco-contribution was eventually removed from batteries.

In December 2016, a compliance organisation geared towards portable batteries was approved: 'GreenPak Battery Recycle', an initiative of packaging compliance organisations GreenPak COOP. In March 2017, GreenPak announced the nationwide initiative [BATREE](#) to replace WasteServ's collection network and Batterina battery collection campaign. **As of May-24, 175 producers are registered with GreenPak Battery Recycle and 4 comply individually.**

Collection rate: Until 2018, POM and collection volumes have fluctuated strongly in the small market, typically between 20% and 40%, at a comparatively low POM. Collection data were uncertain in 2016/7 as a consequence of the transition from WasteServ to a new collection scheme, which became a reality around mid-2016. **In 2019, POM jumped by 112% to 348 g per capita and has since remained high while collection stagnated, leading the collection rate to recede to 22% in 2021.**



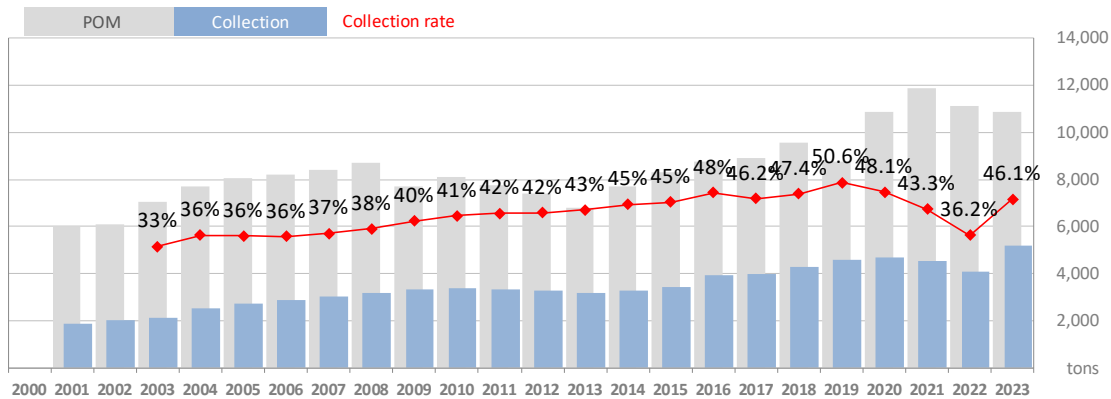
Source: Since 2015: Eurostat, before MEPA; **2022 data are not available.**

NETHERLANDS

Legal and organisational developments: A Government Decision of 1995 held producers of batteries weighing 1kg or less responsible for collecting 90% of waste batteries by 1999 through approved waste plan(s). In mid-1995, the Battery Foundation (Stichting Batterijen, or Stibat) set up a collective organisation to take-back waste batteries. In 2008, a Batteries Regulation transposed Directive 2006/66/EC, obligating retailers to take back batteries and producers to reach a 25% collection target in 2012.

In 2018, a government "Decision to Declare Generally Binding the agreement between Stibat and Producers" (AVV) made Stibat the only compliance option for portable and industrial batteries up to 1 kg. **In July 2022, another AVV declared the EPAC Foundation – whose operations are carried out by Stibat - the only compliance option for e-bike batteries (industrial batteries). On 1 January 2024, Stibat merged with WEEE PRO “OPEN Foundation”, and AVV designated OPEN as the only compliance option for portable batteries, now with a weight up to 3 kg and (from 18-Aug-25) up to 5 kg, as well industrial batteries with a weight of up to 1 kg.**

Collection rate: From 2010 to 2016, the collection rate increased steadily from 41% to 48%. **POM peaked in 2021 at 680 g per capita, collection peaked in 2022 at 292 g per capita, reversing the collection rate’s downward trend and lifting it back to above 45% in 2022.**



Source: Stibat

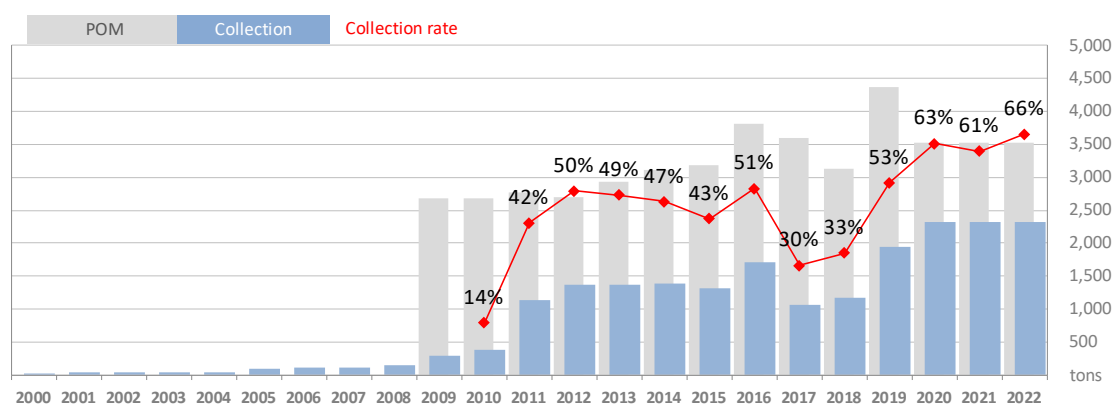
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NORWAY

Legal and organisational developments: Since July 2000, Regulations on Waste Recycling have imposed take-back and reporting obligations on producers of lead-acid, industrial nickel cadmium and rechargeable batteries only. An amendment in October 2012 included an extension of the take-back obligations to all waste batteries and set a collection target of 30% for portable batteries placed on the market in the previous year. As of 2022, the 30% collection target remains applicable to portable batteries. However, the collection rate cannot be calculated for batteries embedded in EEE as there are no requirements to report them separately. **A November 2023 amendment to the Waste Regulations raised the portable battery collection target from 30% to 65%, applicable from 2024.**

From 1999 to 2014, Rebatt AS had remained the only collective compliance organisation for separately sold portable batteries. It shares its management with and operates collection under the name of Batteriretur, which has been the organisation for automotive lead-acid batteries since 1993. In 2014, a second battery organisation Batterigjenvinning (Battery Recycling) was approved. It is a subsidiary of EEE producer-controlled Norsirk, which offers joint WEEE and packaging compliance services through Elretur and Emballasjegjenvinning. *Note: Since mid-2016, all compliance organisations have charged fees to producers directly. Previously, the organisations had contracted this task to the customs authority who charged the fees on import.* In October 2017, Rebatt/Batteriretur joined forces with WEEE organisation RENAS and packaging Organisation GreenPointNorway to offer compliance services under the brand RETURFELLESSKAPET (Take-back Community). In mid-2018, SERVA was established as a competing compliance organisation for WEEE and batteries. In 2021, WEEE organisation ERP Norway acquired SERVA to expand its scope to portable batteries.

Collection rate: The collection rate has been subject to significant uncertainties about volumes of batteries embedded in EEE and WEEE, as these are not reported. Until 2018, we use our estimates as EUROSTAT POM data in our view do not account for the weight of embedded batteries POM and hence result in higher collection rates (33%/87%/41%/39% in 2015/6/7/8). **From 2018 to 2021, the graph below uses the volumes reported to Eurostat, whose POM peaked at 820 g per capita in 2019 and fell to 655g in 2021. In recent consultations, and with reference to 2020 and 2021 collection rates of 65 and 66%, it was estimated that a 73% collection rate can easily be reached by adding 250 tons of waste batteries removed from residual waste in current and planned post-sorting facilities, that will cover close to 50% of the population. Norwegian residents dispose of 100 g per capita of waste batteries annually in residual waste (about 550 tons total), according to multi-year studies.**



Source: Annual POM and collections volumes: 2008-16 Sagis estimates assuming embedded portable batteries contribute 36% to total portable battery POM. 2017 to 2021 Eurostat. **For 2022, the 2021 data are used, as no PROs or Government collection data are available for 2022.**

Note: The collection rate* of separately sold batteries as reported by Elretur members was around 36% in 2016 and 39% in 2017, as reported POM dropped 40% while collection remained flat. *Source: collection data: Batteriretur; POM estimates based on Batteriretur communication.

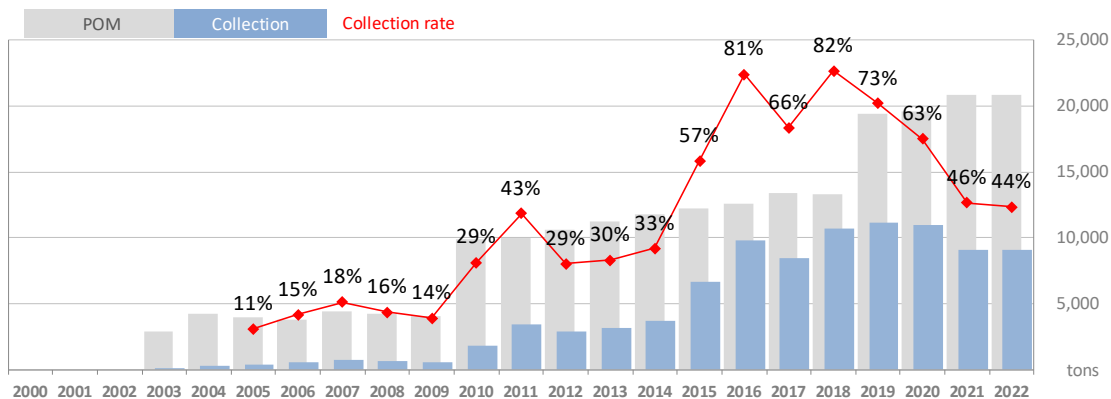
POLAND

Legal developments: Since 2002, the Act on Entrepreneurs’ Obligations has required producers to individually achieve collection targets and pay product fees if the targets are not met. The Batteries and Accumulators Act of 2009 left the collection target/product fee mechanism in place and did not define or regulate compliance organisations. A 2013 amendment to the Waste Act called upon municipalities to contribute to the battery collection network from 2015, and a 2014 amendment to the Municipal Cleanliness and Waste Disposal Act required them to include batteries in the list of wastes for which municipalities must provide collection points, reportedly leading to a significant increase in battery collection points. A further 2014 amendment to the Batteries Act introduced i.a. a formal role for compliance organisations, allowing them to take legal responsibility for member producers’ obligations.

Organisation developments As of May 2024, about 21,465 entities are registered as battery producers (all battery categories) in the BDO register (2022: 18,500), as well as 28 ‘intermediaries’ that act as battery compliance organisations. The previous GIOS registration ended in 2018 with 3,390 registered portable battery producers (2017: 2,856) that complied through 84 registered ‘collectors/service providers’ of which 29 had 10 or more producer clients. The organisations include REBA, set up in 2003 and whose sole shareholder since around 2016 is battery manufacturer GP Batteries, as well as entities set up by WEEE organisations, such as ERP Poland, whose market share increased from 10% in 2012 to 28% in 2013. Each year since 2013, about 25% (30% in 2017, but only 3.7% in 2018) of producers (or their compliance service provider) fail to fulfil the national collection target. Environment Agency GIOS suggests that collection could increase significantly by increasing the product fee. However, this has not yet been acted upon yet.

Lead: Data from Environmental Inspectorate GIOS show the 43% collection rate in 2011 contained implausible amounts of lead batteries, while the collection rate for all other chemistries was 25%. For 2012, the GIOS data show a plausible return rate for portable lead batteries (105%). Later GIOS reports do not contain data that allow these calculations.

Collection rate: From 2010 to 2016, POM volumes increased steadily by an annual average of 4%. Collection volumes grew particularly strong in 2014 and 2015 (+18% annually) when municipalities were held responsible for separate collection of batteries. The official collection rate reported by GIOS from 2011 to 2016 increased from 29% in 2011 to 39% in 2016. However, in its report for 2017, GIOS states that collection volumes in earlier reports only included collection volumes declared by collectors on behalf of producers, and that the necessary revision (all batteries declared by collector should be counted) would result in return rates of 55% in 2015 and 78% in 2016 (current year basis). Actual tonnage data are not provided. We follow GIOS’ correction by adjusting our collection values to arrive at the revised return rates. The results show a collection rate of 81% in 2016, easily exceeding the 45% target, and a collection rate of 66% in 2017, as collection decreased 15% and POM increased 5%. In 2018, POM remained flat at 351 g per capita. Collection increased by 25% over 2017 and exceeded the previous peak in 2016 by 7%. GIOS attributes the strong 2018 collection to increased educational campaigns and awareness creation measures. GIOS has not publicly released battery data since 2019. In November 2018, the Supreme Audit Office released an investigation report into the collection system for used batteries which noted that “the fear is justified that the entire reporting system in the waste batteries and accumulators management system has been functioning incorrectly and did not allow for the determination of the actual collection rates achieved.” Data reported to EUROSTAT show a peak POM of 551 g per capita in 2021.



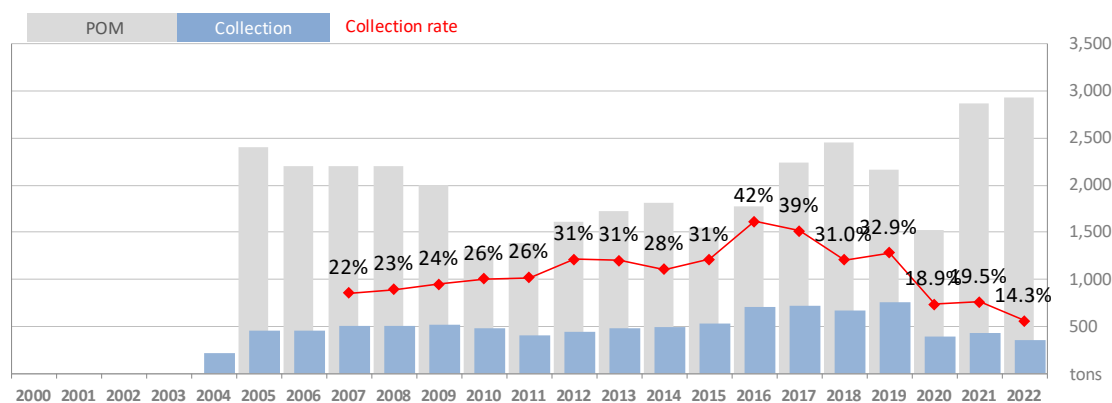
Source: Pre 2010: REBA collection only; 2010-2017 GIOS (Environmental Inspectorate) reports; 2019-21 Eurostat; 2022 not available

PORTUGAL

Legal developments: In response to the 2001 Decree on Batteries, which required producers to take-back waste batteries through a licensed recovery organisation, not-for-profit battery compliance organisation Ecopilhas was set up in 2002. The 2009 Batteries Decree Law, which transposed Batteries Directive 2006/66/EC, tightly regulated battery organisations. Municipalities remain responsible for collecting waste batteries and must be compensated by the organisations for their services. A new Decree Law, in force from January 2018, consolidated 13 legal texts related to products subject to EPR (including batteries) to reduce legal uncertainty for producers and waste operators. As regards batteries, the Decree Law largely maintained the previous provisions but i.a. foresaw an allocation and compensation mechanism to be defined by the Commission for the Monitoring of Waste Management (CAGER) if more than one compliance organisation is active for a given waste stream. In September 2021, clearing rules for battery organisations were published. **In March 2024, a Decree Law further obligated distance sellers, prohibited visible fees on invoices while requiring registration numbers to be visible, and required PROs to present a feasibility study on a DRS for portable batteries by 30 June 2024.**

Organisation developments: Ecopilhas was set up in 2002. In March 2010, two WEEE organisations Electrao (formerly AMB3e) and ERP Portugal were licenced as battery organisations. In December 2017, all three organisations were granted new licences for the period 2018 to 2021. In November 2020, Ecopihlas terminated its operations, leaving Electrao and ERP Portugal as the sole two battery compliance organisations through which around 1,100 battery producers comply. In 2020, Electrao had the largest POM share (55%) and over-collected significantly (68% share of collection). **From 2021, the licenses have been extended annually, the latest in 2023, expiring in June 2024.**

Collection rate: As a result of the 2008 economic crisis, POM decreased by 1/3 in 2010 to 125 g per capita and since then has increased every year – except for 14% drop in 2015 – to 283 g per capita in 2020. Estimated¹¹ collection reached a low in 2011 at 42 g per capita and since then has grown to a peak of 73 g per capita in 2019. In 2020, the year of Ecopihla's market exit and Covid lockdowns, the collection fell by 45% and POM by 30%. **POM peaked in 2022 at 283 g per capita due to collection not rebounding, resulting in Portugal having the lowest collection rate (14%) in 2022 of any of the countries covered by this report.**



Source: Pre 2016 estimates from PROs, notably Ecopilhas (difference to EUROSTAT data 2013/4 minor); 2019 EUROSTAT; 2020 Sagis estimate based on partial PRO data

¹¹ Due to the two licensed producer registers (Ecopilhas as well as ANREE - used by ERP and AMB3E), POM data are uncertain: Our estimate is based on collection data released by producer register [ANREE](#) and data from Ecopilhas, which preferred to announce collection data in battery units (8 million in 2004, 16 million in 2005, 20 million 2009, 2010).

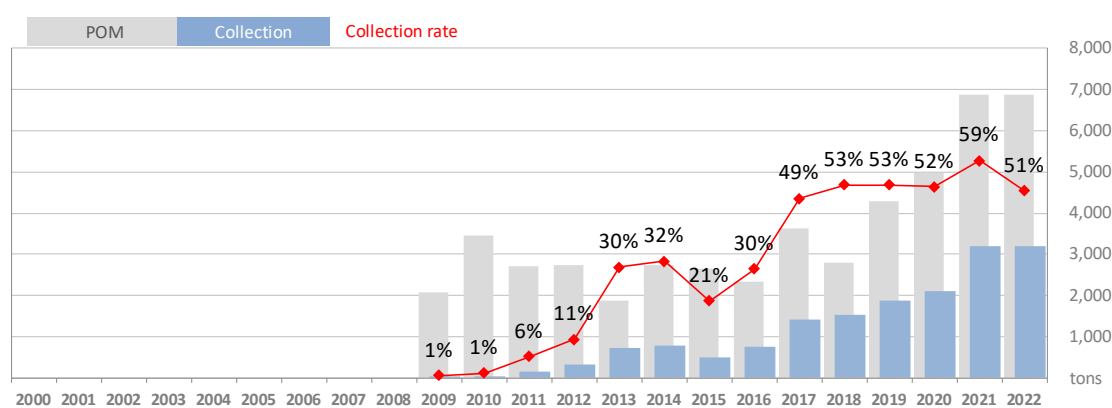
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ROMANIA

Legal and organisational developments: Romania is one of a the few ‘new’ member states that *initially* transposed the Batteries Directive without a state-fund financing mechanism. The 2008 Batteries Decision transposed the EU Batteries Directive 2006/66/EC but required extensive implementing legislation. Ministerial Orders in July and October 2009 defined registration and reporting procedures for producers. A 2012 amendment to the 2008 Decision – much delayed due to stakeholder concerns – defined the approval requirements for individual and collective compliance.

A 2016 amendment to the 2008 Batteries Decision eventually introduced a state-fund financing mechanism. Penalties payable to the Environmental Fund were introduced for not reaching the collection target (from 2018) and for erroneous reporting. A July 2016 amendment to the 2011 Law on Waste and to the 2008 Batteries Decision i.a. introduced an obligation for local authorities to collect waste batteries and tightened controls of battery compliance organisations by removing the possibility for operating under ‘tacit’ (but not explicit) approval. **As of 2022, about 550 producers of portable batteries complied through six (2017: 5) authorised PROs.**

Collection rate: EUROSTAT data available for 2015 show much lower collection volumes than in previous updates of this report. According to these data, the collection rate in 2015 was 21% rather than 32% as estimated by us. Data for 2018 show a POM decline of 23% to 143 g per capita, while collection increased by over 9%, bringing the collection rate to 53%. **In 2021, POM and collection peaked (at 358 g and 167 g per capita respectively) bringing the collection rate to 59%.**



Source: Ministry of Environment (MoE); 2015-21 Eurostat; 20

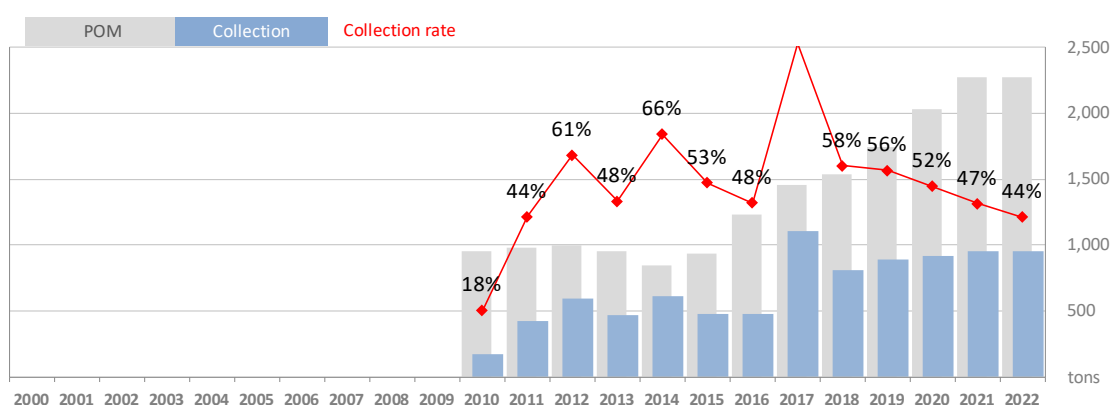
SLOVAKIA

Legal and organisational developments: From 2001 to June 2016, the Product Fee Act subjected separately sold batteries to fees of the Recycling Fund on 100% of batteries placed on the market, less the amount of batteries collected by producers themselves or collected on their behalf. The Recycling Fund was a non-state body run by a Government-appointed Board of Directors. Waste management companies Mach Trade and Elektrorecycling are two of four companies mandated to operate battery collection organisations for municipalities, financed by local taxes and the Recycling Fund.

A new Waste Act, in force from 2016, introduced full EPR (competing organisations with a clearing house – the KC BAA for batteries), requiring producers to comply through approved compliance organisations (that must be controlled by producers) or through waste management companies authorised as ‘third parties’ and abolished the Recycling Fund. Implementing regulations, including a ‘Decree on EPR and management of selected product waste streams’, provide detailed registration requirements, authorisation and reporting requirements. In 2018, Environment Minister László Sólymos (resigned in January 2020) confirmed plans to replace the producer responsibility organisations with a monopoly agency that would be established and managed by producers under Government supervision. These plans did not progress. The Ministry of Environment plans to move the EPR provision of the Waste Act into a new Law on EPR (draft legislation was expected in November 2021) have been postponed. **The Government's 2024 Plan of Legislative Tasks foresees the release of a draft amendment to Act on Waste (79/2015) in Aug-24 to i.a. begin the transposition of the EU Batteries Regulations.**

As of 2024, about 2,000 (2022: 1,700) producers of portable batteries comply through nine entities: Compliance organisations Asekol, SEWA (ERP), Natur-pack, Slovmas, E-cycling and Spoločný baterkový systém (SBS) as well as three waste management companies which are authorised to provide compliance services as ‘third parties’: Mach Trade, Insa and Power Battery. All authorised entities’ operating licenses will expire at the end of 2024 (Power Battery end-2025).

Collection rate: Before 2016, POM remained below a comparatively low 185 g per capita, while collection and the collection rate fluctuated strongly. In 2017, the collection rate peaked at 91% due to a 131% increase in collection. Since then, POM has increased steadily – to 372 g per capita in 2020 (+16% over 2019) – while collection has yet to reach the 2017 level again. As a result, the collection rate moved downwards, but was still 52% in 2020. **In 2021, POM peaked at 418 g per capita, as collection stagnated, bringing the 2021 collection rate to 47%.**



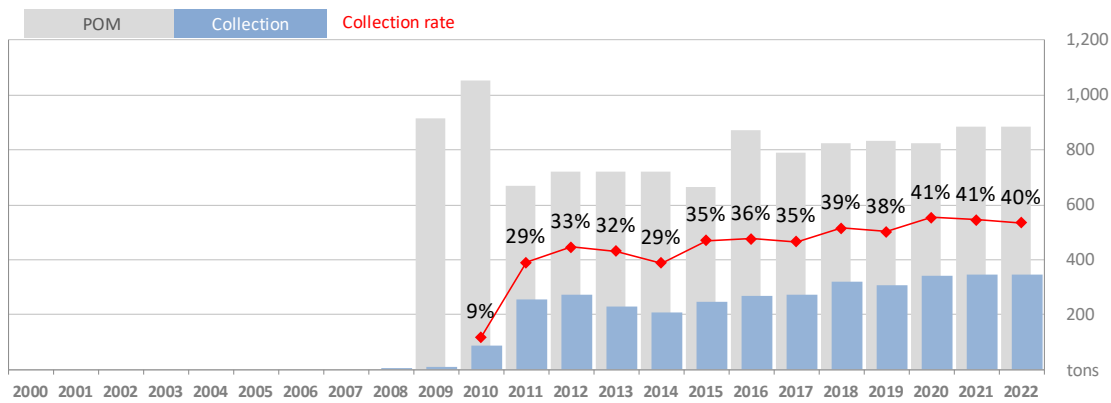
Source: **2022 are not available and use 2021 data.** 2018–21 Eurostat; 2016/7 Ministry of Environment. The MoE data are based on data provided by producers involved in authorised battery compliance organisations. Data are not verified by a third party and provide no breakdown of chemistries.

SLOVENIA

Legal and organisational developments: Since 2003, municipalities have been obliged to separately collect hazardous wastes including batteries. They remain responsible for financing their collection infrastructure. In 2008 and 2010, Decrees transposing Batteries Directive 2006/66/EC required individual producers of separately sold batteries to achieve collection targets by taking back waste batteries from retailers, municipalities and their own collection points through approved waste management plans. Producers of EEE with integrated batteries do not need a separate waste management plan for batteries, but, rather, comply through their WEEE management plan. **In April 2022, a revised Environmental Protection Act imposed new requirements on the activities, legal form, ownership/voting rights and supervision of PROs from April 2022, and from 2023, required each EPR-subjected waste stream is to be managed by a single PRO with the largest share of the market. The latter remains to be implemented.**

As of April 2024, over 600 producers of separately sold portable batteries complied through 5 joint plans (compliance organisations).

Collection rate: In 2016, POM increased by 32% over 2015 to 420 g per capita, and collection by 9%, leading to a collection rate of 36%. In 2018, the collection rate peaked at 39%, driven by an 18% collection increase (POM + 4%). In 2019, POM stagnated and collection decreased by 4%. **2022 data are not available.**



Source: Republic of Slovenia Statistical Office; **2022 are not available and use 2021 data.**

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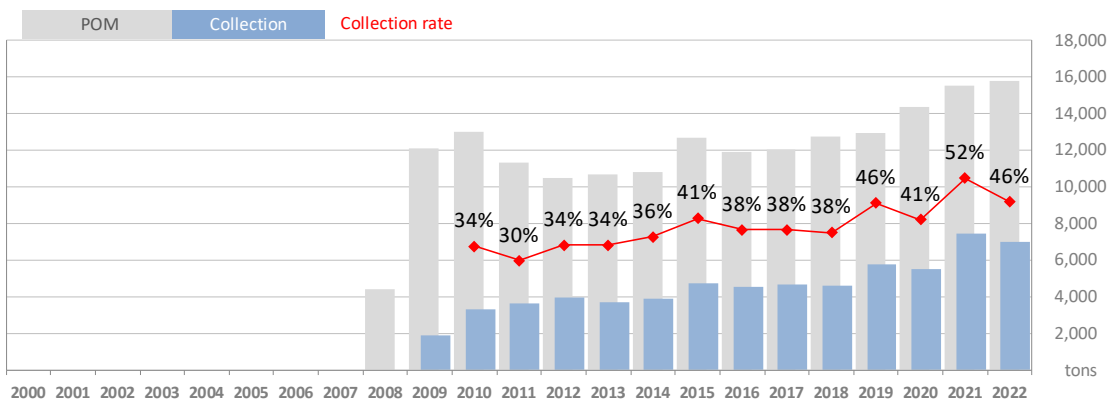
SPAIN

Legal developments: Royal Decree 45/1996 held the Autonomous Communities responsible for separately collecting waste batteries. Royal Decree 106/2008 transposing Batteries Directive 2006/66/EC made producers responsible for taking back waste batteries and left each Autonomous Community responsible for authorising organisations operating on their territory, which slowed the implementation of producer compliance organisations and complicated waste flow monitoring. The 2011 framework Law on Waste established a much-needed Coordination Commission on Waste, comprised of members from all Autonomous Communities, to implement waste policies more effectively. An amendment to the Law in May 2012 strongly simplified authorisation requirements for collective compliance organisations by making the authorisation in their home region valid for the entire national territory. In 2015, a new WEEE Decree extended EEE reporting and take-back obligations to ‘batteries that the end-user cannot manually remove from WEEE’. The (unknown) POM weight of these batteries is reflected in the WEEE collection target calculation. A July 2015 amendment to the Battery Decree i.a. harmonised the Decree with the 2011 Law on Waste and the 2015 WEEE Decree and introduced collection targets to 2020. A January 2021 amendment notably obligated foreign distance sellers as battery producers. **The May 2022 Law on Waste and contaminated Soil for the Circular Economy provided the legal basis for product-specific decrees to require additional information about environmental characteristics and addressed e-commerce platforms.**

Organisation developments: In 2022, about 1,800 battery producers complied through five authorised compliance organisations: Ecopilas (POM share about 53% in 2020), set up in 2000 by battery producers, WEEE compliance organisations ERP (POM share 34% in 2020), Ecolec, Unibat and Reinicia (Reboot). WEEE compliance organisation Eco-RAEE has ceased to offer waste battery management services.

Collection rate: In 2015, a 22% increase in POM coupled with a 17% increase in collection resulted in a 41% collection rate. In 2019, a 7% POM increase and a 31% increase in collection let the collection rate peak at 47%. In 2020, a 10% increase in POM to 317 g per capita and an estimated 4% decrease lowered the collection rate to 42%. **In 2021, collection increased by 36% over 2020. POM peaked in 2022 at 333 g per capita.**

Note: Based on data from the battery register and the compliance organisations, we estimated that in 2016 POM fell by -13%, while collection increased +15%. This results in a higher 2016 collection rate of 41% (Eurostat 38%). Eurostat data suggest the collection increase already took place in 2015. Our estimate of the 2015 collection rate was therefore lower (37% vs 41% Eurostat).



Source: 2018 Eurostat, 2019 and 2020: POM from register, Collection Sagis estimates (data from Ecopilas and ERP + estimate for Ecolec)

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SWEDEN

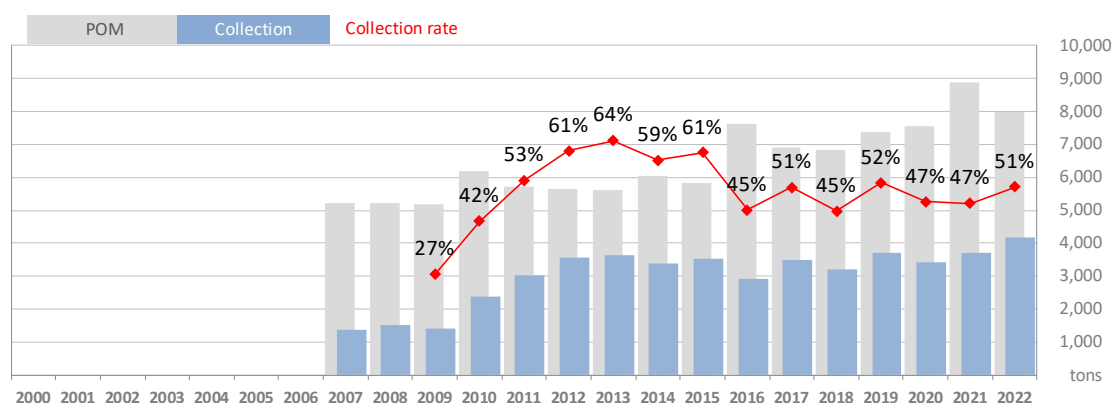
Legislative developments: Following the 1997 Batteries Order, all of Sweden's 290 municipalities had to set up their own battery collection, while producers of certain hazardous batteries financed these organisations through fees paid into a recycling fund managed by environment agency SNV. Batteries Ordinance 2008:834 transposed Batteries Directive 2006/66/EC, and from January 2009 de facto shifted the collection responsibility to producers. **In February 2022, the government sought input on a proposal to improve supervision of the batteries EPR regime and strengthen the compliance market in view of the upcoming EU Batteries Regulation. Subsequent amendments to the Batteries Ordinance harmonised its provisions with the revised WEEE Ordinance and aligned it with the conformity requirements of the EU Batteries Regulation.**

Organisation developments: As of early 2022, around 1,600 battery producers comply through two authorised WEEE organisations which, by way of their WEEE authorisation, qualify as battery compliance organisations. About 1,350 battery producers are signed up to El-Kretsen - set up in 2001 by 21 trade associations - and around 150 producers are signed up to Recipo (until May 2017 Elektronikåtervinning Förening, EAF), established in 2007 as a not-for-profit organisation by SIBA, a large EEE retailer. Recipo claimed a market share of 25% of EEE and batteries POM in 2016.¹² An estimated 200 individual B2B EEE compliers also cover integrated portable batteries in their WEEE programmes. In 2018, El-Kretsen serviced 50,000 collection containers for WEEE and around 5,000 for batteries. During 2017/8, all were replaced by smaller, closable bins to reduce fire risks from expired Lithium batteries.

Until the end of 2015, El-Kretsen charged battery fees only on separately sold batteries, while integrated batteries were covered by the WEEE fee, thus ensuring that producers of integrated batteries do not pay for two collection infrastructures. However, from 2016, El-Kretsen began charging for batteries put on the market in EEE at the same rates as those for separately sold batteries.

Lithium portable batteries: In 2016, POM increased by 31%, exclusively due to a 123% increase in lithium batteries (presumably from e-bikes, hover boards and power packs). The increase means that 46% of total battery POM consisted of lithium batteries in 2016, up from 28% in 2015.

Collection rate: In 2016, the collection rate fell to 45% (2015: 61%) due to a 17% decrease in collection (no conclusive explanations for the decrease, we suspect a clearing dispute) and the aforementioned 31% POM increase due to a doubling of lithium POM. In 2017, the collection rate was 51% as both POM and collection volumes receded from the unusual 2016 values (POM - 10%, collection +18% over 2016). In 2018, POM declined 1% to 675 g per capita and collection fell by 8%. In 2019, POM was back at over 720 g per capita (+8%), and collection increased by 16%, raising the collection rate to 52%. **POM peaked at 855 g per capita in 2021.**



Source: SNV, 2017-21: Eurostat; 2022 Sagis estimate based on collection data

¹² Since 2017, the battery collection volume reported to Eurostat closely corresponds to that reported by El-Kretsen only.

SWITZERLAND

Legislative developments: Legal requirements for the take-back of batteries have been in force since 1986, and voluntary financing by producers began in 1991. A 2001 Ordinance made the financing obligation mandatory through an Advance Recycling Fee (ARF) and a 2010 revision aligned the Ordinance with Batteries Directive 2006/66/EC. From 2016, new provisions for handling lithium containing WEEE in the ADR regulations came into place.

Organisation developments: From 2001 to 2016, the Government appointed producer-controlled non-profit INOBAT to manage the ARF and waste battery management. INOBAT later outsourced its operations to ATAG, a privately held public-services management company. From 2017, the Government appointed ATAG only to manage the ARF, required INOBAT to transfer the rights to the name INOBAT to the federal government, and the owners of the non-profit INOBAT to remove the word INOBAT from the organisation’s name from 2017. INOBAT mainly collects waste batteries from voluntary municipal collection points and obligated retailers.

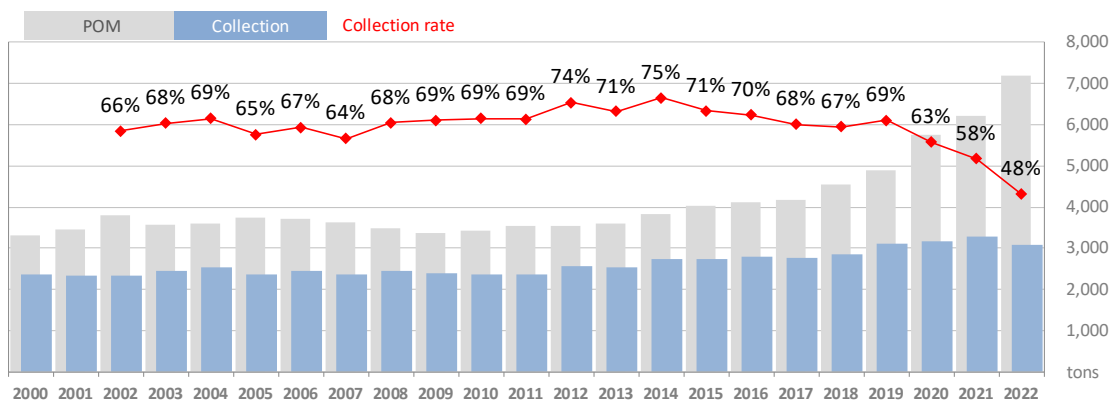
POM of embedded batteries: INOBAT’s annual reports show that consistent POM increases (2011-16) are largely due to increased volumes of embedded batteries. As producers of EEE with embedded batteries do not report their POM, the POM of embedded batteries is based on estimates: These resulted in a share of embedded batteries in total POM of 15% in 2009, 25% in 2015, 23% in 2017, 22% in 2018, 25% in 2019, and 20% in 2020.

Improved calculation methodology for the collection rate: Due to concerns that the increasing share of lithium batteries would depress collection rates as they become available for collection only after a 7-12-year lifecycle, INOBAT has been publishing 3 collection rates since 2016 to more accurately reflect collection performance:

1. The **collection rate methodology** for all batteries subject to the ARF (see graph below);
2. For **non-lithium batteries** subject to the ARF, the collection rate is collection divided by **3-year avg. POM**.
3. For **lithium batteries** subject to the ARF (including those for e-bikes), the collection rate is calculated as collection divided by up to **7-year avg. POM** (the first full dataset will be first available in 2023). This results in **POM of 1,974 / 2,294 / 4,133 in 2020/21/22 (based on average POM of the last 4, 5, 6 years)**.

Collection rate	2020	2021	2022
Non-Lithium batteries subject to the ARF	88.4%	85.7%	66%
Lithium batteries subject to the ARF	20.3%	22.8%	23.4%

Collection rate: A collection rate¹³ of around or close to 70% has been achieved¹³ until 2016. **Since 2016, the collection rate has fallen due to a steady increase in POM (from 495 g per capita in 2016 to 822 g in 2022) largely due to lithium batteries, including those for e-bikes and similar application (which are categorized as industrial batteries under the EU Batteries Directive). Lithium batteries contributed 37% of POM in 2020 and 2021, and 58% in 2022, bringing the collection rate down to 48%.**



Source data: Inobat AR (i.e. 2022). Due to changes in calculating POM over time, the collection rates here deviate slightly from those in Inobat reports.

¹³ POM volumes (and the collection rate shown here) shown here reflect the average of the current and the preceding year until 2020. **For 2020/21/22 POM is the sum of 3-years average for non-lithium plus the 4/5/6 year average for lithium batteries**

UNITED KINGDOM

Legislative developments: The Waste Batteries and Accumulators Regulations of April 2009 introduced the producer responsibility provisions. The first compliance period (of one year) began on 1 January 2010. Compliance organisations are free to choose how they collect batteries but must ‘co-operate’ to ensure that waste batteries are picked up from local authorities and those retailers that are obliged to take back waste batteries. Small producers (POM < 1 tonne) only have registration and reporting obligations and are not required to join a compliance organisation. In November 2021, a new framework law (the Environment Act) laid out post-Brexit environmental policy. **In November 2022, the Government revealed policy plans for improving the portable battery regime, including implementing kerbside collection for portable batteries and clarifying distinctions between battery types. UK-wide consultations on reform proposals are expected in 2024.**

Organisation developments: About 500 producers (2022) comply through five approved battery compliance organisations. In addition, there are about 1,870 small producers not adhered to a compliance organisation, who jointly represent around 0.3% of POM. As of 2016, BatteryBack remained the largest compliance organisation (2020 share of POM 35%), followed by ERP (30%), Valpak (21%), Ecosurety (10%) and Repic (4%).

Lead share in collection: The relevance of the collection rate as a measure of scheme performance can be disputed:

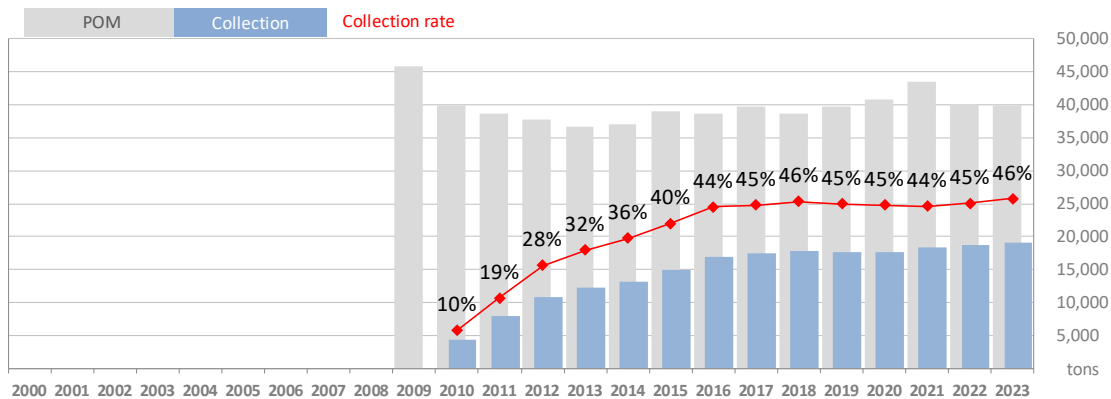
- The weight of lead ‘portable’ batteries collected has been a multiple of lead portable batteries POM (2019: 8.8 times POM; 2020: 8.4 times POM). An implausible amount of lead batteries first appeared in BatteryBack volumes in 2011 (after it tripled its POM share by signing a large producer and needed to increase collection) as well as EcoSurety. In 2012, Repic and Valpak followed suit. ERP bucked the trend until 2016.
- The **collection rate of all other chemistries** peaked at 20% in 2018, **and declined to 11% in 2022.**
- Assuming a plausible scenario in which all lead batteries POM are collected (100% return rate), a **plausible collection rate** would have peaked at 26% in 2016, **declining to 16% in 2022.**

The lead share in the UK’s portable batteries POM has been higher than in most countries: Over 8% until 2012, declining to 5% in 2016/7, and 4% after 4 kg threshold per portable battery was introduced in 2016. **It has been 3% from 2019 to 2022.**

	2016	2017	2018	2019	2020	2021	2022
Collection rate	44%	45%	46%	45%	45%	44%	45%
Coll. rate excl. lead	22%	19%	20%	16%	15%	10%	11%
Plausible lead collection*	26%	25%	25%	21%	19%	13%	16%

* 100% PB return rate

Collection rate: The collection rate increased from 10% in 2010 – the first ‘compliance period’ for battery collection organisations – to a peak of 46% in 2018. In 2019 and 2020, the collection rate stayed at 45%. **COVID years 2020 and 2021 saw a POM increase of +3% and +6%, 2023 a drop of -8%. Collection increased by 3% in 2021, and 2% in 2022 and 2023, keeping the collection rate at around 45%**



Source: Derived from batteries data published on Environment Agency’s National Packaging Waste Database