



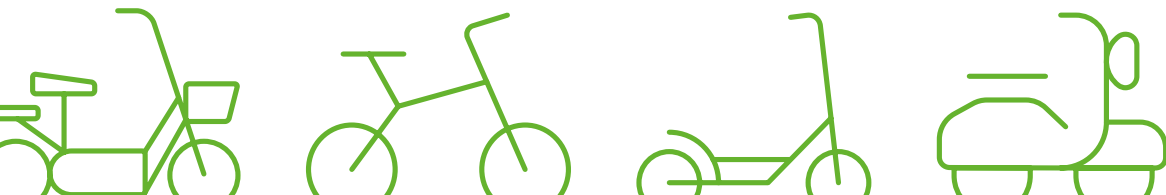
GRS Batterien
Service GmbH

www.grs-batterien.de

Annual Review 2024

GRS eMobility

in accordance with Section 15(1)
and (3) of the German Battery Act
(BattG)





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Preliminary remarks



Producers and importers of batteries for small electric vehicles such as E-bikes or E-scooters, or their authorized representatives, are responsible for the take-back and recycling of portable batteries collected by distributors, municipal waste collectors, voluntary collection centres and treatment facilities.

An appropriate, free-of-charge option for returning waste batteries must be offered for industrial batteries used to power vehicles with electric drives, for example E-bike batteries.

With this in mind, we developed an industry-specific solution in collaboration with the German Bicycle Industry (ZIV: Zweirad-Industrie-Verband e.V.) to ensure comprehensive take-back and disposal of industrial batteries. Following the successful approval of the producer-specific take-back scheme, GRS eMobility, in 2021, the scheme operated by GRS Service GmbH was expanded to include portable batteries.

To future-proof compliance with all regulations relating to the take-back of waste batteries for our customers, our take-back scheme is currently being realigned in accordance with EU legal requirements and in line with the new battery ordinance.

As customers of the GRS eMobility scheme, producers and importers are in full compliance with their obligations under the BattG. At the same time, they can offer their dealerships and service centres a safe and convenient take-back scheme that also benefits consumers. To fulfil the reporting obligations under Section 15(1) and Section 15(3) BattG, the take-back scheme allows joint documentation to be submitted to the German Federal Environment Agency for affiliated producers, as well as for those producers' distributors.

This annual report is a joint report for customers of the GRS eMobility industry-specific solution, covering the take-back and environmentally-compatible recycling of waste portable and industrial batteries from small electric vehicles in 2024.

We would like to take this opportunity to thank all our customers and partners.

Sincerely,

Dr Julia Hobohm (Cert. eng.)

General Manager

Gemeinsames Rücknahmesystem Servicegesellschaft mbH
Hamburg, May 2025



Endorsement of the annual review 2024 for portable batteries

Gemeinsames Rücknahmesystem Servicegesellschaft mbH
Gotenstr. 14, 20097 Hamburg, Germany

determined the quantities placed on and collected from the market, for the take-back scheme for producers of portable batteries (GRS Consumer, GRS eMobility, GRS Health-care and GRS Powertools) for the reporting year 2024 and presented these figures to cyclos GmbH for auditing.

The annual review 2024 (version dated 25/04/2025) was audited using documentation and other random samples provided in compliance with Section 15(1) of the German Battery Act (25/06/2009, in its latest amendment dated 03/11/2020, valid for 2023).

On the basis of the audit result, this version of the annual review 2024 is hereby endorsed (see tables in annexes 1-4).

Osnabrück, 25/04/2025

Gemeinsames Rücknahmesystem Servicegesellschaft mbH
Gotenstr. 14, 20097 Hamburg, Germany

Based on the audit of the Annual Review 2024 for the take-back scheme GRS eMobility, the following results are endorsed*:

Battery Act	Requirements	Result
Section 15(1), no. 1	Mass of portable batteries placed on the market by members/manufacturers in 2024	1073.7 tonnes
	Mass of portable batteries taken back by us	1466.4 tonnes
Section 15(1), no. 2	Mass of portable batteries purchased from other take-back schemes	
	Mass of portable batteries sold to other take-back schemes	826.1 tonnes
	Total mass of portable batteries taken back	640.3 tonnes
Section 15(1), no. 3	Mass of recycled waste portable batteries	644.2 tonnes
Section 15(1), no. 4	Collection rate achieved**	64.2%
Section 15(1), no. 5	Recycling rate achieved	100.6%
Section 15 (1), no. 6	Qualitative and quantitative results for recycling and disposal in 2024	traceable



Dr Stephan Löhle

Publicly appointed and sworn expert by the Chamber of Industry and Commerce for packaging disposal, electrical appliance disposal
Authorised by: Chamber of Industry and Commerce Osnabrück – Emsland – County of Bentheim

cyclos GmbH
Westerbreite 7, 49084 Osnabrück



Ute Schmiedel

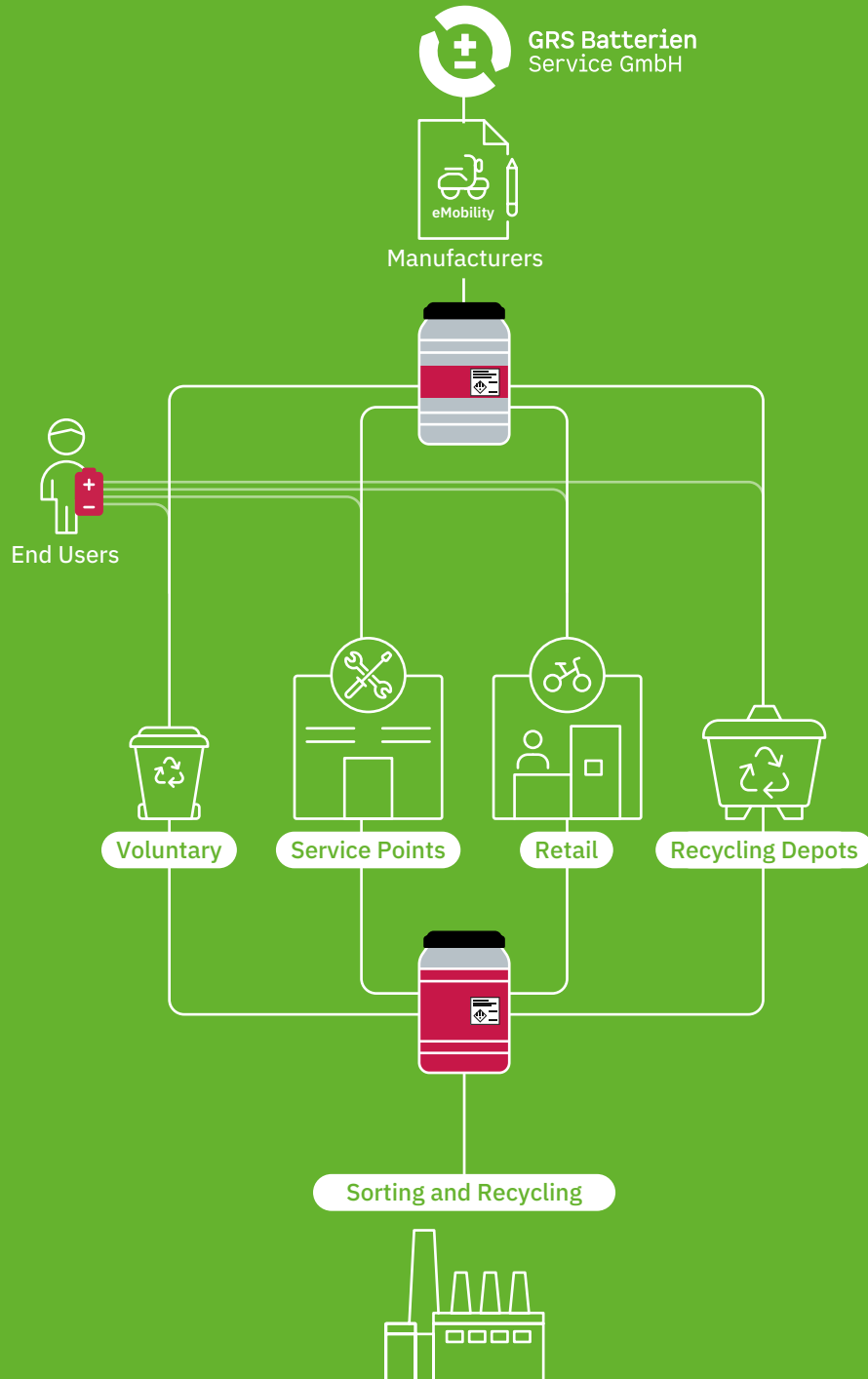
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* For details, please see the methodology report and documentation regarding annual reporting for portable batteries 2024 pursuant to Section 15 BattG (German Battery Act) from GRS Batterien Service GmbH (signed on 28/04/2025).

** The collection rate was calculated pursuant to Section 16(2) BattG

The above information is based on Tables 1 and 2 published by the German Environment Agency.



GRS eMobility, the industry-specific solution

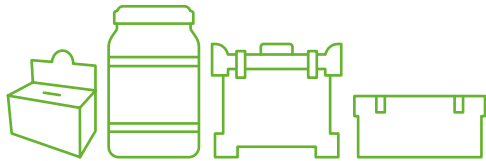
Producers of portable and industrial batteries for small electric vehicles commission GRS Servicegesellschaft mbH (GRS Service GmbH) to offer independent bicycle retailers and producer-owned service centres a collection service for used batteries from electric bicycles, for example.

Voluntary collection centres, municipal waste collectors and treatment facilities for waste electrical equipment and end-of-life vehicles can also take advantage of the scheme as a 'GRS eMobility collection point'. They will receive equipment to get set up, as well as informative literature on the safe collection of waste batteries.

Consumers can conveniently return their used batteries, free of charge, to any of these collection points. Once commissioned by the collection points, GRS Batterien arranges for the collection of the filled collection containers, and manages the sorting and proper recycling of the spent batteries.



GRS eMobility in Numbers



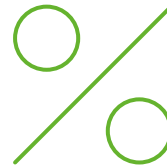
Amount collected

640.3 t

Portable batteries

224.3 t

Industrial batteries



Collection rate

64.2 %

Portable batteries



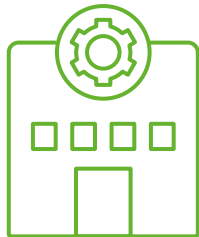
Recycling rate

100.6 %

Portable batteries

100 %

Industrial batteries



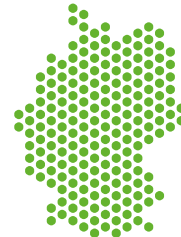
Producers

194

Portable batteries

185

Industrial batteries



Collection points*

1,902

*Collection points where at least one portable and/or industrial battery was returned in 2024.



Producers

The GRS eMobility industry-specific solution has more than 190 customers among producers and importers of industrial and/or portable batteries for small electric vehicles, such as those used in E-bikes, E-scooters, Segways, electric motorbikes and more. GRS Service GmbH undertakes all the duties for these clients to ensure compliance with the Battery Act. This includes:

Section 4: Duty to Register Registration with the relevant authorities.

Sections 5 and 8: Producers' Take-back Duties Offering take-back to distributors, public waste disposal entities, voluntary collection centres and treatment facilities.

Section 14: Recycling and Disposal Ensuring treatment and recycling of batteries in accordance with law, achieving or even exceeding targets for recycling efficiency.

Section 15: Annual Review Annual review to document the mass of batteries taken back and recycled by GRS eMobility users, the collection and recycling rates, and qualitative and quantitative results from recycling and disposal.

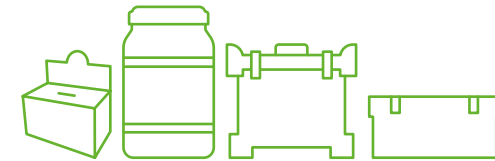
Section 18: Duty to Notify Providing distributors with information and ways to communicate up-to-date information to end users.



Take-back Network

Since the inauguration of our industry-specific solution, more than 2700 distributors of E-bikes and other small electric vehicles have received our start-up package, composed of collection containers, informative literature and packaging materials. The specifically labelled collection container is designed for the collection of large used lithium batteries from electric bicycles and other small electric vehicles.

We take the safety of everyone involved in transporting waste batteries very seriously. With this in mind, and to respond to the strong demand from our collection centres for qualified training on the subject of 'proper take-back of lithium batteries', we offer our GRS training in accordance with 1.3 ADR for all persons involved in transporting dangerous goods.



Collection Results

The continuing boom in the E-bike market shows no signs of declining. According to data from the German Bicycle Industry (ZIV), 2 million E-bikes were sold in Germany in 2024, marking the second year running that more E-bikes were sold than conventional pedal-powered bikes.

Due to the long life of rechargeable batteries, there will be a significant delay before the amount of taken-back spent batteries from small electric vehicles reflects this upward trend. In the medium term, we are expecting a significant increase in the volume of returns and are already well positioned for this. The recycling rate for portable batteries was 100.6%, while the rate for returned industrial batteries was 100.0%.



Communications

One of the essential parts of our job as a take-back scheme is to educate and inform consumers about how to return batteries, especially lithium batteries, in compliance with regulations and separately from household waste. This is why 2024 saw all the take-back schemes operating on the market come together to launch the consumer campaign, www.batterie-zurueck.de in accordance with their obligations under Section 18 of the Battery Act (BattG). The aim of the campaign is to increase the return rate of waste batteries and rechargeable batteries.

In addition, our goal is to become industry leaders in terms of expertise, transforming and continuously optimising the entire circular economy approach in practice and through dialogue with colleagues. GRS Service GmbH is actively engaged in communications and shares its expertise with the industry through lectures, interviews and thought leadership appearances.





GRS Batterien
Service GmbH

Annual Review 2024 GRS eMobility

Annex





Mass of portable batteries placed on the market

Category/Scheme		Tonnes	Percent
Primary batteries			
Round cells	AlMn	441.8	41.15
	Li	13.9	1.29
	Zn-air	14.6	1.36
	ZnC	40.1	3.74
Button cells	AgO	0.1	< 0.1
	AlMn	2.3	0.21
	Li	65.5	6.10
	Zn-air	1.3	0.12
Subtotal I		579.5	53.97
Secondary batteries			
Round cells	AlMn	53.7	5.00
	Li-ion	361.5	33.67
	NiCd	17.3	1.61
	NiMH	57.4	5.35
	Pb	2.0	0.19
Button cells	Li-ion	< 0.1	< 0.1
	NiCd		
	NiMH	2.2	0.21
Subtotal II		494.2	46.03
Total		1.073.7	100.00

BattG Act governing placement on the market, take-back and environmentally-compatible disposal of conventional and rechargeable batteries

Primary batteries non-rechargeable batteries Secondary batteries rechargeable batteries AgO Silver oxide AlMn Alkaline-manganese Cd Cadmium Li Lithium Li-ion Lithium-ion NiCd Nickel-cadmium NiMH Nickel-metal hydride NiZn Nickel-zinc Pb Lead Zn-air Zinc-air ZnC Zinc-carbon



Mass of portable batteries taken back, by category and scheme

Category/Scheme		Mass taken back by our scheme	Mass purchased from other take-back schemes	Mass sold to other take-back schemes	Result (Basis for calculating the collection rate)
Primary batteries		Tonnes¹			
Round cells	ZnC	21.0		11.7	9.3
	AlMn/NiZn	1.183.7		657.5	526.2
	Zn-air				
Button cells ²	Li	22.6		12.6	10.0
	AgO	17.0		9.4	7.6
	AlMn				
	Zn-air				
Li					
Subtotal I		1,244.3		691.1	553.2
Secondary batteries					
Round cells	AlMn				
	Li-ion	111.6		62.0	49.6
	NiMH	34.7		19.3	15.4
	NiCd	49.7		27.6	22.1
	Pb	26.1		26.1	0.0
Button cells	Li-ion				
	NiMH				
	NiCd				
Subtotal II		222.1		135.0	87.2
Not determined		< 0.1		< 0.1	
Total		1,466.4		826.1	640.3

The mass taken back, 640.3 t, used to calculate the collection rate, corresponds to a collection rate of 64.2%.

¹Composition based on sorting results.

²Where sorting was not possible, these results include both primary and secondary batteries.

BattG Act governing placement on the market, take-back and environmentally-compatible disposal of conventional and rechargeable batteries

Primary batteries non-rechargeable batteries **Secondary batteries** rechargeable batteries

AgO Silver oxide **AlMn** Alkaline-manganese **Cd** Cadmium **Li** Lithium **Li-ion** Lithium-ion

NiCd Nickel-cadmium **NiMH** Nickel-metal hydride **NiZn** Nickel-zinc **Pb** Lead **Zn-air** Zinc-air

ZnC Zinc-carbon



Mass of recycled **portable batteries**: Qualitative and quantitative results for recycling and disposal

Category/scheme	Mass of recycled waste batteries	Mass of disposed waste batteries	Mass of waste batteries sent for recycling outside of Germany
Primary batteries		Tonnes	
Round cells	ZnC	11.0	
	AlMn		180.7
	Zn-air	520.6	
	Li	12.7	
Button cells ¹	AgO		
	AlMn	8.9	
	Zn-air		
	Li		
Subtotal I			180.7
Secondary batteries			
Round cells	AlMn		
	Li-ion	50.9	
	NiMH	18.7	1.2
	NiCd	21.4	2.5
	Pb	0.0	
Button cells	Li-ion		
	NiMH		
	NiCd		
Subtotal II	91.1		3.7
Not determined			
Total	644.2		184.4

¹Where sorting was not possible, these results include both primary and secondary batteries.

Scheme	Mass input (t)	Mass output (t)	Recycling efficiency (%)
Pb			
NiCd	21.4	16.1	75.19
"Others"	622.8	478.6	76.85
Total	644.2	494.7	

Taking into account the annual storage figures carried forward, the recycling rate under Section 15(1) no. 5 BattG amounts to 100.6%.

BattG Act governing placement on the market, take-back and environmentally-compatible disposal of conventional and rechargeable batteries
Primary batteries non-rechargeable batteries **Secondary batteries** rechargeable batteries
AgO Silver oxide **AlMn** Alkaline-manganese **Cd** Cadmium **Li** Lithium **Li-ion** Lithium-ion
NiCd Nickel-cadmium **NiMH** Nickel-metal hydride **NiZn** Nickel-zinc **Pb** Lead **Zn-air** Zinc-air
ZnC Zinc-carbon



Mass of industrial batteries taken back, by category and scheme

Category/scheme	Mass taken back by our scheme
	Tonnes ¹
Primary batteries	
	ZnC
Round cells/prismatic cells/block batteries	AlMn/NiZn ²
	Zn-air
	Li
Button cells ²	AgO
	AlMn
	Zn-air
	Li
Subtotal I	
Secondary batteries	
	AlMn
Round cells/prismatic cells/block batteries	Li-ion 224.3
	NiMH
	NiCd
	Pb
Button cells	Li-ion
	NiMH
	NiCd
Subtotal II	224.3
Total	224.3

¹Composition based on sorting results

²Where sorting was not possible, these results include both primary and secondary batteries.

BattG Act governing placement on the market, take-back and environmentally-compatible disposal of conventional and rechargeable batteries

Primary batteries non-rechargeable batteries **Secondary batteries** rechargeable batteries

AgO Silver oxide **AlMn** Alkaline-manganese **Cd** Cadmium **Li** Lithium **Li-ion** Lithium-ion

NiCd Nickel-cadmium **NiMH** Nickel-metal hydride **NiZn** Nickel-zinc **Pb** Lead **Zn-air** Zinc-air

ZnC Zinc-carbon



Mass of recycled industrial batteries: Qualitative and quantitative results for recycling and disposal

Category/Scheme	Mass of recycled waste batteries	Mass of disposed waste batteries	Mass of waste batteries sent for recycling outside of Germany
Primary batteries		Tonnes	
Round cells/prismatic cells/block batteries	ZnC		
	AlMn		
	Zn-air		
	Li		
Button cells	AgO		
	AlMn		
	Zn-air		
	Li		
Subtotal I			
Secondary batteries			
Round cells/prismatic cells/block batteries	AlMn		
	Li-ion	224.3	
	NiMH		
	NiCd		
Button cells	Pb		
	Li-ion		
	NiMH		
	NiCd		
Subtotal II		224.3	
Total		224.3	

Scheme	Mass input (t)	Mass output (t)	Recycling efficiency (%)
Pb			
NiCd			
"Others"	224.3	177.3	79.05
Total	224.3	177.3	

Taking into account the annual storage figures carried forward, the recycling rate pursuant to Section 15 (3) BattG amounts to 100%.

BattG Act governing placement on the market, take-back and environmentally-compatible disposal of conventional and rechargeable batteries
Primary batteries non-rechargeable batteries **Secondary batteries** rechargeable batteries
AgO Silver oxide **AlMn** Alkaline-manganese **Cd** Cadmium **Li** Lithium **Li-ion** Lithium-ion
NiCd Nickel-cadmium **NiMH** Nickel-metal hydride **NiZn** Nickel-zinc **Pb** Lead **Zn-air** Zinc-air
ZnC Zinc-carbon



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