



An Analysis of EU Collection and Recycling of Lead-based Automotive Batteries During the Period 2015-2017



IHS Markit



Study commissioners:

European Automobile Manufacturers Association – ACEA

Japan Automobile Manufacturers Association Inc. – JAMA

Korea Automobile Manufacturers Association – KAMA

Association of European Automotive and Industrial Battery Manufacturers – EUROBAT

International Lead Association – ILA

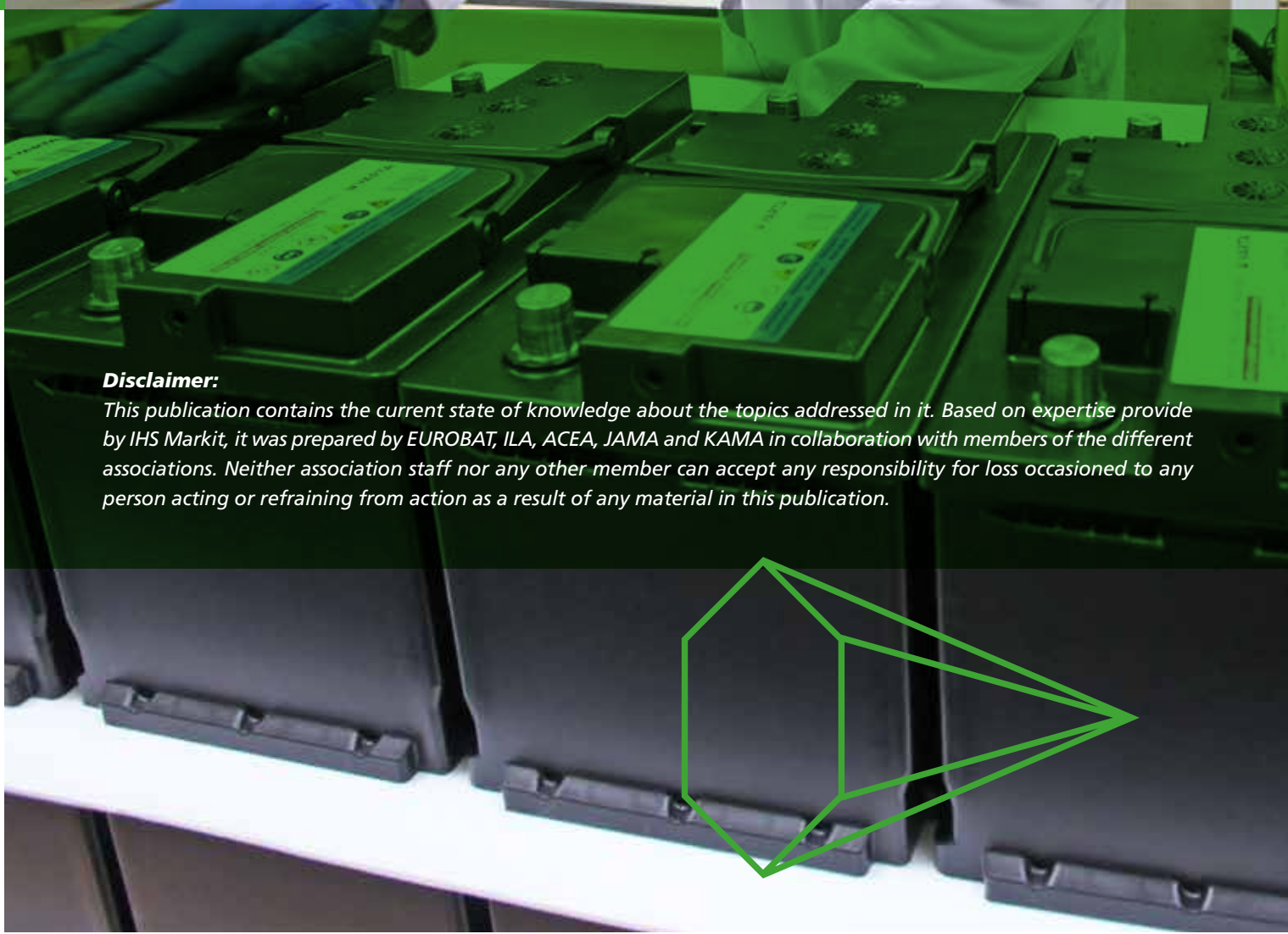
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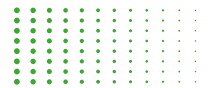




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EXECUTIVE SUMMARY



An analysis of EU collection and recycling of lead-based automotive batteries during the period 2015-2017

The independent consultant IHS Markit was requested to undertake an analysis of EU collection and recycling of lead-based automotive batteries during the period 2015-2017.

The results of this analysis support the conclusion made in other studies that the collection and recycling rate of lead-based automotive batteries in the EU is extremely high and is essentially a closed loop with few batteries being lost through exports in used vehicles.

Introduction

There are no collection targets for lead-based automotive batteries specified in the EU Battery Directive (2006/66/EC). However, they are considered one of the current success stories of the EU circular economy with a mature network of collection points for used batteries feeding strictly regulated secondary lead producers (recyclers). These facilities operate highly efficient processes meaning that **nearly all the used battery is converted into raw materials** that can be used in the EU to manufacture new batteries. The lead battery recycling process can be **repeated indefinitely**, meaning that new lead batteries are made with materials that have been recycled many times over.

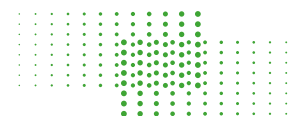
In 2014 a review by IHS Markit¹ concluded that **99%** of all automotive lead batteries available for collection in the EU are collected and sent for recycling. This study was based upon data collected for the period 2010-2012 from seven Member States (France, Germany, Italy, Netherlands, Spain, Sweden, and United Kingdom) representing 75% of the automotive market. During the review of the 8th Adaptation to scientific and technical progress of exemptions to Annex II to Directive 2000/53/EC it was highlighted that significant numbers of cars are exported from the EU and that the impact of this on the collection rate of used lead batteries had not been evaluated by IHS Markit.

The conclusion of a very high collection and rate for automotive lead batteries is confirmed by data collected in other regions where mature collection and recycling network exists. For example, in 2019 Battery Council International reported that their most recent study completed for the years 2014-2018 finds the recycling rate in the USA to be 99.0% with a standard deviation of $\pm 0.3\%$ ².

¹ IHS Markit, EUROBAT, ILA, ACEA, JAMA and KAMA (2014), The Availability of Automotive Lead-Based Batteries for Recycling in the EU - A joint industry analysis of EU collection and recycling rates 2010-2012, prepared by information company IHS Markit. Downloaded from https://www.ila-lead.org/UserFiles/File/Newsletter%20files/IHS_eurobat_report_lead_LoRes%20FINAL.pdf

² National Recycling Rate Study. Prepared by SmithBucklin Statistics Group 2019. Downloaded from https://cdn.ymaws.com/batterycouncil.org/resource/resmgr/2020/BCI_482347-20_2019-Study.pdf

Methodology



The methodology was developed to calculate an amount of made-available lead automotive batteries, based on the parc of vehicles and the estimated lifetime of batteries, that should be entering the waste stream and thus be collected each year.

It addresses both the number and weight of waste batteries that will be available for collection each year, taking advantage of two existing recognised data sources:

- > **IHS Markit** proprietary parc data is used to calculate the number of used automotive batteries recovered within the vehicle lifetime; a formula is applied to parc data by vehicle age to determine the battery's expected lifetime within the vehicle.
- > **EUROSTAT** data by Member State where the battery is recovered during vehicle scrappage is used to calculate the number of automotive batteries recovered from end-of-life vehicles (ELV).

The tonnage of made-available batteries is calculated from the units of batteries reported as being collected by Member States multiplied by the average weight of the battery (in kilograms) and average units of battery per vehicle.

The collection and recycling rate is defined as:

$$\frac{\text{Collected batteries [total tonnage for the Member States examined during 2015–2017]}}{\text{Made-available batteries [total tonnage for the Member States examined during 2015–2017]}}$$

Data from 14 countries were analysed, representing about 92% of the parc of in-use vehicles in the EU in 2017 (Austria, Belgium, Czech Republic, France, Germany, Greece, Hungary, Italy, the Netherlands, Poland, Portugal, Spain, Sweden and the UK) for the time period 2015, 2016, and 2017. Moreover, the new study also attempted to evaluate the impact of exportation of used cars containing lead batteries on overall collection rates.

Key Findings

2015-2017	Europe
Total automotive lead batteries available for collection, 2015–2017 (tonnes)	3,207,909
Total automotive lead batteries collected, 2015–2017 (tonnes)	3,121,409
Collection and Recycling rate	97.3%

The collection and recycling rate for automotive lead-based batteries calculated using this methodology was 97.3%



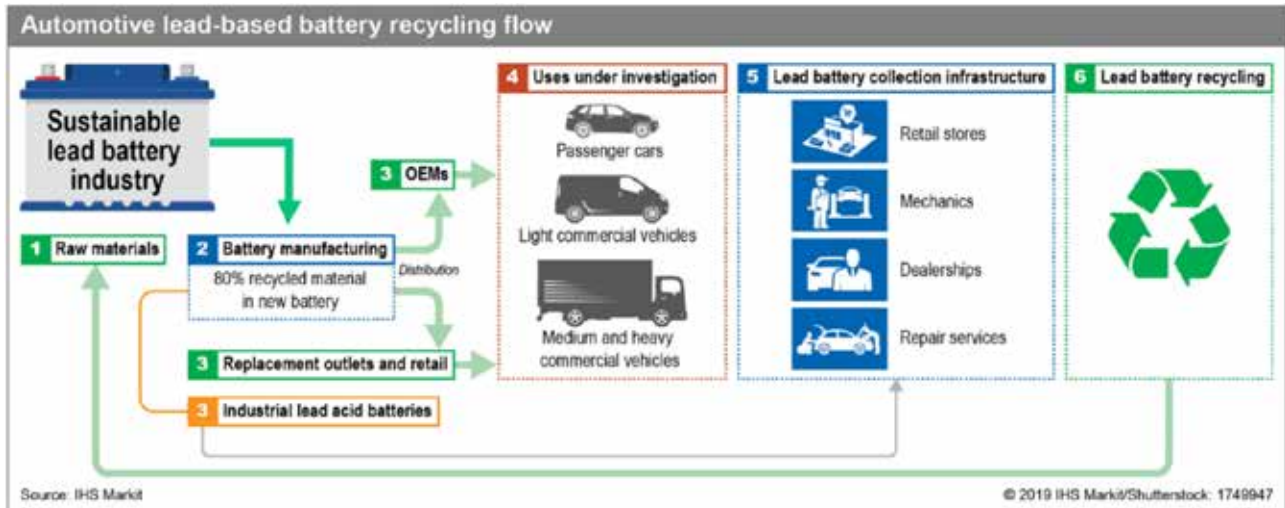
Around 2.7 million second-hand cars were exported outside of the 14 countries considered in the study each year (about half of which are exported out of Germany) for the period 2015-2017. The tonnage of batteries exported as part of second-hand cars (and not available for collection within the EU) represents about 45,000 tonnes per year for the 14 countries surveyed in this study. Assuming the battery for a passenger car has an average lifetime of 6 years, it can be proposed that one of six batteries in the exported second-hand vehicles would have become a waste battery in the same year as it was exported. The batteries that can be considered waste batteries and were exported therefore represent only 0.8% of the total made-available waste lead automotive batteries.

Our previous study conducted for the period 2010-2012 had estimated a collection and recycling rate of 99%. We attribute this difference to:

- > A larger panel of countries, now covering 92% of the automotive parc in the EU (75% in the previous study). The seven countries that have been added to the panel show a lower recycling rate. Using the same panel of countries as the previous study, the recycling rate calculated would have been **99.7%**.
- > Volatility of collection figures: at a national level, the amounts of collected batteries vary from year to year sometimes abruptly, without link to any obvious factor, and not simultaneously among the countries. This is somewhat attenuated by using a three-year average and European coverage, but some volatility remains.



Overview of Lead Battery Recycling in the EU



Used automotive lead-based batteries are typically returned to the point of sale – vehicle workshops, vehicle dealerships, accessory shops, and DIY stores – or returned to recycling businesses or metal dealerships from authorised end-of-life-vehicles treatment facilities (ATFs).

In all cases, the returned batteries are sent to collection points to be picked up by specialised companies that transport and deliver the waste batteries to secondary recycling plants operating under strict environmental regulations.

The lead battery is an excellent example of a product that allows for an almost complete end-of-life recycling, with all components available to recycling.

The components that can be **recycled and re-used** are as follows:

- > **The lead components** (battery plates, paste and terminals), representing approximately 60% of the weight are recycled and refined to be used to make new batteries.
- > **The battery casing**, which is made of plastic (approximately 7% of the weight), is usually separated before the lead is recycled, depending on the method used. It is then reprocessed and re-used for batteries or for other products in the automobile industry for example in bumpers, wheel arches, and other parts.
- > **The spent electrolyte** of diluted sulphuric acid (approximately 30% of the weight) is treated in a variety of ways. In some processes the spent electrolyte is separated and filtered to make it suitable for regenerating fresh acid. Other processes convert the spent electrolyte into calcium sulphate (gypsum) or sodium sulphate (soda), which can be used to manufacture building products or detergents.





The European Automobile Manufacturers' Association (ACEA) represents the 16 major Europe-based car, van, truck and bus makers. BMW Group, CNH Industrial, DAF Trucks, Daimler, Ferrari, Fiat Chrysler Automobiles, Ford of Europe, Honda Motor Europe, Hyundai Motor Europe, Jaguar Land Rover, PSA Group, Renault Group, Toyota Motor Europe, Volkswagen Group, Volvo Cars, and Volvo Group.

- ACEA works with a variety of institutional, non-governmental, research and civil society partners - as well as with a number of industry associations with related interests.
- ACEA has permanent cooperation with the European Council for Automotive R&D (EUCAR), which is the industry body for collaborative research and development.
- ACEA has close relations with the 29 national automobile manufacturers' associations in Europe, and maintains a dialogue on international issues with automobile associations around the world. www.acea.be



EUROBAT is the association for the European manufacturers automotive, industrial and energy storage batteries. EUROBAT has more than 50 members from across the continent comprising more than 90% of the automotive and industrial battery industry in Europe. The members and staff work with all stakeholders, such as battery users, governmental organisations and media, to develop new battery solutions in areas of hybrid and electro-mobility as well as grid flexibility and renewable energy storage. www.eurobat.org



ILA is the only global trade association dedicated to representing lead producers and companies with a direct interest in lead and its use. The Association's team of technical, regulatory, environment and health experts work with stakeholders to promote the benefits of lead and the safe and responsible use of the metal in manufacturing and other applications. <https://www.ila-lead.org/>



Japan Automobile Manufacturers Association, Inc. (JAMA) is a non-profit industry association which comprises Japan's fourteen manufacturers of passenger cars, trucks, buses and motorcycles. JAMA works to support the sound development of Japan's automobile industry and to contribute to social and economic welfare. <http://www.jama-english.jp/>



The Korea Automobile Manufacturers Association (KAMA) is a non-profit organization representing the interests of automakers in Korea. We are promoting the sound growth of the automobile industry and also the development of the national economy. <http://www.kama.or.kr/>