Lead Recycling

Sustainability in action

- **Lead has one of the highest recycling rates in the world, higher even than better known recycled items such as glass or newspaper. It is also the most recycled metal of all those commonly used, far greater than aluminium, copper or zinc[1].**
- **Lead-acid batteries, the world's most recycled consumer product[2], is the main application for lead metal.**
- **Unlike most materials lead can be recycled indefinitely without any reduction in quality, making it ideal for a circular economy.**
- **Lead recycling makes an important contribution to sustainable development, easing the pressure on non-renewable resources and reducing carbon emissions through a simple and energy-efficient recovery process.**

At the end of the recyling process lead ingots are ready to be reused in a variety of applications

Lead batteries are a vital component in the 1 billion petrol and diesel vehicles existing worldwide

In 2013, global secondary lead production was 6.1 million tonnes, or 54% of total production. Secondary production accounts for all the lead produced in the USA and 74% of lead produced in Europe.

Lead is one of the most effectively recycled materials in the world and today more lead is produced by recycling than is mined. Recycling lead is relatively simple and in most of the applications where lead is used, such as lead-acid batteries, it is possible to recover it for use over and over again. In fact the quality of recycled lead is often similar to that of metal obtained from mining.

The majority of primary lead is effectively used only to 'top up' the lead that is already circulating efficiently in the economy. This minimises the pressure on the earth's natural resources to such an extent that lead is likely to be readily available as a sustainable resource in the future for as long as can be reasonably forecast.

How are lead-based batteries recycled?

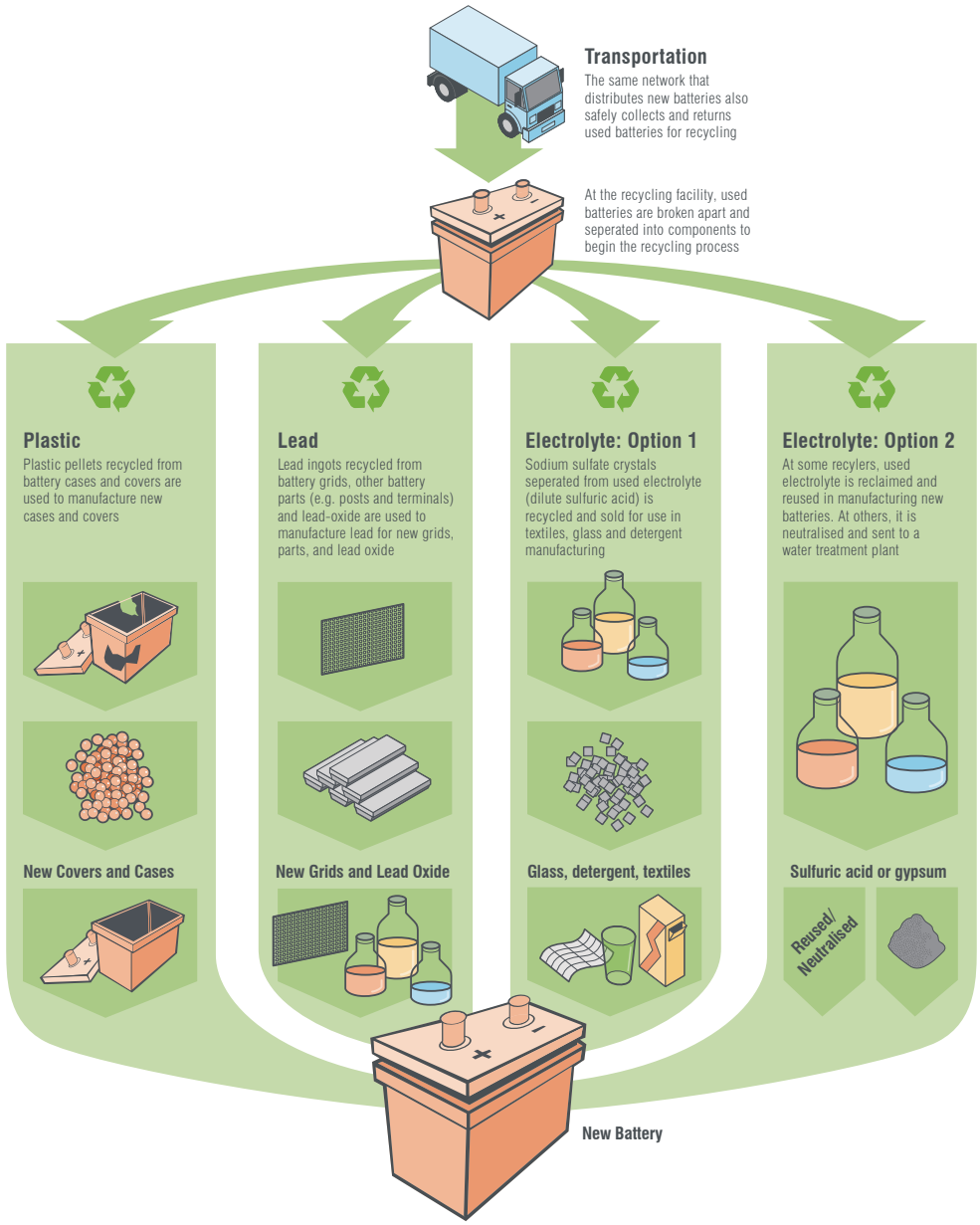
Lead-based batteries account for more than 80% of present day worldwide lead usage and have an extremely high rate of recycling – in Europe and USA the recycling rate is 99%. Lead is a valuable material so rather than send used lead-acid batteries (ULAB) to landfill at the end of their life many countries around the world send ULAB to recycling centres that operate under strict environmental regulations.

ULAB are returned to car accessory dealerships, car workshops, recycling businesses, DIY stores and metal dealerships before being sent to collection points. The batteries are then picked up by specialised companies, who ensure the safe transport and delivery to secondary smelting plants.

At the smelter, the batteries are broken and the components such as the lead metal, paste, plastics and electrolyte (acid) are separated. The lead components are then smelted and refined. The refined lead produced from this process is either used to make new batteries or to make other leaded products such as those employed in building construction, cable sheathing and in healthcare as radiation shielding.

Hardly any part of a lead-based battery goes to waste. In most cases the polypropylene plastic casing is recycled to produce plastic pellets that are used to make new battery casings and car bumpers, while the sulfuric acid in the batteries is recovered or made into gypsum for use in plasterboard, or as an agricultural fertiliser.

Recycling lead batteries



New batteries are recyclable and comprise previously recycled materials

With acknowledgements to BCI.

Lead-based batteries are used for large scale energy storage for renewable energy sources

What are the uses of lead-based batteries?
Lead-based batteries are a vital component in the 1 billion petrol and diesel vehicles existing worldwide[3]. They are also used in critical stationary applications, such as providing back-up power for telecommunication systems.

Lead-based battery technology will play a significant role in helping to achieve national and international energy policy objectives in the future, notably through:

- large scale energy storage for renewable energy sources and electrical power grids
- the reduction of fuel consumption including vehicles with conventional combustion engines (including start-stop vehicles and hybrids) and by powering exhaust-free industrial vehicles (e.g. forklift trucks, golf carts).

Lead sheet, used in the construction industry for roofing and as a radiation shield in the healthcare industry, also has an impressive recycling record – all lead sheet is manufactured from recycled material, and more than 95% is collected and recycled.[4]

How does lead recycling contribute to a sustainable society?
The current 'take-make-use-throw away' model of consumption means that as the world population increases the demand for primary resources will become increasingly unsustainable. It is therefore essential to return materials at the end of their life back into the economy.

Governments around the world are working to create closed loop economies and to ensure that more materials are recycled indefinitely[5]. Battery lead recycling already achieves this closed loop and has other positive environmental impacts. Lead recycling saves energy and reduces carbon emissions since it is far more energy-efficient to recycle than it is to produce lead from mining and processing ores.

The vast scale of worldwide lead battery use would also pose significant supply challenges to any potential replacement materials, should they ever prove to be technically and economically viable alternatives. In Europe, for instance, lead is readily available with good security of supply, whereas massive imports from other regions of the world would be needed for some alternative technologies.

There will be 37 million lead-based start-stop batteries in micro-hybrid cars by 2020

[1] International Lead Zinc Study Group. It is estimated that 75% of all lead is recycled and reused. UNEP International Resource Panel (2011). Recycling Rates for Metals. A Status Report.
[2] EUROBAT, BCI.
[3] www.wardsauto.com
[4] European Lead Sheet Industry Association www.elsia-web.org
[5] European Commission (Brussels) 2011. Communication from the Commission to the European Parliament, the council, the European Economic and Social Committee of the Regions. Roadmap to a Resource Efficient Europe. COM(2011) 571 final.
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