Lead-based battery technologies are sustainable for the long-term, says new study

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Efficient and successful collection and recycling infrastructure of lead-based batteries highlighted

LONDON, UK (Oct. 24, 2013) – There are no concerns about the availability of raw materials or the security of supply for lead-based batteries for the foreseeable future, according to a new study.

In a project to assess the current and future resource availability of a number of automotive battery technologies, conducted by the International Lead Association (ILA), the lead-based battery has proven its long-term sustainability at a time when there is concern in the US and Europe about the availability of natural resources required for future needs.

At present the lead-acid battery is the technology of choice for all Starter, Light and Ignition (SLI) battery applications in conventional combustion engine vehicles such as cars and trucks. In fact all the cars on the road utilise a lead-acid battery, as all hybrid and electric vehicles also require an SLI type battery to provide power for on-board electronics and safety features.

In a presentation to the International Lead Zinc Study Group, in Lisbon this month, ILA's Dr. Alistair Davidson said there were no issues with the availability of lead. He highlighted the efficient and successful collection and recycling infrastructure of lead-based batteries as the main reasons for this availability, with more than half of the 10 million tonnes of refined lead metal produced in 2012 worldwide coming from recycled sources[1]. ILA also analysed the resource availability of materials such as copper, calcium, selenium and tin which can be used as alloying elements in lead-based batteries with no issues of resource availability found.

Dr. Davidson explained that lead is one of only three metals to have a global production rate of more than 50% from secondary production, with an end of life recycling rate for lead-acid batteries of more than 95% in the U.S. and Europe. In the U.S. alone, lead-acid battery recycling keeps 2.4 million tons of batteries out of landfills.

He also reported that while the market for the conventional combustion engine is expected to decline over the next 40 years, any replacement car technologies are likely to continue to use SLI

[1] Worldwide secondary lead production is currently 6m tonnes compared to 4.6m tonnes from primary production.

type lead-acid batteries to provide power for a range of electronics and safety features within the vehicle.

Dr. Davidson added: “Lead-based batteries effectively operate in a closed loop in which commercial considerations drive the collection and efficient recycling of used batteries and the majority of their components at the end of their life. As such, lead is a fantastic example of the circular economy in action – something that policy makers around the world increasingly recognise as being necessary to address negative environmental and social impacts associated with raw material extraction and production.”

The study was part of a range of activities currently underway, in partnership with the Association of European Automotive and Industrial Battery Manufacturers (EUROBAT) and car manufacturing associations from Europe, Japan and South Korea (ACEA, JAMA and KAMA) to support a future submission under the EU End of Vehicle Life Directive.

Dr. Davidson then highlighted contrasting findings for other battery technologies that possibly raise concerns for future widespread substitution of lead with other materials, if this eventually proves to be technically and economically feasible. One such technology that has been suggested as a challenger for the SLI crown is the lithium-ion battery. This currently has very limited use in the SLI space, only being used in luxury vehicles and in racing cars, predominantly due to current technical challenges such as cold cranking and because of the significant cost differential between lead and this technology.

In its analysis of the resource availability of lithium the ILA study identified a number of challenges faced by this battery technology if it was to compete with lead-acid batteries. For instance, if lithium-ion batteries were required in the same quantities as lead-based batteries, lithium production would need to increase more than threefold which could be a significant challenge to its availability as a resource.

More than 600m lead-acid batteries were produced in 2012 and if this number were replaced by lithium-ion batteries it would require 90,000 tonnes of lithium - while there are plentiful reserves of lithium, the current total worldwide production is 37,000 tonnes, of which lithium used for automobiles is less than 10,000 tonnes.

Most lithium is found s in South America in Argentina , Bolivia and Chile and Dr. Davidson highlighted the inherent risk of having a resource that is only available in one specific region. For example, any unrest or instability of the governments in these regions could greatly affect the supply of lithium and have an impact on battery price, and thus vehicle cost.

Dr. Davidson also discussed lithium-ion battery recycling, which is in its infancy. At present less than 1% of lithium is recycled, and only a few companies are able to recycle lithium-ion batteries. Furthermore, due to the different chemistries used in lithium-ion batteries, a number of technical challenges were expected for recyclers. Lithium-ion battery recycling is not currently economically viable, as recycled lithium could cost up to five times more that producing it from primary production. Lithium also has low economic value, and any recycling would likely be driven by other metals in the battery such as nickel and cobalt.

The study recommended that policy makers must consider more than technical issues when mandating substitution of one substance with another. It is clear that there is a role for multiple battery chemistries in the market, and that widespread substitution of a very high volume commodity such as the lead-acid battery, and its well established and highly efficient circular economy, with a more technically complex chemistry that has a greater reliance on the primary extraction of critical raw materials, may present unforeseen issues such as future availability of natural resources.

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Notes to editors

About the ILA
The International Lead Association is a membership body that supports companies involved in the mining, smelting, refining and recycling of lead. The ILA represents the producers of about 3 million tonnes of lead.

With offices in the UK and USA the ILA provides a range of technical, scientific and communications support and is focused on all aspects of the industry's safe production, use and recycling of lead and helps funds bodies such as the International Lead Management Center and ILZRO.

The Lead REACH Consortium is a stand-alone project of ILA-Europe and its activities are funded by 100 member companies.

ILA also supports the Advanced Lead-Acid Battery Consortium, which manages the research, development and promotion of lead-based batteries for markets such as hybrid electric vehicles, start-stop automotive systems and grid-scale energy storage applications. Visit www.ila-lead.org