International Lead Association

Lead-based Batteries LCA

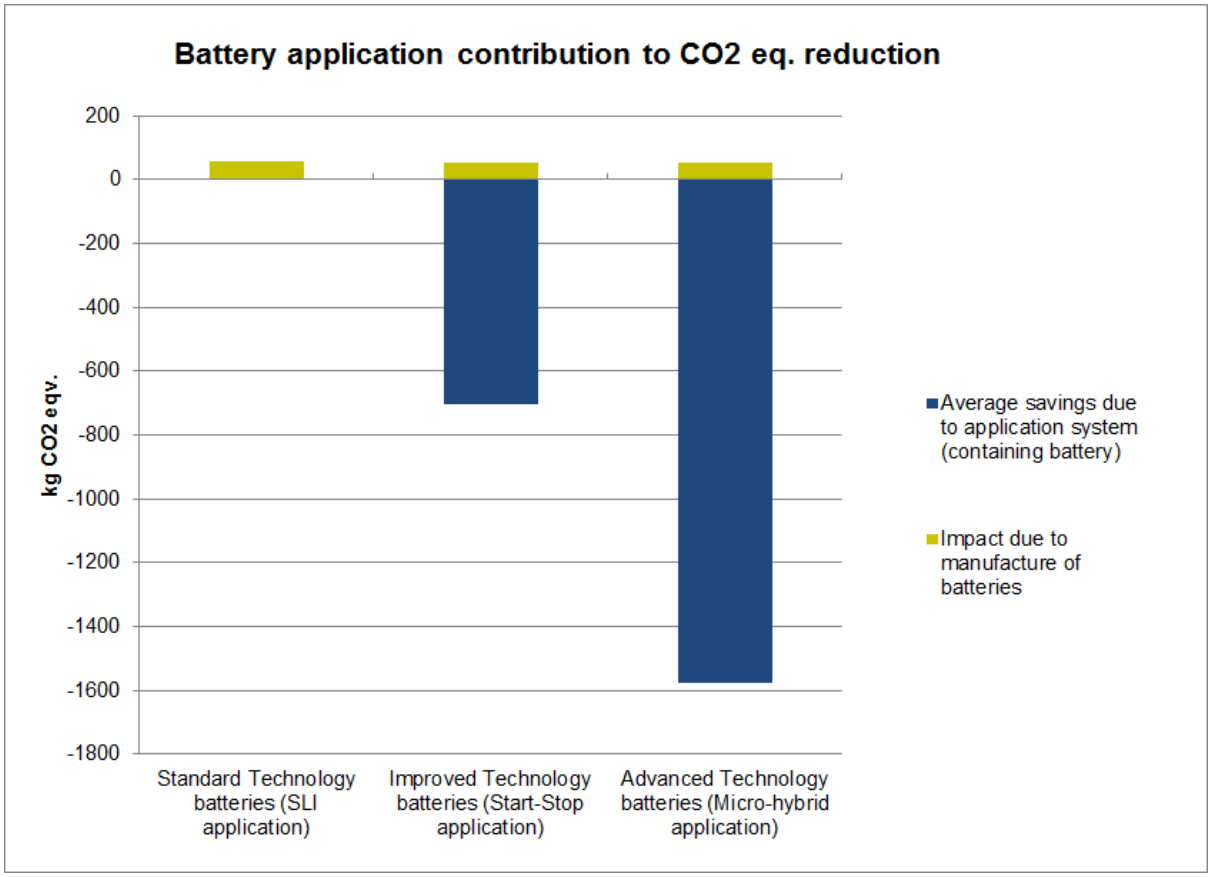
A Life Cycle Assessment (LCA) of lead-based batteries has been conducted in conjunction with EUROBAT (Association of European Automotive and Industrial Battery Manufacturers), ACEA (European Automobile manufacturers Association), JAMA (Japan Automobile manufacturers Association) and KAMA (Korean Automobile manufacturers Association). Completed in 2014 the project examined the life cycle environmental performances of three different lead-based battery types: Standard (batteries used in conjunction with standard combustion engines), Improved (used in Start-stop applications) and Advanced (used in micro-hybrid applications, with braking-energy recovery). The contributing industry data represented more than 90% of the production volume for these technologies in Europe.

The main findings of the study are as follows:

Vehicle production has a greater impact than battery production – Battery manufacturing and assembly processes as such do not play a dominant role in the environmental impacts of lead-based batteries. The study concludes that the material production of lead contributes most dominantly to the studied environmental impacts from battery production.

High recycling rates reduce the environmental impacts of batteries considerably - In the EU, more than 95% of lead-based batteries are taken back and recycled in a closed loop system - a rate of recycling higher than any other mass consumer product. From an end-of-life perspective, the study finds that these sophisticated collection and recycling schemes, run by the European lead-based battery industry, dramatically reduce the need for the production of additional primary lead – the dominant source of environmental impact in the life cycle of the batteries.

Technological capabilities of advanced batteries offset the environmental impact of their production – The use of improved and advanced technology batteries offset the environmental impact caused through production by the considerable savings that they enable in Global Warming Potential when installed in passenger vehicles. These batteries are integral parts of start-stop and micro-hybrid engine systems which have lower fuel-consumption than regular engines. Over the lifetime of the vehicle, using these systems and batteries results in significant emission savings of carbon dioxide equivalent (see the bar chart below).



What is a LCA?

LCA is a tool that is increasingly being used to examine the environmental impact of a product through its entire life cycle. For metals, a typical 'cradle to grave' LCA study covers the mining and extraction of raw materials, their fabrication, use, and recycling/disposal, and includes energy and transportation considerations and all the other product supplies required.

Comparing battery technologies

Argonne National Laboratory (USA) recently performed a review of the LCA of materials used in different battery technologies and concluded that lead-acid batteries had the lowest environmental impact of all battery technologies considered. The study compared LCA data from lead, nickel, sodium and lithium-based batteries, and stated that lead-acid batteries had the lowest production energy, and lowest emissions of carbon dioxide, particulate matter, nitrogen oxides, sulphur oxides and Volatile Organic Carbons.

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