Lead enabling safe, cleaner, and more economical cars

Designed to shut off a car's engine when idling, and restart once pressure is applied to the accelerator, the automatic start-stop system is incredibly effective at reducing both fuel-consumption and emissions. Enabling start-stop requires the addition of enhanced components to the overall build of a car. Key amongst them is the start-stop battery due to the greater demands start-stop systems place on automotive electrics - batteries used in start-stop vehicles must be able to support repeated engine restarts and an increased number of charging cycles.

As the technology behind start-stop, lead battery use is one of the most cost-effective ways to yield fuel savings and reduce CO_2 emissions, delivering up to 8% CO_2 savings in a highly cost-effective manner. They are an essential onboard component in micro-hybrid, mild-hybrid, full-hybrid and electric vehicles (EVs) and can also be installed in EV charging stations to improve their efficiency.

By 2030 it is predicted that more than 80% of cars with an internal combustion engine sold in the EU will be micro-hybrids. The new car sales market will be dominated by those using this technology combined with regenerative braking, where the battery is able to store the energy generated by braking, saving the energy that would otherwise be lost. These advanced systems have the potential to eliminate millions of tons CO_2 emissions without the need to drastically alter vehicle design.

Modern cars also feature a range of electronic features like satnav and safety systems that require continuous power to function. Traditionally, this would be provided by an alternator, but this approach requires a running engine to generate constant current so is incompatible with start-stop. Lead batteries are the only technology that can provide all the necessary performance requirements. Featuring higher charge acceptance and current delivery, they are optimal for coping with the demands of start-stop systems.

Strict risk management processes are observed when using lead in any kind of product, with lead battery manufacturer workers protected by a framework of existing legislation and industry best practice. As lead batteries are sealed in a contained unit, risk of lead exposure is also eliminated for automotive workers fitting or replacing them in vehicles. Importantly, this also ensures no risk to vehicle drivers or passengers as the units are stored under the bonnet or in the boot, and are designed to withstand high-speed collisions.

With modern car designs growing more complex, it is critical for the energy sources powering them to be safe, stable and reliable to ensure electronic safety features continue to function, whatever the scenario. In full electric vehicles (EVs), auxiliary lead batteries support critical on-board emergency and safety functions such as airbags, emergency systems, anti-lock brakes and battery management systems.

The EV revolution not only relies on lead batteries through their use in micro and mild hybrid applications, but also by being more widely used in EV charging stations themselves. Here, they improve efficiency, reduce cost and provide backup power. The benefits of EVs are only fully realised when powered by clean energy, where lead batteries are increasingly being used to support renewable energy storage across the electricity network.

Fact file

- **Over 300 million** motor vehicles in the EU contain lead batteries
- Advanced lead batteries increase fuel efficiency and reduce CO_2 emissions in micro-hybrid vehicles - projected to **represent 80% of cars with an internal combustion engine** on EU roads by 2030
- The average lead battery made in the EU today contains **more than 80% recycled materials**, and almost all of the lead recovered in the recycling process is used to make new lead batteries
- Automotive lead batteries exemplify the fundamental principles of eco-design: they are designed to be recycled at end-of-life with **more than 90% of their material being recovered**

Developed in collaboration with the Consortium for Battery Innovation and EUROBAT, this case study highlights just one of the many essential uses of lead that provide societal benefits and boost the EU's economy

For Europe's future, lead matters.

Lead Matters