Substitution of battery technologies would impact significantly on passenger cars, says new study

19/05/2014 – Brussels. There would be a significant impact on the overall performance and cost of vehicles, plus an effect on targets for fuel efficiency and reduced CO_2 emissions, if established battery applications were to be replaced with alternative technologies, according to a major study published today by Europe's automotive and battery industries.

The study concludes that lead-based batteries will by necessity remain the most wide-spread energy storage system in automotive applications for the foreseeable future. Their low cost and unparalleled ability to start the engine at cold temperatures sets them apart in conventional and basic micro-hybrid vehicles, and as auxiliary batteries in all other automotive applications. With regard to overall storage capability and potential for further fuel efficiency improvements, the demand for larger battery systems based on lithium, nickel and sodium will continue to grow through the increased market penetration of vehicles with higher levels of hybridisation and electrification.

In any automotive application, regulatory decisions to phase out established battery technologies would impact negatively on overall vehicle performance and cost. The study reaches this conclusion through a detailed analysis of the technical requirements placed on the battery in three different classes of conventional, hybrid and electric vehicles, together with an explanation of which technologies are able to fulfil them (see more information in Notes for Editors).

Commenting on the findings, EUROBAT's chairman, Johann-Friedrich Dempwolff, said: "Currently all battery technologies have specific performance profiles that serve a well-defined purpose in automotive applications and continue to have an irreplaceable role in reducing CO_2 emissions from transport".

"In particular, this report demonstrates the necessity of maintaining the exemption for lead-based batteries within the EU End of Life Vehicle Directive's wider ban on lead in light-duty vehicles. The EU's legislative and regulatory framework should guarantee a fair and technology-neutral competition between battery technologies."

The report also makes clear that a transition towards other battery types would have significant ramifications for development times and would be expensive to implement effectively. In order to optimise fuel efficiency improvements in each vehicle type, automobile manufacturers need the flexibility to choose the most appropriate batteries from a technical and economic perspective.

The study, *A Review of Battery Technologies for Automotive Applications,* reached its conclusions on the continued application of existing battery technologies using the combined input of EUROBAT, representing Europe's automotive battery industry, the European Automobile Manufacturers Association (ACEA), the automobile manufacturers' associations of Japan (JAMA) and South Korea (KAMA), as well as contributions from the International Lead Association.

*****ENDS*****

Notes for editors

Download the Executive Summary HERE.

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More information on the automotive battery applications assessed

The study assessed in depth the performance profiles of the automobile battery technologies currently in use:

1. **Conventional vehicles, including start-stop and basic micro-hybrid vehicles** are equipped with a 12V lead-based battery, which is required to start the engine and supply the complete electrical system, and can also be expected to provide start-stop functionality, as well as the entry class of braking recuperation and passive boosting.

   Due to their excellent cold-cranking ability, durability and low cost, 12V lead-based batteries remain the only battery technology tested for the mass market that satisfies the technical requirements for these vehicles. This is expected to be the situation for the foreseeable future.

2. **Hybrid vehicles, including advanced micro-hybrid, mild-hybrid and full-hybrid vehicles** rely on the battery to play a more active role, with the energy stored from braking used to boost the vehicle's acceleration. In full-hybrid vehicles, the stored energy is also used for a certain range of electric driving.

   Several battery technologies are able to provide these functions in different combinations, with nickel-metal hydride and lithium-ion batteries coping best as requirements increase, due to their fast recharge, good discharge performance and life endurance. At high voltages, lead-based batteries are so far limited by their more modest recharge and discharge power and capacity turnover.

3. In **plug-in hybrid and full electric vehicles,** high voltage battery systems (up to 100kWh for commercial vehicles) are installed to provide significant levels of electric propulsion.

   Lithium-ion battery systems remain the only commercially available battery technology capable of meeting requirement for passenger cars according to EV driving range and time, due to their high energy density, low weight, good recharge capability and energy efficiency. Other battery technologies (nickel-metal hydride, lead-based etc.) cannot deliver the required level of performance for these applications at a competitive weight.

   For commercial applications, harsh environments and heavy duty vehicles, high-temperature sodium nickel chloride batteries are a competitive option

All hybrid, plug-in hybrid and full electric vehicles also utilize a second electrical system on 12V level for controls, comfort features, redundancy and safety features. This electrical system is in all cases supplied by a 12V lead-based battery.

About the project partners

EUROBAT, the Association of European Automotive and Industrial Battery Manufacturers, acts as a unified voice in promoting the interests of the European automotive, industrial and special battery industries of all battery chemistries. With over 40 members comprising over 90% of the automotive and industrial battery industry in Europe, EUROBAT also works with stakeholders to help develop a vision of future battery solutions to issues of public interest in areas like e-Mobility and renewable energy storage.

The European Automobile Manufacturers Association (ACEA)
Founded in 1991, ACEA represents the interests of the fifteen European car, truck and bus manufacturers at EU level. Its membership consists of the major international automobile companies, working together in an active association to ensure effective communication and negotiation with legislative, commercial, technical, consumer, environmental and other interests.

Japan Automobile Manufacturers Association (JAMA)
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.

Korea Automobile Manufacturers Association (KAMA)
KAMA is a non-profit organization, representing the interests of automakers in Korea. KAMA is also dedicated to the sound growth of the automobile industry and the development of the national economy.

International Lead Association (ILA)
The ILA 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 tons of lead and almost two thirds of lead production in the western world. ILA's work has a broad focus, covering all aspects of the industry's safe production, use and recycling of lead.

In related projects, this joint industry group has also evaluated the resource availability of materials used in batteries, and conducted a lifecycle assessment (LCA) of batteries used in passenger cars.