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Latest developments in electric vehicle research showcased at LCV2011

A Ricardo-built electric vehicle technology demonstrator platform highlighting some of the very latest research and innovation in the field of powertrain electrification, was revealed for the first time today at the prestigious Cenex Low Carbon Vehicle Event 2011 at Rockingham, UK

The vehicle – a technology demonstrator platform based on a popular 4X4 SUV model – is just the latest output of the Low Carbon Vehicle Technology Project (LCVTP), a major multi-partner research programme launched in early 2010 as part of a UK government initiative to declare the West Midlands region a Low Carbon Economic area for advanced automotive engineering. This landmark project comprises a combined financial investment worth £19 million by Advantage West Midlands and the European Regional Development Fund, with further contributions from the project’s industrial partners Ricardo, Jaguar Land Rover, Tata Motors European Technical Centre, MIRA, and Zytek Automotive, who are joined in the research by Warwick Manufacturing Group and Coventry University.

A major objective of the LCVTP has been to extend the range of vehicle electrification beyond the small city car sector which has been the focus of much research and product development to date. The reason for this is that while smaller vehicles offer a very practical initial opportunity for electrification, a large proportion of the urban car fleet is represented by larger vehicles that are used by their owners for occasional long distance travel in addition to shorter range daily commuting. Almost all aspects of vehicle efficiency are therefore being considered by the project in addition to the needs of energy storage and auxiliary power systems. Addressing electrified vehicle architecture in this holistic manner is increasingly considered to be a crucial to the development of practical future electric plug-in vehicle products. This is not just in terms of addressing the well-documented issue of range anxiety, but also in providing for the air-conditioning, heating and infotainment system loads that can represent a significant proportion of the vehicle’s overall energy requirement, particularly in more extreme climates.
Within the project's 15 individual work streams the partners are focused on developing a wide variety of next-generation electric vehicle drivetrain technologies, and the vehicle based technology demonstrator platform enables the project to test, demonstrate and evaluate these in a highly integrated manner. The version of the technology demonstrator platform unveiled today is a pure electric vehicle implementation in which the conventional powertrain has been replaced with a 108kW continuous rating traction motor and an A123 22kWh battery pack. The vehicle's power electronics include a Ricardo DC-DC converter and rapid prototype vehicle supervisory and stability controllers, as well as intelligent heating and air conditioning systems.

On-going research work within the LCVTP will see the vehicle developed as a range extended electric vehicle incorporating a Ricardo-developed auxiliary power unit (APU). Early work on this aspect of the project has also been shown by Ricardo at the LCV2011 event. The concept being developed is based on a bespoke Ricardo-designed generator applied to an existing volume-production 2-cylinder gasoline engine. This APU uses a liquid cooled, permanent magnet machine rated at 55kW peak (at 4,000 rev/min). This highly scalable concept will incorporate an operating strategy specifically optimized for APU operation and is providing valuable validation for the e-drive toolset also being developed by the project.

Commenting on the company’s involvement with the LCVTP, Professor Neville Jackson, chief technology and innovation officer of Ricardo plc and chair of the UK Low Carbon Vehicle Partnership, said:

“Ricardo is extremely pleased to be an active participant in the LCVTP both as a member of this important research initiative and a lead partner in a number of project's work streams. The technology demonstration platform revealed for the first time today demonstrates some of the early results of the project. We have many further innovative technologies in development that address some of the challenges of vehicle electrification with a focus on minimizing energy use and storage challenges whilst enhancing vehicle utility. In the near future, in collaboration with our research partners, we expect to show even more technically sophisticated developments of the technology demonstrator platform’s architecture.”

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PRESS RELEASE

NOTES TO EDITORS:

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