The LC Super Hybrid has been conceived by Controlled Power Technologies (CPT) and the Advanced Lead-Acid Battery Consortium (ALABC) to show that significant CO_2 reduction can be achieved through electric hybridisation at low voltages (12-48 volts) using the latest lead-carbon batteries. The production-ready technology offers the potential of a mass market, petrol-powered, large family car with superb drivability, impressive performance and excellent 5.6 litres/100km (51mpg) fuel economy achieved at substantially lower cost than an equivalent diesel model. The low voltage technology enables aggressive yet near-term down-sizing and down-speeding of existing engine families.

The state of the art in substantial and affordable CO_2 reduction will be unveiled at the 2012 Geneva International Motor Show, where the LC Super Hybrid will make its world debut helping to define a whole new class of low cost low consumption lead-carbon hybrid vehicles. The low voltage (12 volts) 'micro-mild' technology demonstrator has been developed by UK-based Controlled Power Technologies in cooperation with the Advanced Lead-Acid Battery Consortium, an international research group based in the US. The vehicle includes production-ready technology recently sold by CPT to the leading French tier 1 supplier Valeo, thereby becoming the first global automotive component manufacturer to offer its OEM customers a range of electric superchargers. Other international companies involved are powertrain developer and systems integrator AVL Schrick based in Austria and Germany, springy materials specialist Mubea also from Germany, and Provector, a leading expert in battery management systems, based in the UK.

The LC Super Hybrid will be presented on the Swiss association e'mobile stand 5141, which takes centre stage at the international exhibition in Hall 5. The association works closely with Palexpo SA, which is mandated to organise the show on behalf of the Geneva Motor Show Foundation. Geneva has a long tradition of being in the vanguard of revealing technical breakthroughs and new design concepts ever since the inaugural event in 1905. The 2012 exhibition opens to the general public from 8th to 18th March following the two press days on 6th and 7th March when the LC Super Hybrid's innovative technology will come under the scrutiny of 11,000 media reporters.

VIP visitors also taking a look at the LC Super Hybrid include Switzerland's president Eveline Widmer-Schlumpf expected on 8th March during her official visit to the motor show. Daniel Büchel vice-director of the Swiss Federal Office of Energy and head of the program Swiss Energy is expected to visit on 14th March. They will be hosted by Swiss association e'mobile president, Yves Lehmann, and managing director Dr Susanne Wegmann.

Based on a series production 1.4-litre turbocharged VW Passat TSI model - generally considered an industry benchmark for fuel economy in this size of vehicle - the LC Super Hybrid will provide carmakers with real world validation of its pioneering technology. With a mass of approximately 1,530kg the demonstrator including its up-graded battery pack and on-board test equipment adds about 79kg to the kerb weight of the baseline vehicle. However, much of this additional mass including the test equipment would be eliminated in a production vehicle as well as the existing starter motor, which is made redundant by the belt-integrated starter generator. The additional payload further underscores the excellent performance and drivability of the LC Super Hybrid demonstrator.

The technologies comprise an electric supercharger, next generation belt-integrated starter generator with an advanced belt tensioning system, carbon enhanced valve regulated lead–acid (VRLA) batteries which avoid the need for super-capacitors, and higher gear ratios to reduce engine speed. Recalibration of the engine increases power from 122 to 142PS and torque from 200 to 275Nm. This power and torque is more comparable with VW's bigger 1.8-litre TSI gasoline engine, which delivers 160PS and 250Nm, and the engine output of the LC Super Hybrid is generally equivalent to vehicles in the 2-litre class. Despite the enhanced gasoline engine performance the vehicle achieves near diesel levels of fuel economy, but with substantially lower production costs.

The impressive performance and excellent fuel economy are underscored by the acceleration figures and results measured on the standard European drive cycle. The LC Super Hybrid delivers CO_2 emissions of less than 130g/km compared with 140g/km for the baseline Passat 1.4-litre TSI, which is already best in class, and an even more significant reduction when compared with 160g/km for the 1.8-litre TSI model. This represents a reduction in CO_2 emissions of 8 and 23 per cent respectively. Similarly, the excellent fuel economy of 5.6 litres/100km (51mpg) represents a significant 11 and 24 per cent improvement respectively when compared with 6.2 litres/100km (46mpg) for the 1.4-litre TSI and 6.9 litres/100km (41mpg) for the 1.8-litre TSI also measured over the standard European drive cycle.

This notable reduction in CO_2 emissions and fuel consumption has to be seen in the context of the impressive performance and driveability of the technology demonstrator. In 4th gear, which is taller even than the gearing in the baseline vehicle, the 80 to 120 km/h (50 to 75mph) top gear acceleration is reduced by 3.5 seconds from 16.0 to 12.5 seconds. Similarly, the 0-100 km/h (0-62 mph) time is reduced by 2.6 seconds from 11.1 to 8.7 seconds compared with the 1.4-litre TSI and achieves virtually the same acceleration (8.5 seconds) as the 1.8-litre TSI model.

The LC Super Hybrid technology, which has taken years of research to develop, has achieved its technical breakthrough in the cost effective reduction of CO_2 emissions and fuel consumption without depriving the normal drive feels and high energy density humans enjoy advantage of gasoline engines. This technology addresses two energy-carbon emissions (MIX) more guarantees, which are not currently employed by the automotive industry in mass production. The motors are of simple robust construction using cast, aluminium and copper and avoid the use of increasingly expensive rare earth materials required for permanent magnet motors. The MT technology is licensed from Near Corporation of Japan, one of the world's leading suppliers of electric motors.

"We are confident we have met the challenge facing the automotive industry for cost effective CO2 ... reduction technology, a capable and spacious automobile which delivers the performance and joy we all want," said Ulrich Hackenberg, Member of the Board responsible for Development, at VW. "This is the type of automobile that our customers will be looking for in the future."

Head of research and development at VW, Ulrich Hackenberg, Geneva, March 2001: a crucial and capable automobile which delivers the performance and joy we all want, says Hackenberg, and which also meets the requirements of the future, especially in terms of low fuel consumption. The new technology is the result of a development project lasting several years. The motor is supplied by Bosch and the electronic control unit by Siemens. The new technology is to be used in the upcoming Golf IV – a petrol version is already available, with a diesel version following in autumn. The new technology is likely to be used in the Passat in 2002.
