

# GOING ULTRA-LOW

**As Millbrook gears up for this year's premier international low-carbon event, Brian Tingham looks behind the scenes at the business drivers and the technologies**

**O**n 14 and 15 September, Millbrook opens its doors for the Cenex LCV 2016 event - the technology showcase and networking opportunity for the low-carbon vehicle community. As last year, this flagship exhibition and conference also features a 'ride and drive' line-up, with prototype and production vehicles ranging from low-carbon cars to light and medium ultra-low emission trucks.

So what can visitors expect? According to Robert Evans, CEO of organiser Cenex (the UK's independent centre of excellence for low-carbon and fuel cell technologies), this event will be even bigger than last year's, both in terms of exhibitors and sponsors. The latter now includes even more government departments, with BEIS

(Department for Business, Energy and Industrial Strategy), OLEV (Office for Low Emission Vehicles), DIT (Department for International Trade, formerly UKTI) and now also the new CCAV (Centre for Connected and Autonomous Vehicles).

Other supporting partners comprise: APC (Advanced Propulsion Centre); Automotive Council UK; Innovate UK; LowCVP (Low Carbon Vehicle Partnership); Millbrook; and SMMT (Society of Motor Manufacturers and Traders). They are joined this year by the Transport Systems Catapult - one of the government-funded technology and innovation centres, aimed at driving integrated, sustainable transport systems.

Impressive backers - and representatives from all of them will be working hard to play up the UK's capabilities throughout low-carbon

vehicle technology. As Andrew Everett, chief strategy officer at the Transport Systems Catapult, puts it: "This event is all about ensuring that the UK can reap the rewards of low-carbon transport R&D, in terms of manufacturing, jobs and ultimately also technology adoption."

This matters - and now more than ever, not least because Brexit threatens the UK's mid- to long-term access to what has been significant European funding. So LCV 2016 comes at what some will see as a challenging time.

For Lawrence Davies, CEO of the AIO (Automotive Investment Organisation), this is about parading the UK's blend of know-how, community and government support. "Among our shining stars is the APC, which exists to facilitate and support collaboration between people with ideas and organisations ready to develop and market them. We also have four of the top 10 universities, nine of the 11 top Formula One teams... And we have the CCAV, R&D tax credits..."



## **"It's all about the race to low-carbon propulsion, driven by legislation, mostly responding to global warming"**

Garry Wilson

It's an impressive list. For the APC, Garry Wilson, business development director, explains that his organisation is about "turning low-carbon propulsion technology into products developed here in the UK". LCV 2016, he says, is "a phenomenal place to do business", precisely because it will host large numbers of foreign firms all wanting a slice of the UK's low-carbon R&D action.

"Our industry is going through the biggest change in its entire history – including even the emergence of the Otto cycle," insists Wilson. "It's all about the race to low-carbon propulsion, driven by legislation, mostly responding to global warming. So that means opportunities now include hydrogen, plug-in electric, hybrids, range extenders..." In short, it's wide open.

Which is where APC scores so highly – not only by promoting the UK's value as an investment destination, but also by developing the R&D community to support it. And again by injecting project funding through its biannual competitions, aimed at bridging the divide between industry and academia.

### **PROPULSION NATION**

Clearly, it's pivotal to the government's stated objective of building a 'propulsion nation'. That's why LCV 2016 will feature a substantial UK Pavilion, with the APC showcasing current projects alongside funding mechanisms and providers.

It's also why that organisation is fielding a speaker programme that involves all its so-called 'spokes', each designed to bring together industry and academia in strategic technologies – from electric machines to power electronics. And it's why the organisation will be launching a new LCV publication at the event, and running an augmented-reality low-carbon powertrain demonstration.

What else can delegates expect? Well, over 100 exhibitors for a start, showing everything from low-carbon drivelines



and components to lightweighting and aerodynamics technologies, alternative fuel systems and the vehicles themselves. Companies like Brigade, BYD, Cenex, Controlled Power Technologies, Ford, GKN, Horiba MIRA, Integral Powertrain, Mahle, Millbrook, North East Automotive Alliance, Revolve Technologies, Ricardo, Robert Bosch, Siemens, Tata Motors European Technical Centre (TMETC), Tewa Motors, Torotrak and Ulemco.

Just picking out a few, Brigade Electronics will be displaying an electric vehicle sounder, designed to warn vulnerable road users of oncoming, near silent electric vehicles. It's also worth talking to this company about its work in intelligent 360 camera systems.

BYD and Alexander Dennis (ADL) will be showing the new 10.8-metre version of their existing all-electric 12-metre single-decker bus. Dubbed Enviro200EV 10.8m, it is designed to carry up to 79 passengers and will have a kerb weight of 12.6 tonnes. Range under standard operating conditions (UITP SORT 2 test conditions – driver's aircon on) is claimed at 179 miles with a recharge in 3.5 hours.

Meanwhile, Integral Powertrain will be continuing its focus on engine downsizing with enhancements for micro and mild hybrid applications harnessing its high-power electric machines. The firm is best known for its high-efficiency traction drive transmission technology and particularly its electro-mechanical power split system Supergen, both



seeing application in boosting and turbo-compounding for low-carbon vehicles.

### **HYDROGEN DUAL FUEL**

Then Revolve – the technology provider behind Ulemco's dual-fuel hydrogen panel van conversion – will be showing its next generation H2ICED. Fitted to a Euro 5 Ford Transit's 2.2-litre, four-cylinder Puma demonstrator vehicle, it uses compressed hydrogen as the main fuel, with diesel injected only as the ignition catalyst. Trials are already underway in Scotland, and Revolve says that next up will be 26-tonne RCVs (refuse collection vehicles) equipped with similar hydrogen injection and ECU technology.

As for TMETC, group chief engineer David Hudson says that, despite the ongoing revolution in battery energy density currently changing the game for range extenders, his company will be showing its LowCAP (low-cost auxiliary power) project, based on the existing Tata Euro 6 two-cylinder 624cc ICE. You're looking at a 20/23kW (4,000/5,000 rpm) unit weighing just 81.5kg and operating at 350–450V, developed with Ashwoods and the University of Bath, with co-funding from OLEV and Innovate UK. TMETC is now looking to expand its range of APUs to include booster e-drives.

Finally, Torotrak intends to show its Flybrid composite high-speed flywheel-based KERS (kinetic energy recovery system), already proven to deliver more than 11% fuel economy improvement. The system acts like a mechanical supercapacitor, and in its last prototype bus application, stored energy release was via a clutched flywheel transmission integrated to a drive axle PTO. [ITB](#)