

Low emission

With the UK Fuso Canter Eco Hybrid truck trials now 18 months in, and at the halfway mark, Mercedes and the eight operators involved have released what they see as encouraging results. Brian Tinham reports

Eight London-based fleets – Parcel Force, DHL, Tesco, Ringway, Amey, TNT, Hill Hire and Scottish and Southern – have been involved in the first 18 months of Mercedes-Benz's UK Fuso Canter Eco Hybrid truck trials, running a total of 10 trucks. All are 7.5t gvw vehicles, but in a range of configurations – from traditional box bodies to a refrigerated box truck and electrically-operated tippers, with loading and unloading cranes.

Together, they have clocked up more than 260,000km of 'no holds barred' driving and, according to Mercedes' estimates, have saved 5,000L of diesel and the equivalent (13 tonnes) in CO₂ emissions. Impressively, all operators – whose trucks have covered distances varying from 750 to 3,000km per month – report high reliability from their vehicles.

Fumio Akikawa, head of Daimler's Global Hybrid Centre in Kawasaki, Japan, says the 'hybrid support rate' (the contribution from electric motors) has been consistently between 13% and 18%, although fuel economy depends on the operation. "So far, there have been no technical issues, despite the Canter Eco Hybrids running at about twice the average speed experienced in our trials in Japan – and with heavier loads," he says.

He also points to data, taken regularly from all of the vehicles' ECUs, that shows fairly clear correlations between hybrid support rate, and average speed and stop/start frequency. Citing Royal Mail's truck, for example, he observes that its electric motor has only been supporting 5–10% of its mileage, due to the relatively high percentage of extra-urban journeys at speeds from 40–60km/h, where the diesel engine takes over.

"In the stop-and-go traffic of inner-city London, average speed drops to around 20km/h. The support rate then rises to around 15%," he says. And he adds: "Thanks to the hybrid drive, fuel consumption then rises only very moderately from

around 15 to 17L per 100 km, despite the extremely demanding operating conditions."

Actual savings recorded across the operators vary from 3.8 to 7.9% and Akikawa suggests the data shows that considerable extra savings could be achieved, if idling-stop technology was introduced on top of the hybrid engine/transmission. With idling in one case recorded at



Together, eight vehicle fleets have clocked up more than 260,000km of 'no holds barred' driving and, according to Mercedes' estimates, have saved 5,000 litres of diesel and 1.3 tonnes of CO₂



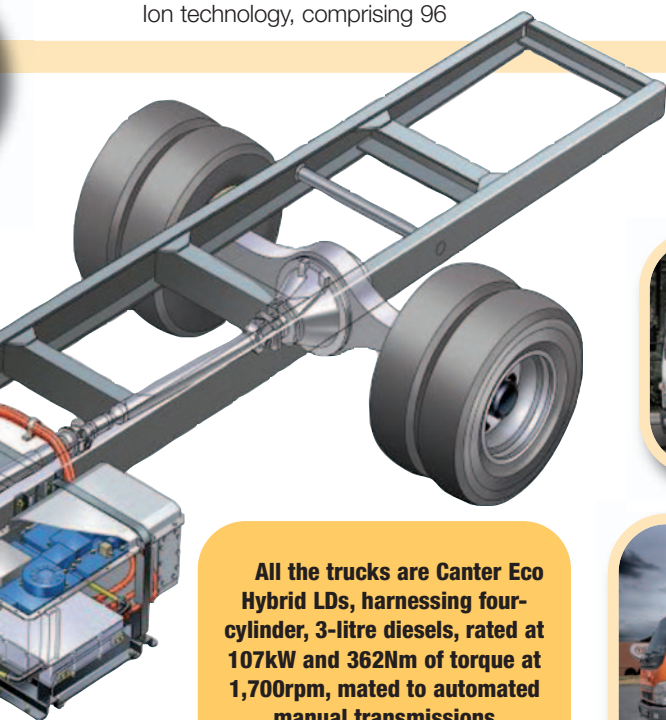
50.8% of running time, it's not difficult to see the potential. Estimated savings for TNT, for example, are a further 5.3% from idling-stop, compared with the existing 5.7% derived from the electric motor, which runs at 78.9% efficiency.

The hybrid technology used is Daimler's 'P2' parallel drivetrain – in which the diesel engine and/or electric motor can provide propulsion independently.

trials

All the trucks are Canter Eco Hybrid LDs, harnessing four-cylinder, 3-litre diesel engines, rated at 107kW and 362Nm max torque at 1,700rpm, matched to automated manual transmissions – with the slimline three-phase permanent magnet electric motor (rated at 35kW) sitting between the clutch and the gearbox.

That system picks up 'recuperation energy' from deceleration (with the electric motor then acting as a generator) and the trials also show the value of using the exhaust brake to maximise efficiency. "That is the best fit for the truck duties involved," insists Akikawa, also explaining that the batteries are Li-Ion technology, comprising 96



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cells, and delivering 346V and 5.5Ah – selected to deliver high power, rather than high capacity.

In fact, the hybrid technology switches mode – the electric motor being used to move off, with the clutch to the diesel engine disengaged (making it quiet and virtually zero emissions), while, during hard acceleration, the clutch closes and the diesel engine provides more power. When cruising at higher speed, the diesel engine takes over completely – although,

during downhill stretches, the electric motor again serves as a generator.

As for the operators' experience, Matthew Smith, Tesco's development engineering manager, speaks for all of them when he says that it's been hassle free. "Mercedes' training of our drivers and our maintenance people was very good. They also did full maintenance training with S&B Commercials [the local Mercedes dealership], who are on our site, and trained our own technicians, so that they could fulfil their safety checks."

He has no gripes with the truck, which is being used on the daily fresh food service run from its distribution centre in north London to the city centre, clocking up 22,000 miles (37,000km) per annum on its 60-mile (100km) round trip. On costs, however, Smith says that the Fuso Canter Hybrid, like all other

electric-diesel hybrids, is "astronomically expensive", making it "very difficult at the moment to see where we might use it in the future". However, he also points to the rapid growth of Tesco Express stores in inner cities, meaning a clear requirement for clean stop-start distribution operations.

Mercedes' Akikawa concedes that, despite the success of the trials to date, hybrids do remain expensive and says that, without government subsidies, they are not currently viable. He points to improvements in fuel economy over the generations of hybrids, however, and the potential for globalisation. "In the future, when we reach the 'magic moment', increasing fuel efficiency and reducing system installation costs will mean that operators could get faster payback," opines Akikawa.

That said, no fewer than 1,000 Eco Canters have already been sold, across three continents, and Ian Jones, managing director of Mercedes-Benz Commercial Vehicles, suggests that part of this success is down to Mercedes' infrastructure – including its maintenance training and "very high parts availability off the shelf".

Jones also alludes to the high take-up of electric hybrid Vito London Black Cabs, launched just a year ago, using similar technology. As for the future, he insists that R&D is now set to deliver further improvements in fuel efficiency across a wide spread of operations, not least by using the results of the London trials. He suggests, for example, that higher powered electric motors will be used to deliver higher hybrid support rates and even better fuel economy.

"Heavy distribution in the London area is already subject to the London LEZ [low emission zone] and congestion charging. These and similar incentives will also drive take-up of electric hybrid trucks," concludes Jones. TE



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