

The addition of an engine to an electric van helps to overcome range anxiety issues



LCVs

on the

The number of electric vehicle options for operators continues to grow, albeit still at the light, rather than heavy-duty, end of the spectrum. John Challen highlights some of the most recent developments

Following the lead set in the automotive sector, commercial vehicle manufacturers are now starting to embrace electric drive technologies to help operators reduce fleet-wide fuel consumption figures and give greater consideration to the environment. Last year, for example, numerous electric efforts were debuted, including the Mercedes Vito E-Cell, Iveco's Daily Electric, Renault's Kangoo Van ZE and the Transit Connect Electric. The latter was developed by Ford, in conjunction with Azure Dynamics, which filed for bankruptcy in March this year, leading to a delay in production of the vehicle – but it is coming.

Following introduction of these all-electric vehicles, modest numbers entered a few operator fleets – a move made possible by factors ranging from government subsidies to the gradually maturing vehicle charging network. Details of just how these vehicles are performing remain thin

on the ground, but many manufacturers quietly admit they had hoped rather more would be working around city streets than is currently the case.

Quite an eventful recent past, then but, despite some perceived limitations, there appears to be no stopping acceleration of the electric van portfolio. While fewer new electric models may have broken cover so far in 2012, several manufacturers have confirmed that they have vehicles on the way. At the recent CV Show, for example, Peugeot revealed plans to electrify its van range, with a 'preview' of the Partner Electric van, due to go on sale next year. Despite the vehicle shown being a regular Partner van, simply adorned with details of its planned electric potential, the message was plain for all to be seen. Sister company Citroën will also look to offer an electric van in the near future and Fiat Professional has not ruled out the notion of an electric van in its range.

Far Eastern electrics

One exhibitor happy to talk about electric commercial vehicles was Nissan. Looking to build on the platform it has already established with the all-electric LEAF passenger car, the Japanese manufacturer says that it intends to be a leader in the technology and has several products currently under development in Japan.



charge

“The next Nissan electric vehicle, after the LEAF, will be a van based on the NV200, which will start production at the end of 2013,” confirms Francis Bleasdale, sales and marketing director for LCVs at Nissan. “This will represent a real breakthrough for us, because the market is ready for it and there is a lot of pressure on fuel costs. The focus that operators need to have on fuel prices and the pressure to reduce their carbon footprint will both make our argument compelling.”

This will be big

Bleasdale expects uptake to follow Nissan’s experience with its LEAF. “We expect the van to be no different,” he states. “We don’t see electric vans as a niche product and our development is not a joint tie-up [with Renault],” he adds. So this will be big. In fact, the electric NV200 will use motor and battery technology already on LEAF, which is due to benefit soon from upgrades currently being made at the company’s headquarters in Japan. “We’ve got a battery plant opening, and would expect that any improvements in batteries and battery technology will follow from LEAF through to our vans,” comments Bleasdale.

Interestingly, as well as the vehicles, Nissan is also readying its support network to service and maintain its next-generation vehicles. “We have a

very strong focus on technical training on vans right across the range,” he insists. “Our master technician programme has very high standards and we expect dealers to put at least two of their main technicians on that, providing a role model within the dealership for further training. With electric vehicles, it will be no different. To lead in electric vehicles, you need to lead in the level of training and the quality of the dealer network.”

While he concedes that cars and vans – and their respective requirements – vary greatly when it comes to detailed engineering, the principles in development, he says, remain. Thereafter, it’s about perception. “What we found with LEAF is that there is no substitute for test driving,” says Bleasdale. “Once someone has driven it, whatever their feelings and scepticism, or arguments about economics, I’ve never met anyone that hasn’t been impressed. It will be the same with our electric van.”

Bleasdale also contends that, in some ways, the van is more predictable, certainly in terms of its function and operation. “We expect operators to decide primarily based on range, and we think that, for a large proportion, the range will be acceptable and a practical proposition,” he says. And the Nissan man adds that trials with the likes of Fed-Ex and British Gas (see panel overleaf) have proven

Operating experience

With an objective of switching 1,400 of its LCVs – representing 10% of the fleet – to electric power, British Gas proved a willing guinea pig for a prototype all-electric Nissan e-NV200. The van was based at British Gas depots in Leicester and Newbury, and was the first OEM product of its kind to feature on the fleet.

Beyond proving the product's engineering reliability and the powertrain's capability, main aim of the trial was to determine which of the 14,000 drivers' daily travel patterns were best suited to an electric van's typical working range, including getting to and from work. As a result, the van was run at maximum gross vehicle weight during the trial, which shadowed drivers from British Gas' national network of engineers as they carried out their daily duties. During the weeks of the trial, the van covered more than 1,200 miles.

Another task of the e-NV200 has been to put drivers into an EV, sometimes for the first time, and get them used to the different performance characteristics and the charging procedure. "With fuel prices continuing to rise, one of the biggest benefits of e-NV200 is the breakthrough in long-term running cost savings," states Colin Marriott, general manager of the British Gas fleet.

"Over the course of the trial, our drivers told us they were happy to do away with diesel and go electric," he continues. "With electric cars and vans coming of age, we feel the time is now right for us to introduce electric vans into our fleet and we are currently evaluating the benefits they can bring."



that the vehicle is a good fit for a large proportion of their fleets. "Tests have shown that range anxiety is not as applicable in vans as it is in cars. That whole understanding of the customer is something we can take forward."

Halfway house ahead

However, this range anxiety is one factor that has led Emerald Automotive to join the ranks of those companies pushing development of lightweight diesel-electric hybrid delivery vans. Given the performance and range limitations of EVs, matched with the duty cycles of, say, multi-drop LCV operations, they believe that a range-extender is a preferred option – and there are plenty of operators that would agree.

Instead of a battery-only powertrain, Emerald Automotive has opted for two 25kWh lithium-ion

battery packs (comprising 128 cells) from Axion, working alongside a small diesel engine, acting as a range extender. EVO Electric has supplied the electric drive motor and generator, with the motor integrated onto an off-the-shelf differential, providing a compact powertrain set-up, while the generator is mounted directly onto the diesel engine within the limited packaging space.

Unlike more conventional hybrid commercial vehicles that have a limited range and/or speed in electric mode before switching to the ICE (internal combustion engine), this delivery van starts and remains in electric mode for as long as possible. At this stage of development, predicted range is 64.2 miles all electric – the original target being 50 miles. Current average fuel consumption for the development vehicles is 91.5mpg for the first 125 miles, with 31.4g/km of CO₂ emitted.

Ideal compromise

Assembling a team of mainly UK-based partner organisations, Emerald Automotive hopes that its vehicle could be an ideal compromise for those not willing or able to go for electric-only vehicles. "The van is positioned between pure electric vehicles and traditional ICE-powered products," explains Paul Turner, technical director at Revolve Technologies, the company responsible for coordinating the overall vehicle package, design and parts integration, as well as manufacture and assembly of the demonstrator vehicles.

"Ford's Transit was chosen as the donor vehicle and the final product uses many of its parts, but also employs some innovative products, such as a lightweight chassis and thermoset composite body panels," adds Turner.

Turner says there are still several aspects that need improvement – including fuel economy, the battery, electric range, emissions and possible price, given that the van is presently expected to cost in the region of £32,000. However, given that the three-tonne vehicle offers 1,400kg payload and has a 1,600kg kerb weight, Andy Tempest, Emerald Automotive's CEO, believes it should be an attractive proposition for large fleets. He is confident that the range-extender configuration should work well for many operators, and is already in discussions with Royal Mail, DHL, La Post, FedEx and BT.

"The delivery van is designed on a flexible platform, and we are looking to produce versions with a longer wheelbase and higher roof," explains Tempest. "We are in detailed discussions with companies about three-cylinder gasoline units that meet Euro 6 standards, and are also considering CNG [compressed natural gas] and biofuel options." Tempest says he is looking at starting volume targets of 10,000 a year and up-scaling from there, dependent on demand. 