

# Supercharged vans

Operations of diesel light commercial vehicles are likely to be increasingly curtailed in many urban areas, and retrofitting electric drivelines may be a solution for some fleets. Richard Simpson reports

**N**o one can argue with the success of vans in today's transport market: there are now over four million commercials of up to 3.5 tonnes gwv registered on the UK's roads, travelling almost 50 billion miles a year, or one tenth of the total mileage covered by the entire vehicle parc. Indeed, one in every five new vehicles being put on Britain's roads is a van.

But the downside is that vans now produce over 13% of the UK transport sector's greenhouse gas emissions, and rising. They are increasingly being seen as unsuited for sustained operation in urban conditions. PM filtration is a particular issue.

With London's T-Charge for pre-Euro 4 vans scheduled to morph into a more stringent ultra low emissions zone (ULEZ) from April 2019 - which will see all non-Euro 6 diesels pay an extra £12.50 a day on top of the existing £11.50 congestion charge - van operators need alternatives. Particularly as other cities are looking to follow suit.

Electricity is one option. Van manufacturer Renault/Nissan claims that the cost per mile of fuelling an electric van is just one tenth of its diesel equivalent.

And repowering an existing diesel van to an



electric-only driveline will win the vehicle exemption from both congestion and pollution-related charges when it is operated in the capital, according to Transport for London. However, to avoid charges, DVSA must be notified of this change. The vehicle's keeper should wait until the new V5C (registration document) has arrived from Swansea, and then check with TfL that the van's details are on the organisation's database, a spokesman said.

In addition, the Department for Transport changed the rules in December 2017 to allow 'alternatively

fuelled' vans weighing up to 4.25 tonnes working in the UK only to be exempt from truck operator and driver licensing. This allows a typical 3.5t van more than 750kg extra for batteries and other powertrain components, so not compromising payload limits (although the extra weight would hit fuel efficiency). On the other hand, it has also closed the loophole that allowed electric vehicles to avoid an annual test; they must be assessed starting in May.

In any case, electric vans are at their best when operated in heavy traffic. There is no conventional gearbox or clutch, little noise, no energy is wasted idling in traffic, and regenerative braking returns energy that would otherwise be wasted.

But there are drawbacks. Operators of the two most successful production electric van types currently available - the Nissan eNV200 and Renault Kangoo ZE 33, which share much technology through the close alliance between their



manufacturers – report real-life ranges of less than 100 miles. The latest versions, announced towards the end of last year, are claimed to have extended this by as much as 60%. Matching range with expected work cycles and recharging opportunities is obviously a first step on the electric highway for van operators.

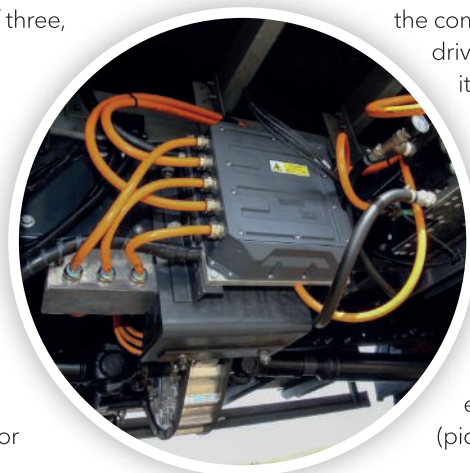
The lure of cheap emissions-free transport is clearly appealing to an increasing number of UK operators looking to 'green' their existing fleets. However, the cost of re-fleeting an entire operation with new electric vehicles would be too much for many organisations, even if vehicles were available. So an alternative that involves repowering existing vans with all-electric drivelines may be attractive.

### REPOWER OPTIONS

**Dragon Electric Vehicles** of mid Wales offers retrofit conversions for vans based on the Bedford Rascal/Suzuki Super Carry platform in addition to the ubiquitous Ford Transit. Using cheap lead-acid batteries, the company can create a zero-emissions vehicle with a claimed top speed of 50mph and range of 50 miles for around £15,000, plus the cost of the donor vehicle.

Recharging a converted van currently costs around 1p/mile if off-peak supply is used (double that for peak rate), and specifying (vastly more expensive) lithium-ion batteries can extend range by a factor of three, Dragon claims.

Another British company enjoying considerable success in electrical conversions is **MagTec**, which has been converting buses since 1993. The Sheffield company offers conversions for



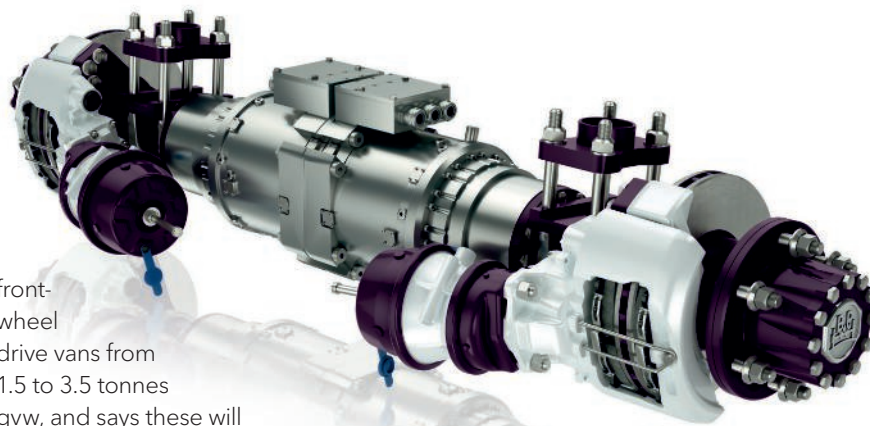
front-wheel drive vans from 1.5 to 3.5 tonnes gvw, and says these will normally replicate the speed and grade capability of the original van. Typical ranges are around 100 miles.

Vehicles of greater weights can also be converted – although these are more complex as, for example, electrically-driven compressors must be installed to operate the truck's foundation brakes.

**Lightning Systems**, which has its European headquarters at Nuneaton, has already won Ford approval for a hybrid system for the Transit, and is to introduce an approved all-electric drive LightningElectric conversion, initially to fit the heavy 4.7 tonnes gvw Transit (pictured, p33), with others to follow.

Hybrid system conversions won't enjoy the same LEZ concessions as pure electrics, but leasing giant Fraikin is testing the water with a 12-tonne IVECO Eurocargo from its rental fleet, which has been retrofitted with a kinetic energy recovery system (KERS) by UK specialist **Alternatch** (pictured below; (<https://is.gd/kodoxo>)). Fuel savings of around 32% are claimed for the system, which is suited for urban multi-drop and refuse collection.

**BPW** of Germany, best known in the UK for heavy trailer axles, is offering a conversion which entails removing the complete diesel driveline and replacing it with a drive axle incorporating two asynchronous motors, each delivering some 74bhp. Suitable for rear-wheel drive vans and trucks of up to 7.5 tonnes gvw, the eTransport system (pictured above) is



said to be up to 20kg lighter (including batteries) than the diesel driveline it replaces, if a 50-mile range is specified. BPW has a retrofitted Mercedes-Benz Vario that is available as a demonstrator in Germany.

Axle or wheel motors potentially free up space currently occupied by combustion engines and their associated systems, while batteries can be positioned for optimum weight distribution and load maximisation rather than just fitted into available space.

A host of companies, both new and established, are working on such systems. **Dana Spicer** is developing integrated e-axles with outputs from 105.5bhp to 235bhp.

**ZF's** electric mSTARS axle is primarily intended for passenger cars, but also has potential in vans, and is suitable for front- or rear-wheel drive platforms. It harnesses a single motor of up to 148bhp with a two-stage single-speed transmission and mechanical differential, and is due to enter production this year.

Chinese company **Protean** is developing direct-drive, in-wheel motors for electric vans at its engineering centre in Farnham, England. A current demonstrator commercial vehicle is a Vauxhall Vivaro van where the front-wheel drive diesel driveline is retained, but Protean motors are fitted to the rear wheels. This van can operate as a plug-in hybrid with a possible fuel saving of 60%, or drive for up to 55 miles on its batteries alone. **IE**

### FURTHER INFORMATION

Tax benefits – <https://is.gd/idaqiq>

Plug-in van grants – <https://is.gd/bisubo>

LoCity scheme – <https://is.gd/9scbau>