

SEEING DOUBLE

The latest step on Transport for London's march to electrify the capital's buses will be the roll-out of a fleet of electric double-deckers, reports Will Dalrymple

London bus operator Metroline is gearing up to integrate what TfL has called the world's largest electric double-deck bus fleet over the next few months. Although not a small initiative, it is just a part of the city authority's assertive investment in low-emission bus technology. In April, it introduced three more low-emission bus zones, bringing the total to ten, and launched three more full-electric routes. As a result, it says that by October 2020 all buses in London will have a Euro VI powertrain, be converted to Euro VI standards, or full-electric.

Following the original announcement last year, the buses have been built by OEMs Optare and ADL, with powertrain partners ZF and BYD, respectively. Optare is supplying 31 Metrodecker EV units (pictured above); ADL/BYD is sending 37 Enviro400EV models. Metroline is part of Comfort DelGro (UK & Ireland) and group engineering director Ian Foster says it deliberately chose to split the order between suppliers to run a mini-competition between them. He explains: "As they are both new vehicle types with similar technology but different systems, it allows us to monitor reliability, operational mileage and to compare performance on a like-for-like basis."

Although both manufacturers have also supplied single-decker EVs - Optare its Metrocity EV; ADL/BYD the Enviro200EV - these buses represent a further step of technical progress.



Image: citytransportinfo

That means, for the ADL/BYD at least, an extra 120kW of power in total, nearly double the output of the twin 90kW motors on the former unit, says Mike Kerslake, BYD technical manager, plus a new traction management system.

He adds: "The whole concept was designed to take advantage of the recent increase in the UK road limit from 18,000kg to 19,500kg. Initial vehicles will be plated at 19,200kg, allowing the use of industry-standard 275/70 tyres, but the design weight is the full 19,500kg and this can be achieved using suitable tyres." (DfT brought in the weight increase, for two-axle buses of all powertrains, in October 2017.) In contrast, the Optare model follows the 18t limit, on the principle that lighter weights reduce the battery load. Its integral space framed-body is said to keep its total gvwt within a few hundred kilograms of the diesel version.

ADL/BYD has also worked to minimise heat loads to heat the passenger cabin with a new reversible

ADL heat pump, said to provide twice the thermal output of a resistive heating system. In addition, BYD has developed a mains heating option to warm up the bus interior on cold days before unplugging the bus. The bus demists the windscreen by combining warm air and direct electric heating of the glass.

EXPERIENCE

It is not Metroline's first experience with electric double-deckers, nor with electric powertrains. Foster states: "We currently operate the biggest Volvo hybrid fleet in the world, and the challenge of running those vehicles is a taster of what we expect from the electric vehicles."

And in 2016, Metroline began operating full-electric double-deckers on an entirely urban route (98) between Willesden and Holborn in London, which it called a world first. That fleet of five 10.2m-long buses are scheduled to run until the end of the year.

Speaking of the new buses, Foster says: "These vehicles will bring a

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Ian Foster

whole host of new challenges, from managing charging strategy and battery deterioration, to correct vehicle allocation, smart charging control systems, and finding a market for repairs of motors, regeneration units, PLC and control systems. These vehicles are first of a kind, which means inevitably they will continue to be developed in field and in operation, so reliability will be a keen point of focus. As a guide, we had a target of 80% uptime for the prototypes we have been running for three years. The new vehicle will be required to hit a target of 95%, which is the same for all other vehicle types.”

The routes chosen, 43 and 134, both run between north London suburbs and central London. Foster says Metroline worked with TfL in choosing routes that “allow us to build a charging and operating strategy based on all types of operation in London, and operating at the outer limits of the current range available in EVs”. He adds that although both have a mix of flat and hilly sections, one runs more extensively in central London. Average speeds are expected to range from 12-20mph. The buses are expected to clock up between 120-150mi per day. Those allocated to night shifts will receive an extra charging cycle.

To cater for the fleet, Metroline has converted its Holloway and Potters Bar



depots to provide vehicle charging. Potters Bar received a charger for each of the 31 Metrodeckers; but owing to power capacity limitations, Holloway has to make do with a total of about 40 chargers for 37 new Enviro400EVs, plus 20 other full-electric single-decks. Foster explains that BYD’s smart charging system will help top up each bus equally, regardless of differences of range or duty. However, he did not praise the electrification process, which he described as costly and time consuming.

Alongside the infrastructure changes at a depot level, Metroline is also

preparing staff, including drivers and technicians, for the new arrivals. As regards the latter, Foster adds: “Most staff have already been high-voltage certified, and our training department has started to plan in-depth training for chosen personnel and master technicians within the business.”

In the longer term, Metroline is considering going beyond the MechElec qualification currently required of apprentices. The electric and fuel cell buses announced last month (see below) require “a much stronger need for in-depth electrical skills,” says Foster. **TE**

HYDROGEN ON THE WAY

TfL announced last month that it is installing 20 hydrogen fuel-cell double-deckers on routes 245, 7 and N7 serving west and north-west London in 2020. All three routes are operated by Metroline. TfL says it is spending £12m on the buses and infrastructure – however, it will receive more than half of that from public funds: £5m for the project from European sources, and £1m from the UK government. The European project is JIVE (joint initiative for hydrogen vehicles across Europe: see profile, www.is.gd/yunaxe). JIVE aims to bring down the cost of the vehicles by buying in bulk with other authorities – helping put the price per bus on a par with the other cleanest fuels.

The buses are Wrightbus StreetDeck Fuel Cell Electric Vehicles using a Ballard FCveloCity fuel cell, a Siemens drivetrain and a 48kW traction battery pack, and offering a 200-mile operating range. Each has a passenger capacity of 64 seated and 21 standing, with an overall length of 10.9m and width of 2.55m.

