

# A new electric bus for the UK

Sensing an opportunity, bus operator Go-Ahead took a leap into the future and worked with suppliers to develop a new single-deck electric bus design for London routes, reports Steve Banner

No UK politician is keener on making the air of his city cleaner and more breathable than London mayor Sadiq Khan – and that has major implication for bus operators in the capital. They are under growing pressure to switch to zero-emission vehicles. That means changes, not only to the buses they run, but to the depot infrastructure that supports them. One of the key challenges they face is the arrival of the ultra low emission zone (ULEZ) in the centre of the capital next April.

“All single-decker buses that go through it will have to be zero-emission and all double-deckers will have to be Euro VI,” says Go-Ahead’s London engineering director Richard Harrington (main picture). “What’s more, the ULEZ will be expanded out to the North and South Circular Roads in 2021.”

Go-Ahead anticipated the need to switch to zero-emission vehicles and the measures it would have to take some time ago. In particular, it looked at the implications for the two routes it runs out of its bus garage just behind Waterloo Station; 507 to Victoria Station and 521 to London Bridge.

“With these routes, the shortest daily duty we do is 38 miles and the longest is 130 miles,” says Harrington. “On average we’re talking about 70 to 80 miles a day.”

Harrington spoke to a number of manufacturers at a 2011 bus exhibition, and ended up flying to China to visit BYD – Build Your

Dreams – at its Shenzhen headquarters. A major battery manufacturer, the company is the world’s biggest electric bus producer. “We were told that BYD could build a bus to Transport for London (TfL) specifications,” says Harrington. That proved to be more of a challenge than was expected, however, especially so far as the body was concerned.

“We had no driveline issues,” he says. “It was the body that was the problem. We had issues over the size of the destination blind box – TfL will not allow it to be altered – and the door openings were illegal,” he explains. So when the first two BYD electric buses arrived in the UK in 2013, they had to be taken for remedial work before they went into service.

## STARTING POWER

“We had to train the drivers, too,” says Harrington. With an electric bus, all of the motor torque is available immediately. “So if you accelerated hard away from rest as if you were driving a Ferrari, there was the danger that the standing passengers would all fall over,” he says. “You had to adopt a different driving technique.”

Go-Ahead had been looking ahead to the prospect of a five-year TfL contract to operate

## FACT

All single-decker buses that go through London’s ULEZ will have to be zero-emission, and all double-deckers will have to be Euro VI



electric buses starting in 2016. The tender, which Go-Ahead won, meant that 51 zero-emission vehicles would be required to run the two routes.

Go-Ahead’s experience with the Chinese-built BYDs stood it in good stead and presented BYD with a further opportunity, but Harrington told the manufacturer it would have to find a UK bodybuilder to ensure there would be no further problems.

The one chosen was ADL, which resulted in the intriguing spectacle of Chinese and Scottish

**FACT**

Go-Ahead will soon have 95 BYD-ADL Enviro200EVs operating in London, and charging facilities in Waterloo and Tottenham



**"You can't do this sort of thing on your own. It has to be a partnership"**

Richard Harrington

The line-up includes 10.8m as well as 12m models and the buses are in operation on routes 153 and 360, as well as the ones mentioned earlier. They will be deployed on route 214 next year.

"We are without doubt the pre-eminent operator of electric buses in London, and have accrued significant experience of their operation," says Harrington. "The fact is that BYD-ADL products have proved themselves capable of replacing diesel buses without any operational impact in terms of daily scheduling.

"Careful planning of the depot recharge facilities and infrastructure is of course necessary, but we have no need to use any opportunity charging," he adds. In other words, there is no need to plug any of the buses into a charging point for five or ten minutes during lay-overs to top up the batteries.

"Electric buses certainly won't damage your business," comments BYD UK country manager Frank Thorpe (pictured, inset right). "If you drive them all day and charge them all night, then you will be using low-cost electricity." Your bus is likely to consume 0.91kW per kilometre at a price of 13p per kW, he says.

Charge at night and you are also more likely to be using electricity from environmentally-friendly, sustainable sources.

Nor will going electric compromise the UK's power network, he insists. "If every bus in the country went electric right now, they would take just 3% of the grid's night-time output," he contends.

The only way this sort of project can be a success, says Harrington, is if the operator, the bus manufacturer and the infrastructure provider all co-operate with one another. "You can't do this sort of thing on your own," he remarks. "It has to be a partnership."

Going electric has been a massive change, says Harrington – but change sometimes has to be embraced, no matter how daunting it may seem.

"When you are standing on the edge of a cliff, you may have to be prepared to jump off," he remarks. "But put your parachute on first." ■

engineers communicating with one another at ADL's Falkirk plant. "We're talking about two different cultures," says Arthur Whiteside, ADL managing director for UK sales (pictured, inset left).

Any cultural clashes were overcome, however, and the 51 BYD-ADL Enviro200EV 12m single-deckers began to be delivered in 2016, giving Go-Ahead the biggest fleet of electric buses in Europe.

Driving the bodied BYDs from Falkirk to London – a 450-mile journey – looked as though it might be a challenge, and two stops were allowed for along the way. As it turned out, however, they only needed recharging once; they were not of course carrying a full load of passengers.

Go-Ahead had to ensure that it had the right charging facilities in place at Waterloo, and a bus needs an 80kW charging point, says Harrington.

"80kW times 50 is 2.5MW," he adds. That was the size of the grid connection Waterloo required, which meant involving both UK Power Networks and SSE – Scottish & Southern Electricity. Forty-three charging points were finally installed in the one-acre site which service the 46 BYDs based there; charging is managed in such a way that none of the vehicles miss out. The remaining five out of the 51 are run out of Go-Ahead's Camberwell garage, which is not far away.

"When you do something like this you have to tell your neighbours, because there are a lot of civil works involved," Harrington says.

Subsequent orders mean that Go-Ahead will soon have 95 Enviro200EVs in operation in the capital, with some based at its Northumberland Park garage. It has been kitted out with BYD charging equipment.