Juice for refuse

Battery-electric refuse collection vehicles offer zero emissions in operation, but much effort and expense is required of the operator to reach that point, finds Steve Banner

Any organisation planning to acquire a fleet of all-electric RCVs should first ensure that it has a suitable charging infrastructure in place. So says Vince Dignam, City of London Corporation's business performance and transport group manager. "And installing one can be a massive challenge," he observes.

City of London's first experience of an electric RCV involved a Mercedes-Benz Econic 26-tonner fitted with a Geesinknorba compactor body and converted to run on batteries by Skelmersdale, Lancashire-based Electra Commercial Vehicles (pictured below). "All we needed to charge it was a 63A power point," Dignam recalls.

Subsequently, however, the corporation has decided to put seven electric Dennis Eagle Elite 26-tonners, again converted by Electra, into service in conjunction with Veolia. That means it will become the first UK council to run a fleet of fully-electric bin wagons. The fleet boasts a number of other battery-driven vehicles, including sweepers. As a result of the plans, a £250,000 electricity substation has had to be installed to help deliver the necessary power to its central London site in Walbrook Wharf, Upper Thames Street.

Although the fleet delivery was held up by the Coronavirus outbreak, the Corporation has already learned a great deal from the Econic, successfully putting a trial unit to work emptying two hundred 1,100-litre industrial bins daily. The route that the truck tackled was urban, along flat roads devoid of inclines. "If you used one on a rural route with some hills, then it is likely that the power would drain out of the battery a lot more quickly," he comments.

Aside from one or two minor body-related glitches, the truck proved reliable. "It was quiet, too," Dignam says. "The only time there was any noticeable noise was when a bin was being tipped into the back," he adds. Such silent running might offer councils the option of emptying bins at night when there is less traffic around, which means rounds could be completed more quickly. That could mean fewer trucks are required.

On the other hand, near-silent running means that vulnerable road users may not always be aware of an electric RCV's presence. "So the ones we've got coming generate white noise," he says.

Turning to operating costs, a 26-tonne diesel RCV costs around £160,000 to acquire, compared with double that for its electric counterpart, says Dignam. However, the latter is cheaper to power than the former, he points out, and costs less to maintain. "You don't have to replace the oil, air and fuel filters so often, for example," he says. In Dignam's view, an electric RCV will work out at £2,000 cheaper to acquire and operate over seven years than a diesel, assuming that the value of the investment is written down to zero and the battery pack does not have to be replaced. The batteries should last that long, he believes. What this calculation does not include is infrastructure costs.

"The increasing number of electric vehicles in use in the council's fleet will start to gradually reduce the amount of diesel and petrol purchases"
Mark Smith

The City of London is by no means the only local authority to opt for electric RCVs. North London's Islington Council plans to deploy two later this year, while Sheffield City Council is already benefiting from a 2010-vintage Elite 26-tonner converted from diesel to battery power by Magtec; the first of two. Its useful life will be extended for several years; good news for the environment, and for the fleet's budget.

PAYLOAD INCREASES

Sheffield City Council's electric Elites can carry half a tonne more payload than their diesel counterparts, says waste strategy officer Alastair Black. That is despite the fact that the authority has opted for a 300kWh lithium-ion battery pack – the biggest available, and sourced from Nissan – with the aim of achieving an 80-mile range between recharges. Batteries now sit beneath the cab where there would usually be ballast to counter the risk of a rear axle overload, he explains; they are heavy enough to do the same job. With no ballast needed, and the engine, Allison automatic gearbox and diesel tank gone too, the truck can transport more rubbish. In operation, some juddering has occurred on inclines – Sheffield is not short of steep hills – but Black believes that this problem can be resolved. "It's not a major cause for concern," he says.

The importance to cash-strapped local authorities of the fuel savings that can be achieved by going electric should not be underestimated. With compactor bodies and bin lifts to power and on low-speed stop/start work, diesel 26-tonne bin wagons serving built-up areas are thirsty beasts, with Greenwich Council's achieving no more than from 2.5mpg to 4.5mpg.

Islington aims to switch its entire 500-strong fleet over to battery power before 2030. The line-up includes 40 RCVs. At present it spends around £1m annually on fuel, a bill which is set to shrink. "The increasing number of electric vehicles in use in the council's fleet will start to gradually reduce the amount of diesel and petrol purchased," says Islington corporate fleet and transport manager, Mark Smith.

January saw Bristol-based Eunomia Research & Consulting publish a document entitled 'Ditching diesel - a cost-benefit analysis of electric refuse collection vehicles' (*www.is.gd/izobam*). The substantial report has been compiled with the assistance of Dignam and Black.

"The earliest adopters were relatively flat, compact urban municipalities, but there are now examples of eRCVs operating in a range of geographies," it observes. "Operational ranges of around 100 miles and six to nine hours between charges are being achieved, with some examples of vehicles being double-shifted."

It also states that the cost of the supporting charging infrastructure can be a concern. "However it should be noted that the infrastructure investments are likely to considerably outlast the vehicles," the report states. "The cost can reasonably be shared over multiple vehicle life spans."

ACROSS THE CHANNEL

In mainland Europe, the first electric DAF CF Electric 6x2 bin wagon is working in the Dutch city of Zwolle on trial with waste disposal contractor ROVA (pictured above). It uses an electric powertrain and refuse collection body sourced from VDL and a 170kWh battery pack that can be recharged to 80% of its capacity in just half an hour, says DAF.

"It is just as good and easy to operate as any conventionally-powered truck," observes ROVA general director Marco van Lente.

About that vehicle, DAF's UK marketing manager Phil Moon adds: "We'd hoped to see one on trial in the UK during the second half of this year, but now it's more likely to be in 2021."

In France, an electric Renault Trucks Range D Wide Z.E. 26-tonner is helping empty bins in Lyon. Faun Environnment has soundproofed the rear of the body to deaden the noise produced when a bin is tipped into it.

Battery-electric RCVs may eventually be superseded by another zero-emission solution offering a longer range which may appeal to some fleets. While VDL states that the DAF CF Electric may be good for 100km between recharges, the hydrogen fuel cell Mercedes-Benz Econic-based Geesinknorba 6x2 RCV set to join Aberdeen City Council's fleet should achieve 250km, says the bin wagon builder. It will be the first truck of its type to appear in the UK, and its only emissions will be water vapour. TE