



Picture credit: Transport Scotland

# Spreading the news

**E**arlier this year, in February, a gritter quietly made its way over the Queensferry Crossing, the newest Forth Road bridge. It was the maiden outing for the world's first all-electric gritter.

Called Electra, the vehicle was unveiled at a Transport Scotland event in November 2019, before certification and type approval processes were completed during the winter. The gritter is undergoing a three-year trial and is a project between Transport Scotland, Electra Commercial Vehicles and Bucher.

Elsewhere, in Wales for example, more traditional diesel-powered gritters are used to keep both of the Severn crossings clear. Highways England's south-west region manages these bridges: it operates two Schmidt DI-bodied vehicles, which are used solely for the M4 Second Severn Crossing and the original M48 Severn Bridge.

A spokesperson for Highways England says that the Schmidt DI vehicle is a liquid-only 18-tonner, capable of carrying up to 7,500 litres of Supamix KA, a potassium acetate liquid de-icer. The two DIs are complemented by two Schmidt Combi vehicles, which treat the region's M32 Eastville Viaduct and M5 Avonmouth bridge with salt

**Bridges in the national motorway network are often exposed to the worst of the winter weather conditions, so keeping them open in snow and ice is a priority, as Laura Cork reports**

(pictured, top of p19, at left). These 26-tonne combi spreaders are each able to carry up to 12 tonnes of salt, 3,000 litres of brine and 2,000 litres of potassium acetate in the tank behind the cab.

The vehicles all have scheduled summer and winter servicing, as well as the daily pre-treatment checks carried out by drivers.

## SWITCHED ON

Transport Scotland's 18-tonne Electra with Bucher Phoenix body may be the first all-electric gritter, but it's not the first to feature an innovative power solution – and here, too, Scotland is scoring with a fleet of soon-to-be-retrofitted dual-fuel hydrogen models (see box, p19).

The Forth Bridges Unit's all-electric gritter, pictured, top of p19, at right, was built by Blackburn-based Electra Commercial Vehicles (ECV). A division of NRG Fleet Services, ECV is best known to date for its electric refuse collection

vehicles, often built on glider chassis supplied by manufacturers such as Mercedes-Benz, Dennis Eagle, Isuzu and IVECO, among others.

However, the Electra – full name the Electra 100% Electric Gritter SEIV 19-350 – was one of ECV's repowering projects. "This particular truck was originally a skiploader," explains Iain McDonald, Transport Scotland's network resilience manager. "It was converted from a diesel-powered skip vehicle into a fully electric gritter, which has never been done before."

The gritter is a version of Bucher's Phoenix Electra in which a 48V electrical system replaces the usual hydraulic systems. According to Bucher, the unit is powered by a lithium battery and brushless motors with dedicated and integrated inverter – the company says this set-up avoids power losses.

Lithium technology also enables partial battery charging during the salt refilling operation, even if the battery is not flat. The unit's battery is housed in a separate compartment for easy access for maintenance, and it is protected with a special coating so it will work in temperatures as low as -20°C.

McDonald continues: "The simplicity of the Electra chassis build is that most body types can instantly be applied, including non-winter assets such as

***“All of the runs were planned around recharging points or halfway capacity, allowing us to get back to base to recharge and monitor the power management system”***

Iain McDonald

sweeper units or refuse collection vehicles, for instance (see also article, [www.is.gd/nayebi](http://www.is.gd/nayebi)).

“The work to adapt the chassis for electric use also removes elements above the wheel level to provide a larger, flatter area on which to mount the gritter body. The Bucher spreader unit complements the all-electric theme in delivering a sustainable winter service operation with its battery-powered delivery. Equally, a hydraulic body can also be fitted using power from the electric PTO in lieu of an engine or gearbox-driven PTO.”

The Electra is part of Transport Scotland’s strategy to undertake its winter service operations in a carbon-neutral way. It’s undoubtedly a bold move, with many eyes focused on the all-electric gritter’s ability to deliver during heavy-duty, cold weather operations.

Battery performance, not surprisingly, was keenly observed during Electra’s early on-road trials. An on-board electronic battery management system optimises power delivery and the batteries are thermostatically controlled, with driver behaviour also a significant influence on battery performance. An in-cab display shows the driver a ‘performance meter’ and, says McDonald, “Electra



has the capability to regenerate power back into the unit by as much as 40% by optimising driver dynamics. For example, running downhill will regenerate up to 116kWh back into the batteries, as can other simple driving tactics such as being able to run up to junctions and traffic lights.”

The vehicle’s range is said to be 150 miles compared to 300 miles for diesel equivalents. Range may not be so vital for its bridge duties, but the Electra has undergone considerable testing.

“We strived to get Electra out on a variety of short, medium and long trips during trial runs,” says McDonald.

“All of the runs were planned around recharging points or halfway capacity, allowing us to get back to base to recharge and monitor the power management system.” The testing took place over demanding routes, culminating in a run over

Soutra on the A68 down towards the border: “On return, the unit was on schedule to achieve around 210 miles – notwithstanding the fact that further regeneration might well have been added by completion,” recalls McDonald.

As well as regeneration during operation, Electra has an on-board charger which allows either a fast recharge using a DC-DC charging point, or a standard recharge of as little as four hours with a three-phase supply.

The Electra is hired through Riverside Truck Rental, another business in the NRG Fleet Services group.

McDonald says an important part of Transport Scotland’s role is to provide ‘options and outlets’ for development and innovation, and adds: “I think even the most sceptical would find it difficult not to be impressed by what Electra offers.” **TE**

## HYDROGEN CONVERSION PLANS

Glasgow City Council has received £805,000 from Transport Scotland to fund the conversion of 20 gritters to dual-fuel hydrogen power. The funding is part of a larger award of almost £3.5m for vehicle replacement and infrastructure.

A spokesperson says that the project will result in two 12-tonne, eleven 18-tonne and seven 26-tonne gritting vehicles, a mix

of DAF and MAN chassis. The 26-tonners are all DAF chassis with permanently mounted gritters; the two 12-tonners are being ‘repurposed’ from food waste collection vehicles to multi-purpose gritter/tippers.

“We are also purchasing eleven 18-tonne chassis which will be multi-purpose vehicles,” says the council spokesperson, explaining that a



of bodies will be fitted so the vehicles can swap from winter gritting duties to tipping, road maintenance or gully emptying, for example.

Vehicle body modifications are being carried out by James A Cuthbertson, of Biggar, while hydrogen specialist Ulemco is undertaking the dual-fuel conversion.