

Case Study: Fleet Electrification – First Bus Caledonia Depot, Glasgow

Distribution Network Operator: Scottish Power Energy Networks (SPEN)



Photo: Scottish Minister for Transport, Jenny Gilruth and First Bus Managing Director Scotland, Duncan Cameron.

In 2020 work began on an ambitious new project by First Bus to transform its Glasgow Caledonia bus depot into the UK's largest Electric Vehicle (EV) charging hub. The plans mark another major milestone on First Bus' sustainable travel roadmap and follows its pledge to only invest in zero-emission bus fleet by 2035 and not to purchase any new diesel buses after December 2022.

The first phase of the project saw 11 dual DC rapid charging units installed to charge 22 ADL/BYD electric buses from Alexander Dennis Limited (ADL) in Falkirk, with a further 126 vehicles delivered over 2021 and 2022, with the order due to be completed by spring 2023. 69 further dual headed chargers have now also been installed. First Glasgow's Caledonia depot bus fleet will be 50% electric by December 2022. First Bus' long-term objective is to ensure that the site is fully prepared for the transition to a 100% zero-emission fleet. This will include opportunities for further on-site renewable energy generation and storage.

The depot will not only support First Bus' growing electric fleet in Glasgow, it will also help other organisations operating in the city to decarbonise their own fleets by removing the need for bespoke expensive grid civil engineering duplication. With a first-of-its-kind innovation for the transport sector, First Bus is trialling third party charging using its charging infrastructure during the day when its buses are out on service.

The depot's new rapid charging stations can fully charge a bus in just four hours if required and will be controlled via smart charging software to ensure that power is used in the most efficient way - an approach that will help to minimise the draw down from the national grid at peak times, in effect working with the DNO to balance supply and demand.

This plan to fully electric Caledonia depot has 6 key phases detailed within Table 1 below. The installation and lead times alongside the key contractor and funders are also noted alongside each key phase

Table 1: Key Phases

Phases	Install/Lead Time	Contractor – Funding
1. New power supply to site (2MVA)	4 weeks (5 months from order)	SPEN – SULEB 2
2. 11 (dual) x DC chargers and onsite cabling	4 months	Power Systems - SPEN Green Economy Fund
3. New temp power supply to site (3.5MVA)	4 weeks (5 months from order)	SPEN/SSE – SULEB 2
4. 69 (dual) x DC chargers and onsite cabling	10 months	SSE – SULEB 2
5. New permanent supply (10MVA)	12 months	SPEN – Ofgem Green Recovery Fund
6. Future chargers as EVs increase	TBC	TBC

Key Challenges:

1. Minimising Operational Disruption On Site

During the extensive infrastructure works on site, the continued and safe operation of the existing vehicle fleet was paramount. First Bus took a phased approach to ensure that any works had the least impact on the ground at any one time. We developed a close relationship with the contractor and worked with our architect to ensure that each phase of works were planned with the existing vehicle operations in mind.

2. Timing of Site Power Availability versus Requirement

First Bus worked with the DNO SPEN to establish the power requirement on site. This power requirement was then matched to both electricity supply and vehicle deliveries. From this, the appropriate power requirement was able to be provided in line with vehicle deliveries. In order to meet this demand, an initial 2 MVA supply was provided, then a temporary 3.5MVA supply whilst the construction of a new substation was completed.

3. Local Authority Stakeholder Management

First Bus required input from the local authority in relation to planning consent and also local road closures during the completion of the infrastructure works. Their understanding of our aim, the timescales and risks were key to successful partnership working.

4. System Integration/Interface

This multidisciplinary project involved a range of stakeholders. Due to the range of stakeholders, such as power suppliers, contractors, charging manufacturers, funding manufacturers, smart charging software providers, a programme management structure was imperative to ensure the required BAU and maintenance processes were delivered.

Additional Information

For more information, please contact Craig Dennett, PR Manager for First Bus Scotland at craig.dennett@firstbus.co.uk

About First Bus

First Bus is one of the UK's largest bus operators. Making journeys easier for our customers, we were the first national bus operator to accept contactless card payments across all of our services and our First Bus App is voted 'best in class' amongst UK bus operators. Our most recent investments are in new, state-of-the-art buses across our key networks.

We work proactively with our local authority partners, making a positive impact on air quality, tackling congestion and improving customer experience. We are focused on First Bus becoming a leader in the transition to a low-carbon future and are committed to operating a zero-emission bus fleet by 2035; we have pledged not to purchase any new diesel buses after December 2022. We also operate the Aircoach network in Ireland.

First Bus is a division of FirstGroup.

For more information on First Bus: news-scot.firstbus.co.uk