

Case Study: Xplore Dundee, East Dock Street Depot, Dundee

Fleet electrification partner - Zenobē Energy Limited (Zenobē)

Distribution Network Operator – Scottish and Southern Electricity Networks (SSEN)

In 2021, Xplore Dundee (now part of the McGill's Bus Group) began the first phase of its fleet electrification strategy at the East Dock Street Depot in Dundee. McGill's identified a requirement for 12 electric double-deckers.

This project was made possible on tight timelines through partnership working: Zenobē worked with McGill's to identify power requirements and develop future proofed charging infrastructure designs for the initial fleet. This information then enabled SSEN to make a successful application on behalf of the project to Ofgem's Green Recovery Fund, providing funding for essential grid upgrades.



The Challenge

McGill's had already secured grant funding through SULEB (Scottish Ultra-Low Emission Bus Scheme), which provided 75% of the infrastructure and 75% of the difference in capital cost between a diesel and an electric bus. The operator required additional financing to cover the remaining cost and maximise the number of vehicles and charging infrastructure they could procure.

The upgrades to the depot had to be carried out concurrently with two additional depots, both of which were also on a tight timeline for completion prior to COP26, hosted in Glasgow in 2021. The site required investment in the local electricity network to charge the 12 'Electric Emerald' fully electric double decker buses and to accommodate future expansion of the fleet.

With growth in mind, it was important to futureproof the site and ensure McGill's had adequate support in place as the depot moved from diesel to electric.

The Solutions

1. Maximising funding and removing risk

To allow McGill's to maximise the SULEB grant and the number of e-buses which could be put into service, Zenobē provided match funding for 12 x ADL E400EV double deck buses and the required charging infrastructure.

Zenobē also provided innovative financing for the batteries-on-bus (BoB), whereby McGill's pay a monthly rental for the BoB with a guarantee that the battery will always be above a pre-agreed state of health. This ensures the battery's life is maximised, with the assurance that Zenobē will replace it at no additional cost once unable to service the routes.

Additionally, by finding second-life applications for e-bus batteries, Zenobē can offer more competitive financing to the operator in the first life.

2. An end-to-end solution: from infrastructure to power procurement

Working to tight timelines, Zenobē designed, managed and built the site: from parking planning and power procurement, to installing infrastructure for 6 x 120kW ultra-rapid chargers and implementing Zenobē's proprietary smart charging software.

Scottish and Southern Electricity Networks (SSEN) undertook early analysis to determine the available network capacity in the area. Initially, a demand load of 2.5MVA was identified as the desired option to meet the fleet's current and medium-term requirements, but the fleet operator's time constraints meant other options had to be developed.

Instead, a high voltage connection solution was pursued with a reduced demand load of 1.5MVA, which avoided costly upgrades to primary transformers and accommodated the charging infrastructure. The installation of the new 11kV connection and cable overlay works commenced in early October 2021 and was completed within six weeks.

3. Software to reduce energy use and optimise operations

The e-bus charging is controlled by Zenobē's proprietary smart charging software, adapted through close collaboration to fit McGill's operations before installation. Through the software's algorithms, the buses can charge at off peak times, lowering energy costs to McGill's, and reducing the peak power.

The software also allows McGill's to monitor the buses both when they are in the depot charging and when they are out on the road – highlighting if there are any issues with chargers or vehicles and providing performance insights. Data collected shows bus energy consumption, HVAC, regeneration and driver performance.

4. Additional funding for future capacity needs

With peak power analysis and infrastructure design completed by Zenobē, and additional support from Dundee City Council, SSEN was successful in securing £3 million of strategic funding from Ofgem's Green Recovery Scheme. This enabled the replacement of the two transformers and 0.3km of cabling at the Constable Street Primary Substation.

These works are due for completion in Summer 2023 and will unlock 12.8MW of green growth in the city, supporting additional EV charging capacity for electric buses, emergency service EV fleets and accessible charging for the general public.

The Additional Benefits

- No regret costs as thanks to the procurement of ample grid capacity with SSEN, and the identification of network improvements at Constable Street primary substation, future electrification needs can be met.

- Additional funding from Ofgem's Green Recovery Scheme was acquired thanks to power analysis, allowing these works to progress in parallel with McGill's electrification programme.
- Leading at COP26 - McGill's showcased e-buses in time for the pivotal international climate change summit, with an estimated 11,800 tonnes of CO₂ due to be removed from Dundee over the 15-year project.
- No upfront costs were paid by McGill's who were able to maximise their funding thanks to Zenobē's match funding and innovative finance.
- Early engagement between Zenobē and SSEN meant network upgrades were at a minimised cost and the project was delivered on time.
- Second-life uses for batteries by Zenobē mean the BoBs will be replaced at no additional cost to McGill's, and batteries will have a second life replacing diesel generators.
- An efficient fleet can be trained using Zenobē's charging software and data insights, learning to reduce energy consumption and extend battery life.

Zenobē

For more information, visit www.zenobe.com or email fleet@zenobe.com

Scottish & Southern Electricity Networks

For more information visit www.ssen.co.uk/about-ssen/contact-us/ or email commercial.contracts@sse.com