Stourton Park & Ride

Case Study: Empowering journeys for UK's first Solar Powered Park & Ride

Project Summary

Project name:
Empowering journeys for UK's first Solar Powered Park & Ride

Location:
Stourton Park & Ride, Leeds, West Yorkshire, UK

Completed:
September 2021

Contractor:
EVO Energy

Products used:
5 x LZ EV Supply Pillars

Background:

In December 2020, it was announced that a new Park & Ride would be introduced in Leeds. The £38.5 million project is part of the 'Connecting Leeds' initiative; an ambition to improve the bus network, provide better connectivity and reduce carbon emissions in the city.

The new site is the first ever fully solar powered Park & Ride in the UK and is served by an electric bus fleet that runs every day. It is part of a wider network of Park & Ride sites across the city, complementing two others at Elland Road and Temple Green.

Solar panels and an innovative battery storage system provide energy to power the entire site and a fleet of zero-emission electric buses that operate every 10 minutes. In addition to this, the site accommodates 1,200 car parking spaces and hosts bays providing power for 26 electric vehicle (EV) charging points and one bus capacity point. Of these charging points, trickle charging for long-stay commuters with EV, and rapid chargers for those passing the site, help to build a network of public charge points.

Challenge:

The challenge of the project was to ensure the renewable energy supply (sourced from solar panels) was manageable and distributed consistently across the site. It also had to provide accessible charging facilities for the zero-emission bus fleet and public EV charge points.

With an estimated generation of 851.7MWh/year, the solar powered Park & Ride requires a reliable and effective distribution solution that supports it and the many uses of its facilities, as well as variable power generation and use.

Lucy Zodion's involvement was to aid the management and distribution of Stourton Park & Ride's energy.

Results:

Lucy Zodion's EV supply pillars contribute to the site's overall completion by providing not only a safe and secure connection for EV charging facilities, but for helping to ensure the power generated on-site is effectively distributed and managed for optimum charging. The project overcame objectives, by:

• **Manage renewable power:** Lucy Zodion's EV supply pillars were installed in various locations across the site to ensure EV charge points had a localised substation of renewable energy. By decentralising the supply, firstly via renewable energy and secondly with several smaller EV supply pillars (rather than a single substation), demand can be more precisely addressed.

The five pillars Lucy Zodion designed, which are fed by the solar canopy and battery storage system on site, work independently to supply up to four dual charge point connections each.

• **Distribute power on-demand in peak hours:** The EV supply pillars that Lucy Zodion designed for the Stourton Park & Ride project consider the maximum load anticipated, should EV charging be required from all points.

This, combined with the battery storage system, means that power is always abundant and available.

When demand is low it enables the battery storage system to recharge via the energy generated from the solar panels at the Park & Ride. The EV Supply pillars use the energy generated only when a charge is initiated, to minimise any wastage.

Their modular design means that Lucy Zodion was able to leave 25% of the internal pillar space available, so further components can be integrated within the pillar, should the demand for more charge points increase in the future.

The Solution:

Lucy Zodion worked with EVO Energy to ensure the Stourton Park & Ride site was equipped with a range of EV supply solutions, to address and overcome the many challenges and objectives that were presented.

Lucy Zodion's Design Centre manufactured five bespoke EV Supply Pillars which were supplied to support the installation of the charge points within the Park & Ride.

These included either a 250A or 400A supply for arange of dual charging units, which varied from 7kW (Fast) to 50kW (Rapid).

The specification of the pillars is:

Pillar 1	Pillar 2	Pillar 3	Pillar 4	Pillar 5
• Size 22 Fortress Feeder Pillar (HDG) • 3 x Dual 7kW charge point connections • Single phase supply	• Size 22 Fortress Feeder Pillar (HDG) • 4 x Dual 7kW charge point connections • Single phase supply • TT Earthing	• Size 22 Fortress Feeder Pillar (HDG) • 3 x Dual 7kW charge point connections • Single phase supply • TT Earthing	• Size 22 Fortress Feeder Pillar (HDG) • 4 x 50kW charge point connections • Three phase supply • TT Earthing	• Size 22 Fortress Feeder Pillar (HDG) • 1 x Dual 7kW charge point connection • 2 x 50kW charge point connections • Single phase supply (for 7kW) • Three phase supply (for 50kW) • TT Earthing

All pillars were also equipped with Surge Protection Device, Anti-condensation heater, service light and service socket

• Simultaneous charging at different charge speeds: Lucy Zodion worked with EVO Energy to ensure the Park & Ride offers simultaneous charging at different charge speeds, again by providing several pillars, rather than one single substation.

Each pillar is dedicated to supplying a small number of charge points; most of these provide power exclusively for chargers of a specific rating/connection.

Pillar five (9) has been designed with both 7kW and 50kW connections, to cater for fast and rapid charging requirements.

By grouping a number of charge points with dedicated supply pillars, power can be fed and supplied in a much more manageable way.

By doing this, it means the site is able to continue offering EV charging facilities should a charge point or supply pillar face issues. Furthermore, any issues at the pillar shouldn't affect the entire site and faults can be addressed more quickly with minimal disturbance to most charge points at the Park & Ride.

Quote:

"**We worked with Lucy Zodion to ensure EV Charge points at the Park & Ride to use power generated by the solar canopy and battery storage system. Lucy Zodion supported the project by providing five bespoke EV Supply Pillars, which were installed near the charging bays in the carport for localised power.**

As the Park is the first of its kind in the UK, we entrusted Lucy Zodion to provide pillars pre-equipped with the wiring and components to support the site's infrastructure. We are happy with the results and, because the pillars have been built with 25% of available internal space, it means we can optimise the pillars for future EV charging requirements."

EVO Energy

Conclusion:

The Stourton Park & Ride opened in September 2021. Overall, this is a Multi technology project with a 1.2MWp solar carport, 500kW /950kWh Tesla battery, smart controlled EV charging infrastructure and an 300kW electric bus charging capability.

There are 13 twin 7kW EV charging points, 4 x 50kW EV chargers with linked with ANPR barrier entry for afterhours use, where the park and ride transforms into a EVcharging station.

The PV system is estimated to generate 852,000 kWh/ yr, only 12% of which is estimated to be exported, because of the battery and solar interaction. Overall, the Solar PV will offset 471 tonnes of carbon in year 1 which is the equivalent of removing 203 cars from the roads.

The site will lower commuting costs, improve air quality and reduce carbon emissions. The solar canopy and the supporting battery storage solution, combined with the electric bus fleet and EV charging capabilities for users, ensures the site and its users are contributing to the city's aim of reaching net-zero by 2030.

Sources:

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