

Shared Access Wireless Electric Vehicle Charging Hub Feasibility Study

Flexible Power Systems (FPS), University of Birmingham (UoB) and Tyseley Energy Park (TEP) are undertaking a techno-commercial feasibility study to assess a shared wireless electric vehicle charging (WEVC) hub for commercial vehicle users within TEP. The study is funded by InnovateUK and is seeking input from potential users in exchange for a free EV fleet assessment.

Shared Charging Infrastructure

Commercial vehicles like vans, trucks and buses are intensively used and have substantial energy requirements. Overnight charging in depots may not be a complete solution for many of them because they require charging during a day's operations, or they are stored on-street overnight. These vehicles need rapid charging at high powers to minimise lost productive time. High power DC rapid chargers cost ~10x the cost of AC fast chargers to deploy. However, they are often used relatively lightly because rapid charging within shifts happens occasionally.

Today, fleets cannot use public charging networks to meet this need because charger availability is not sufficiently "firm" to be included in route plans due to issues like charge point failures and the general public's usage of the charge points.

A shared charging infrastructure hub with very high availability and a booking system that can fit with the tight windows in work schedules and route plans could be an answer to this challenge. If vehicle operators can share access to these hubs then they can share the costs of purchasing the chargers, installing them and connecting them to the grid. It may also be possible to add other services to the site like fulfilment and consolidation to improve its business case.

Wireless Electric Charging

Wireless Electric Vehicle Charging (WEVC) may further improve the performance of the hub. It enables vehicles to be charged without plugging in which can generate time savings, reduce space requirements, eliminate trailing cables (so vehicles can do more whilst charging) and future proof for autonomous vehicles. A proof of concept wireless charging trial is in operation in Edinburgh



Figure 1 - Wireless Electric Charging System

The Opportunity in Birmingham

TEP is a potentially attractive site for a shared charging hub. It's location on the A45 means the site can be accessed during and at both ends of a working day. TEP also enjoys significant power availability and space which are key factors in likely implementation costs.

The feasibility study is intended to confirm whether a charging hub would be useful to fleets operating in Birmingham and the suitability of the TEP location. To do this several questions need to be answered:

- Will there be enough commercial electric vehicles to justify it?
- Will those vehicles require charging outside of their depots?
- Is TEP's location a match with vehicle movements (or would large diversions be required)?
- Is there time during typical shift patterns for any charging?
- What mix of rapid and wireless charging would best suit the hub?
- Can conflicts in when fleets need access to the hub be managed?
- Do the benefits of providing the hub outweigh the costs for all parties?

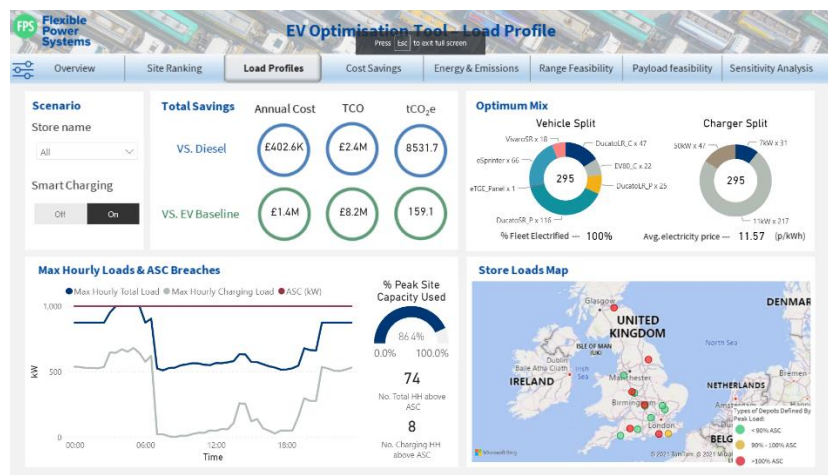
Our Approach

FPS approaches projects like this by constructing detailed simulations of vehicle movements based on logistics or telematics data. This enables likely vehicle and infrastructure choices to be modelled from a cost and emissions perspective both with and without the charging hub so they can be compared for all users.

Based on user requirements FPS will develop a cost estimate for implementation of the hub so that differing business models can be explored.

The goal of the study is to develop a business case for a pilot hub deployment in the city to inform a larger scale follow on project.

Benefits of Participating



For participants the study will inform their electrification strategies by: identify vehicles operating in Birmingham that can be electrified; vehicle and charger types that would minimise costs; energy use; and emissions savings. A sample dashboard screen grab is shown on the left. An interactive version is available on

Figure 2 - Dashboard Sample Loads

<https://www.flexpowersystems.com/>.

Participating organisations will also be given access to results of the study and longer term may be able to reduce their costs of decarbonising their fleet through use of the hub.



How to Participate

Hub investment costs are likely to be substantial. It is also possible that several hubs will be required to meet the needs of some users. As a result, we are taking a data driven approach to the project to enable us to draw firm conclusions. Data requested includes:

- A vehicle asset register
- List of current depots with their locations and scales
- Vehicle movement data (e.g. Telematics, Proof of Delivery Handset data or fuel card)

We would also like a conversation with the current vehicle fleet manager to understand any major changes planned to depots, vehicle fleet composition or operations.

All data shared with the project will be treated as confidential and anonymised in any wider presentation of results.

About the Partners

Tyseley Energy Park (TEP) is committed to delivering low and zero carbon power, transport, heat, waste and recycling solutions for a greener, cleaner, healthier Birmingham. The facility has considerable potential to act as a low carbon transport hub owing to its strategic location, space and significant power availability.

University of Birmingham (UoB) For more than a century, the University of Birmingham has been pursuing and sharing knowledge through outstanding teaching and world-leading research. The University is also an investor and contributing to the wider development of an innovation centre on the site.

Flexible Power Systems (FPS) are an electric vehicle fleet and load management technology developer. FPS combines engineering, operational knowledge and data science to reduce the costs of commercial fleet decarbonisation across planning, deployment and operations stages.

For More Information

Please contact:

Michael Ayres – Managing Director – Flexible Power Systems

Tel: +44 (0) 7714 513 653

Email: Michael.Ayres@flexpowerltd.com