Smart Electric Urban Logistics

Addressing the need to optimise energy usage for fleet EV charging

Smart Electric Urban Logistics (SEUL) is a two-year trial innovation project that is helping electrify vehicle fleets. The project began in April 2017 with the aim of testing smart charging technology that integrates energy storage, alongside an innovative tool to assess existing grid capacity. Trialling the combination of these technologies will provide scalable lessons from real-world operation and testing.

The SEUL project is led by UPS with project partners UK Power Networks and Cross River Partnership. It is part of the Low Emission Freight and Logistics Trial funded by the Office for Low Emission Vehicles (OLEV) in partnership with Innovate UK.
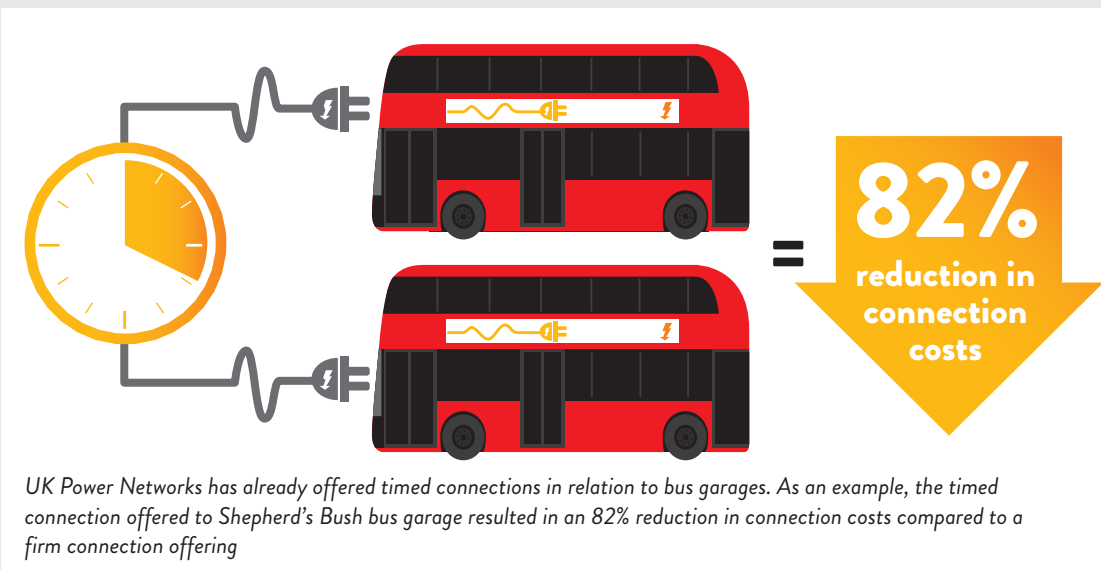
For further information on the project background, please see SEUL Factsheet 1.

Timed Connections Tool

The integration of EVs is expected to increase peak demand on power distribution networks. This could require reinforcement of the local electricity grid, which has cost and time implications. Previous work on controlling electrical loads demonstrated that mechanisms to control EV charging can be used to alleviate local constraints and minimise the need to reinforce the grid.

Timed connections are a type of flexible connection that allow customers to use different levels of power during different times of the day. Combining smart charging with the offering of timed connection unlocks spare capacity in the network, avoids costly reinforcements, and results in a quicker connection for customers.

= **82% reduction in connection costs**

UK Power Networks has already offered timed connections in relation to bus garages. As an example, the timed connection offered to Shepherd's Bush bus garage resulted in an 82% reduction in connection costs compared to a firm connection offering

Case study - Timed Connection at UPS central London depot

In the case of unmanaged EV charging, the full electrification of the central London depot-based fleet of global logistics firm UPS, would require a connection of 2,200kVA. Deploying smart charging technology combined with a timed connection could reduce the supply requirements down to 1,500kVA. As depicted in Fig.1, the operational profile of the company provides a 16-hour time window to charge the EVs (15:00 to 07:00 the next day), which means that vehicle charging demand could in fact be shifted from late afternoon and evening times, when network peaks occur, to late night time when spare capacity exists in the network. The graph shows that all fleet vehicles can be fully charged by the time they need to go out the next morning.
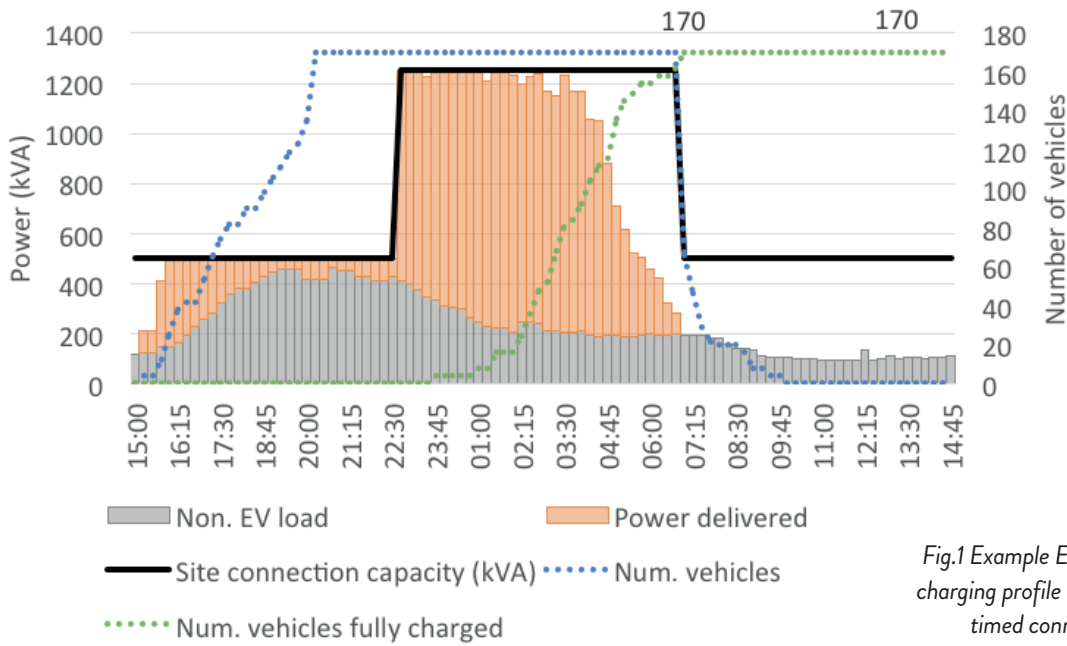
Fig.1 Example EV fleet charging profile using a timed connection

Quicker, simpler electricity connection process

Assessing and offering a timed connection has typically been a labour intensive process. It has taken up to 1.5 days to assess and offer a timed connection to the customer. UK Power Networks is currently developing automation tools that can reduce the time to assess a timed connection down to a few hours. As a result, it will be much easier to process a number of timed connection requests quickly, enabling more customers to be offered this type of connection.

Automating the assessment process allows UK Power Networks to streamline their timed connection offer
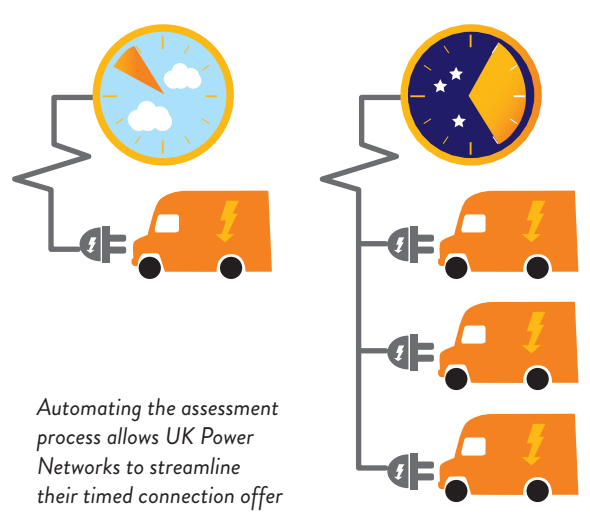
Developing tailored timed connection offering for customers

UK Power Networks, London's electricity Distribution Network Operator (DNO), is now developing plans to offer 'profiled connections' to ensure even more timely connection of depot sites. A profiled connection would be based on an optimal daily maximum demand profile, which would be made of up to 48 half-hourly steps. This optimal profile would be generated to meet the operational needs of a specific site.

Key lessons for vehicle fleet managers

It is important for fleet managers to engage with their local DNO at an early stage in the process of electrifying their fleet. This way, they can explore all different options available for connecting the EV load including the offering of timed connections.

For more information, please see
https://crossriverpartnership.org/projects/smart-electric-urban-logistics/

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