

Smart Electric Urban Logistics

The Smart Electric Urban Logistics (SEUL) project is a world-first deployment of a smart charging system for a freight fleet, incorporating active network management, energy storage and the development of an innovative tool to assess existing grid capacity efficiently.

The two and a half-year project, between April 2017 and September 2019, was part of the Low Emission Freight and Logistics Trial funded by the Office for Low Emission Vehicles (OLEV) in partnership with Innovate UK. SEUL has provided scalable lessons from real-world operation and testing, and therefore supports the wider transition to electric vehicles for larger commercial fleets.



More Electric Vehicles (EVs) on the street, improving air quality and proving that electric really works

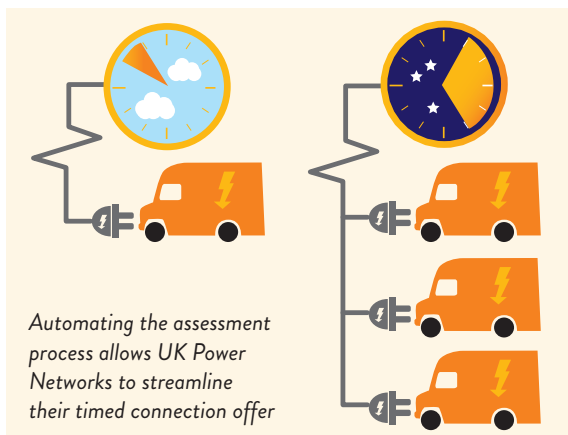
At the start of the project, global logistics operator UPS had already integrated 52 plugin electric trucks in its 170-vehicle fleet operating from its central London depot. However, existing electricity grid infrastructure constraints limited its ability to introduce more without a costly and disruptive grid infrastructure upgrade.

Through the project, UPS has demonstrated that it can electrify its entire central London fleet without the need to further upgrade the local electricity grid infrastructure, through a combination of smart charging and onsite energy storage. 20 mid-life UPS P80 7.5 tonne diesel urban distribution trucks were converted to fully electric models, taking the total number of EVs above the threshold number that could be charged at the depot previously.



Their successful deployment has demonstrated that EVs remain the technology of choice for urban last-mile logistics. The converted vehicles retain the capacity and distinctive features of the UPS urban distribution truck, with reduced local emissions and noise, alongside lower running costs and avoiding emissions-based charges in London. The converted vehicles have already delivered significant air quality and greenhouse gas emission savings since deployment, with an estimated 74 tonnes of CO₂e saved in the first year of deployment on a well-to-wheel basis¹.

Quicker, simpler electricity connection process with timed connections



Automating the assessment process allows UK Power Networks to streamline their timed connection offer

UK Power Networks developed an innovative timed connections assessment tool as part of SEUL, which has allowed them to streamline their flexible connection offering to other customers with large EV charging demands. This type of connection can reduce the need to upgrade the local electricity infrastructure and help to manage charging demand. Previously, assessing and offering a timed connection has been a time-consuming process. UK Power Networks have developed automation tools that can reduce the assessment time down to a few hours. In future, more customers can be offered this kind of connection.

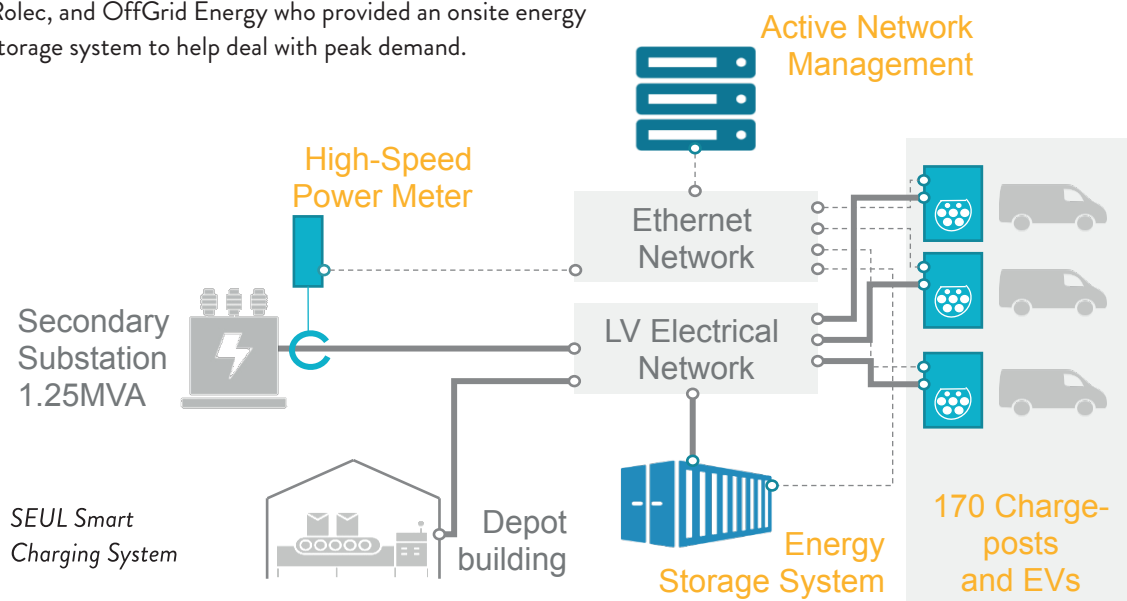
¹ Based on actual distance travelled in km between September 2018 and September 2019, and per km savings as calculated by LowCVP based on CVRAS cycle testing at Millbrook test facility in November 2018. Well-to-wheel CO₂e figures based on

Defra GHG reporting figures for 2019(grid/pump average). Diesel tailpipe CO₂e figures based on measured CO₂, CH₄, N₂O emissions. BEV charging efficiency not measured, assumed to be 90%.



Electrification via smart charging

To achieve the objective of fully charging all vehicles, whilst ensuring total grid demand does not exceed the contracted grid connection capacity, an Active Network Management System was designed by UK Power Networks Services to control the charge delivered to the vehicles. They worked with chargepoint supplier Rolec, and OffGrid Energy who provided an onsite energy storage system to help deal with peak demand.



Opening up new areas for cross-sector research and development

Cross River Partnership have taken the lessons from this project and seen them deployed elsewhere, including working with public sector fleet managers to develop vehicle electrification strategies.

The project has also unlocked new avenues of research and development for UPS and one of

the project's subcontractors, UK Power Networks Services.

Further development of the smart grid concept, incorporating new technologies and services, will ultimately further improve the business case for electrification in many cities and for many customers.

Overall Conclusion

SEUL is a foundation technology for UPS.

The SEUL project has delivered:

- Fleet electrification
- Significant Air Quality savings and Greenhouse Gas savings
- Managed energy demand including at peak times
- Onsite energy storage

Smarter technologies around EV charging are now well understood in a fully operational business environment.

Next steps for the SEUL project could include:

- Using batteries for storage that are no longer fit for truck use (second life)
- Using advancing technologies for predicting as well as managing energy demand
- Integrating publicly accessible charge-points through the smart grid approach
- Implementing different combinations of emerging technology, for environmental and financial savings

For more information, please see

<https://crossriverpartnership.org/projects/smart-electric-urban-logistics/>



Innovate UK



Office for Low Emission Vehicles