



# Optimise Prime

**HITACHI**  
Inspire the Next

**Uber**

 **Scottish & Southern**  
Electricity Networks

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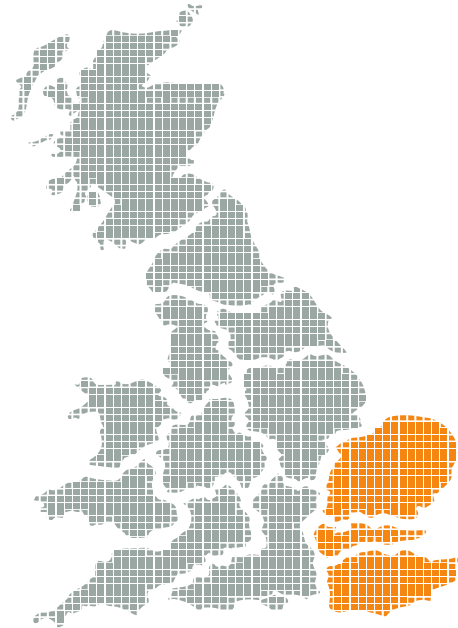


**UK**  
Power  
Networks 

## Optimise Prime interim learnings

Florentine Roy, Innovation Project Lead, UK Power Networks

Cornwall Insight EV & Charging Infrastructure Forum, 19 May 2022



**8.3M Homes and Businesses served (19M people)**  
28% of UK total

**226,000 EVs currently in our patch**  
Pure and plug-in hybrids  
27% of UK total

**Up to 4.5m EVs forecasted by 2030**  
According to our Distributed Future Energy Scenarios

# Interim learnings from the Optimise Prime project

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1. Optimise Prime overview
2. Home charging trial – interim learnings
3. Depot charging trial – interim learnings
4. Mixed charging trial – interim learnings

World's largest commercial EV trial with 6,000+ commercial vehicles



Home Charging



Depot Charging

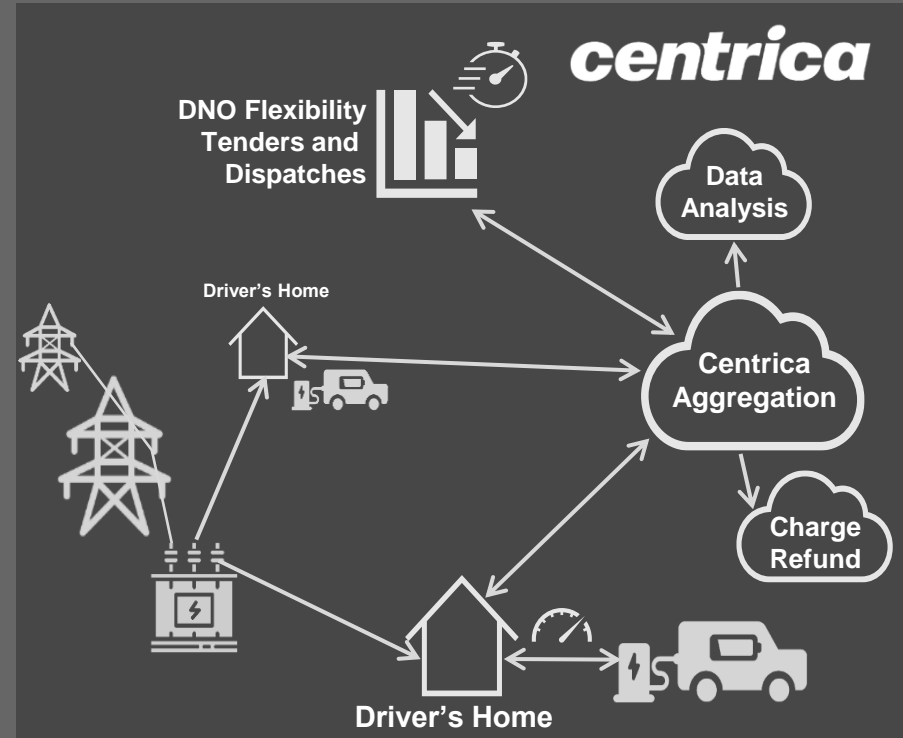


Mixed Charging

Photo: Casey Gutteridge/Uber/PA/CC BY-SA 3.0



- Commercial EVs charged at home
- Separation of personal and business power use
- Demand side response via flexibility services



## Commercial EV loads at domestic properties – general consideration

At-home ICEV fleets going electric **cannot charge fully at home**

## Commercial EV loads at domestic properties – learnings for fleets

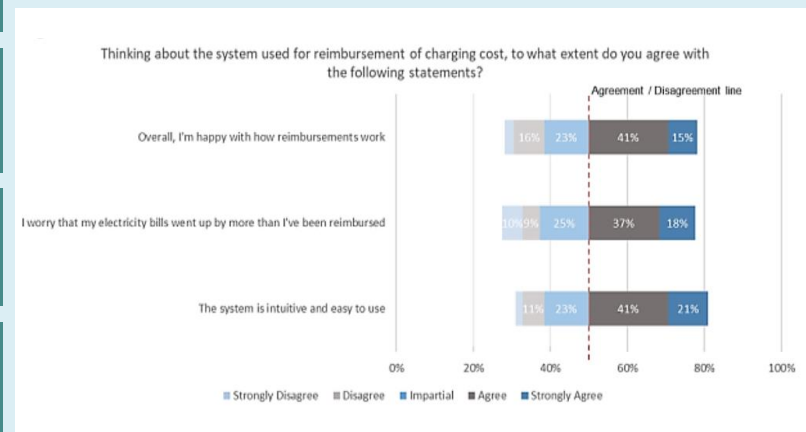
**Automating the reimbursement** of charge-at-home electricity is necessary for larger fleets

**Communicating** the complexities of optimisation and engaging drivers can be difficult

The driver first has to pay the bill and be separately reimbursed, **creating worries for drivers**

Achieving benefits from **time-of-use tariffs** is challenging

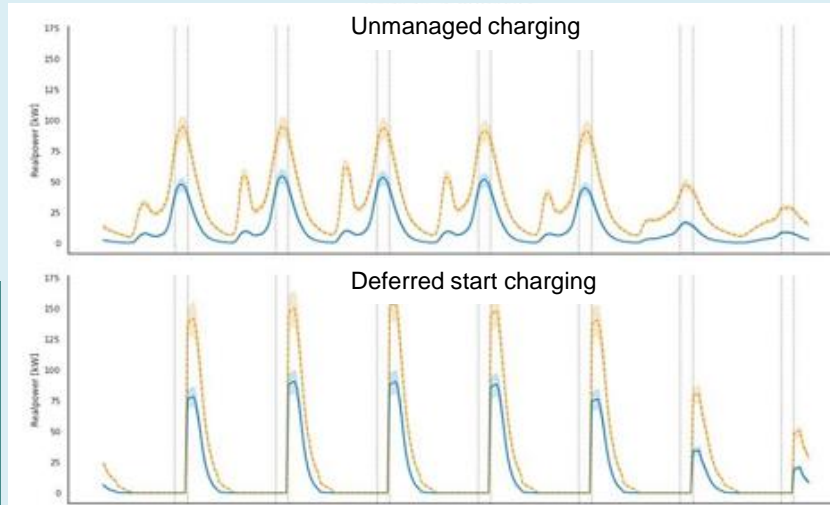
**Plug-in rates could be accurately predicted** with an estimated 95% accuracy



## Commercial EV loads at domestic properties – impact on network load

Unmanaged **peak charging** likely to coincide with distribution network peak demand

**Smart charging** can significantly reduce peak demand if the load is balanced



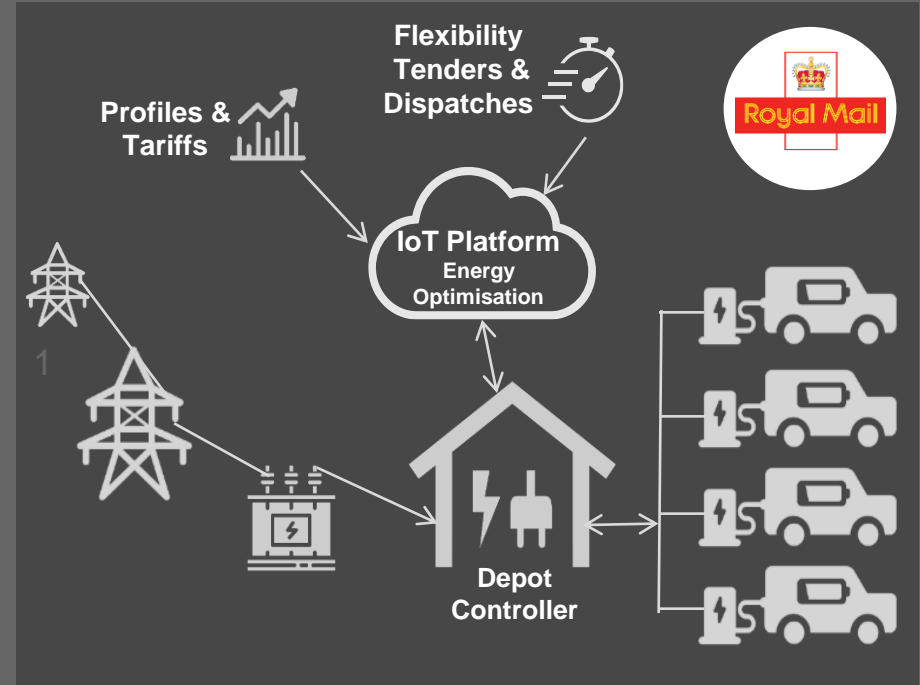
Expected **significant seasonal variation** in power demand

The majority of journeys could be fulfilled with the **current generation of EV vans**



# Depot Based Fleet Trial – Royal Mail

- Multiple vans charged in depots
- Site planning tool
- Profiled connection
- Ongoing cost optimisation
- Flexibility services



## Main drivers of ICEV and EV cost differences

**EV prices** are the key determinant of whether EVs make economic sense for a fleet

The **OPEX savings** for depot-based can offset a 28% higher CAPEX price of EVs vs ICEVs

## Key learnings on Smart Charging & Flexibility for networks

Smart charging can **reduce peak demand for networks**

Smart charging **saves costs for depots**

Flexibility trials proved an ability to **control charging in response to a flexibility request** from the DNO.

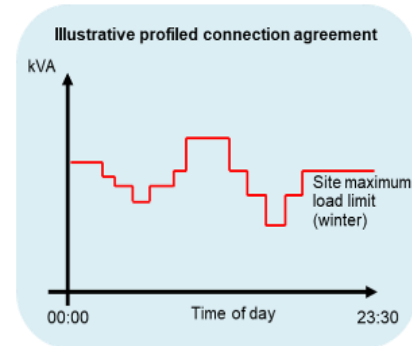
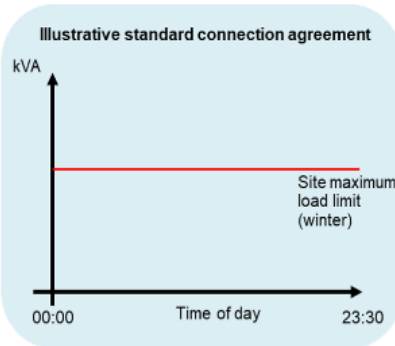


*Comparison of unmanaged (left) and managed (right) EV charging load at a Royal Mail depot*

## Profiled Connections trials

Controllable EV load needs to be greater than the variation in building load

Determining an accurate profile is key to being able to adhere to the profile



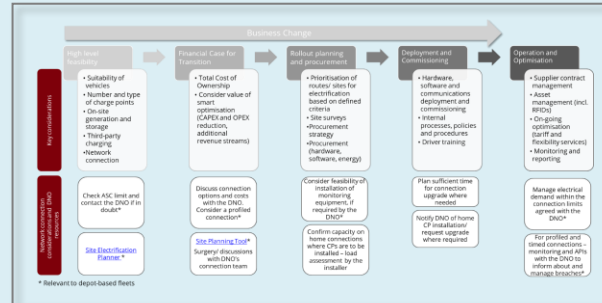
Profiled connections may need to be refined as more data becomes available

Monitoring and controlling adherence at low voltage may be challenging

# Depot charging trial – Interim learnings

## Tools to help fleets go electric

### Fleet electrification guide



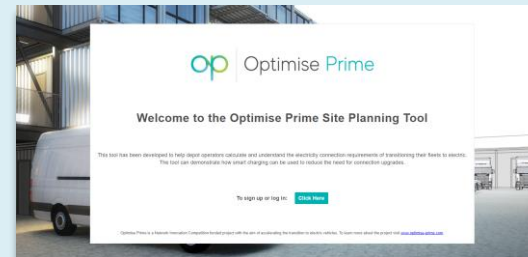
My site will have  charge points

Each charge point can deliver  kW of power

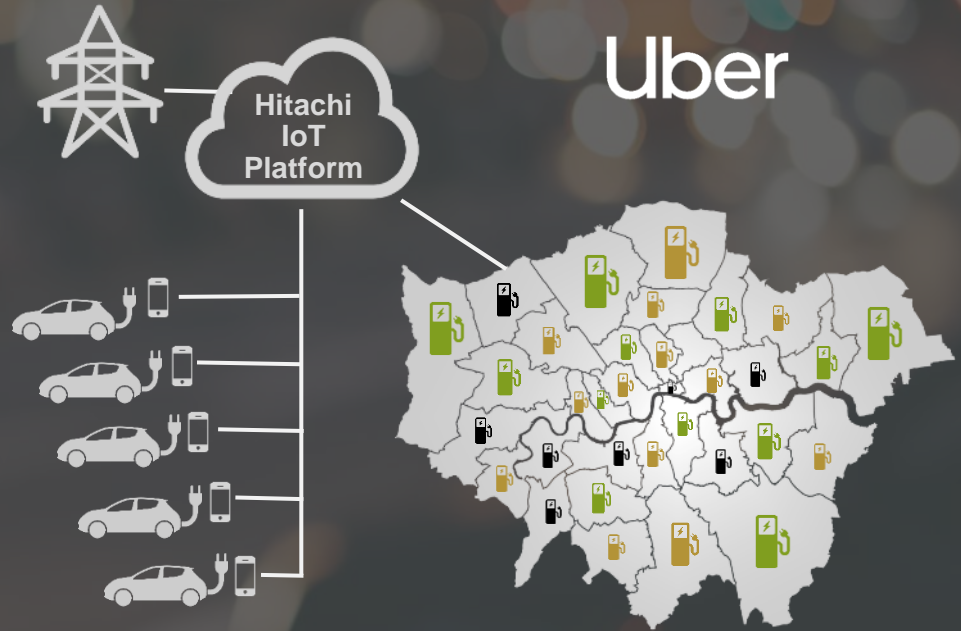
My site has a connection limit (ASC) of  kVA

At peak times, my power demand is currently  kW (- % of the ASC)

Site Electrification Planner



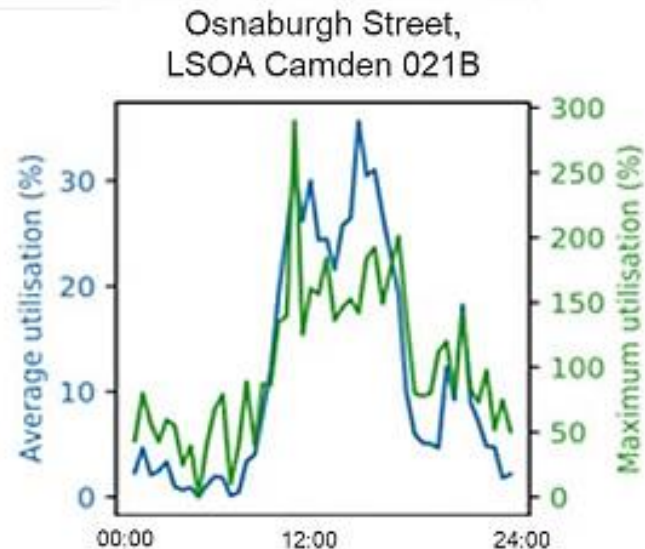
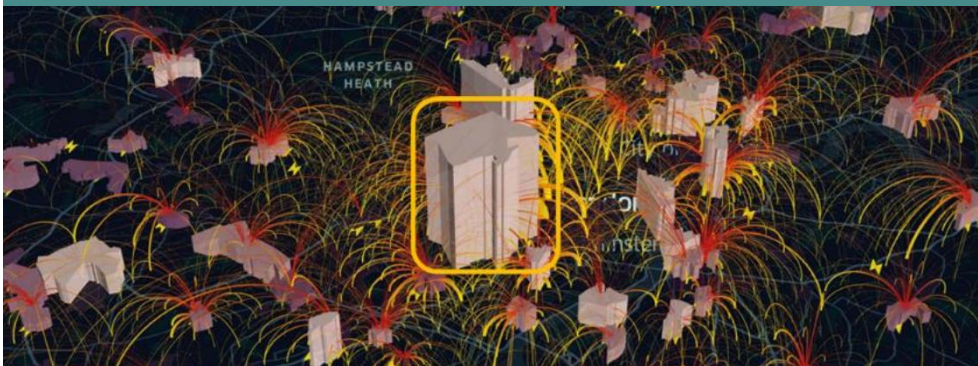
Site Planning Tool



- Analysis of data from electric PHVs
- Insight into need for charging infrastructure and network impacts

# Mixed charging trial – Interim learnings

Most popular chargers in London have demand beyond their capacity



## Total cost of ownership for electric private hire vehicles

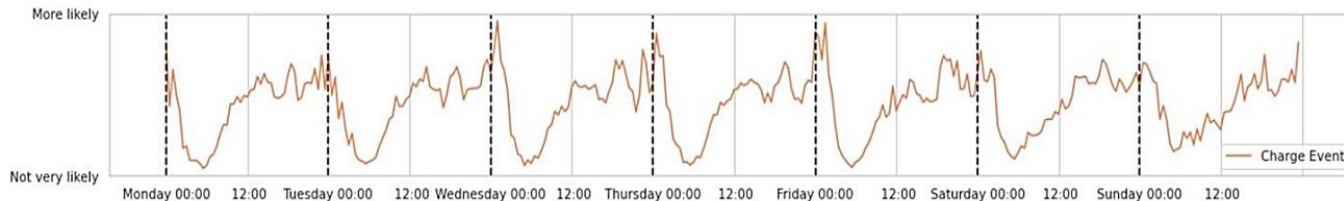
The development of the **second-hand market** is key

The **Congestion Charging** exemption for EVs is key

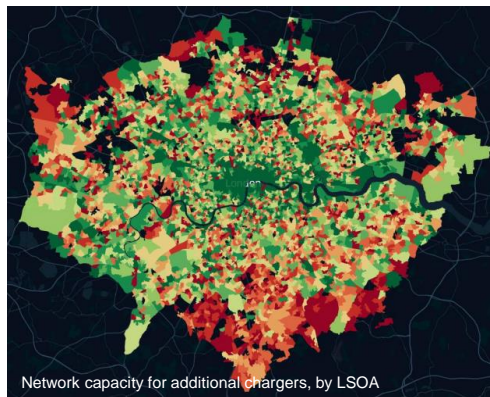


# WS3: Mixed Charging

Charge demand from PHVs is likely to peak in the evening

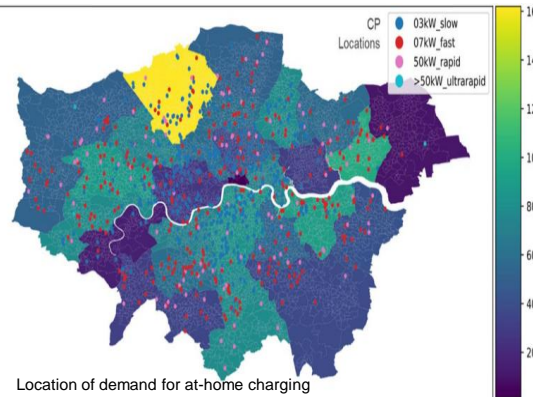


Clear pattern in trip and on-shift charging demand

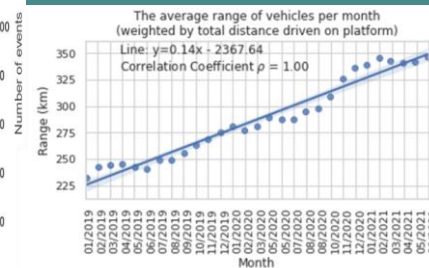


Likely to be **capacity for sufficient growth** in infrastructure in Central London

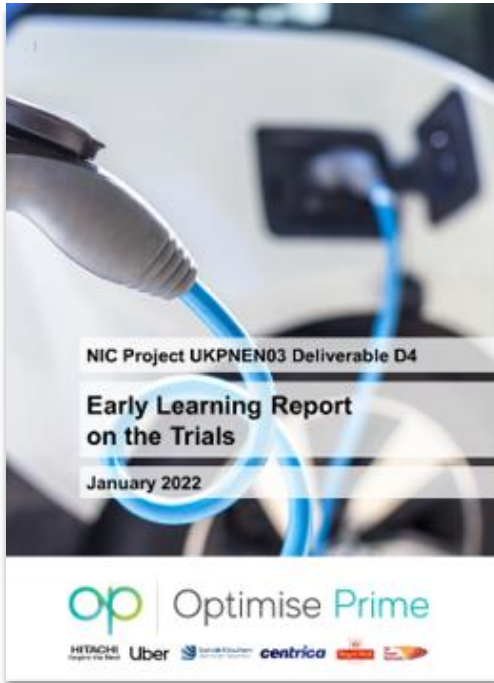
May be **more constraint** in outer areas where drivers live



Average EV range continues to grow, potentially reducing frequency of charging but increasing power need



# To find out more



All Optimise Prime reports  
can be found at  
[www.optimise-prime.com](http://www.optimise-prime.com)

# Next steps



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Thank you!



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