Cross River Partnership

- Good Jobs
- Strong Businesses
- Clean Air
- Great Places
● 4.5-year EU-funded project

● 8 cities, 32 partners

● To demonstrate the suitability of electric freight vehicles for inner city logistics
Local grid infrastructure capacity

- Overall impact still low but local constraints pose problems

- FREVUE partner UPS encountered grid infrastructure constraints when charging all EFVs at the same time

- Infrastructure upgraded to charge up to 63 vehicles

- Such infrastructure upgrade has proven:
  - Costly, lengthy and disruptive
  - Non-incremental
  - Requiring investment in 3rd party assets

Barrier to the large-scale deployment of EFVs
EFV power requirements

- EFV power requirements and charging patterns different to passenger cars and buses
  
  An 18t single-shifted truck with a 200kW battery in daily operation requires an average of 163 kWh per day to charge. In comparison, a medium-sized van requires approximately 30kWh per day

- Little diversity in charging patterns of large EFVs
  
  Large (over 12 tonnes) and medium (3.5 tonnes to 7.5 tonnes) EFVs within FREVUE tended to be charged only once a day in the late afternoon at the operator’s depot.

- Providing challenges but also opportunities
Smart Electric Urban Logistics

- An **additional 20 EFVs** at UPS central London depot
  - Bringing the number above the maximum that can theoretically be charged

- Design and implement a sophisticated **network capacity assessment tool** developed to take into account time of day variation in demand

- Design and implement an **innovative smart charging system** at this depot together with an energy storage system

- April 2017 to March 2019, funded by UK Office for Low Emission Vehicles, in partnership with Innovate UK
Vehicles
Network capacity assessment tool
Smart Electric Urban Logistics

Load (MVA)

00:30 02:00 03:30 05:00 06:30 08:00 08:30 11:00 12:30 14:00 15:30 17:00 18:30 20:00 21:30 23:00

- Capacity
- Maximum Demand
Smart Electric Urban Logistics
Smart Grid System
Smart Electric Urban Logistics

Night-Time Demand on 16-17 January 2016

Demand (kVA)

Base Demand (kVA)
Smart Electric Urban Logistics

Night-Time Demand on 16-17 January 2016

- Base Demand (kVA)
- 42 Vehicles (kVA)
Smart Electric Urban Logistics

Night-Time Demand on 16-17 January 2016

Base Demand (kVA)  42 Vehicles (kVA)  63 Vehicles (kVA)
Smart Electric Urban Logistics

Night-Time Demand on 16-17 January 2016

- Base Demand (kVA)
- 42 Vehicles (kVA)
- 63 Vehicles (kVA)
- Smart-enabled capacity (kVA)
Smart Electric Urban Logistics
Smart grid system – Architecture
Smart Electric Urban Logistics (cont’d)

- Expected results
  - 5-year vision: Develop roadmap of how all 170 vehicles at UPS central London depot could be electric
  - Clarify how these results are transferable to other fleet operators
Thank you

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