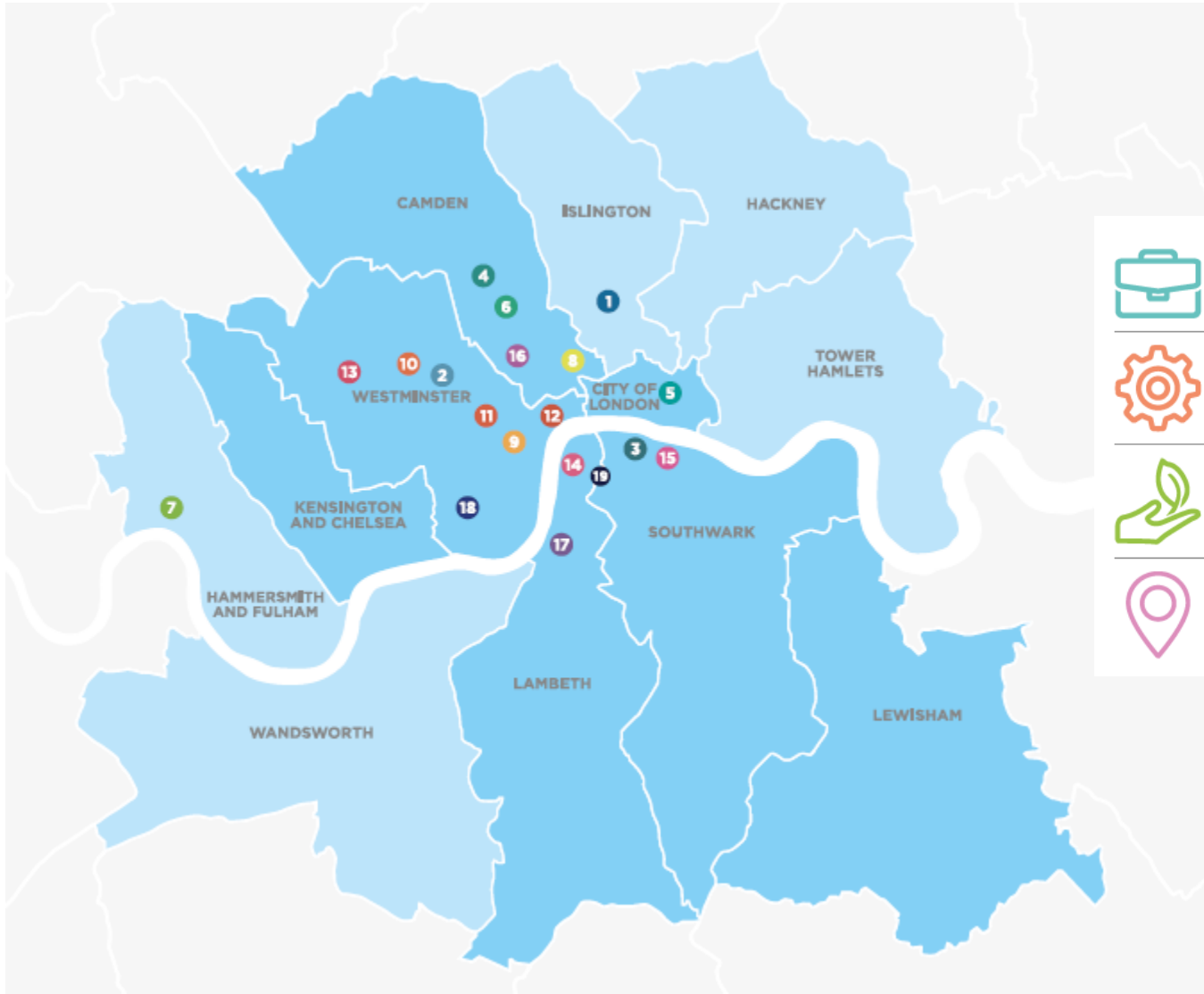




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Cross River Partnership



Good Jobs



Strong Businesses



Clean Air

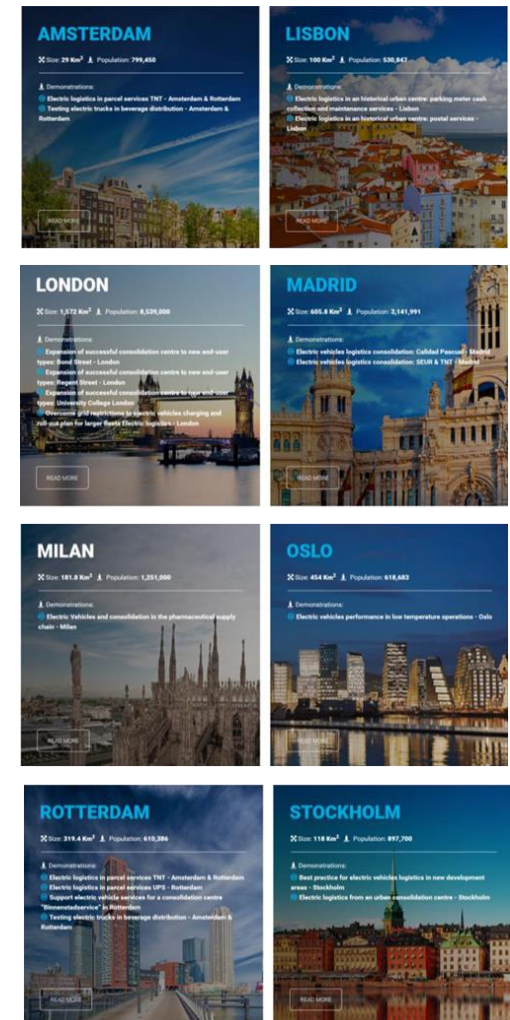


Great Places

FREVUE

Freight Electric Vehicles in Urban Europe

- 4.5-year EU-funded project
- 8 cities, 32 partners
- To demonstrate the suitability of electric freight vehicles for inner city logistics





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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



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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 UK





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Vehicles





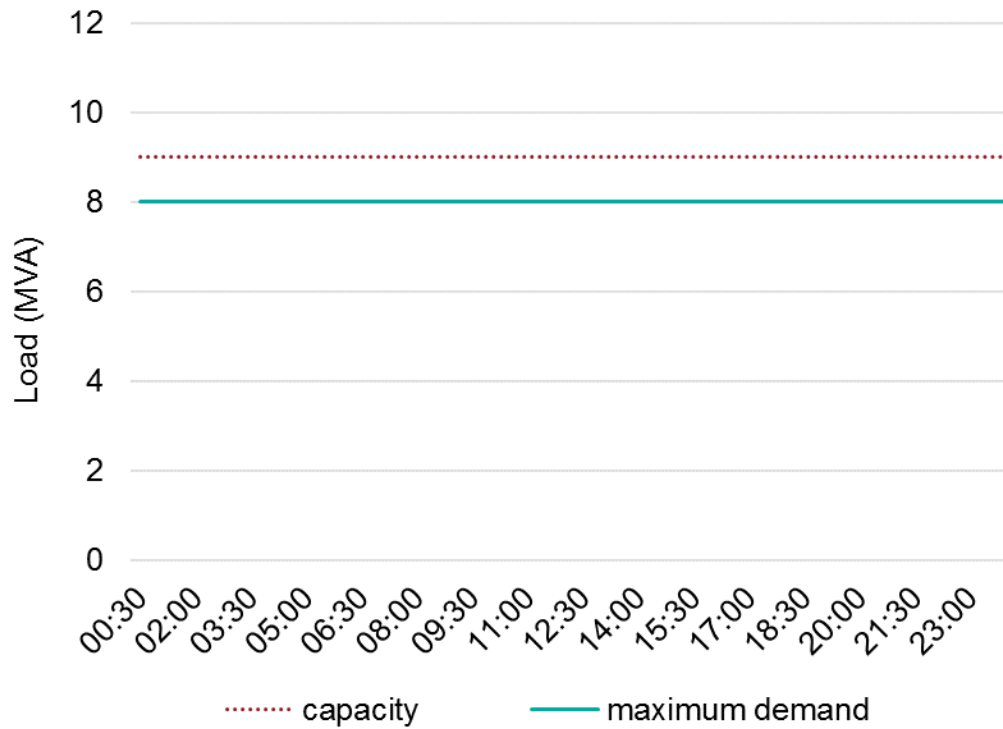
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Network capacity assessment tool



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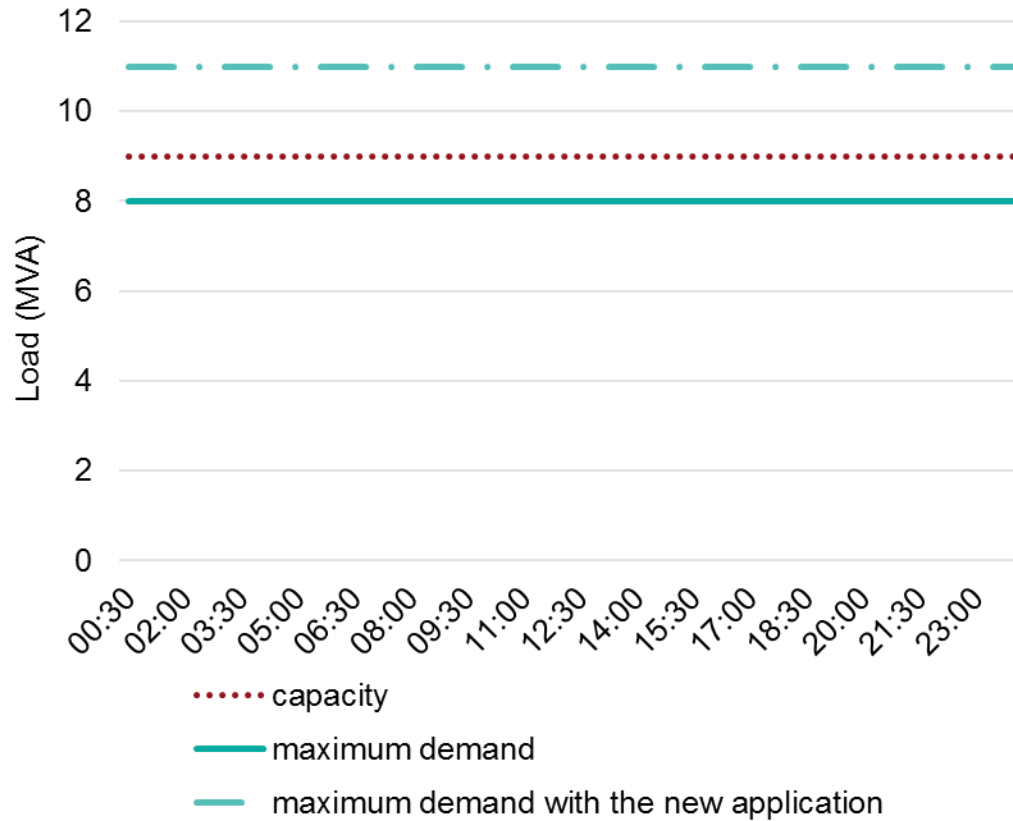
Smart Electric Urban Logistics





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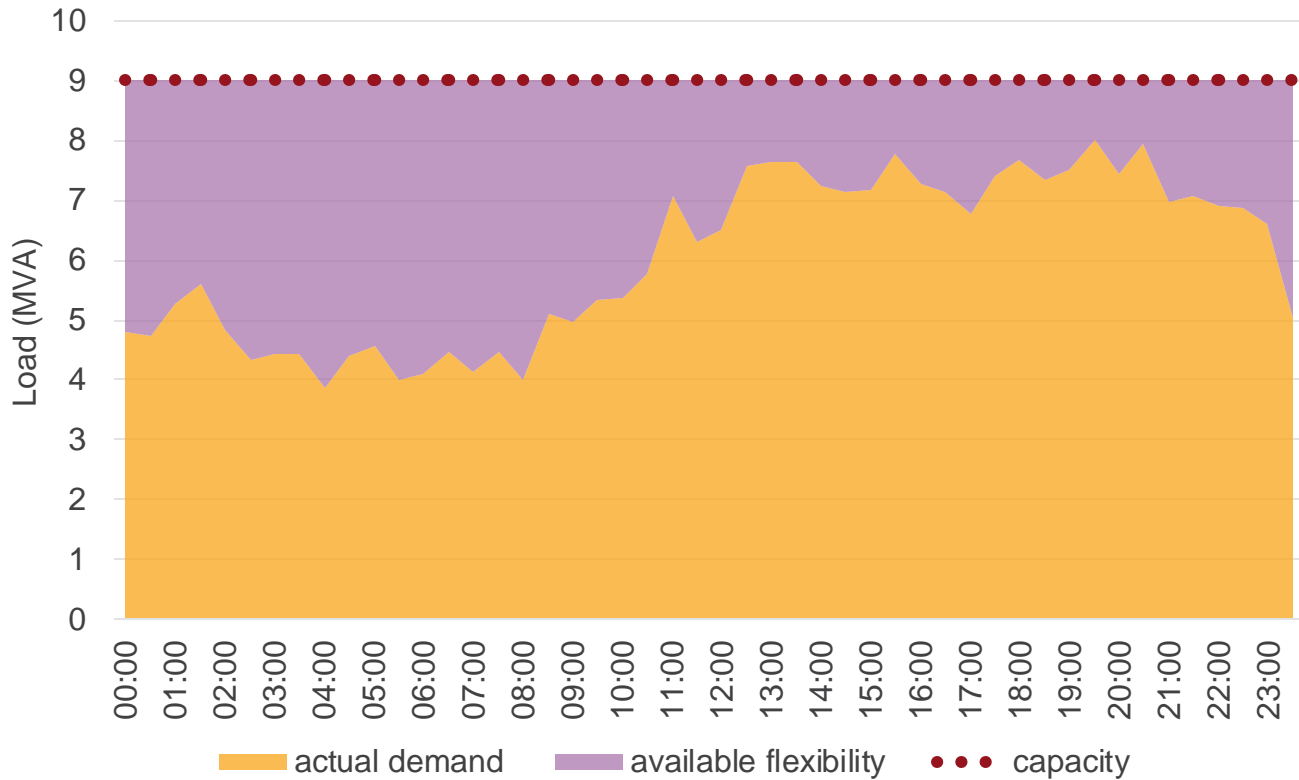
Smart Electric Urban Logistics





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Smart Electric Urban Logistics





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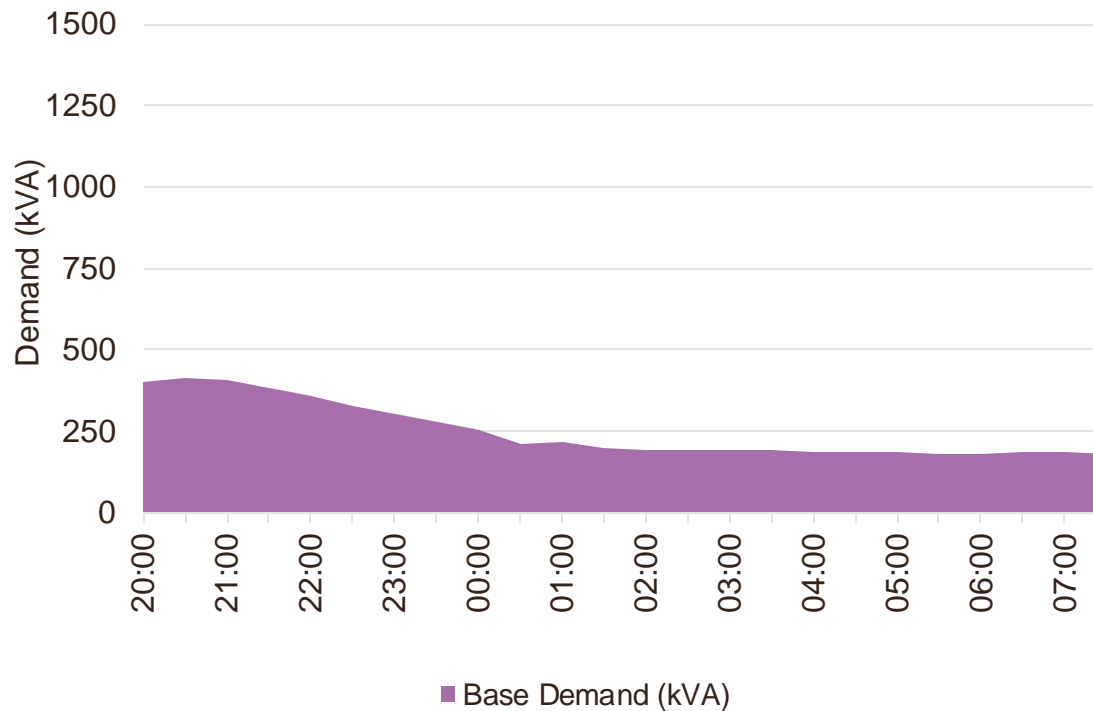
Smart Grid System



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Smart Electric Urban Logistics

Night-Time Demand on 16-17 January 2016

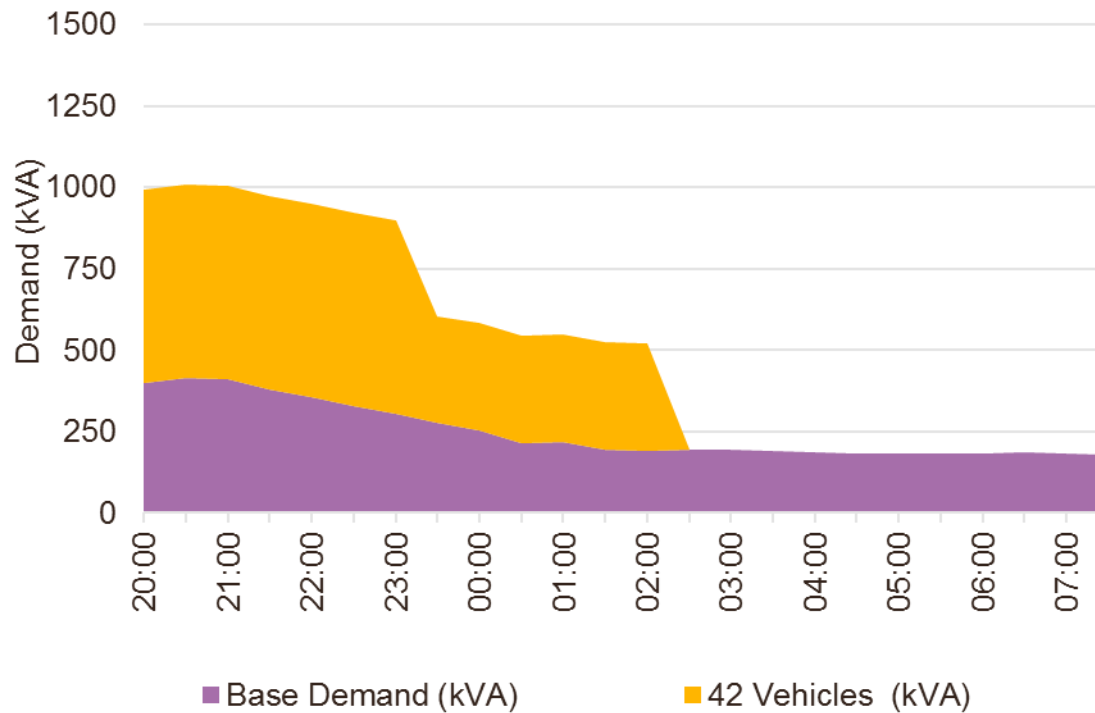




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Smart Electric Urban Logistics

Night-Time Demand on 16-17 January 2016

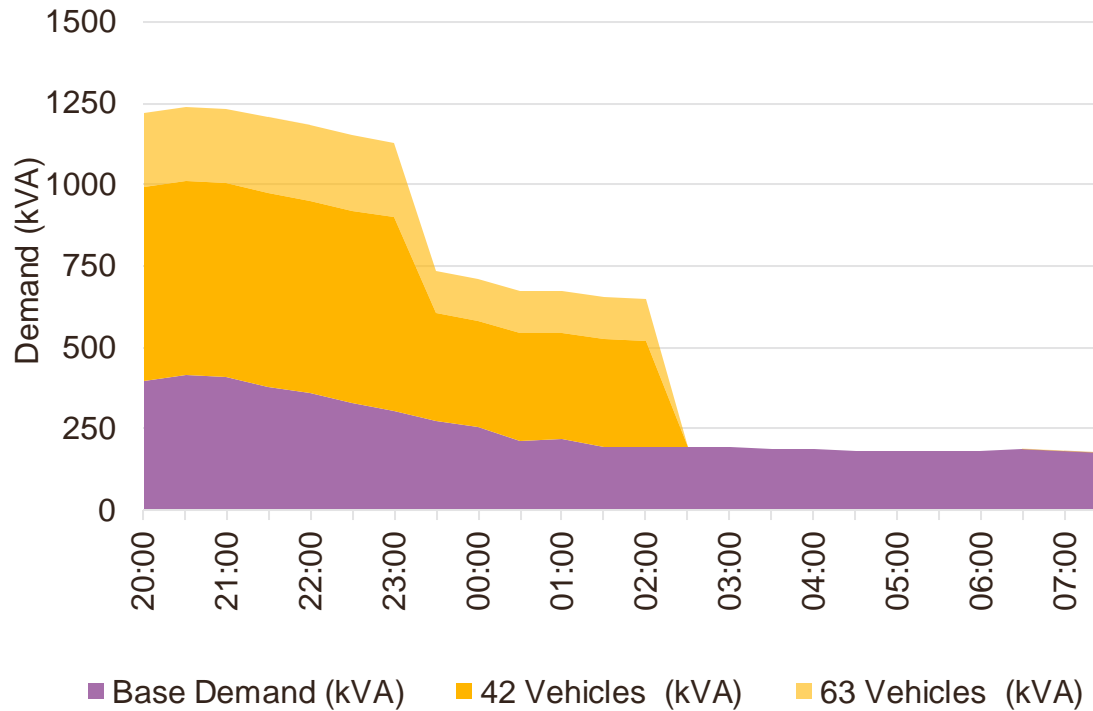




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Smart Electric Urban Logistics

Night-Time Demand on 16-17 January 2016

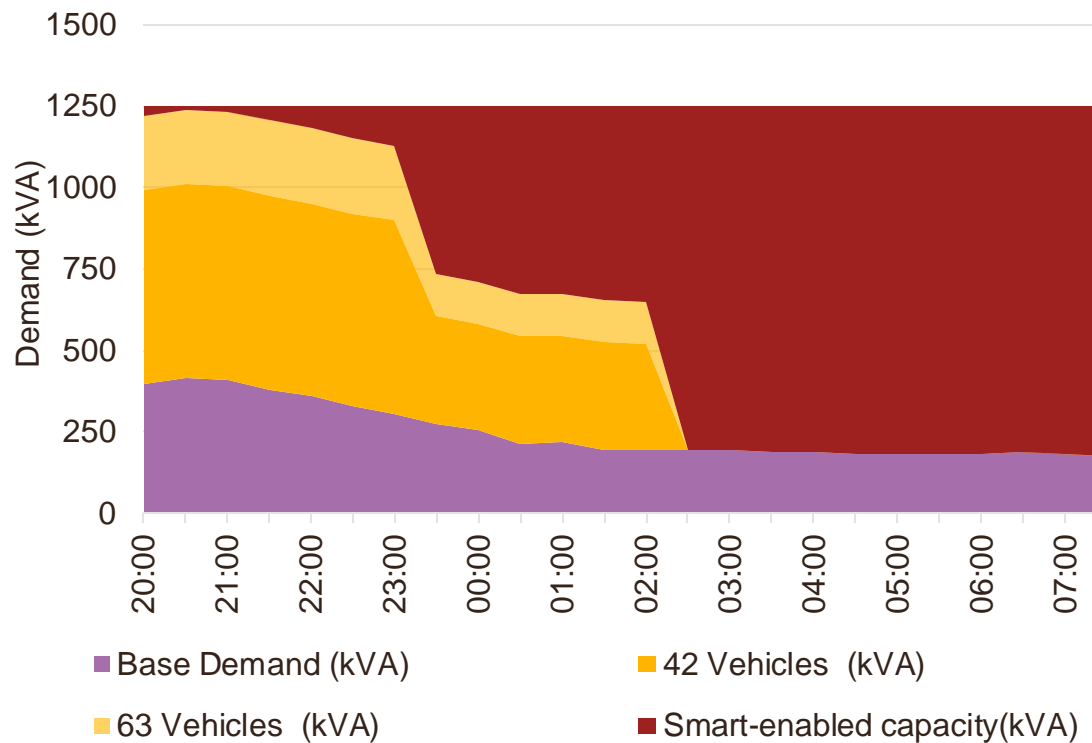




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Smart Electric Urban Logistics

Night-Time Demand on 16-17 January 2016

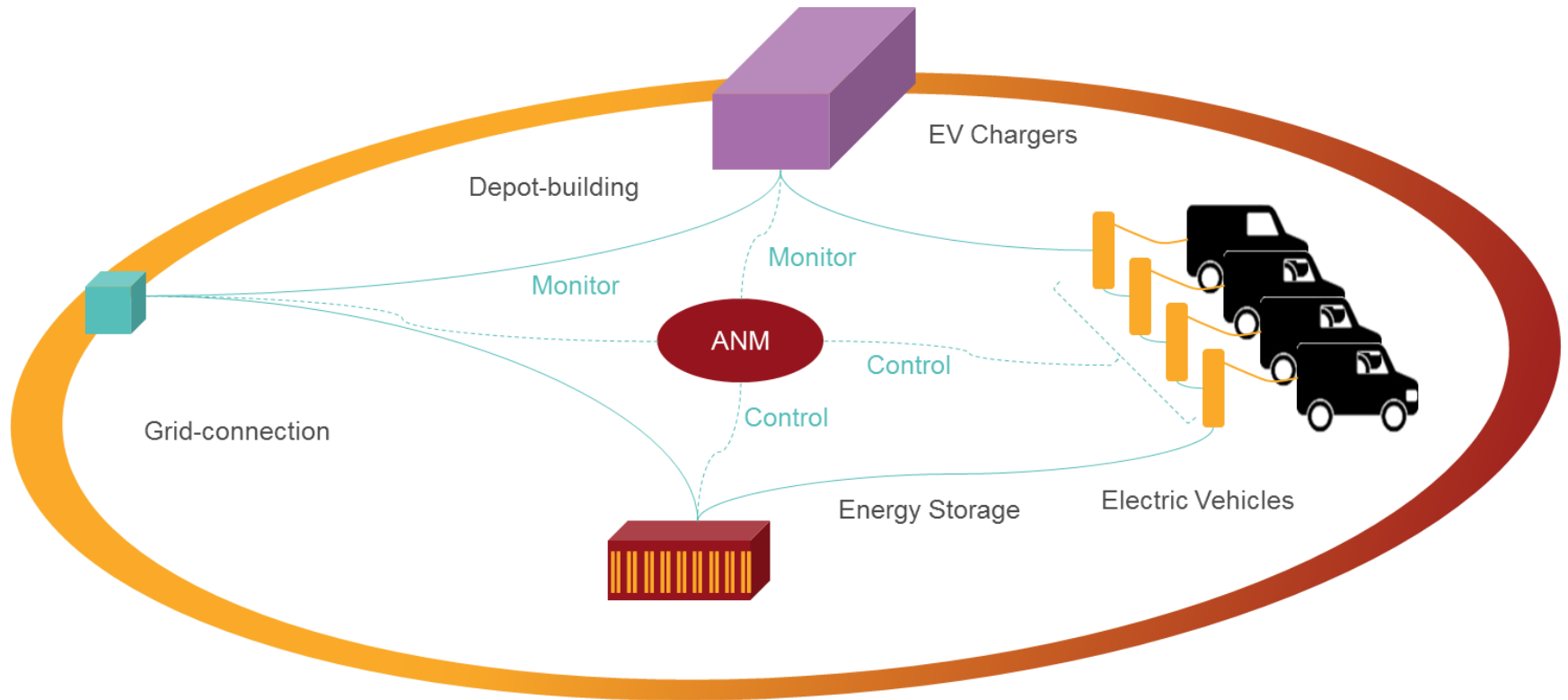




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Smart Electric Urban Logistics

Smart grid system – Architecture





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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





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Thank you

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