

Enabling a future energy transition

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Contents

- Introduction to UK Power Network Services
- What UK Power Network Services does
- Business drivers for energy change
- Technology options & benefits
- Developing a microgrid solution
- Case study – Smart Electric Urban Logistics project
- Conclusions



UK Power Networks Services

We work with **world leaders** in their chosen markets developing, delivering and financing tailored energy infrastructure projects



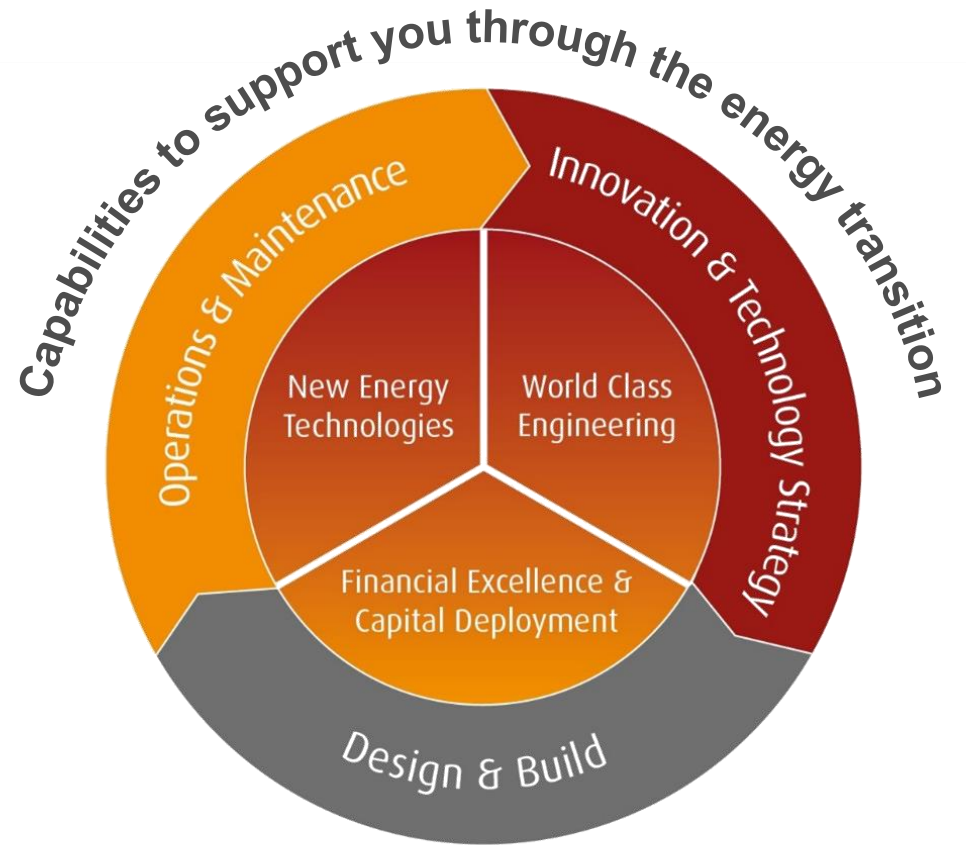
What we do

Our mission is to enable our **clients** to:

- Increase productivity
- Transition to a low carbon economy
- Release value from energy assets

By:

- Increasing resilience
- Increasing security
- Reducing risk
- Aligning power infrastructure to business goals
- Future-proofing infrastructure



Business drivers for energy change

Cost

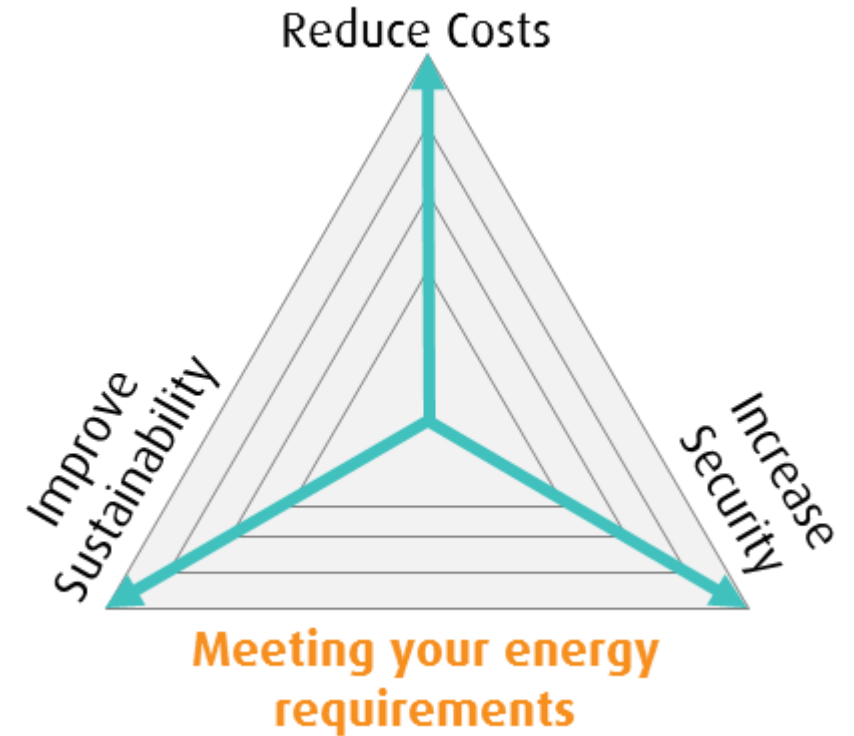
- Business growth
- Asset electrification
- Increasing energy costs
- Asset utilisation
- Network efficiency
- Integration of new technologies (e.g. EVs)

Security

- Business disruption
- Transients
- Outages
- New business/load growth

Sustainability

- Renewable energy sources optimisation
- Reduce carbon footprint



Technology options & benefits

There are **multiple options** in the market that can assist your business targets and vision. Each technology can add value in your business by **reducing energy costs, improving security** and **reducing carbon footprint**.

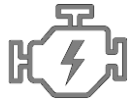
Active network management



Electric vehicles



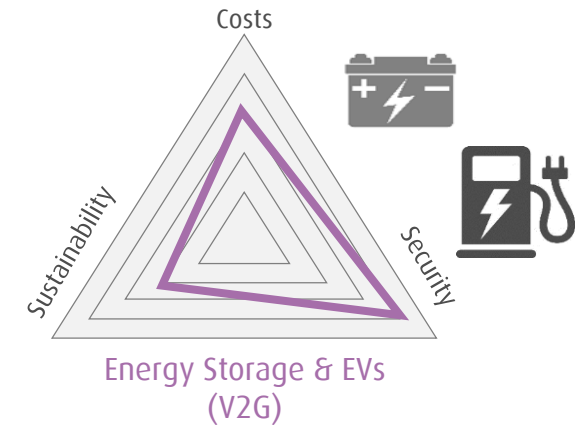
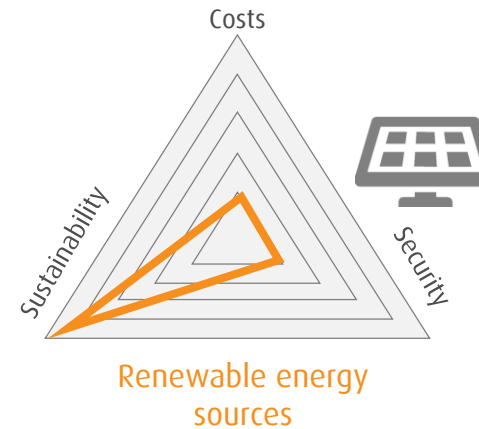
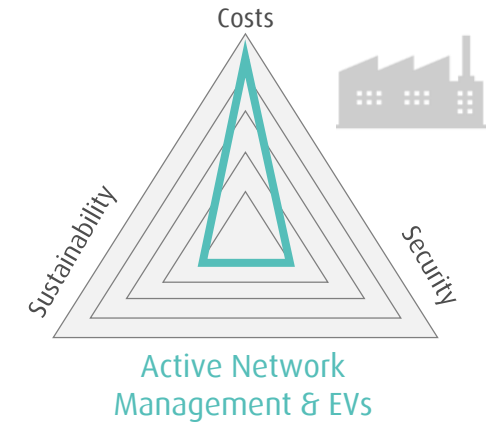
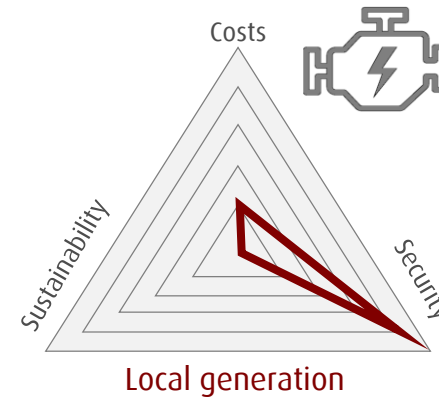
Local generation



Renewable energy sources



Energy storage



Developing a microgrid solution

Maximizing the value of all **embedded technologies** through a bottom-up aggregation

Active Network Management

Reducing/Increasing flexible demand during peak hours

Solar PV Generation

Renewable generation
Reduced CO₂ emissions

Energy storage

Local balance, resilience, external revenue streams



Energy management & control

Real time control and optimal dispatch

EV charging & V2G

Renewable generation
Integrated parks, bi-directional power flows

Embedded generation, CHP

Autonomy, resilience, back-up generation



Case study – Smart Electric Urban Logistics (SEUL)

Project summary:

Develop and deliver a system that will enable the electrification of a 170 vehicle fleet at the UPS site in Camden, London and investigate timed distribution network connections.

The project is funded by the Office of Low Emissions Vehicles (OLEV) in partnership with Innovate UK.

Project drivers:

- Business growth
- Sustainability targets
- Policy & legislation



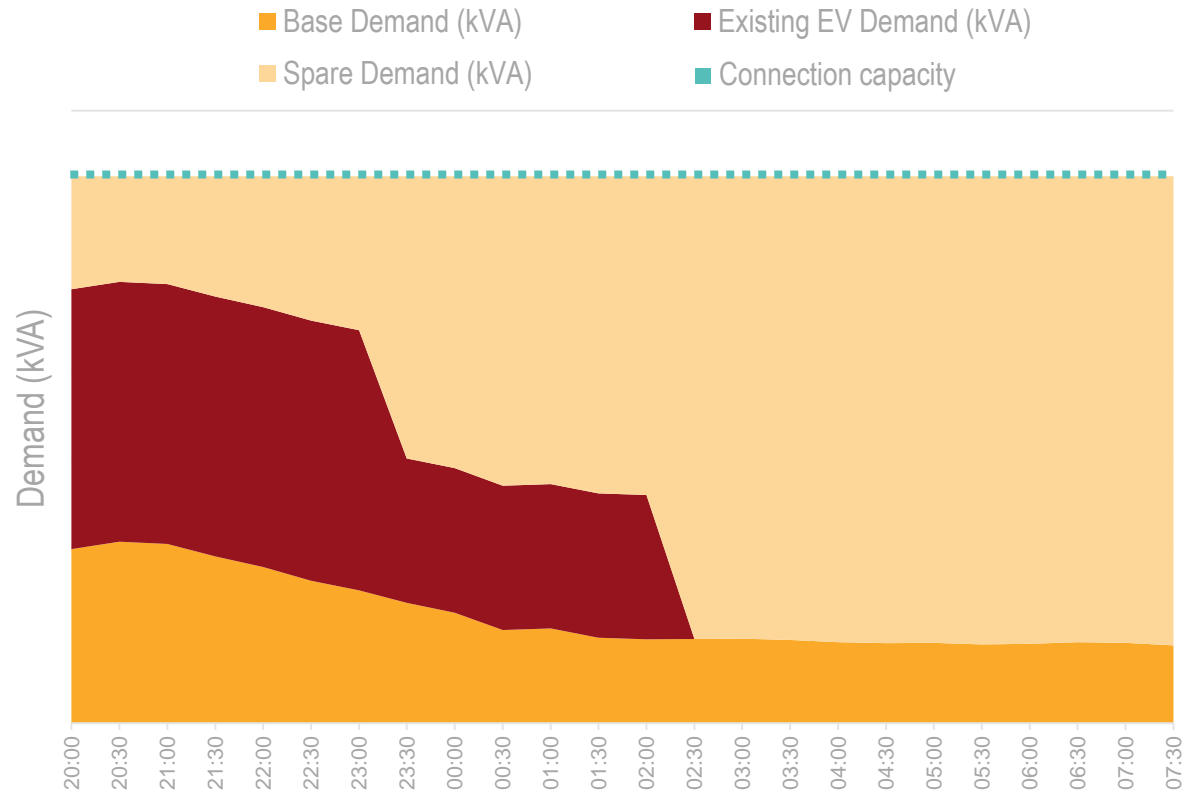
Ultra Low Emission Zone

The Ultra Low Emission Zone (ULEZ) is an area within which all cars, motorcycles, vans, minibuses, buses, coaches and heavy goods vehicles (HGVs) will need to meet exhaust emission standards (ULEZ standards) or pay a daily charge to travel.



SEUL – System requirements

- Enable the electrification of 170 vehicle fleet without any further distribution network reinforcement
- High system availability
- Minimal business disruption
- Delivery period aligned with the Innovate UK requirements
- Economic & environmental friendly
- Future-proof



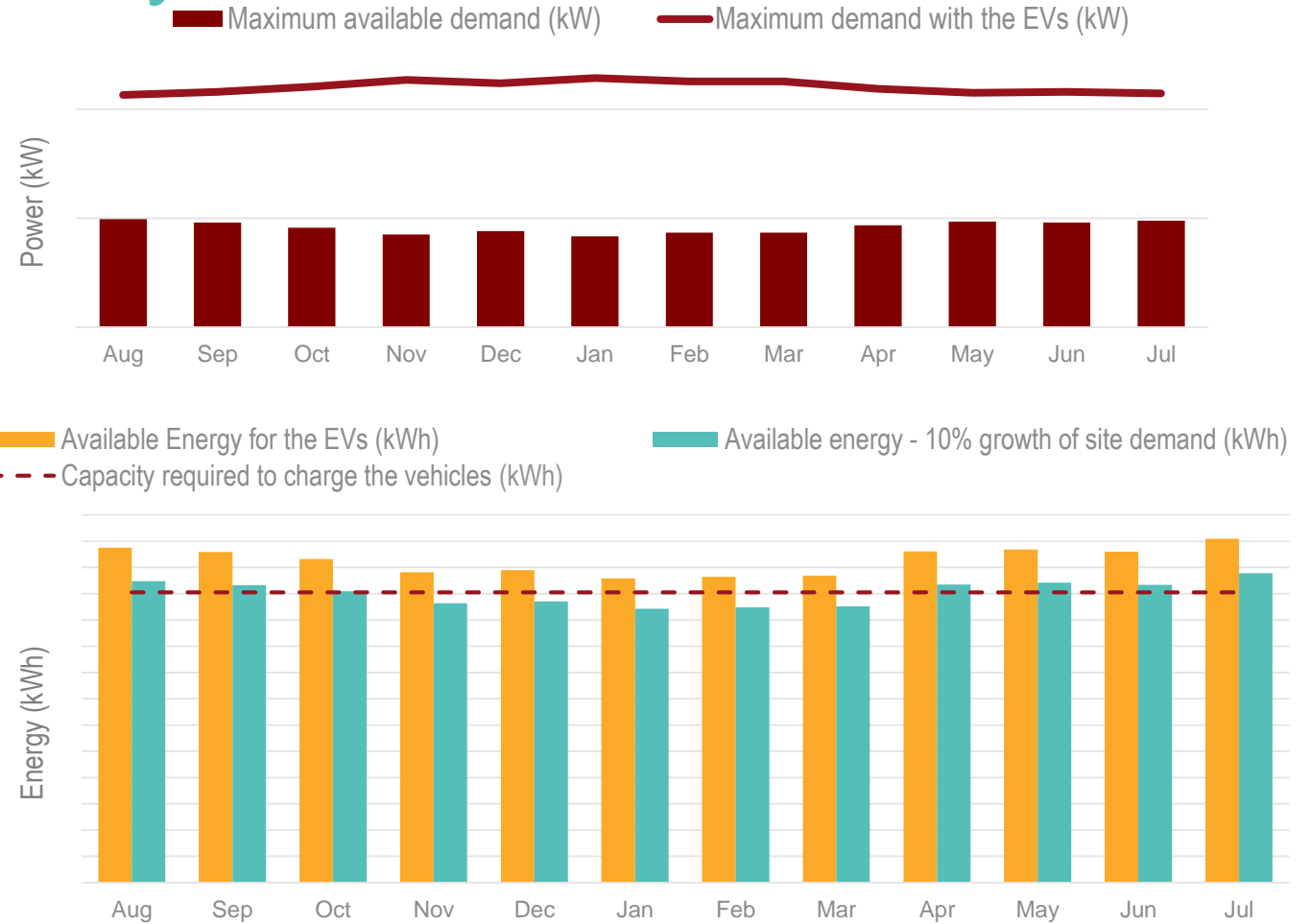
UPS site demand profile during a January 2016 night



SEUL – System options analysis

Options:

- 1.a Reactive static smart EV battery charging
- 1.b Reactive dynamic smart EV battery charging
2. Proactive smart EV battery charging
- 3.a Static smart EV battery charging and energy storage
- 3.b Dynamic smart EV battery charging and energy storage
- 3.c Proactive smart EV battery charging and energy storage
4. Smart EV battery charging and energy storage, including route and multiple locations consideration



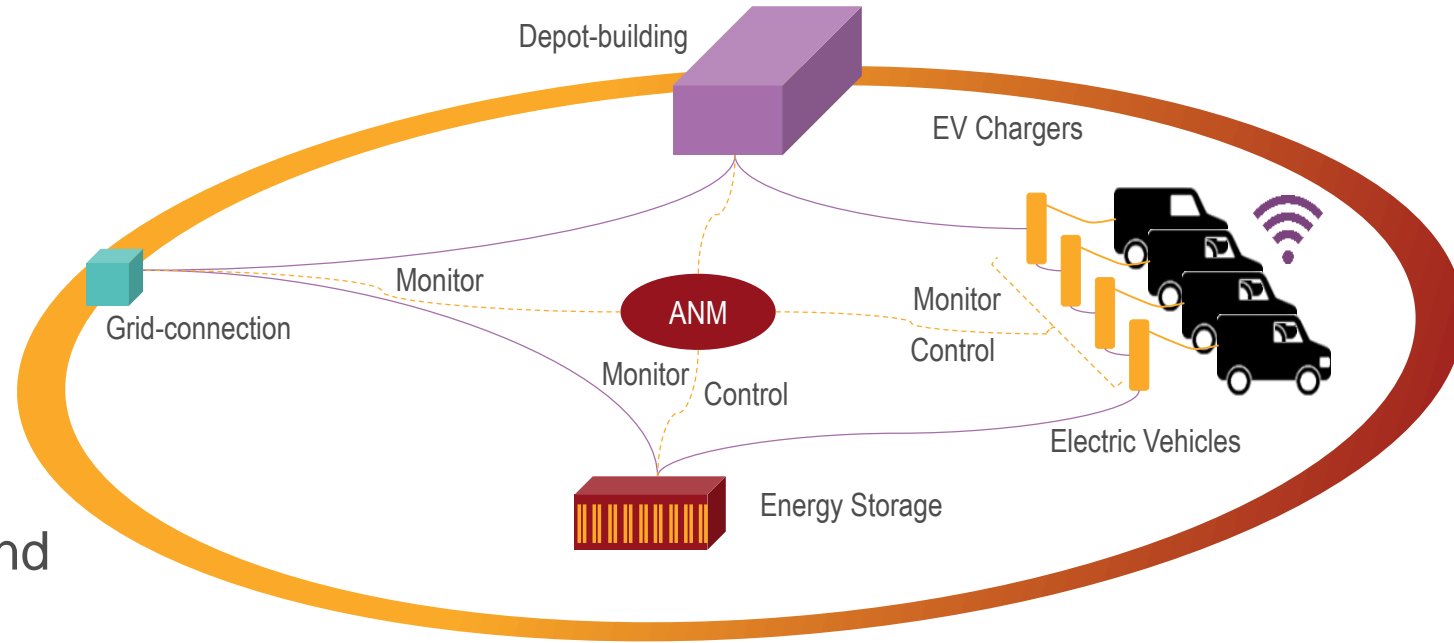
SEUL – Preferred solution

The preferred solution includes the specification, design, development and installation of a **microgrid solution** that integrates the following technologies:

- Active Network Management (ANM)
- Energy Storage

Core functionality:

The system monitors the total onsite demand and during high-peak periods dynamically dispatches an **Energy Storage System** and/or reduces the charging output of the connected **Electric Vehicles** to retain demand below the capacity limit.



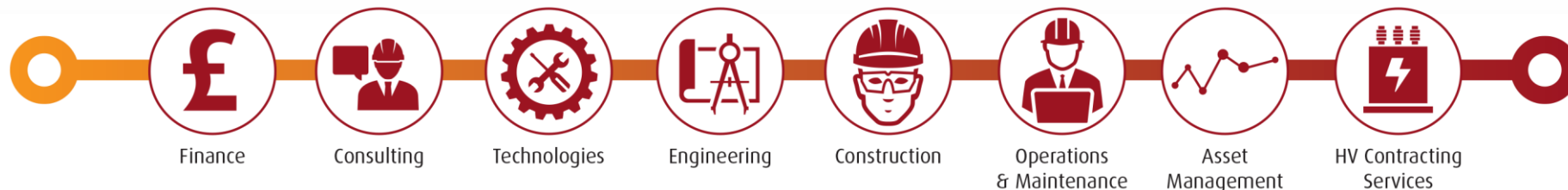
SEUL – Project status and next steps

- Project is currently underway and the system is due to be **delivered in December 2017**
- **Extended system tests are currently carried out** using emulators, to evaluate the system's performance and software's resilience
- **Pre-trial system tests** will last until March 2018
- **One year trial period** starts in April 2018 and is concluded in March 2019



Conclusions

- Each organisation has different drivers, priorities and requirements when investing in energy infrastructure projects
- While individual technologies add value in your business their benefits are maximized when these solutions are integrated and aggregated in a microgrid solution
- Businesses such as UPS are now considering new, innovative solutions instead of traditional approaches and integrating them into Business as Usual processes
- There is not a fit-for-all solution when developing smart infrastructure projects



Thank you!

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