

7th Smart Grids & Cleanpower 2016
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The potential of energy storage in the UK

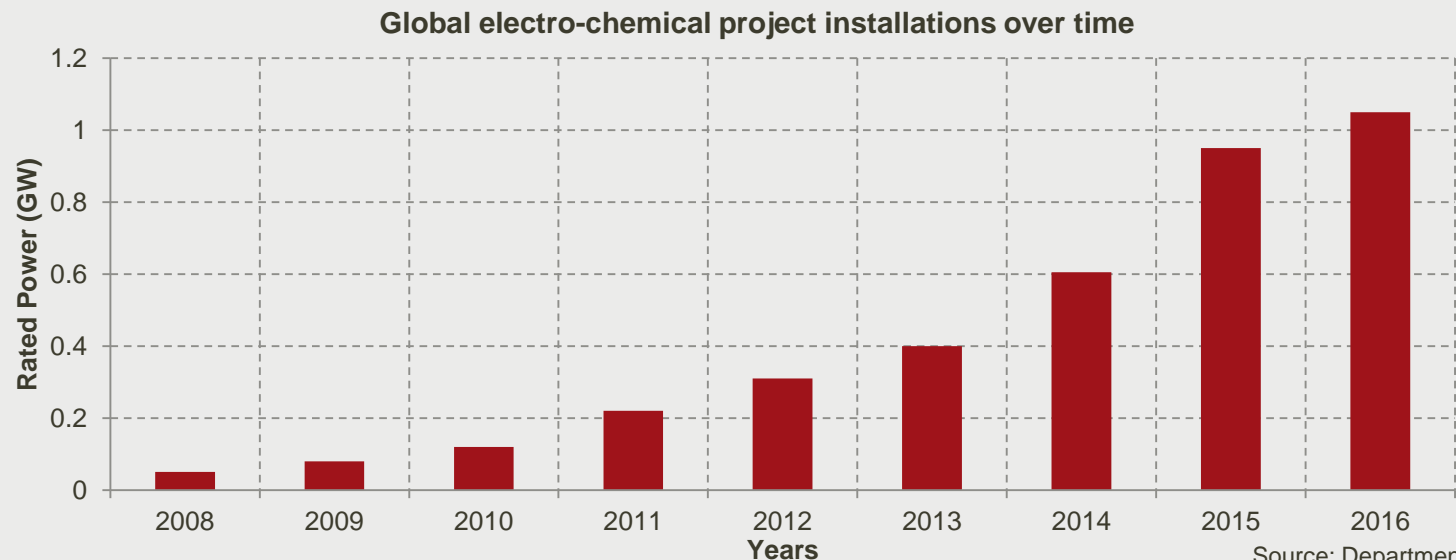


Introduction

Energy Storage has been experiencing a high uptake in the last 2 years

The reasons for this are:

- Maturity of the Lithium-Ion technology
- Battery costs decreasing as a result of the mass production for the automotive industry
- Integration of large renewable energy generation into power systems
- Electricity market price spikes during peak hours



Source: Department of Energy (DOE)

UK market - Overview

UK Market is one of the leaders in Energy Storage development in the world

- Most of the projects were funded by Ofgem through the Low Carbon Network Fund
- In September 2015, National Grid (the Transmission System Operator in GB) launched the Enhanced Frequency Response (EFR) service
- UK Power Networks received by April 2016 **9GW** of energy storage applications
- Strong interest from the commercial/industrial sector for applications behind the meter

Electrochemical Energy Storage Systems in the UK



Why Energy Storage?

- Very fast response (less than 1 second)
- Long duration (based on energy capacity)
- Active and Reactive Power capability
- Fully controllable and dispatchable asset
- Energy forecasting, scheduling and optimisation capabilities
- Can provide different services simultaneously
- Mature, reliable and effective technology
- Enabler to low carbon transition



Use of storage – Different applications

Customers



Today

- Arbitrage (tariff management, solar matching)
- EV charging
- Emergency/backup
- Voltage support

Future

- Smart energy management

Distribution



- Reinforcement deferral
- Reactive power support
- Voltage control

- Flexibility products
- Microgrids
- Emergency CML/CI reduction

Transmission



- Frequency response
- Reserve
- Triads

- Constraint management
- Reactive power support

Supply



- Portfolio Balancing
- Price arbitrage
- Hedging/Tolling

Aggregators



Create customer portfolio and offer services to all parties

Stakeholders



DNO owned

- Defer reinforcement
- Improve power quality
- Voltage control
- Provide ancillary services to the TSO
- Improve network's resiliency
- Triad avoidance
- Tolling/arbitrage

3rd party – grid scale

- Provide ancillary services to the TSO/DSO
- Triad avoidance
- Tolling/arbitrage

3rd party – commercial/industrial

- Improve power quality
- Improve network's resiliency
- Voltage control
- Enhance benefits from embedded generation
- Provide ancillary services to the TSO
- Reduce electricity costs
- Demand shift/arbitrage

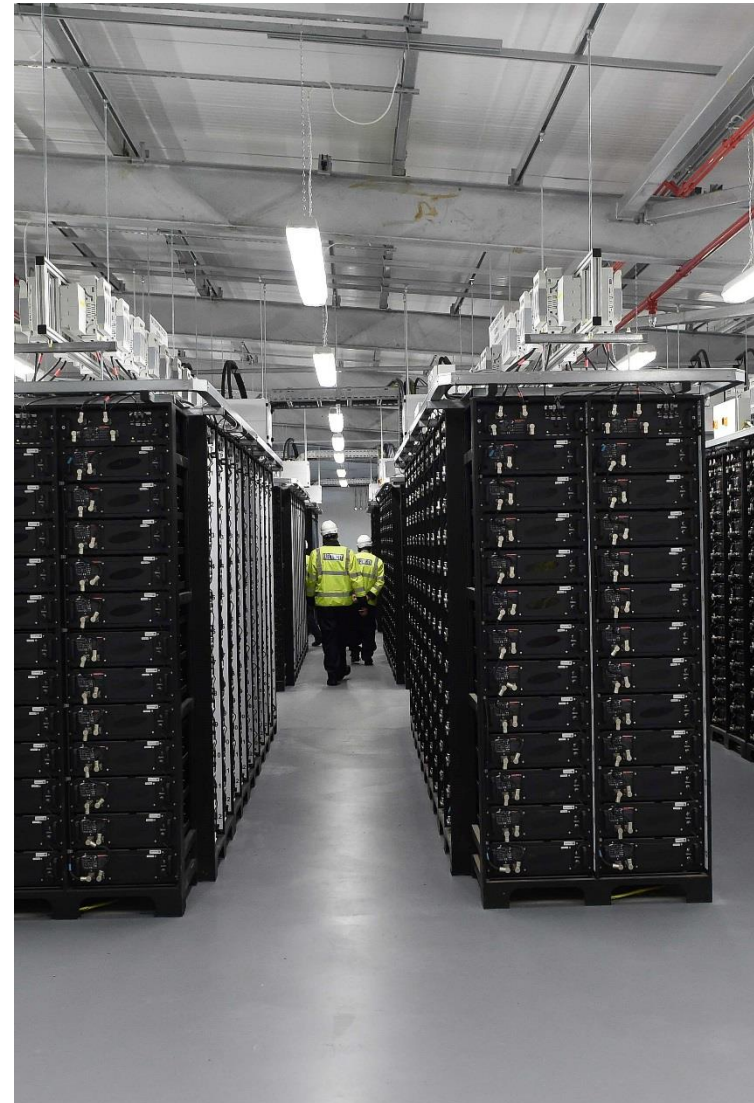
Smarter Network Storage Project



- Smarter Network Storage is an Energy Storage Solution (ESS) rated at 6MW/7.5MVA/10MWh, located in Leighton Buzzard
- £13.2m Low Carbon Network Fund funding; £4.0m investment from UK Power Networks

Outcomes

- Demonstrated multi purpose application of Energy Storage across full value chain
- Quantified business model for Energy Storage multiple revenues can be “stacked” to improve business case
- Identified regulatory barriers for an energy storage uptake in the UK



UK Power Networks Services



- UK Power Networks Services is owned by Cheung Kong Infrastructure (CKI)
- We are specialising in Power Systems for critical electricity network infrastructure
- We own and operate and maintain the HV networks of Heathrow, Stansted, Gatwick and City airport, delivering first-in class services
- We work together with large electricity consumers to assist them to achieve their sustainability and energy efficiency goals



**Distribution
Network
Operator**



**Unregulated
business**

Full project lifecycle capability



Our core strengths

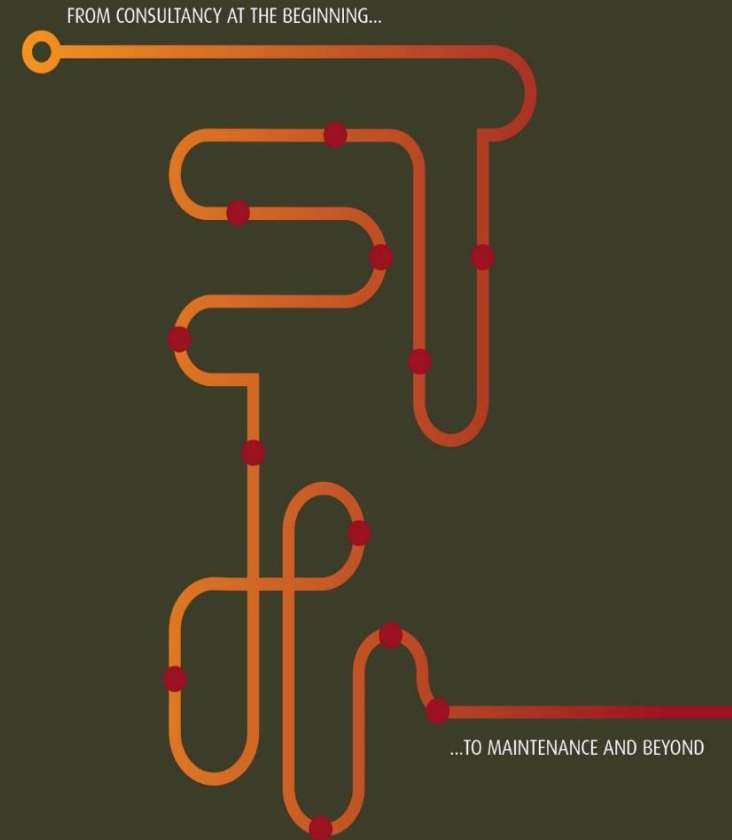


A compelling proposition – full project lifecycle capability

We have the scale, expertise and experience to successfully deliver every facet of your project from inception to conclusion.

Putting your electrical network assets in our safe hands allows you to:

- Focus on your core business
- Rely on certainty of cost and performance
- Plan for the future



www.ukpowernetworksservices.co.uk

Thank you

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