Webinar
Cara Blockley
Low Carbon Projects Manager
Webinar format

30 minutes presentation

10 minutes questions & answers

Submit written questions online during the webinar
Agenda

- Introduction
- Technology
- Trials & customer engagement
Our smart grid programme

Leading work on developing smart solutions

Deliver value from existing assets

Customer choice

Three flagship products

£30 million

C2C
Capacity to Customers

CLASS
Customer Load Active System Services

SMART STREET
Smart Street overview

Combines innovative technology with existing assets ...

... to enable networks and customers’ appliances to work in harmony

Low carbon ● Lower bills ● Faster LCT adoption ● Less disruption
Voltage regulation

Historic networks have no active voltage regulation
Problem - LCTs create network issues

Drift range

LCTs rapidly surpass voltage and thermal network capacity
Smart Street – the first intervention

- Voltage stabilised across the load range
- Power flows optimised
- Low cost
- Quick fit
- Minimal disruption
- Low carbon
- Low loss
- Invisible to customers

Low cost • Quick fit • Minimal disruption • Low carbon • Low loss • Invisible to customers

Voltage stabilised across the load range • Power flows optimised
Smart Street benefits

Now we can stabilise voltage
We can set the voltage level lower
This will lead to:

- Reduced demand
- Reduced customer energy consumption
- Maximised DG output

How much could customers save?

<table>
<thead>
<tr>
<th></th>
<th>GB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinforcement savings via DUoS</td>
<td>£330 over 25 years</td>
</tr>
<tr>
<td>Reduced energy consumption, 2013 (from CVR ≈ 3 - 7%)</td>
<td>£15 - £30 pa</td>
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<tr>
<td>Maximise DG output (from maximising Feed In Tariff income)</td>
<td>£70 pa</td>
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Efficient network solutions ● Energy savings ● Carbon benefits
Existing radial network

- Diversity between feeders is untapped
- Fuses not suitable for meshing of LV networks
- Customers’ needs invisible to the network
- Demand and generation levels limited by passive voltage control systems

- Reliability driven by fix on fail
How the network will change

Builds on C₂C and CLASS • Storage compatible • Transferable solutions
Technology – Spectrum

Measures, optimises and responds

CVR and losses benefits unlocked

Oversees network and customer needs

Builds on CLASS smart voltage control
World leading LV vacuum circuit breaker

Advanced measurement and protection capability

Safe LV interconnection, live monitoring and control

Improves supply reliability and restoration through fault management and detection
LYNX

LV switch

Allows active network meshing and un-meshing

Advanced monitoring capabilities

Ability to close and open the circuit at the link box locally or remotely
What customers will see – LV capacitors in street furniture

80 LV capacitors

One on each closed ring

Tried and tested
What customers will see - HV capacitors

<table>
<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td>4 ground mounted HV capacitors</td>
</tr>
<tr>
<td>Housed in containers but not on street</td>
</tr>
<tr>
<td>4 pole mounted HV capacitors</td>
</tr>
<tr>
<td>Installed similar to pole mounted transformers</td>
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</tbody>
</table>
Smart Street trial areas

- 6 primary substations
- 11 HV circuits
- 38 distribution substations
- 163 LV circuits
- Around 62,000 customers
- 3 selected primary substations in CLASS

Locations:
- Wigton & Egremont
- Wigan & Leigh
- Manchester
### Smart Street trial design

<table>
<thead>
<tr>
<th>Time Duration</th>
<th>Techniques</th>
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<tbody>
<tr>
<td>Two years</td>
<td>LV voltage control</td>
</tr>
<tr>
<td>One week on</td>
<td>LV network management and interconnection</td>
</tr>
<tr>
<td>One week off</td>
<td>HV voltage control</td>
</tr>
<tr>
<td>One year’s worth of data</td>
<td>HV network management and interconnection</td>
</tr>
<tr>
<td>To be designed to avoid placebo affect</td>
<td>Network configuration and voltage optimisation</td>
</tr>
<tr>
<td>Five trial regimes to test full effects</td>
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</tbody>
</table>

- LV voltage control
- LV network management and interconnection
- HV voltage control
- HV network management and interconnection
- Network configuration and voltage optimisation
Customer experience

- Customers will see increased activity while equipment is installed.
- Possible planned supply interruptions due to equipment installation.
- Higher number of faults of shorter duration.
- Less time off supply.
Customer engagement

To prove that customers will not perceive a change to their electricity supply

Customer engagement using multiple channels

Engaged customer panel to develop comms materials

Project leaflet for all customers in trial areas

Draw on information from CLASS and other projects

Qualitative research – three engaged customer panels

Feedback via customer contact centre, website and SMS

Findings published on dedicated project website
Smart Street summary

- Faster LCT adoption
- Less disruption
- Less embedded carbon
- Optimise energy and losses
- Re-usable technology

Carbon Footprint: CO₂

Challenge

- Combine into one end-to-end system
- Optimisation

Low Risk

Benefit

- Lower energy bills
- More reliable supply
- Reinforcement savings

- Maximise use of existing assets
- Leverage C₂C, CLASS and worldwide learning
- Configure off the shelf technology
QUESTIONS & ANSWERS

Craig McNicol, Future Networks Programme Delivery Manager
Cara Blockley, Low Carbon Projects Manager
Kate Quigley, Future Networks Customer Delivery Manager
Damien Coyle, Future Networks Technical Engineer
Daniel Harber, Future Networks Trials & Research Engineer
Thank you for your time and attention
Webinar
31 July 2014