



SMART STREET



Paving the way for a smarter network

Our £11.5 million Smart Street project trialled new innovative techniques to stabilise voltage, which could cut up to £70 a year off customers' bills, by making their electrical appliances perform more efficiently.

The project findings showed that Smart Street can deliver energy savings by stabilising and reducing voltage, without affecting our customers' power quality. This could save £44 million for customers in the North West, and £519 million across Great Britain, by deferring expensive network reinforcement, cutting an average customer bill by up to £70 a year.

Smart Street has proved that controlling voltage on our low voltage network brings a number of benefits to customers. It can reduce electricity bills, reduce carbon emissions and will provide more flexible solutions to help us connect low carbon technologies to the network – all without impacting power quality.

Why do we need Smart Street?

To meet the decarbonisation challenge laid down by the Government, our customers are being encouraged to adopt new low carbon technologies such as electric vehicles and heat pumps. Government forecasts suggest that there may be up to a 60% increase in total electricity demand in Great Britain by 2050. In 2017 the UK government announced a ban on new petrol/diesel cars from 2040 which will further encourage customers to buy electric vehicles and help reduce air pollution.

On an estate of domestic properties, changing gas central heating to an electric alternative such as a heat pump and adding a new electric vehicle per property, could result in a total load over six times the peak demand that the network was originally designed for. Without intervention, this scenario would cause voltage levels to drop below statutory limits. Conversely, clusters of new sources of generation on the distribution network such as solar panels (photovoltaic cells) could push voltage above statutory limits.



“Smart Street is 40% cheaper than traditional reinforcement”

Distribution network operators like Electricity North West need to connect these new low carbon technologies to our networks, while maintaining statutory voltages, reducing network losses, managing power quality and helping reduce costs to customers.

What is Smart Street?

Smart Street has delivered a step change in the co-ordination and operation of electricity networks in Great Britain and is the first demonstration of a fully centralised low voltage network management and automation system.

Using new controllable switching devices, called the Weezap and Lynx, integrated into our network management system, and controlled by Siemens Spectrum Power 5 (SP5), Smart Street stabilises voltage and prevents it rising above or falling below statutory limits.

Supply voltage to customers can then be reduced to an optimum level, a technique known as conservation voltage reduction.

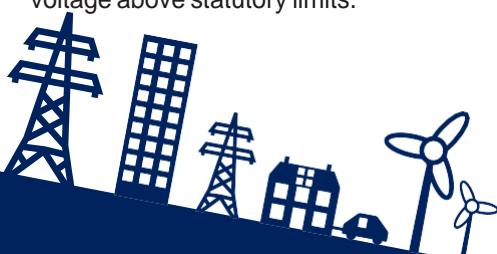
By optimising voltage across high and low voltage networks in this way, Smart Street improves the energy efficiency of customers' electrical appliances, reduces energy bills, and lowers network losses.

It also enables clusters of low carbon technologies to be connected to the network much more quickly, releases capacity up to four times faster and is 40% cheaper than traditional reinforcement.

Smart Street delivers:

- Increased network capacity
- Easier connection of low carbon technologies
- Reduced reinforcement costs
- Improved carbon efficiency
- Reduced overall energy consumption
- Lower bills for customers
- Shorter interruptions to customers' supplies
- Improved service to customers.

The project ran from January 2014 - April 2018.



Smart Street trials

The project involved a series of trials to test Smart Street technology on six primary substations and 38 related distribution substations which serve 67,000 customers.

The primary substations involved in the trial were:

- Egremont, Cumbria
- Wigton, Cumbria
- Hindley Green, Wigan
- Green Street, Wigan
- Denton East, Manchester
- Longsight, Manchester.

During the technology build we installed 498 Weezaps and 126 Lynx devices, 49 end-point monitors, 84 low voltage capacitors, six high voltage capacitors and five on-load tap changing transformers. All of this equipment was integrated into our network management system and was controlled by SP5.

The live trials started in January 2016 and ran for a two-year period using a two-week-on/two-week-off test regime. This enabled us to compare one year's worth of Smart Street data with normal network operation.

We collected and analysed a varied and significant amount of data during the trials which included information on voltage and power quality. This enabled us to quantify the effects of Smart Street on the regional and national electricity networks and assess any impact on service to customers.

Analysis of the data generated by the project showed that implementing these techniques can provide a reduction of up to 10% in energy consumption on the low voltage network and a reduction in high voltage losses of up to 15%.

Engaging with our customers

Understanding whether customers were affected by the method was crucial to the viability of Smart Street. Therefore, we engaged with customers in the trial areas to inform them about the project, its potential impacts and the benefits. Customer focus groups were influential in helping us decide the best way to communicate information about the project and based on this feedback, we distributed a general awareness leaflet to every home and business in the trial region.

Additional focus groups were held during and after the trials to collect qualitative information from customers. The aim of this research was to test if customers observed any changes in their electricity supply when the Smart Street techniques were applied. All the customers confirmed that they didn't notice any changes.



“These techniques can provide a reduction of up to 10% in energy consumption”

Who's involved?

Throughout the Smart Street project we worked with a number of partners and key suppliers who are leading experts in their respective fields of research, technology and customer engagement. Our project partners are listed here and you can find out more about how they supported the Smart Street project on our website.

- Kelvatek
- Siemens
- Impact Research
- TNEI
- The University of Manchester
- Queen's University Belfast
- The Tyndall Centre

THE PROJECT CLOSEDOWN REPORT AND OTHER RELATED REPORTS CAN BE FOUND ON OUR WEBSITE:

www.enwl.co.uk/innovation

Smart Street Roll-out

In November 2019, we were granted an adjustment of £18 million to our ED1 allowance under Ofgem's Innovation Roll-out Mechanism (IRM) to facilitate the roll-out of Smart Street technology within the RIIO-ED1 price control period.

The IRM provides funding to implement proven innovations which will provide carbon benefits and long-term value for money to customers, and which cannot be delivered under any other means within ED1.

We have now started the roll-out of Smart Street technology to 180 distribution substations across our network, targeting areas with a high uptake of low carbon technologies, such as electric vehicles and solar panels, particularly where these overlap with areas of fuel poverty. This will provide benefits for up to 45,000 customers, reducing electricity consumption by 5-8% per year.

In the longer term, this roll-out will save 143,860 tonnes of carbon out to 2050 – this is the equivalent of removing 2,570 cars from our roads every year.

We expect this initial phase of the roll-out to complete in March 2023, following which we will continue the roll-out to the remainder of our network under our RIIO-ED2 business plan.

Network Awards

In July 2020, our Smart Street project was awarded 'Innovation Project of the Year - Electricity' at the virtual [Network Awards](#), despite tough competition from National Grid, UKPN, WPD and Northern Powergrid.

The Network Awards recognise individuals and organisations that have demonstrated exceptional performance in the energy networks space.



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Following in the footsteps of our CLASS project, Smart Street is another fantastic example of transferring innovation into business as usual, which will deliver significant financial and environmental benefits for our customers.

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Steve Cox, Engineering and Technical Director