ADVERTORIAL

SMART STREET

Creating efficient distribution networks

electricity north west

Bringing energy to your door

Electricity North West's Smart Street project is now at the half way point and ready to report on progress. The £11.5 million project is trialling innovative voltage control techniques to enable networks and customers' appliances to perform more efficiently and make it easier to adopt low carbon technologies onto the electricity network.

Electricity North West, the company who operates the electricity network in the North West of England, is leading the way in developing smart solutions to meet the UK's future energy challenges.

Smart Street is the first demonstration in Great Britain of a fully centralised low voltage network management and automation system. Its new voltage control techniques configure and optimise voltage on high voltage (HV) and low voltage (LV) networks in real time using bespoke Spectrum 5 software developed by Siemens. These techniques are intended to stabilise voltage and minimise the impact of low carbon technologies. Once voltage is stabilised, it can be lowered to increase the efficiency of electricity networks and customers' appliances and therefore deliver energy savings, a technique known as conservation voltage reduction (CVR).

Project trials

A range of new voltage management technologies have been installed in the company's main control room, at six primary substations and at 40 associated distribution substations. The trial sites serve around 67,000 customers in Manchester, Wigan, Wigton and Egremont. These sites were chosen as they are representative of the company's geographic area and different customer types.

The trials began in January 2016 and will take place over a two-year period so that one year's worth of Smart Street data can be compared with normal network operation. This will enable the project team to calculate the overall benefits of Smart Street and understand any impact on customers.

Findings to date

Since the trials went live the company has been extracting system data which is passed to its academic partners for analysis. Later this month the project's initial academic reports will be published which will assess the benefits of the Smart Street techniques and suggest possible modifications based on the first 12 months of data.

The first report looks into the potential benefits of CVR on the trial networks. CVR impact is measured as the percentage of energy savings resulting from a one per cent reduction in voltage. Initial results suggest that a CVR factor of 1% should be achievable on both the HV and LV networks. This report also looks at the benefits of time limited ring operation on the LV networks as opposed to running the circuits permanently meshed. The trials to date suggest that using ring operation only at peak times offers effectively the same benefits as running the network meshed all the time.

The second of the reports looks at the impact of lowering voltage on power quality. As part of this study the project team are investigating observed reverse power flows recorded by a power quality monitor fitted at one of the trial sites. Analysis of the data will also allow the team to assess whether any modifications to the Spectrum 5 software are necessary. No power quality issues have been identified during the first 12 months of the trials.

The suite of reports also includes studies on the carbon impact and the cost benefit analysis of Smart Street compared to traditional reinforcement methods. These reports will introduce the methodologies to be used in the final assessments at the end of the project.

Customer engagement

A key hypothesis of Smart Street is that customers will not perceive any change in their electricity supply as a consequence of the trials. Before the technology installation began, the company launched a campaign to inform customers in the trial areas about the project. A customer focus group was held to help decide the best way to communicate information to the 67,000 customers served by the trial circuits.

The project team has worked closely with contact centre colleagues to ensure that any power quality issues that could potentially be linked to the trials are captured; to date, none have been reported. The next phase of research involves a series of targeted focus groups to collect qualitative information, to understand whether customers have observed any changes in their electricity supply as a result of the trials. The first of these were held in January 2017 and demonstrated that customers on the trial circuits have not noticed any changes in power quality since the trials began. Further focus groups will take place after the trials are completed with a detailed report of the findings due to be published in April 2018.

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