

NETWORKS

Making local electricity data openly available

A new project led by EA Technologies and Western Power Distribution is looking to improve local electricity network efficiency through access to data. Richard Potter writes.



Energy, and specifically electricity, has a key role in assisting the transition to a low carbon economy – as generation decarbonises, and through supporting heating and transport demands as these shift towards electricity.

Britain has about one million low voltage (LV) feeders, which take power from substations to end consumers, and LV networks are expected to see radical change as customers alter their behaviour and requirements in the shift to this low carbon world.

We've seen the start of this transition over the last five years, with new solutions – supported by Ofgem network innovation funding mechanisms – starting to appear on these otherwise passive LV networks. However, each of these solutions is built on a different proprietary platform. As each substation has slightly different needs, there is a risk of lots of competing systems being deployed, each addressing their own, highly specific purpose. This could result in inefficiency, both in terms of capital and deployment costs, and could ultimately lead to a raft of stranded assets as the new needs of the network outstrip the pace of change of the infrastructure

that supports it.

A new initiative, OpenLV, aims to solve this problem by making local electricity data openly available. The LV-CAP platform, provided as part of the OpenLV project, is opening up information about the capacity of local electricity networks and allowing third parties to develop their own apps, using the data provided by the project, all on one standard platform.

What's the idea?

The LV-CAP platform is designed to monitor electricity substation performance and electricity demand, and to integrate with third-party products to enable network control and automation, as well as increased customer participation in network management. The platform can host applications provided by a diverse set of developers, such as community groups, businesses and universities, providing a variety of services to network operators, communities and the wider industry.

The OpenLV project is funded by Ofgem through the Network Innovation Competition (NIC) and is led by EA Technologies, a third-party innovation technology company. It is being delivered in partnership

with Western Power Distribution (WPD). Key project suppliers include Nortech, Lucy Electric GridKey, the Centre for Sustainable Energy (CSE) and Regen.

The project will see software being installed in 80 LV distribution substations located in WPD licence areas – the Midlands, the South West and South Wales. The software could ultimately be deployed across the entire electricity network.

It will use three approaches to demonstrate the platform's ability to provide benefits to the network owner, customers and service providers:

1. Improving the capacity of the local electricity network

The OpenLV software platform is designed to measure and manage activity within a substation, and will allow it to temporarily link with other substations to increase capacity, or release capacity, through active management of the local electricity network via new software applications, if required.

This will also improve system security, as temporary load issues can be mitigated by sharing load between substations until the demand decreases. By doing this, the platform will reduce the need for network reinforcement and the associated costs of this.

2. Community benefit

The OpenLV software platform can be used to provide data about the local electricity network to individual customers or groups, with the aim of providing benefit to end customers. The project has invited people to come up with novel ideas for using this data, either in the form of an app or in any other way. Submissions from communities have now been assessed and the final group of trials have been confirmed.

The selected communities are being assigned a project officer from CSE to help them design and deliver a community engagement process to recruit local users for the apps and maintain ongoing engagement. The community groups will also be assigned a software engineer from CSE's research team to work with them to understand how they want their app to function, and then to

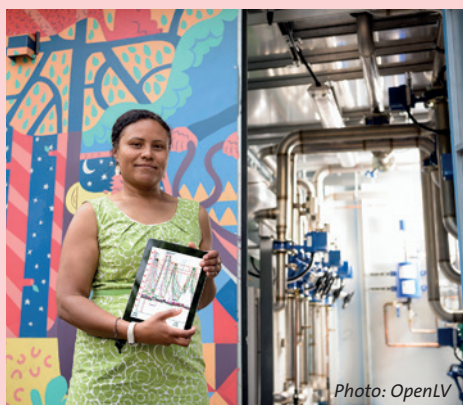
A total of 80 WPD LV substations, such as this one in Bath, will see the software installed

Photo: OpenLV

App potential

Applications, or apps, are one way to utilise and display open data. The OpenLV project could potentially enable the following to be developed:

- Community group apps
 - Get to know my substation app
 - Reducing community costs app
 - Influencing community demand app
 - Community generation app
- Low carbon technologies take-up monitoring
- Real-time thermal rating – transformers and cables
- Demand-side response for managed EV charging
- Automated voltage monitoring and management
 - Maintain statutory limits app
 - Load management app
 - LCT management in response to voltage variation app
- Distributed generation control and automated energy storage control
- Community information alerts



carry out the programming work on the community's behalf. Trials will begin in September this year, once programming is complete.

3. Development of apps

In addition to the ideas for apps being developed by communities, third-party companies are able to develop and release their own apps for the platform. The OpenLV Project team has been inviting industry and academia to come forward with ideas for new apps that can utilise LV network data to provide benefits to Distribution Network Operators (DNOs), community groups, the wider industry and, of course, customers.

But why is it needed?

Currently, electricity network operators have limited information about power flows on local electricity networks. This can act as a barrier to the installation and operation of, for example, electric vehicle (EV) charge points or distributed generation devices. EV charge points will have an impact on local electricity networks, which could, in some cases, require reinforcement to the network to manage clusters of demand.

To help reduce reinforcement costs, network operators are trialling various projects such as OpenLV, which is opening up data information about the capacity of local networks.

OpenLV also has complementary aims to those contained in the recent *Data for the Public Good* report published by the National Infrastructure Commission. This document states that having more information or data about

infrastructure assets enables them to be used more productively, and quotes the direct benefits of UK public sector open data as being worth £8.9bn.

Transport for London (TfL) has already demonstrated that releasing data to the public can save its users time, equivalent to the economic value of between £15mn and £58mn per year. Release of open data by TfL has also supported the growth of London's tech economy to the value of £14mn annually in gross value added, and in over 700 jobs. It has also unlocked new revenue, savings opportunities, and new ways of working at TfL, including a £20mn increase in bus usage, as customers are more aware of services offered.

Who else will use it?

Initially, the OpenLV project will provide access to the telemetry data of 80 low voltage substations. In the longer term, it is expected that the technology being trialled in the project will be in operational use in substations around Britain.

The real-time data about the capacity of local electricity networks that OpenLV is expected to provide could assist with the installation of the growing numbers of home EV charge points, as well as public chargers. In addition, the data will be useful to a wide range of other sectors, including domestic battery systems, renewable energy developers, property developers, facilities managers, smart city planners and operators of private energy networks, as well as the electricity industry itself.

For example, electricity network operators will be able to assess how

much distributed generation could be supported by the LV network, and owners of distributed generation could utilise the platform as a single monitoring, reporting and control platform to manage energy import and export.

OpenLV will also help with being able to monitor, manage and enhance the understanding of the LV network supplying electricity to commercial and domestic properties; third parties will be able to gain access to LV network data and use it to improve the experience for residents, workers and visitors.

Communities and any businesses, including technology companies, organisations involved in the energy industry, or app developers – as well as academics – have been encouraged to submit ideas for how they would like to be involved in OpenLV. The project has received a high level of interest from businesses that have ideas about how they could use such data. For example, IBM held an internal global competition to invite ideas that may provide benefit to the network operator, the community or any other stakeholder.

In February a workshop was held for companies and academic groups who were interested in OpenLV. The aim of the event was to provide more information about the technology and the commercial arrangements involved in OpenLV. Over 30 delegates attended, with the main questions focused on the technical aspects of OpenLV and the LV-CAP platform. Delegates were from a range of backgrounds, including universities, the EV sector, and the electricity system equipment design sector.

Ultimate aim

By providing open data from local electricity networks, OpenLV is a key enabler to help facilitate progress towards a smart grid. As well as reducing the need for network reinforcement, the availability of data from substations, along with the open software platform, will also help to create new economic opportunities and enable the transition to more actively managed local electricity networks.

It is expected that the technology being trialled in the OpenLV project could be in operational use in substations around Britain in the not-too-distant future. And businesses that get involved with the OpenLV project now will be ahead of the game. ●

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Find out more about the project at openlv.net

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