



Open LV project: invitation to parish councils

Introduction to Open LV

Open LV is a groundbreaking project collecting local electricity data from substations on Western Power Distribution's low voltage (LV) network, and making it openly available for the first time ever. There are around a million electricity substations in the UK, but almost all of them are currently 'silent' – local people have no way of knowing what is happening at the substation.

Substation data will be made available through trials of a new open software platform (LV-CAP™) which is being installed in electricity substations to monitor substation performance and electricity demand. It will mean that information about capacity of local electricity networks, which has not been available until now, could be used to develop software applications (apps). We hope that the apps developed will create benefits for all parties involved, and that they can be replicated for other communities to use in the future.

A number of community organisations, including one parish council in the WPD area (the Midlands, the South West and South Wales), will have the opportunity to be part of this flagship research project. We are looking for a parish council that wants to explore potential apps that could use data to change the way their community uses electricity and relates to the local network. Open LV apps could be used for things like:

- Monitoring how much electricity is being used by all properties fed by a particular substation
- Enabling electric vehicle charging, or development of new electric vehicle schemes
- Freeing up grid capacity by changing peak demand times
- Reducing the carbon footprint of your community by reducing electricity demand
- Developing battery storage systems for locally generated renewable energy
- Increasing local grid capacity for micro-generation and heat networks
- Improving management and use of electricity in large buildings or facilities
- Alerting carers or family members in the case of loss of power supply to vulnerable customers

Could your parish council benefit from local electricity network data? Can you think of an idea for an Open LV app which people in your parish would benefit from? If so, we would love to hear from you and find out whether we could work with you over the next two years to develop your idea.

More information about the project

Visit CSE's project page for an outline of the Open LV project: www.cse.org.uk/projects/view/1335

The main project site is here: www.openlv.net

And this short animation gives a good overview of Open LV: <https://youtu.be/bogJNxOAUfl>

Contact Bridget Newbery at the Centre for Sustainable Energy if you are interested in getting involved in the project.

Email: Bridget.newbery@cse.org.uk

Phone: 0117 9341400

Applying for support

We would really like to work with a parish council that is strongly embedded in the local community, is interested in innovative local projects and is keen to take up this challenge. You will need to have capacity to work with the Centre for Sustainable Energy (CSE) to deliver the project within the planned timescales, and to attend relevant Open LV events and conferences to promote and disseminate the app that you develop. We are also looking for applicants who are able to provide a level of match funding.

You will be asked to define your proposed project area and sketch out your app idea as part of the shortlisting process. If you are interested in this project, and would like to discuss an idea you have for an app which would use data from a substation in your parish, please get in touch with Bridget Newbery:

Email: Bridget.newbery@cse.org.uk

Phone: 0117 9341400

What support will you receive?

Successful applicants will receive support from the Open LV project team:

- Software development expertise to produce web based apps and any associated text or email based alert systems, in response to your ideas. Software engineers will be assigned to your group to lead the programming work for you (unless you can demonstrate sufficient software development skills to lead this yourself, in which case our software engineers will support, rather than lead).
- Community engagement and consultation support, to help you recruit users for your proposed app and allow others to feed into your app design concept.
- Support with development of communication materials, press releases and a web presence, if needed.
- EA Technology will arrange installation of LV-CAP™ units at selected substations.

Project timescales for parish council Open LV project

Project deliverable	Timeline
Competition opens for applications	04/12/17
Discussion of ideas with parish councils	December 2017 / January 2018
Interviews with shortlisted applicants, finalists selected	March 2018
Community consultation events	April 2018
App design workshops	May 2018
Full software development for apps	May to August 2018
App deployment and trial period	September 2018 to June 2019
Evaluation	July 2020 (TBC)

The technical bit

What does a distribution substation do?

The national grid transmits power over long distances at very high voltage to reduce losses. A series of distribution substations then transform these very high voltages into progressively lower voltages before the power reaches the consumer. The final step in this process occurs at secondary distribution substations, where 6kV or 11kV is transformed to 230V, 'Low Voltage' (LV), for distribution to homes or other consumers. The number of homes served by a substation varies widely. Many rural substations serve a very small number of homes, whilst in built up areas a single substation may serve hundreds. Larger consumers, such as schools or hospitals, will often have their own substation.

Common Application Platform (LV-CAP™)

As part of efforts to introduce the smart grid, hardware units have been developed by EA Technology which can be installed in distribution substations to make a range of measurements, including for example the power demand on the substation, or the temperature inside the substation. These units run a software platform called LV-CAP™, which stands for Low Voltage Common Access Platform.

You can think of the hardware unit as a computer that sits inside an electricity substation and measures and reports on what the substation is doing, in real time. The LV-CAP™ software platform sits on this computer and can be programmed to transmit data from the substation to a central server via the mobile network, where it can be retrieved and analysed. The LV-CAP™ platform has been specifically designed so that interested parties, such as community organisations, the network operator or university research teams can programme apps to access the substation data.

Applicants should be aware that:

- Data will only be available for the limited geographical area served by the selected substations that receive the LV-CAP™ units. This is unlikely to correspond to an entire community, unless it is very small, or you are intending to work only in a specific neighbourhood. The final number and location of buildings connected to each substation will be confirmed with shortlisted groups after initial applications have been assessed.
- LV-CAP™ units can be installed in secondary distribution ground mounted substations only.
- Use of any apps developed as part of this trial must be free to the end user.
- All apps must respect data protection and data ownership clauses defined within participation agreements

Project partners

The OpenLV project is funded via Ofgem's Network Innovation Competition (NIC), which means it's a publicly funded project. It's being managed by EA Technology, working in partnership with Western Power Distribution. There are a range of suppliers to the project. Nortech and Lucy Electric Gridkey are providing technical support to ensure the monitoring equipment functions well and the data is sent and stored securely. The Centre for Sustainable Energy (CSE) is managing the process of recruiting and supporting community organisations, including parish councils and housing associations, who want to access substation data. CSE is also providing support with software engineering, community consultation and project management. Regen will monitor the progress of all the community projects, produce a record of what is learnt and share the lessons from the project more widely.

10 things you may not know about local electricity networks



1. Electricity comes from power stations via the high voltage electricity network ('the motorway') and then gets 'transformed' to lower voltage at substations before coming into people's homes via the 'local' **low voltage electricity network** ('the A & B roads').



2. Approximately 800,000 kilometres, or **half a million miles**, of overhead and underground power lines make up the low voltage distribution networks in Britain (more than the distance to the moon and back).



3. There are approximately 230,000 ground-mounted distribution substations nationally. In addition there are approximately 349,000 pole-mounted transformers (these are 'mini-substations'). So there are around **579,000 'substations' in total**.



4. **Feeders** carry electricity from substations to our homes. Great Britain has about a million low voltage feeders. The pole-mounted transformers tend to supply one feeder (but sometimes two), and the ground-mounted distribution substations supply 3 - 4 feeders on average, but in urban areas this could be as high as 10 or 11.



5. The basic units for measuring **electric power** are watts, kilowatts (1,000 watts) and megawatts (one million watts).



6. **Energy from electricity** is generally measured in kilowatt hours, megawatt hours and gigawatt hours (kWh, MWh and GWh).



7. A **kWh** equates to the use of 1,000 watts of electricity for a full hour, or ten 100 watt light bulbs all lit for a full hour.



8. A **MWh** equals 1,000 kilowatt hours - enough to supply the average power requirement for around 2,000 homes for an hour.



9. The **average household** uses around 3,300 kWhs of electricity per year.



10. The **WPD Electricity Network** delivers power to 7.8 million customers over a service area of 34,000 miles or 55,000 sq km.