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OPENING UP THE SMART GRID

Community Engagement Specialist: Deliverable 1 Report

Establishing the market for community-based substation data apps

ea technology

RIIO NIC NETWORK INNOVATION COMPETITION

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1 Executive Summary

Method 2 of the OpenLV project will work with community groups across the WPD network area. Ten LV-CAP™ units will be installed in substations in selected communities, and apps will be developed in partnership with participating community groups that bring benefits to the wider community and the network operator. The aim is to demonstrate that the LV-CAP™ platform can be used to drive network efficiencies through closer working with communities as well as through the more technical interventions being trialled in other Methods of the OpenLV project.

As a starting point, the OpenLV project team need to investigate whether there is an interest from communities to participate, to understand whether this interest is spread across the network area or concentrated in certain localities, and to determine whether there is a broad or narrow range of app ideas that might emerge from such collaboration. This is referred to as 'Establishing the Market'. This element is led by the Centre for Sustainable Energy (CSE), in their capacity as the Community Engagement Specialist.

This report details the work done to establish the market, and recommendations for next steps.

Methodology

- Information was collected via a survey, which was open for 28 days during June and July 2017.
- The survey was sent directly via email to 447 individuals, and was also circulated via a number of umbrella bodies representing community development organisations, parish councils, housing charities and environmental groups.
- The survey contained 6 'ready-made' app ideas, and also gave space for respondents to give details about their own app ideas.
- The survey required respondents to rate their skills in app development, electrical engineering, data manipulation, business model development and fundraising.

Findings

60 responses were initially received. Once duplicates and incomplete submissions were removed, 51 substantially complete submissions were assessed.

34 of these respondents described themselves as 'community energy groups', of whom 22 already owned generating assets and 15 were involved in electric vehicle projects, and 33 of which give energy advice to householders, suggesting a good level of understanding of energy system issues. The skew towards self-defined community energy groups indicates that more effort will be required at full application stage to recruit community groups who do not currently have a sole focus on energy (such as parish councils and housing associations).

Respondents were located across the WPD network area, but with a higher density in the south west licence area than elsewhere. This suggests a need for more proactive targeting of the full application process in the midlands and Wales.

A large proportion of respondents (20 out of 51 groups) had no paid staff, but the majority of respondents did have volunteers, with more than half of respondent groups having more than 5 volunteers apiece, suggesting a good level of capacity for ongoing involvement.

More than 90% of responding groups were interested in the ready-made app ideas of 'understanding community energy demand' and 'connecting low-carbon technologies to the grid', and a further 72% were very interested in apps that would deliver community alerts relating to pressure on the grid. This suggests that there is a general interest in simply understanding local energy use better, and a promising level of interest in working more proactively with the DNO on active demand management.

46 app ideas were also sketched out in the free text fields available, ranging from public energy consumption displays to developing an evidence base to feed into local planning documents. None of the app ideas were described in enough detail to determine the absolute feasibility of software engineering, but it is encouraging that a good proportion require only LV-CAP™ data, and should therefore be workable. Others require freely available datasets from other sources (e.g. weather sets or national grid carbon content models), again suggesting no absolute barriers to programming feasibility at this stage.

In terms of skills and abilities, only 5 responding groups rated themselves as having a good level of app development skills, whereas a large proportion (33) rated themselves as good at fundraising and more than half rated their business modelling skills as good. This suggests that support with software engineering will be vital, but that groups should be able to bring match funding and business skills to the project without too much support from the project team.

Pole-mounted transformers are almost exclusively located in rural areas, and installing LV-CAP™ units on pole-mounted transformers represents a significant technical challenge. An analysis of the app ideas put forward by respondents suggests app type is not correlated with rurality. Therefore, if the technical challenges presented by pole-mounted installation prove insurmountable, it should not affect the range of apps that is developed via Method 2 of the project.

Most community groups responding to the survey represent an area that is likely to contain more than 5 substations. There were very few responses to the survey that would require LV-CAP™ units to be fitted to a single substation only. In order to prove the concept, genuine community buy-in will be required, and therefore the fact that only 10 LV-CAP™ units are available represents a risk to genuinely impactful community projects which will need to be managed.

Conclusion and Recommendations

Overall the market research report establishes that there is a good enough level of interest from community organisations across the WPD network area to proceed to the next step of the Method 2 workplan, and begin a full recruitment process.

The recruitment process should be designed to ensure that:

- community groups who do not currently have a specific focus on energy are encouraged and supported to apply, to ensure a better representative outcome for the project.

- community groups of all types are not unduly deterred from applying by a lack of in-house programming skills. The project team should provide robust hand-holding and guidance for this element of the project.
- community groups are able to determine where transformers in their project area are located, and what design they are (i.e. ground or pole mounted), to ensure that they do not waste time applying where their project will not be technically feasible.
- community groups are aware that their project must not cover an area that will require more than 3-4 substations to be fitted with LV-CAP units. Proposals that require 3 units or more should be able to demonstrate a range of uses for the application, for example combining local energy consumption displays with EV charging time alerts.
- community groups are aware that an element match-funding should be brought to the project as part of their application, in order to maximise their skills in this area and add value to the project overall.

2 Introduction

The OpenLV Project is an Ofgem NIC Project, managed on behalf of Western Power Distribution by EA Technology. OpenLV aims to trial and demonstrate an open, flexible platform (LV-CAP™) that could ultimately be deployed to every LV substation in Great Britain, replacing a wide range of proprietary systems that deliver a range of highly specialised substation management solutions with a single piece of hardware that could run a range of different substation management software applications. The OpenLV project is split into three trial approaches (Methods 1, 2 and 3).

2.1 Method 1: Network Capacity Uplift

This method forms the bulk of the investment in time and equipment and aims to demonstrate the capacity of the OpenLV platform to perform measurements and control from within the LV substation. The innovation in Method 1 lies in the fact that it will test the ability for control signals to be sent via a highly distributed architecture. It will also be the first NIC project to implement automated meshing of LV networks in conjunction with RTTR (Real Time Thermal Rating) of the local LV transformer. Sixty paired substations will be fitted with LV-CAP™ units for Method 1, of which 5 pairs (10 substations) will also have ALVIN reclose units fitted, while the remainder will carry out simulated meshing operations only.

2.2 Method 2: Community Engagement

The OpenLV platform can be used to provide data to groups of customers who live in the same community and wish to understand more about their community's electricity consumption. Method 2 is designed to test whether there is interest from community members in accessing this data (establish the market), and to support them to develop ideas for app production and other data uses that would benefit the wider community, and the DNO. Data security will be provided through a secure third-party hosted service. ***This report serves the first part of Method 2, by establishing whether there is a market for this community-based use of LV data, and what the range of applications might be.***

2.3 Method 3: Third party user engagement

In a similar way to Method 2, this Method will make LV-CAP™ units available to other individuals or organisations who may wish to access LV data for commercial or academic uses. This method will test whether there is interest from the wider commercial and academic market, and support the development of app ideas.

3 Method 2 delivery

For Method 2 to be successful, the project team first need to demonstrate that there is sufficient interest in the OpenLV project from community groups. This report details how this research has been carried out, and the main findings. Subsequently, communities will need to be recruited and supported to take their initial ideas from outline to full development and deployment. Table 1 below summarises the proposed timetable of community support.

Deliverable	Details
1. Establish the market (this report)	**To be delivered by***:* August 2017. To assess and report on the potential market for community engagement with the OpenLV project.
2. Community Engagement Plan	**To be delivered by**: September 2017. To develop a plan for recruiting 6-10 communities who could be supported to consider in more depth how the OpenLV project could work for them.
3. Community Guidance	**Timeline**: September 2017 to June 2019. To provide documentation and 1:1 support to the selected communities that will help them outline app ideas for consideration, and to assess and shortlist these ideas for more detailed support.
4. Help Community groups develop proposals	**Timeline**: September 2017 to August 2018 To work with 4-6 communities to develop a proposal that identifies how the community would utilise the data provided by the OpenLV project and/or what App would need to be developed specifically for each community. To include a Cost Benefit Analysis and identify what the trial within the community will achieve.
5. Assist Community groups access funding	**Timeline**: September 2017 to August 2018 To support the shortlisted communities to apply for and secure funding to pay for developer time for app development, and to provide mentoring support and information to ensure apps are ready for deployment by the end of August 2018.
6. Support Community groups through app development and testing	**Timeline**: September 2018 to December 2019 To provide mentoring and support for the communities to deploy and test the apps they have developed.

4 Methodology

The market for community engagement in the OpenLV project has been investigated via an initial online survey, which remained open for 28 days between the 27th of June and the 10th of July 2017. The survey link was sent directly via email to 447 individual contacts and a further 9 umbrella groups who could promote the survey to their membership. Further detail on the contacts can be found in Appendix 1.

4.1 Survey design

The full survey questions are presented in Appendix 2. The survey contained 17 questions, of which 9 were multiple choice or preference ranking questions, and 4 required free text answers. The remaining 4 questions were for the collection of data on the groups themselves, such as contact details and locations. The survey was approved by Regen (Community Learning Specialist) before circulation, to ensure it aligned with the needs of their contract deliverables.

The length and content of the survey was designed to gather as much information as possible at this very early stage of the project, without being unduly onerous. While it may have been possible at this stage to develop a more detailed survey requiring groups to propose more detailed apps, this would have greatly reduced both the response rate and the range of participants, since it is likely that only active community energy groups with generating assets and good technical skills would have taken the time to engage. This would not have demonstrated the full market that the OpenLV project could engage with.

The survey was designed so that it could be completed in between 5-7 minutes, a good rule of thumb to secure and maintain interest from a moderately interested participant. The fact that of the 60 responses, only 3 were very incomplete, suggests that this was an appropriate length.

4.2 Direct mailing selection

The survey was sent directly via email to 447 individual contacts. Principally, these were drawn from CSE's own community mailing list, which contains contacts for a broad range of community groups from Parish and Town Councils, Neighbourhood Planning groups, active community energy groups, local authority sustainability and housing association contacts, and academics. CSE's full community mailing list covers the entire UK, but was restricted to only those contacts with postcodes falling within WPD's distribution area for this survey.

The survey was also sent directly by Regen to approximately 100 contacts on their mailing list who had attended events over the past 2 years hosted by Regen and WPD, which focused on innovation in the energy system. There was some significant overlap between the Regen contacts and the CSE contacts. We estimate around 50% of this list will have received the communication from both partners, because the audience served by CSE and Regen has some considerable overlap.

The likely effect of this duplicate mailing is to increase the likelihood of the recipient completing the survey, since it will have acted as an extra reminder.

4.3 Umbrella group contacts

In addition, CSE contacted 9 national 'umbrella groups' who we felt would have memberships that should be interested in accessing substation data for a range of reasons. These included:

- Interest in local resilience and community action in general
- Interest in locally-led housing or development that relies on grid access
- Interest in sustainable community development (e.g. Transition)
- Neighbourhood planning

4.4 Survey timings and promotion

The survey was open for 28 days. Aside from direct email and contacting the umbrella groups noted above, a news story about the project and links to the survey were displayed on the CSE website and advertised using a banner on our home page. A short piece was also included in the CSE e-news and CSE communities update which are sent monthly, as well as the Regen monthly newsletter. 2 tweets about the project were sent from the CSE community-specific twitter account, which has 753 followers.

5 Findings

There were 60 responses during the open period. Once the survey was closed, analysis showed that some responses were either very incomplete or were duplicates, where more than one member of the same group had responded along similar lines. Rationalising these responses leaves us with 51 substantially complete surveys to analyse[1]. Since the closing date, a handful of new enquiries have been received from community groups who missed the survey but have asked to be kept up to date with the project nonetheless.

5.1 Overall findings

Table 1 (below) gives a high-level overview of the wide range of group types that responded to the survey, the areas that they serve, and the types of activities they already carry out. Encouragingly, we can see that the vast majority of applicants already have some experience of securing grant funding, and a small (but not insignificant) proportion rate themselves as having good technical skills in app development or a good understanding of electrical engineering.

[1] Some surveys are marked as 'incomplete' by the survey software where every question has not been answered. However, for some groups some questions were not relevant. Any surveys marked as 'incomplete' were therefore considered substantially complete for the purpose of analysis and are included in the 51 real responses.

Grey columns indicate required questions with mutually exclusive responses (i.e. the respondent could only tick one option and could not move on unless they did so). Other columns represent areas where respondents were able to either skip the question, or chose more than one option, or both, hence the totals do not always sum to 51 respondents.

Type of Group		Legal structure of group		Area type*		Socio-economic characteristics		Energy activities currently carried out by group		Capacity - resources		Capacity - skills	
Community Charity	**7**	Charity	**6**	Market town	**16**	Most on middle to low incomes	**6**	Owns generating assets	**22**	No paid staff	**20**	App development	**Yes: 5**
													No: 36
													Some: 10
Community Energy Group	**34**	Company ltd by shares or guarantee	**9**	City/dense urban	**12**	Very affluent	**2**	Gives advice on energy use or fuel poverty	**33**	1-5 paid staff	**9**	Data manipulation	**Yes: 18**
													No: 11
													Some: 22
Dev'ment Trust	**1***	Community Interest Company	**6**	Village	**16**	Generally affluent, but pockets of deprivation	**30**	Owns or promotes electric vehicles	**15**	5+ paid staff	**6**	Electrical engineering	**Yes: 13**
													No: 15
													Some: 23
Individual	**2**	Registered Society	**14**	Sparse hamlets and farmsteads	**10**	Generally low incomes with high benefit reliance	**1**			No volunteers	**4**	Business modelling	**Yes: 22**
													No: 12
													Some: 17
Local authority	**3**	Unincorporated	**12**	Mixed settlements over a larger geographical area	**9**					1-5 volunteers	**14**	Grant funding applications	**Yes: 33**
													No: 3
													Some: 9
Private company	**1**	Statutory body	**4**	University campus	**1**					5+ volunteers	**25**		
Parish Council	**1**												
Umbrella body	**1**												
University	**1**												

** Group defined as development trust but main focus is energy projects.*

Table 2: Summary of responses

'Type of group' and 'Legal structure of groups

34 groups identified as community energy groups, with 7 identifying as community charities. Of the remaining respondents, 2 were individuals who volunteer in their community (giving energy advice), 3 were local authorities, the remaining 4 were a parish council, a university[2], a national community development support service and a company specialising in devices to support time-of-use tariffs.

While it is clear that the majority of respondents identify themselves as 'community energy groups' first and foremost, this is a definition that has no basis in law. The picture with regard to legal structure is far more evenly mixed, since the community energy groups have chosen to take many forms, and indeed, 8 of them remain completely unincorporated. The legal form taken by a community group does have a bearing on their ability to secure different types of charitable grants (or any at all), which is discussed further in section 4, on funding.

Area type and socio-economic status

In some cases, the exact area which the respondents operate in was difficult to define, but can best be broken down as follows; 16 serve a market town, the same number that serve villages. 12 respondents serve dense urban areas. 10 describe their area of operation as being 'sparse hamlets and farmsteads', and 9 in 'mixed settlements' (usually those who cover a much larger area, such as a whole county). 3 operate on the rural/urban fringe, 2 in suburban areas, and 1 respondent aims to specifically serve a university campus. 5 respondents skipped this question. Given that there may be technical limitations to rural groups participating, it is encouraging to see that more than half of the groups are located in towns or cities.

The vast majority of respondents stated that their area was reasonably or very affluent (in many cases referring to pockets of deprivation). This is not unexpected – community energy groups tend to emerge in middle class areas, though they often carry out activities such as fuel poverty advice in the parts of their communities that are less affluent.

Energy activities currently carried out by group

There was a wide range of responses regarding the capacity of group members, but most notably is that the majority of respondents to this question said they have no paid staff. Amongst respondents who did have paid employees, they ranged from just a few workers (9 employ fewer than 5), to around 15. A couple of outliers (a county council and a university) stated in the hundreds, but these are obviously exceptions to the rule that community groups tend to be low on staff.

7 respondents skipped this question entirely, and 4 used a decimal point in their response, which we have taken to mean that there is a part-time employee.

[2] Cranfield University has been referred for potential inclusion under Method 3, although their stated interest is in using OpenLV data for engaging a campus community, so they may still be best suited to participation in Method 2, or some combination of both.

Most groups then, rely on volunteers to carry out their work. Again, not all respondents answered this question, and the responses are very variable. While there are several groups who claim to have more than 100 volunteers, our experience of working with community energy groups is that the term 'members' (taken to mean shareholders or supporters) tends to be conflated with the term 'volunteer' in the sector. It is not usual, in our experience, for a group to have more than around 15 very active volunteers who would put more than a couple of hours a week to a project, and only one or two who would manage a day or more on a voluntary basis.

The questionnaire also asked respondents to identify key skills which their group (or individual members of their group) possessed. These were: app development, data manipulation, electrical engineering, business modelling and grant funding applications.

6 respondents skipped this question. Amongst respondents, they were generally least confident regarding app development (36 groups possessed no skill, whilst 5 possessed skill), and most confident about grant funding applications (33 possessed knowledge of this skill, only 3 have no experience at all). This was the only skill however, that the majority of respondents felt confident about. In regards to data manipulation, business modelling and electrical engineering, there is a relatively even spread between those who possess knowledge around the subject and those who possess 'some knowledge', with a minority of those who possess no knowledge. Electrical engineering however, has a majority of respondents (23) who possess 'some knowledge'.

While it seems superficially beneficial to have the involvement of groups with some technical ability of their own in app development, it is likely to be useful for replicability purposes if some of the groups participating in the project have limited capability in this area, since it is unlikely that advanced programming skills are commonly found in community groups in general.

Relevant activities of respondent groups

Energy saving/fuel poverty advice

33 responding groups indicated that they provided this service to some degree or another. Of those who don't provide this service, 3 said they would be interested in starting this activity and 1 said they occasionally give away information but don't consider this a central activity for them.

29 who said they provide this service went into further detail to varying degrees, with 12 describing how they use general promotion of energy saving tips via running events, stalls and website promotion. This suggests that a majority of responding groups in this survey are already likely to be relatively well known and trusted in their communities, which is useful for getting new project work off the ground quickly. Another 9 respondents described general advice work via the provision of a telephone advice line, including helping people switch energy providers.

Ownership/promotion of electric vehicles in the community

15 groups answered 'yes' to the question 'does your organisation already own and/or promote the use of electric vehicles in the wider community?'. Of these, 9 already own the EV (either the group itself or an individual member), while others promote the technology but don't yet own or lease their own. One group is investigating buying an electric bus for use in the community, which is again a useful profile-raising activity that would help such an organisation get another project recognised in the wider community quickly.

Ownership of renewable energy generation assets

22 of the responding groups said that they did already own generation assets. In the section on further detail, these are described as predominantly solar PV arrays, ranging in capacity from an 11kW rooftop array to 12MW solar farm. There are also one or two micro-hydro and small wind assets among the respondents, along with one community-owned heat pump system. It is likely that the vast majority of these were financed through local share issues, at least to some extent, which again can be taken as a proxy for local recognition for the group.

5.2 Technical constraints to participation

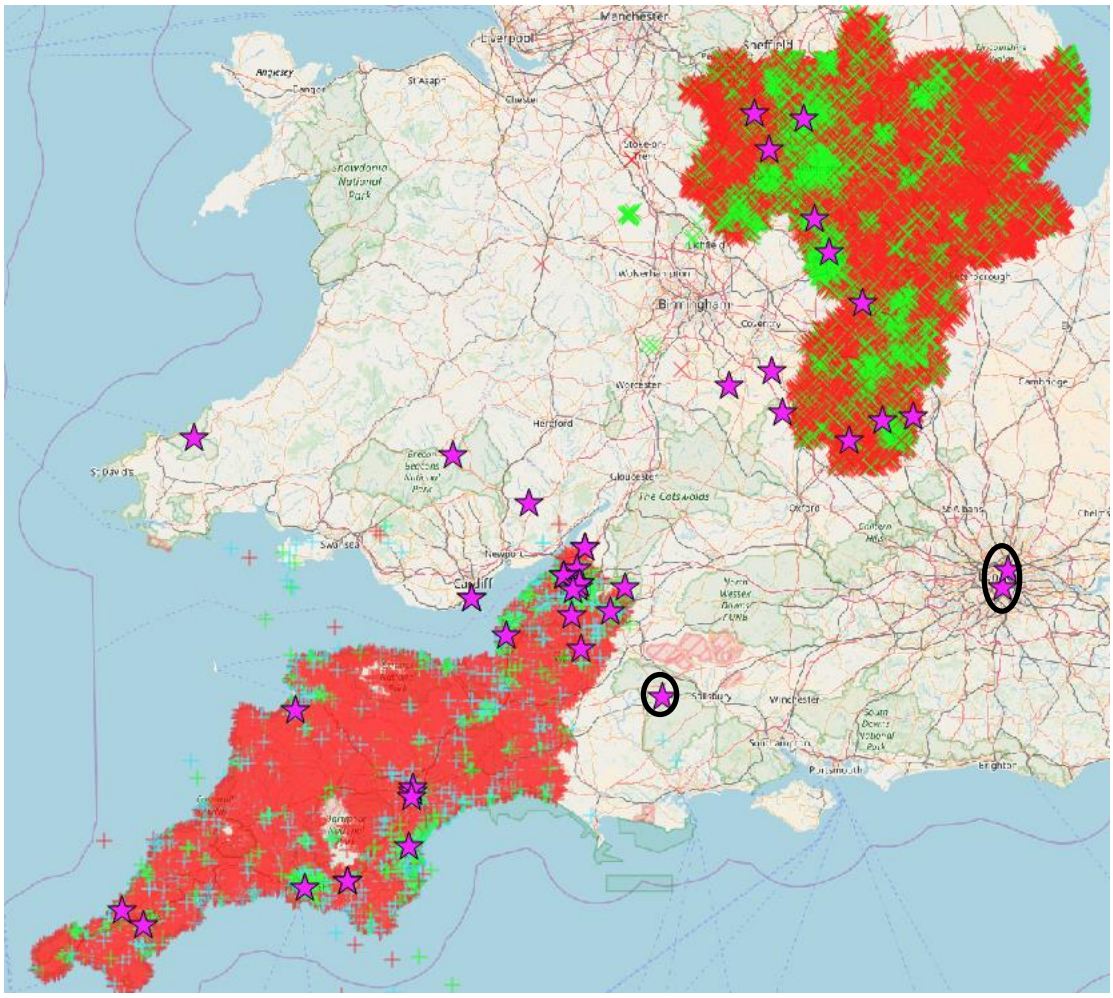


Figure 1: Survey respondents mapped against likely transformer type

The map in Figure 1 was created using data provided to EA Technology by WPD. EA Technology staff working under Tim Butler's direction assessed the data set and cleaned the data as much as possible. CSE created the map using open-source GIS software (QGIS)[3], and full GIS files have been provided to allow EA Technology to examine this map in more detail. The stars represent the postal address given by respondents to the survey. Stars with a black circle around them are respondents who are located outside of WPD's licence area. All others are inside WPD's licence area, but CSE doesn't currently have data on the transformer types in all areas, hence some of them are located in white areas of the map.

The full data set provided to CSE appears to be a combination of several different sources, most probably representing different licence areas within the WPD network area, hence the information available in some areas is distinctly different from others.

In terms of basic technical eligibility to participate in the OpenLV project, EA Technology have now confirmed that it is considerably more complicated to install the the LV-CAP™ system to pole-mounted transformers. The extra time and technical complexity represents a risk to this element of the project if all of the Method 2 communities were located in areas with pole-mounted transformers. CSE has mapped the data provided to give some illustration of whether survey participants are located predominantly in areas with this type of transformer, so that we could understand the level of risk this may pose to the project.

The dataset provided by WPD and cleaned by EA Technology contains information on approximately 150,000 substations, most of which do not have manually-entered mounting information associated with them. However, Mark Dale of WPD has advised that a reasonable judgement can be made by applying the following rules of thumb where a rating is available:

Substations rated at 315kVA or above are most likely to be ground mounted;

- Substations rated at 100kVA and below are most likely to be pole mounted;
- Substations rated between 100kVA and 315kVA could be either ground or pole mounted - manual checking via street-view on Google maps is the only useful way of determining this, unless WPD can provide further detail.

Taking this information, CSE has mapped the data and it appears to reflect significant differences in the WPD, data set, which probably stem from WPD's assets being made up of licence areas previously operated by other organisations.

[3] QGIS can be downloaded from this link: http://www.qgis.org/en/site/

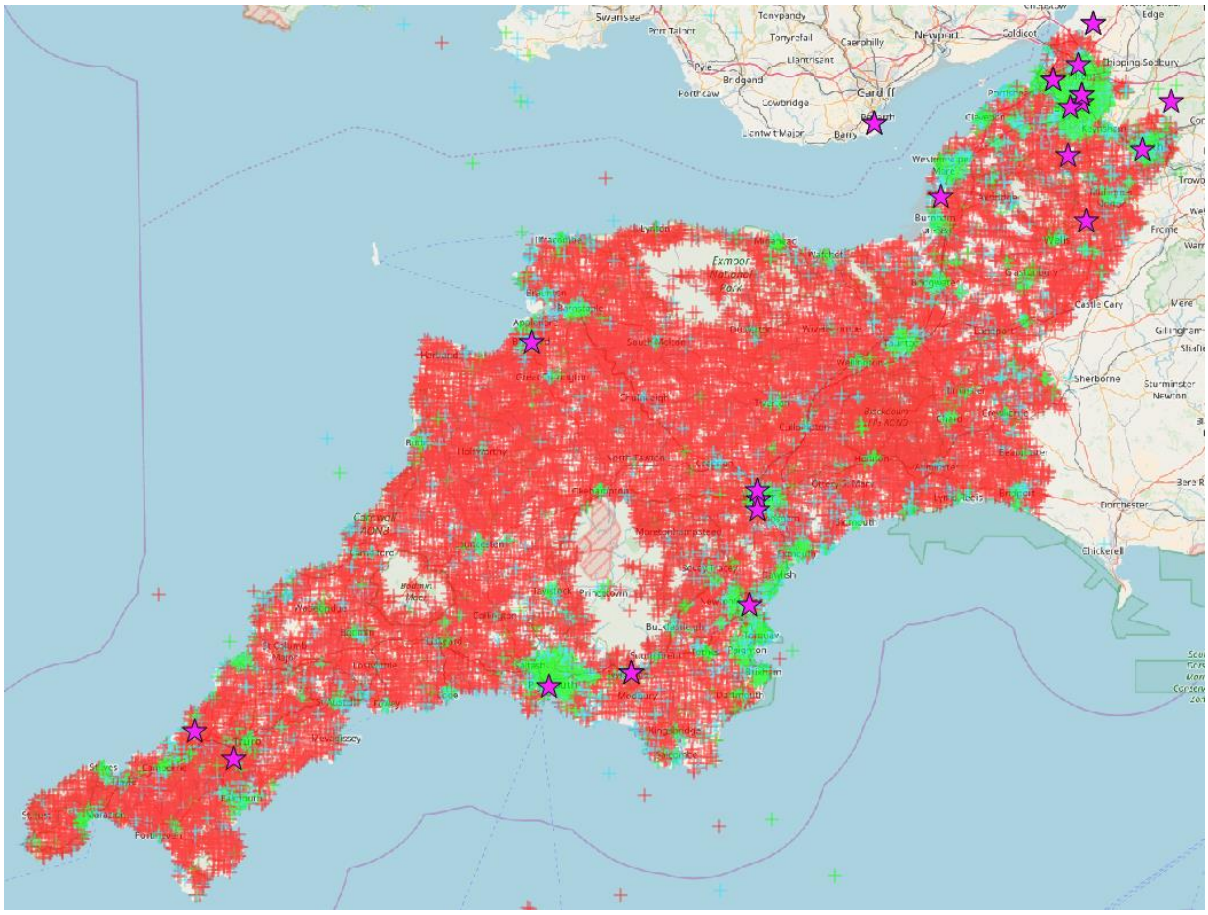


Figure 2: Survey respondents mapped against likely transformer type – South West area

For the south west area, covering Cornwall up to Bristol, the data set contains very few manual entries that confirm whether a substation is ground mounted or pole mounted. However, rating data is available for most locations. The transformer type has therefore been mapped based on transformer size, according to the rules of thumb above. Red transformers are under 100kVA (likely pole mounted). Green transformers are over 315kVA (likely ground mounted). Some transformers fall between these two size limits and therefore the mounting type is not known (these can be seen as light blue when the map is viewed at higher resolutions). A high proportion of respondents in this area are located near to ground-mounted transformers (13 out of 19).

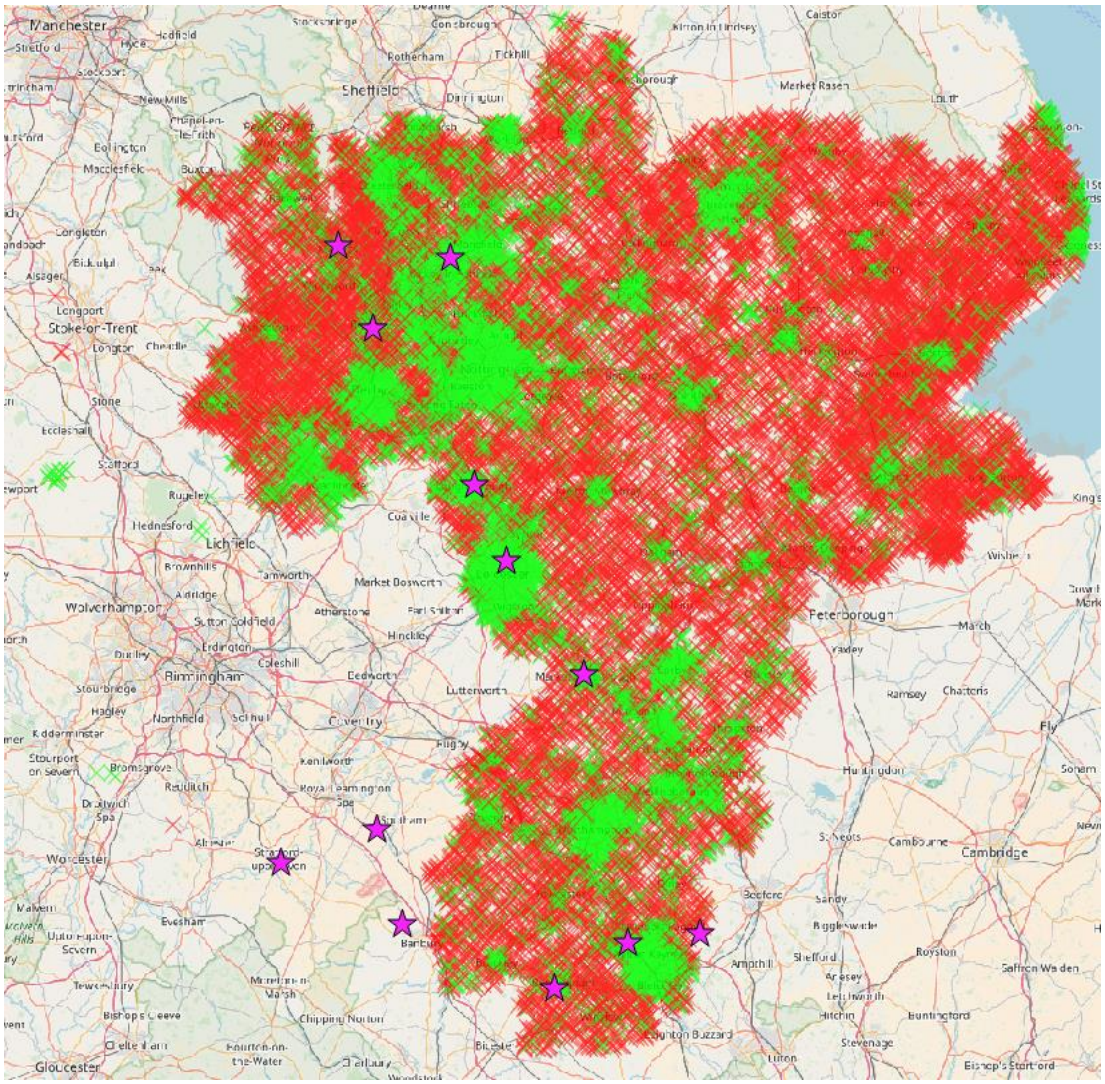


Figure 3: Survey respondents mapped against likely transformer type - Midlands

For the West Midlands, the data set contains extremely limited manually entered data on mounting type or rating – only location is known. Most of the entries in the dataset only have location information. We have therefore only mapped the handful of transformers for which manually entered mounting data was available, which can be seen as green crosses to the west of Bromsgrove and further north, near Stafford and near Lichfield. The remainder of the West Midlands dataset does not give enough information to usefully map, other than location.

For the region covering Milton Keynes and the East Midlands, the data set is very comprehensive and contains a large quantity of manually entered transformer types. Pole-mounted transformers are shown with a red X, ground-mounted transformers are shown with a green X. The distribution almost exactly matches OS definitions of urban and rural areas when the map is examined at greater detail. Again, a good number of the interested groups seem to be located in areas with ground mounted transformers.

Overall, the fact that approximately 20 of the 51 respondents are located in areas likely to have ground mounted transformers is promising. It gives confidence that there will be sufficient interest from areas with this type of transformer to take forward the small number of groups required to meet the aims of the project. Further recruitment stages will need to be designed to take this major technical barrier into account, to avoid wasting time for groups in rural areas.

5.3 Geographical constraints to participation

The vast majority of the survey respondents were from addresses within WPD's distribution area, as indicated by the purple stars in Figure 1.

In terms of geographical eligibility for survey respondents to participate in the OpenLV project, the following information should be noted:

- WPD had not provided EA Technology with data for their Welsh licence area. All the stars in Wales on the map *are* within the WPD area, but there is no network information shown.
- A large section of data is missing from the Coventry and Warwickshire area (licence area 25), which appears as a white hole in an otherwise contiguous area in Figure 1. This area *does* fall within WPD's network area, and the yellow dot in that gap therefore represents an eligible group.
- Three groups are definitely outside WPD's area - two in London and one in Wiltshire.

Interest in the project therefore does seem to be coming overwhelmingly from within the WPD Network area (reflecting where the survey was promoted), which gives confidence that there is enough interest to take the project forward from this point.

5.4 Proposed apps and levels of interest

Summary of relative interest in 'app concepts'

Respondents were asked to indicate their interest in 6 app concepts:

1. understanding community electricity demand;
2. connecting low carbon technologies to the LV grid;
3. community alerts to request reduction or increase/decrease in electricity usage;
4. demand-side response for managed electric vehicle charging;
5. community information apps to understand community energy use and;
6. automated electricity storage control.

Respondents could select 'very interested', neutral' or 'not interested' for each of these app suggestions. The results are summarised in Table 3, below

	Very interested	Neutral	Not interested	Total
Understanding community electricity demand	92% (44)	6% (3)	2% (1)	48
Connecting low carbon technologies to the LV grid	91% (43)	9% (4)	0% (0)	47
Community alerts to request reduction or increase in electricity usage	72% (34)	19% (9)	9% (4)	47
Demand side response for managed electric vehicle charging	63% (30)	31% (15)	6% (3)	48
Community information alerts	66% (29)	34% (15)	0% (0)	44
Automated electricity storage control	56% (27)	38% (18)	6% (3)	48

Table 3: Summary of interest in app concepts

48 respondents answered this question, with 91% of respondents stating that they were 'very interested' in the concepts of both 'understanding community electricity demand' and 'connecting low carbon technologies to the LV grid'. (In the case of the latter, no respondents selected 'not interested'). Similarly, no groups indicated that they were 'not interested' in community information alerts (though there was a greater spread for this option between 'very interested' and 'neutral' than for the previous two examples).

The majority of respondents indicated that they were 'very interested' in all apps, with 92% saying they were very interested in 'understanding community electricity demand'. And while 'automated electricity storage control' gained the smallest share of the 'very interested' vote (27 of 48 being very interested), this still represents a majority (56%) of respondents. Given that the majority (29 out of 51) respondents do not own generating assets, it is understandable that this app idea would attract less interest than those concepts which are of use to everyone, though still, the majority interest in this concept implies a longer-term interest from some groups who have yet to develop their own generating assets. This concept, as well as demand-side response for managed electric vehicle charging, had the highest number of 'neutral 'responses (18 and 15 respectively), and again we posit that electric vehicle charging is likely to be of greater interest to those who already own generating assets, because they are usually the most advanced community energy groups and have capital from their generation projects which can be invested in community EV schemes.

Whilst 'not interested' responses do not reach above 10% for any app suggested, 'community alerts to request reduction or increase/decrease had the highest' 'not interested' responses (albeit only 4). We speculate that, in comparison with 'community information alerts', this app concept sounds a little more imposing.

However, overall all of the app concepts seem to be of interest to a majority of respondents, which suggests that the general ideas have broad enough appeal that other groups participating in the full recruitment process will be similarly interested.

Summary of app ideas generated by respondents.

Besides the 'pre-formed' app suggestions outlined above, 46 app descriptions were put forward by the groups themselves in response to the two free-text questions below:

1. *'Do you have alternative ideas for apps that could use and manipulate data from your local electricity grid?'*
2. *'Are you interested in energy data for anything other than the apps suggested? Even if you don't have ideas of how you would use the data we would like to know if there are any other reasons you might be interested in it.'*

It was hoped that the two questions would elicit different responses, in that the first was designed to get groups to think about particular apps, whereas the second was to allow groups who did not want to build an app to suggest other uses for the data. In practice, the answers given to both are very high-level and it is not always possible to extract app development concepts from the first list, while some entries to the second question could equally have been described as app concepts. They are therefore combined in Table 2, and grouped into themes (applied by CSE) where they appear to have similar purpose. An assessment of whether the idea would need real-time, ongoing data feed from the LV-CAP™ unit is also given. Where real-time data would not be needed, we assume that collecting data over a period of 12 months or less would often be sufficient, based on the limited information in the app descriptions.

Data collection periods, particularly if a baseline is required, are an area that will need careful consideration for the main recruitment phase. For example, one of the ideas under the 'policy, planning and retrofit' theme suggests developing a before and after comparison of energy use once a retrofit programme has been carried out. As a minimum, this would need 6 months of winter energy use data to be collected before retrofit, and then a comparison the following winter (2 whole years would be ideal for such an idea). It is difficult to see how this kind of idea could be accommodated without risk into the wider OpenLV project timetable.

Table 2: Free-text app ideas

Theme	Idea from survey (as entered by respondent)	Real-time data needed?
connecting renewables to the LV grid	Spare capacity for new generation (say 30 kWp)	No
connecting renewables to the LV grid	We have explored setting up an energy co-operative that foundered on lack of grid capacity	No
connecting renewables to the LV grid	Some of our members may be interested in data that helps them to inform their feasibility/fundraising plans	No
connecting renewables to the LV grid	Finding electricity consumption data easily for commercial sites, so we can quickly produce estimates of the size of PV systems required and revenue generated from a PPA.	Yes
demand management	Behaviour influencing through displays in town.	Yes
demand management	being able to remotely switch appliances, heating etc on/off if local demand gets too high	Yes
demand management	When is peak and off peak demand locally to make use of low demand energy and install storage facilities	Possibly
demand management	district/city/area wide app to help communities work together to reduce energy consumption	Yes
demand management	As above, we are interested in using energy data to make predictions of demand that can inform decision-making.	No
demand management	Trying to suggest ways of minimising use.	Possibly
demand management	analyse the data to determine how much local generation/storage is required to make the community self sufficient and use this as a goal for the community to aim for	No
demand management	If we could link it to fuel poverty and energy efficiency projects to show that consumption has reduced that would be very useful. Also to find out how much our area uses and spends, identifying patterns of usage - because community solar energy projects need a consumer as selling to the grid not viable at the moment. Pitting communities against each other in challenges to reduce their consumption the most!	Possibly
demand management	Separating domestic versus commercial, pared to large users, possibly by postcode area.	Possibly
demand management	usage patterns over a day compared to the weather and renewable generation	Possibly
demand management	informing the public	Yes
demand management	Data from a wider area (eg Bristol urban area) would also be useful just to raise awareness in a more concrete way and ideally compare with renewable generation in the area for public display in centre for example.	Yes
demand management	Demand by street or postcode	Yes
demand management	Having electricity demand data would be useful for baselining "carbon reduction strategies" and "energy descent plans" and then comparing actual demand to required reductions in the area.	Possibly
demand management	CO2 energy production - when is it best to use low CO2 energy?	Yes
demand management	Would be interested in information that would suggest low cost methods of heating and supplying energy to large rural buildings such as churches, community halls etc.	No

demand management	Allow people to understand how their household and their community uses energy is an important first step in changing behaviour and demand reduction	Possibly
demand management	We are about to begin a large (1,000 homes) community engagement piece on reducing domestic energy use. We are looking at how to give longevity to this programme. Anything that that adds a local/community element to this would be of great benefit - even something as simple as real time energy use within a defined community. We also run Data Play sessions in Plymouth (http://plymouth.thedata.place/) (http://madeinplymouth.co.uk/project/data-play/) where we actively encourage communities to use and manipulate data in ways which can benefit those communities	Yes
Local economic resilience	Something to reduce fuel poverty - alerts when electricity is cheaper? Or allowing residents to pool together and buy electricity at a lower unit cost?	Yes
managing risks on the network	it would be helpful to see the quality of electricity at our substation ie power factor and voltage variations	Yes
managing risks on the network	Indicator of local high demand rather than just general high demand. We would like to prioritise this.	Yes
managing risks on the network	We know that there are distribution constraints at some substations eg at times of peak demand in winter. We would like to understand what financial incentives are available for either local generation or local demand reduction to relieve constraints.	Possibly
managing risks on the network	Possibly know about grid wide renewables surges and shortages	Yes
managing risks on the network	Mapping distributed energy resources with substation constraints	No
matching demand & renewable supply	Website showing percentage of local demand me by the community solar farm on a real time basis. Local energy market and VPP models in future.	Yes
matching demand & renewable supply	Provide information on balance between local generation and demand	Yes
matching demand & renewable supply	We are intending to develop a 1 MW solar farm in the village of Drayton Parslow. We would like to implement a variation of the Energy Local idea where local residents are 'matched' to output from the farm and are able to buy the energy that is produced locally. We need the local data to make this happen, and know that once there is a fully smart understanding of the relationship of local supply to demand, we can then manage (influence?) and respond to local energy demand needs. Our app development will be about managing and matching the supply and demand, and also customer billing services	Yes
matching demand & renewable supply	Website showing percentage of local demand met by the community solar farm on a real time basis. Local energy market and VPP models in future.	Yes
matching demand & renewable supply	it would be interesting to be able to correlate with wholesale prices, ie how much effect renewable generation is having on wholesale and triad prices	Yes
matching demand & renewable supply	We have installed 414 kW of rooftop PV in our community and are interested in knowing how its output hour by hour relates to demand in our agricultural area.	Yes
matching demand & renewable supply	Talybont is a small tourist village in the Brecon Beacons National Park. We're keen to mount a cool graphics display in the village which shows current power use relative to % generated locally by our various hydro & solar which is currently ~20%. This would attract interest, stimulate discussion & motivate new generators to increase our renewable percentage to 50% or more!	Yes
policy, planning, retrofit programmes	Could be useful to understand the gross before/after impact of large-scale retrofit on social housing blocks/estates where these are served by a dedicated substation perhaps (all electric blocks)?	No

policy, planning, retrofit programmes	We are interested in drawing on community energy usage data to make predictions about future energy demand that can inform policy and network management. An open platform with a variety of apps presenting diverse data could be invaluable for energy research. An app which can not only display information on energy usage but also predict demand could be used to inform decision-making at government, community or individual level.	No
policy, planning, retrofit programmes	Building a case to persuade residential developers to adopt define and adopt sustainable, reliable, renewable, lower-cost, domestic energy & heat supply for new home developments then refurbs. 2. Identify options & Build economic case for social housing near-EnerPHit-type-refurb	No
policy, planning, retrofit programmes	currently beginning a neighbourhood development plan & think the information would inform our look at infrastructure/planning	No
policy, planning, retrofit programmes	neighbourhood planning; measuring data to drive low carbon city/carbon reduction, addressing fuel poverty	No
promoting existing proprietary devices	We produce devices and can produce apps to indicate TOU parameters - data could be used to inform devices such as the Time Cheese.	Yes
promoting existing proprietary devices	'Business Service' IT design to allow easy integration into other IT applications and platforms/uses - e.g. 'Open Utility' - an open data approach making data available for other users to find uses for.	Possibly
promoting existing proprietary devices	See here -> http://www.cepro.co.uk/2014/06/kudos-energy-challenges/	Yes
promoting existing proprietary devices	Provide online real time data on our website for a number of apps	Yes
storage	As we develop our renewable assets, we are developing our strategies around both heat and electricity. We know that there is a powerful opportunity for storage that will soon become viable and we want to optimise this, and will need good data for it.	Possibly
storage	demand storage investment	Possibly

5.5 Cross tabulation

We have examined the following relationships in the data, to determine whether there are patterns emerging:

1. Does ownership of renewable energy generating assets correlate with interest in particular app types?
2. Does rurality correlate with interest in particular app types?
3. Does self-reported technical capability correlate with more complex or well-formed app ideas?

Does ownership of generating assets correlate with interest in certain types of app?

Of the 51 respondents, 48 answered whether or not they own renewable energy generating assets; 23 said yes, 25 said no.

All respondents were asked to express their interest in 6 different types of app that could potentially be created from the OpenLV data. Again, they could answer 'not interested', 'neutral' or 'very interested'. Some respondents failed to mark their interest in all types of app, hence there are fewer than 48 responses for all apps.

Full analysis is shown in Appendix 3. Overall, there is greater interest shown by those with generating assets towards apps which allow for greater control of energy (storage, community alerts and EV charging). This is understandable as it is within their interest to either use their energy more wisely (i.e. by possessing the ability to store their energy), or capitalise upon it (by connecting new assets to the LV grid using income generated from previous projects). With regard to apps which would help monitor energy usage, both asset-owners and non-asset-owners show generally equal interest, as they can both use this data to their advantage.

More surprising is that most respondents who don't own generating assets are also 'very interested' in apps that would support connecting renewable generation to the LV grid (21 of the 25 non-asset-owning groups who answered this question). The prevailing attitude among community energy groups is that, for start-ups, building profitable generation projects is becoming increasingly difficult due to changes in policy. This high level of interest could reflect increasing confidence, but given that some of these groups may be recent entrants into the community energy world, it may also reflect a lack of understanding of these difficulties. This suggests that the next stage of the project, full recruitment of participating groups, will need to determine how realistic any plans are from less experienced groups who are intending to use OpenLV data as the basis for a business plan for new generating capacity. If they are unaware of the timescales involved in such projects, it could mean that the OpenLV project timetable is simply not long enough to see their projects through to the end.

Does rurality correlate with certain app ideas?

Given that most pole mounted transformers seem to be located in rural areas, it is prudent to look at whether rurality is a key driver in interest in certain types of app. If (as seems increasingly likely) rural communities will be excluded from participation for technical reasons, it could represent a risk to the project if this reduces the range of apps likely to be developed as a result.

Groups have therefore been divided into rural and urban categories via a postcode analysis, and differences in interest between the app ideas they were presented with in the questionnaire (as well as any they put forward) have been considered.

47 groups provided both their postcode and either their interest in the provided app ideas, or provided their own. Of the 47 groups, 29 respondents operate in rural areas and 18 in urban areas. Full analysis is shown in Appendix 4 (note that the graphs in the appendix may not all total 47 as some groups did not register their level of interest in some app ideas).

In summary, there appears to be very little correlation between rurality and preference for app ideas; ownership of renewable energy generating assets (as described above) plays a much greater influence instead. There is no particular app type that seems to be overwhelmingly favoured by rural communities and for which there is no corresponding interest in urban areas. Therefore, if difficulties with installing LV-CAP™ units on pole-mounted transformers result in participation from fewer rural communities, this initial survey does not indicate that this will reduce the range of apps emerging from the project.

Does self-reported technical capability correlate with more complex app ideas?

In terms of technical capabilities, groups were asked if they had good knowledge of app development, data manipulation or electrical engineering. They could either answer 'Yes', 'Some knowledge' or 'No'.

- Five groups stated that they had app development skills, with a further 10 stating that they had some knowledge in this area.
- 13 groups reported that they had skills in electrical engineering, with a further 23 reporting some knowledge in this area.
- 18 groups stated that they had skills in data manipulation, with a further 22 reporting some knowledge in this area.

We looked at whether those who reported being more skilled in app development produced more complex and well-formed app proposals, but found no particular evidence of this. Most ideas for apps are very high level indeed, and there is not enough detail included in the descriptions to determine whether those with self-reported app development skills really do have any useful level of knowledge to bring to the project. The survey was deliberately high-level to avoid being offputting to groups with little technical knowledge, so it would have been unreasonable to expect much technical detail at this stage. Technical skill will be a key area of consideration as part of the recruitment process, although given the fundraising and support elements of the project, it should not be an undue barrier to participation if groups have no programming skills.

6 Fundraising potential

Community groups will not be provided with funding direct from the OpenLV project budget in order to fund developer time for the production and testing of their apps. This section therefore summarises the main considerations in relation to fundraising for this element of the project, and highlights the most obvious sources of funding based on what we know so far from the survey respondents. Following the final make-up of the shortlisted groups, we will be able to identify sources more appropriate to each group.

6.1 Defining proposed project outcomes

Groups have a number of fundraising options: from their existing resources (e.g. income generated by their existing community renewable energy generation assets), from local sources (individuals, local companies, their council, parish council, or a local charitable trust, including the nearest community foundation), or from national sources (particularly large charitable trusts or lottery).

To access all types of charitable funding, groups will need to demonstrate the benefits of the project: rather than concentrating on the technical detail, they will need to determine and make some assessment of the change or difference they expect the project to make (its outcomes), and link this to broad funding themes such as social inequality, climate change or community resilience.

Groups can be supported to draft and refine mission statements to clarify what their group stands for (its mission or overall aim) and how the OpenLV project will help deliver this. Different funders focus on a range of outcomes, and groups may need support to draft funding applications that reframe the project in different ways to appeal to a range of funders. For example, some projects could be framed in such a way that broad themes of social inequality are brought to the fore, in particular where a community can be shown to be disadvantaged in some way (low incomes, rurally isolated, off the gas network, to name a few). 42% of the survey respondents self-reported that they were based in a ‘sparse hamlet or village’. Issues of rural isolation and lack of affordable energy services could prove a useful framing in these areas. There are a range of charitable trusts with a focus on rural issues, and many community foundations in rural areas have specific funding streams on access to services and utilities.

Similarly, a sizeable 67% of respondents were very interested in ‘Community information alerts’, which could be valuable for carers looking after vulnerable members of society. Alerts could be sent to members of a community or carers if supply is lost for a sustained period of time. In this instance the target funder outcomes would be very different, e.g. improving the health and wellbeing of vulnerable people, and would be better suited to funders with a focus on health or social isolation outcomes.

According to the survey, the two most popular uses for an app were to understand community electricity demand (92%) and connecting low carbon technologies to the LV grid (90%), which could enable community members to carry out carbon foot-printing or improve opportunities for community renewable generation.

Potential outcomes could include: reducing the UK's carbon dioxide emissions, promoting behaviour change to reduce energy consumption and building community resilience to climate change, all of which would appeal to funders operating in those themes.

Once the groups have been supported to define their outcomes (the change or the difference they want to make), they can be supported to apply to a range of funders who want to fund similar outcomes. Generally, if a group cannot raise funds from its regular supporters, from its own income, or from their own members' contacts ('major donor fundraising'); they can be supported to apply to **local funding sources** and **major national funders**.

6.2 Legal structures

Before discussing these two options in detail, it is important to note that the legal structure of a group may have a bearing on whether they can apply for funding from some funders. For example some charitable trusts may only support registered charities. Other funders will usually include support for other not for profit groups such as registered societies (co-operative societies, community benefit societies, and former industrial and provident societies).

Notably, of the 51 respondents to the survey, 12 were unincorporated. As a minimum, such groups will have to adopt a constitution and open a bank account in order to secure charitable funding (this is the lower bar set by some statutory funders such as Awards for All). However, some funders will require them to incorporate as a company, charity or registered society in order to receive funding, so the project team will need to understand and assess the risks to the delivery timetable associated with this, as such processes can take several months to complete.

6.3 Local funding sources

Local sources, such as a local charitable trust or Parish Council, might only support groups or projects based locally, so there will only ever be a limited number of competing causes for funding. As an example, one of the groups participating in the survey, Wolverton Community Energy, might be eligible for funding from The Ancell Trust, which specifically supports causes in Stony Stratford, a small town neighbouring Wolverton, in Buckinghamshire. Groups should also consider any local authority grants (although these have diminished significantly in recent years), or if they are aiming to support the health and wellbeing of vulnerable people, the local health sector (the clinical commissioning group and public health) may help through programmes like the Better Care Fund.

Rural groups might consider applying to a LEADER programme which operates at local levels across England to support the rural economy as part of the Rural Development Programme for England (RDPE).

Local Community Foundations are also another popular source of local funding. There are 46 Community Foundations covering the whole of the United Kingdom, each working with individuals, families, companies and other organisations that want to support good causes in their local area. Community Foundations give out combined grants totalling over £65 million annually, almost exclusively small grants to local groups. This website has links to all 46: http://www.ukcommunityfoundations.org/our-network

6.4 National funding sources

Major national funders have the advantage of significant resources. The most obvious funder is the National Lottery, which runs a programme specifically tailored to support small community groups, *Awards for All*, offering grants from £300 to £10,000. Groups must have a constitution and a bank account requiring two signatories. The project must meet at least one of three funding priorities:

- bring people together and build strong relationships in and across communities
- improve the places and spaces that matter to communities
- enable more people to fulfil their potential by working to address issues at the earliest possible stage

These priorities demonstrate the importance of pre-planning to better understand the long-term change or difference groups want to make through the OpenLV project.

In time, there may be other major grant programmes that emerge, who support community energy or technology for social good from government, lottery, energy companies or major charitable trusts (e.g. both Nominet Trust and Comic Relief have in the past supported technology that support community benefits), but at the moment Awards for All would seem the best option from a national funder, not least because its decision-making timetables are relatively quick. Though there is a range of other funders with priorities around climate change and energy (for example, the Friends Provident Foundation), many national funders have fixed application dates, sometimes only twice a year, and do not run an open, rolling application system. This again represents a risk to the project, because groups may have to wait several months to apply, and then several more months to hear from the funder. In CSE's experience, it is not unusual for fundraising from such sources to take 6-18 months to secure.

This risk will need to be managed - for some groups, it may be more appropriate to use in-house programmer time from CSE, replacing fundraiser capacity, in order to accelerate app development.

7 Conclusions

The survey has demonstrated that there is definitely interest in accessing LV data from a range of community groups. Given the short time period over which the survey was open, it was reassuring to receive more than 50 substantially complete responses, the vast majority of which were from within WPD's network area.

While it looks increasingly likely that communities in rural areas will be unable to participate (due to the pole-mounted transformer type common in such places), the level of interest from groups and organisations operating in towns and cities is around 40% of total respondents. This gives confidence that, even if the full recruitment phase can only be carried out in urban areas, it will not prove excessively difficult to find enough participants for the trials.

A reasonable number of groups have indicated that they do have technical and programming skills of their own, but the detail put forward for proposed apps by these groups are neither more complex, nor more well-thought-out than the concepts put forward by those groups who do not report having any technical or programming skills. Lack of detail in app concepts represents the biggest area of concern at this point – a challenge for the full recruitment process will be in developing a selection process that ensures a good range of end uses can be pursued. Although 46 app concepts were advanced via the survey (from questions 7 and 8) the vast majority are variations on a theme of interpreting real-time consumption data – the most useful tool for selecting between these may well be to use cost-benefit scoring during the recruitment phase. The project team will need to consider whether the key aim of Method 2 is simply to encourage wide community access to LV data, or to maximise the number of different ways that communities might use the data (in which case, selection might need to be based on identifying distinct niche uses by a range of different groups).

Two areas of concern arise from this survey around timescales – fundraising and data collection. The recruitment phase will need to be robust in assessing the likely timescales over which data will need to be collected to make some of the ideas workable (this is especially important for any app idea that requires a baseline data collection period) if the idea is to be developed and tested within the wider OpenLV project delivery timetable. Similarly, fundraising for programmer time could result in problematically long timetables for unincorporated groups, or those with few options other than national charitable trusts.

Community energy groups, many of whom already own generating assets, make up the majority of respondents to the survey. This is not unexpected, since the mailing list used would have been heavily skewed towards this type of group. If the trials are to include a range of different group types, the full recruitment phase will also need to look carefully at how non-community-energy groups can be encouraged to participate. Most likely, this will need to be achieved through targeted mailing and use of umbrella groups to promote the opportunity.

Again, the survey gives reason for cautious optimism on this front, since representative groups from local government, community regeneration charities, parish councils and universities all completed the survey, albeit in much smaller numbers than the community energy groups, which is understandable, given the higher numbers of community energy groups that were contacted in the first place.

Despite the areas of risk outlined above, this initial phase of the community engagement work gives overall confidence that recruiting enough community groups to deploy the 10 LV-CAP™ units allocated for Method 2 should be eminently possible. The key to increasing project impact will be in developing a recruitment process that ensures the participating groups are not replicating each other's work, but are offering distinctly different approaches to using LV data, and that development, data and fundraising timetables have been robustly assessed.

Appendix 1 – Survey contacts

The survey was circulated directly to 447 individual contacts on CSE's mailing list, drawn from the following types of organisation.

- 23 Local authorities
- 13 Housing associations
- 290 Parish councils and/or community regeneration charities
- 121 Community energy groups

In addition, the survey was circulated to around 100 contacts on Regen's mailing list, who had attended Regen & WPD network innovation events in the previous 2 years. There will have been some overlap with the 447, since CSE and Regen serve a very similar demographic.

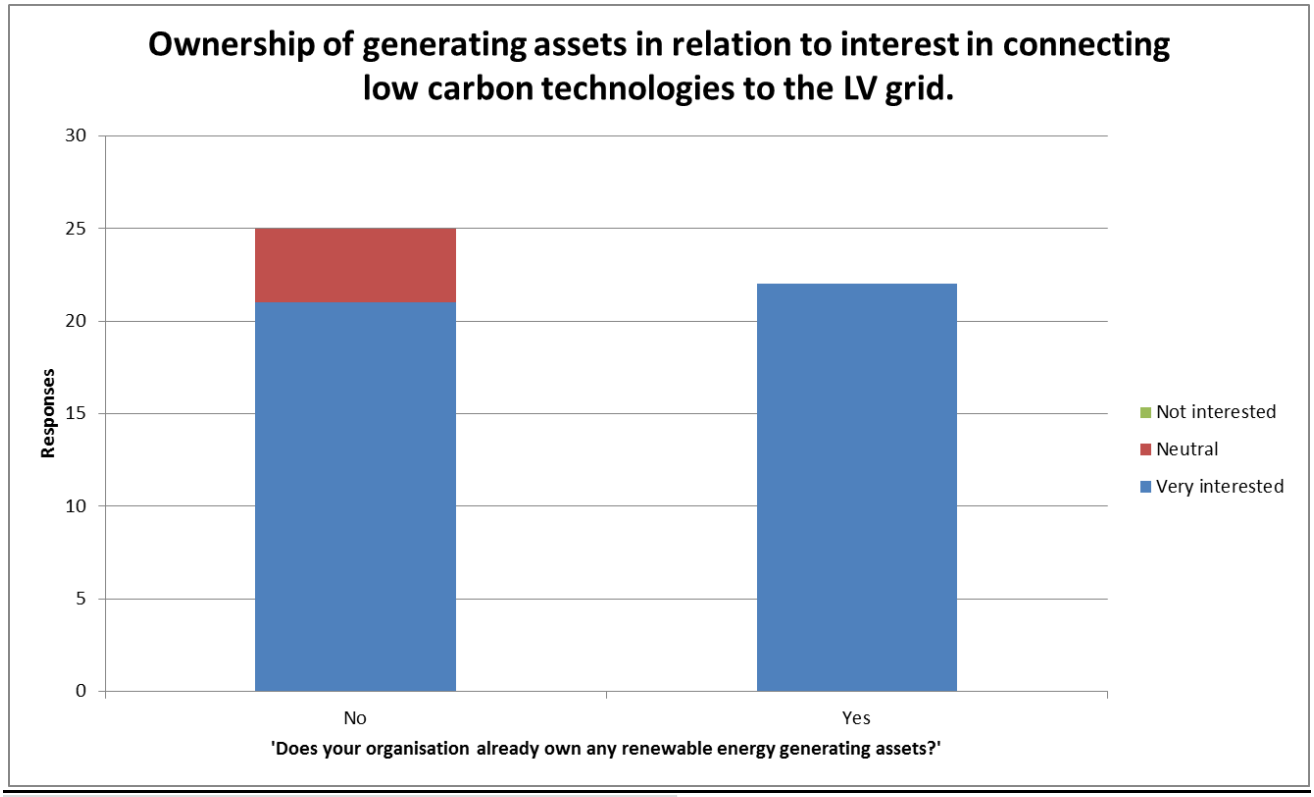
All direct mail contacts were within the WPD network area.

The survey was also sent directly to the following organisations with large membership groups who could have an interest in understanding LV grid data. In most cases, the link was followed up with a phone call to explain the purpose of the project and ensure that the link was passed on via newsletters. The short timetable for the survey opening time meant that it was not possible for all of these organisations to put the link into an official newsletter.

- **ACRE – Action for Communities in Rural England** (umbrella body for the 38 Rural Community Councils in England).
- **Transition Network** – umbrella body for the Transition Towns movement.
- **NALC – National Association of Local Councils** (umbrella body for all Town and Parish Councils).
- **LGA – Local Government Association** (umbrella body for all Local Authorities).
- **Community Land Trust** – Umbrella body for all local land trust (whose principal, but not sole, focus is on the development of locally-led housing projects).
- **Development Trusts Wales** – Umbrella body for community development trusts in Wales
- **Locality** – Umbrella body for community development trusts in England, and national support programme lead for DCLG Neighbourhood Planning support.
- **National Housing Federation** – Umbrella body for Housing Associations and Registered Social Landlords
- **National Custom and Self-build Association** – umbrella body for self-build and co-housing groups.

Appendix 2 - Full survey text

Appendix 3 - Relationship between renewable energy asset ownership and app type



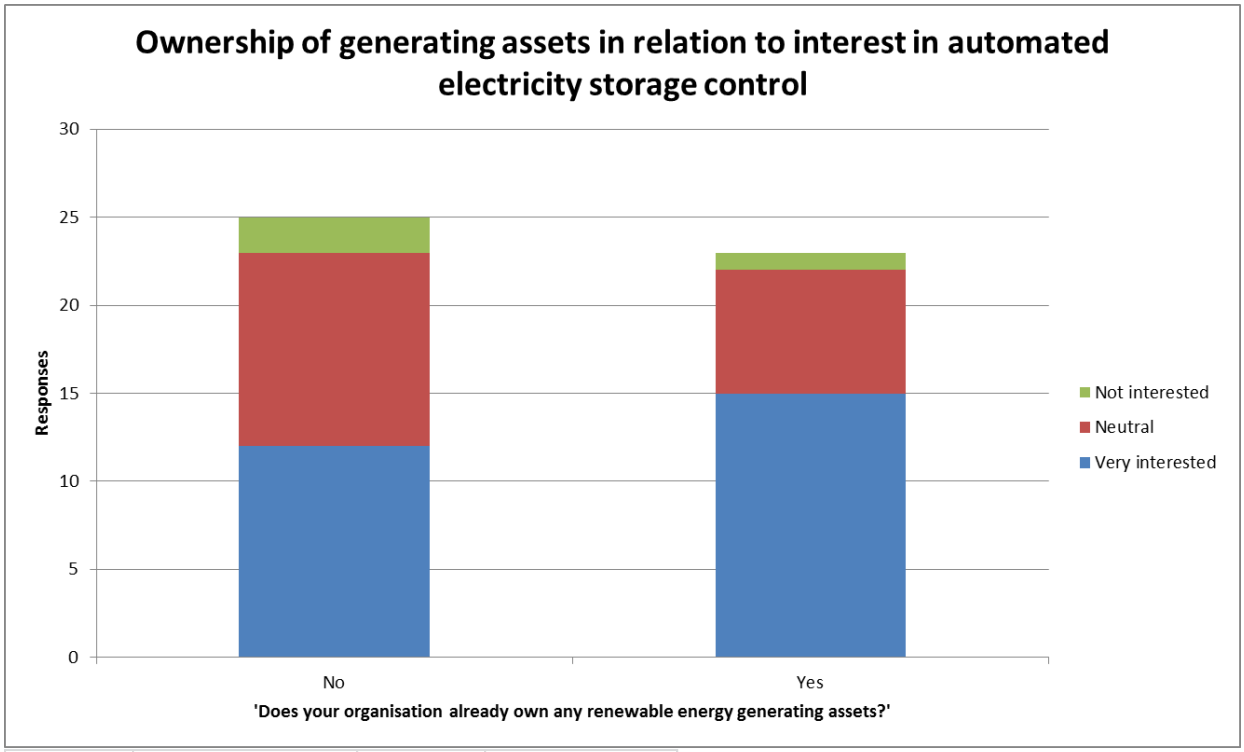
	Very interested	Neutral	Not interested
No	21	4	0
Yes	22	0	0

Figure 1: Asset ownership and its relationship to interest in apps that support connecting low carbon technologies to the grid.

All of those who own generating assets are 'very interested' in using this app, which was not unexpected, since, most community energy groups are interested in expanding their asset portfolios, and some will have a cushion of investment capital and a robust member base on which to base the finances of future projects.

More surprising is that most respondents who don't own generating assets are also 'very interested' in apps of this nature. The prevailing attitude among community energy groups is that, for start-ups, building profitable generation projects is becoming increasingly difficult due to changes in policy. This high level of interest could reflect increasing confidence, but it may also reflect a lack of understanding of these difficulties by more fledgling groups. This suggests that the next stage of the project, full recruitment of participating groups, will need to determine how realistic any plans are from less

experienced groups who are intending to use OpenLV data to underpin a business plan for new generating capacity.

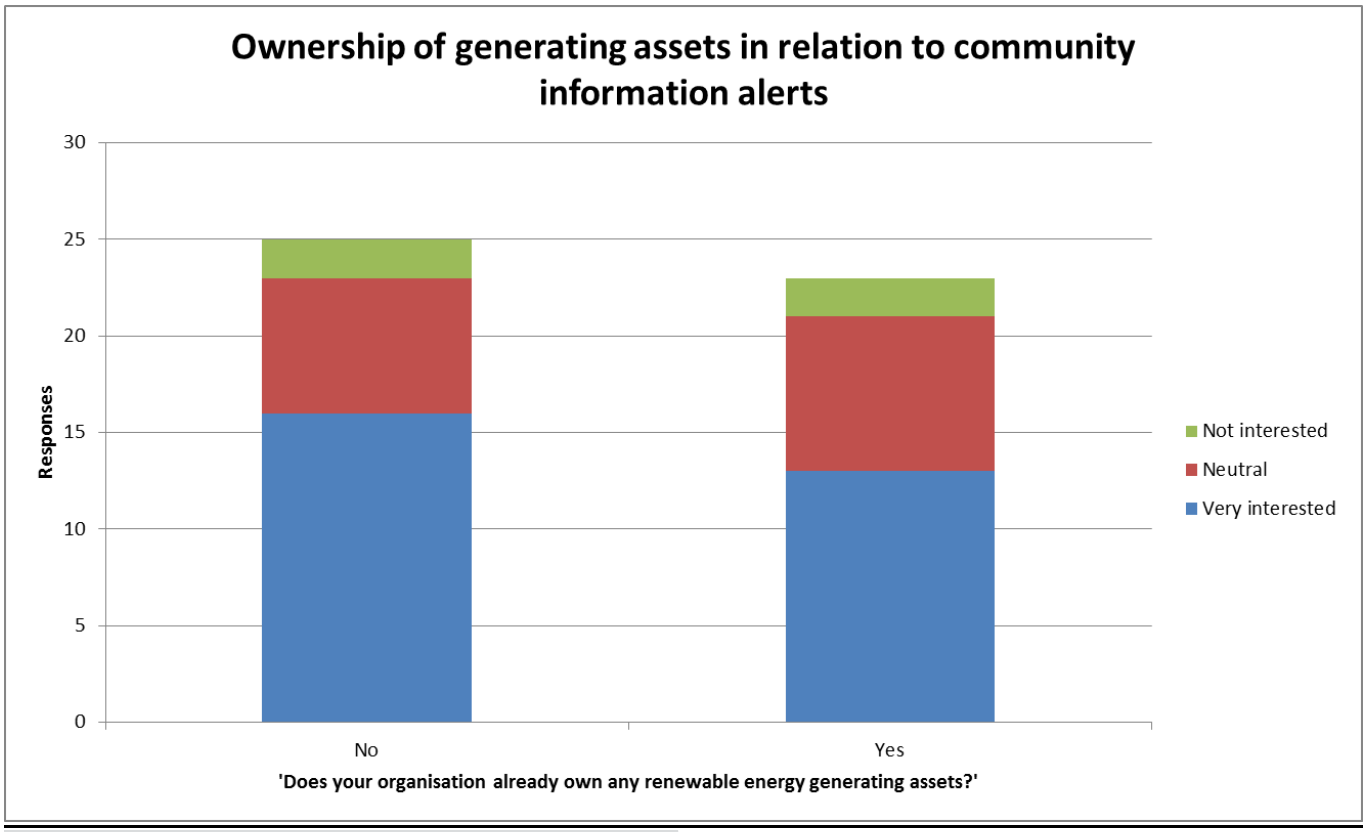


	Very interested	Neutral	Not interested
No	12	11	2
Yes	15	7	1

Figure 2: Asset ownership and its relationship to interest in apps that support automated storage control

Again, a greater interest in this app is expressed by those who own generating assets, most likely because of hopes that it will allow them to maximise income and carbon savings.

There is still interest shown, however, by 12 respondents who don't own generating assets. As with the previous section, this may imply they are interested in generating their own renewable energy in the future and are interested in methods that could make projects that are currently uneconomical to develop into viable business prospects. However, this does again point to a need to interrogate the plans of applicants during the full application process. While the storage field is very fast moving, research in the last year has suggested integrating storage with new or existing generation assets is not necessarily the panacea the community energy sector has been hoping for.

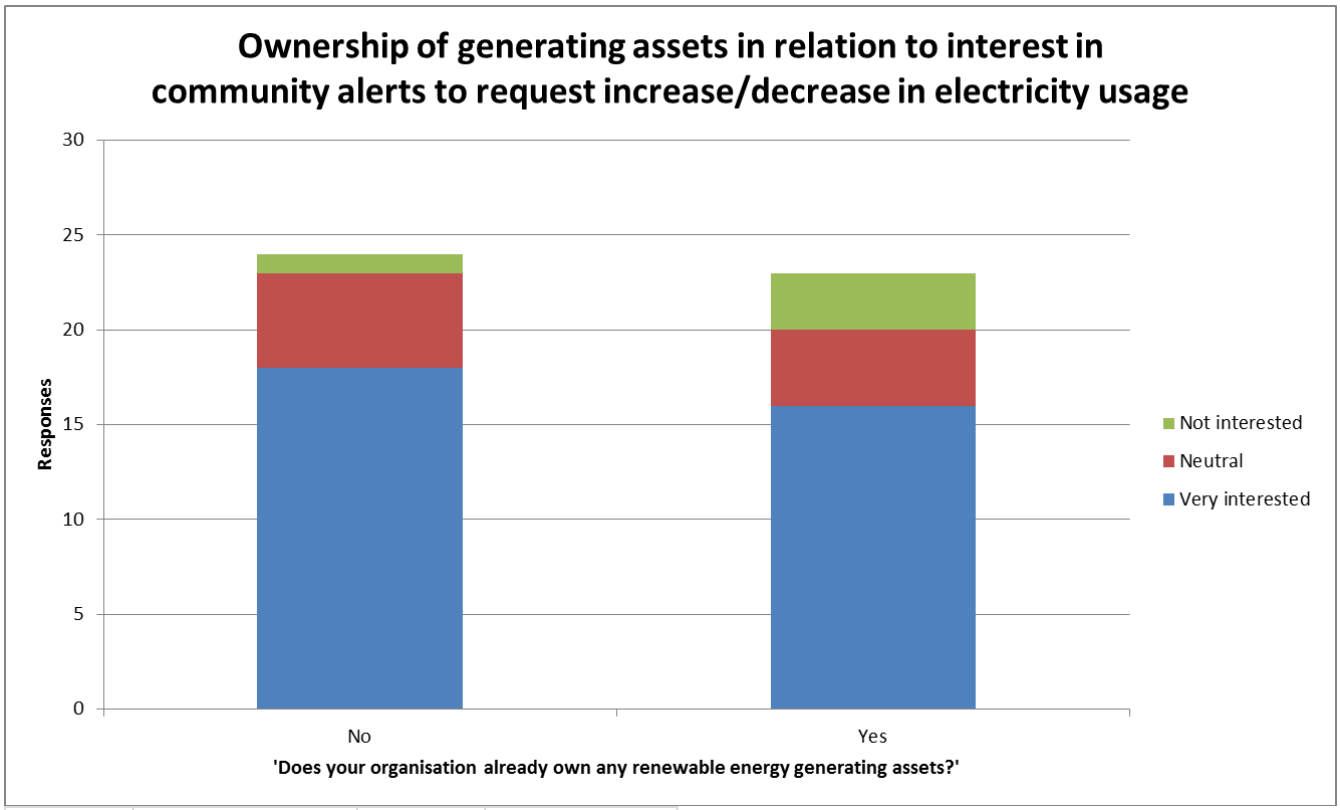


	Very interested	Neutral	Not interested
No	16	7	2
Yes	13	8	2

Figure 3: Asset ownership and its relationship to interest in apps for community information alerts

Whilst the majority of both groups are 'very interested' in this app, asset ownership does not seem to be the main driver of interest. Indeed, it is notable that a significant proportion of both owners and non-owners are either 'neutral' or 'not interested'.

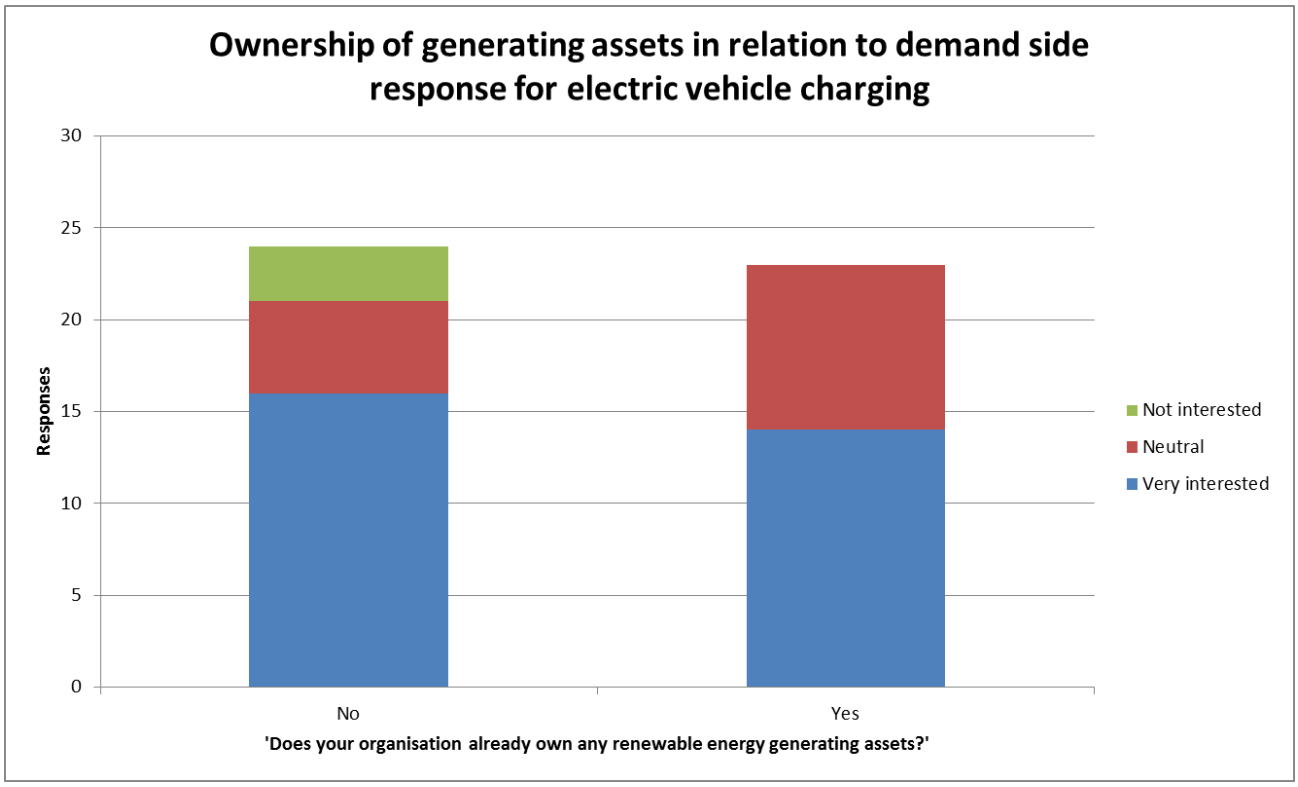
It may be that the term 'community information alerts' is a rather broad term, and can be interpreted in a number of ways in comparison to other app ideas suggested, but given the community orientated nature of the other app suggestions, it is a little surprising to not see more interest.



	Very interested	Neutral	Not interested
No	18	5	1
Yes	16	4	3

Figure 4: Asset ownership and its relationship to interest in apps that produce community alerts to increase/decrease consumption

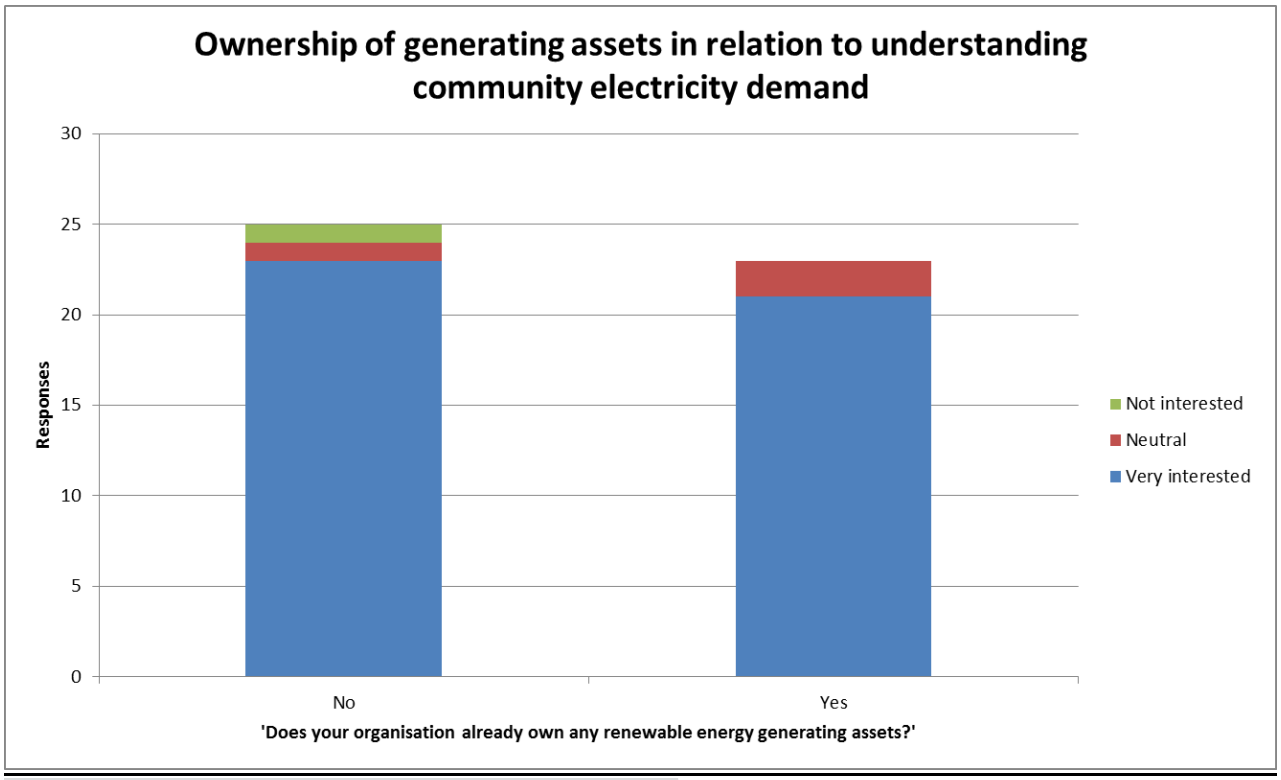
There is slightly more interest for this app than the app for 'community information alerts', possibly because it is better defined. Ownership of generation assets does not seem to be driving interest in this app.



	Very interested	Neutral	Not interested
No	16	5	3
Yes	14	9	0

Figure 5: Asset ownership and its relationship to interest in apps that support electric vehicle charging

Both groups express some interest in this app, with the majority 'very interested', though both groups also have a significant number of respondents who are either 'neutral' or 'not interested'. There some relationship with asset ownership, in that the only respondents who are 'not interested', are those who do not own any renewable energy generating assets. This may be reflective of the aims of the respondents. Those who do not own any generating assets were more likely to have described energy projects focused on fuel poverty or using energy more efficiently, whilst those who do own generating assets are perhaps more interested in further developing their low carbon ambitions.

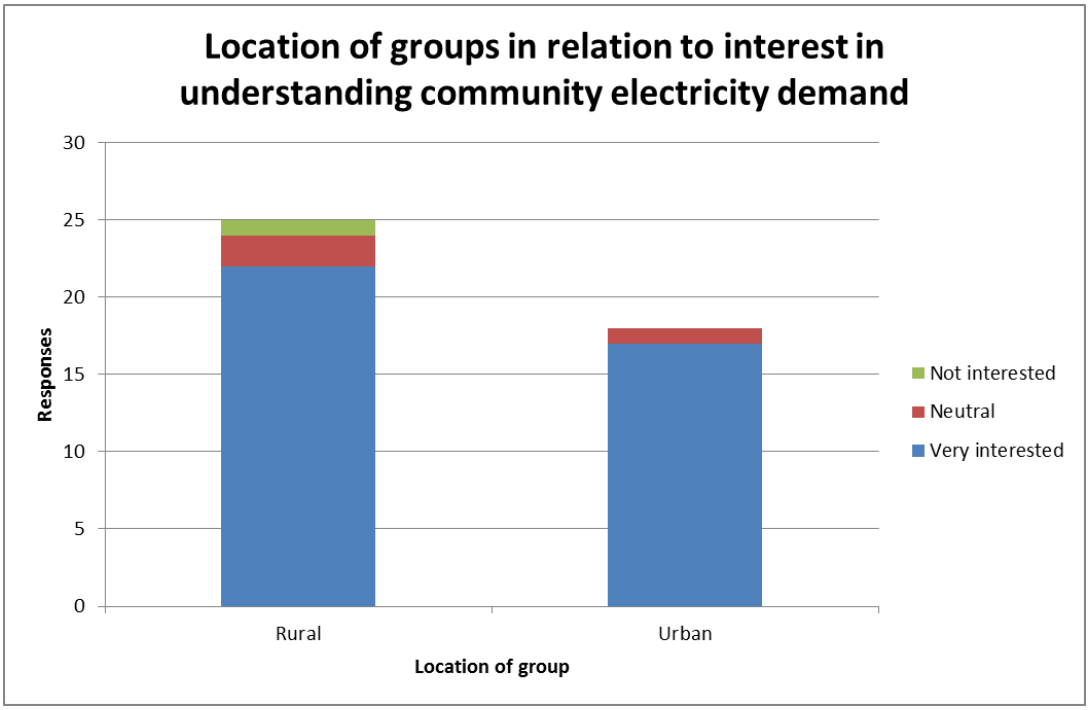


	Very interested	Neutral	Not interested
No	23	1	1
Yes	21	2	0

Figure 6: Asset ownership and its relationship to interest in apps that support understanding community electricity demand

Great interest is shown by both groups towards this app idea, with the vast majority being 'very interested'. Whilst a few respondents are 'neutral' or 'not interested', this app will benefit both groups by encouraging efficient electricity usage.

Appendix 4 - Relationship between rurality and app type

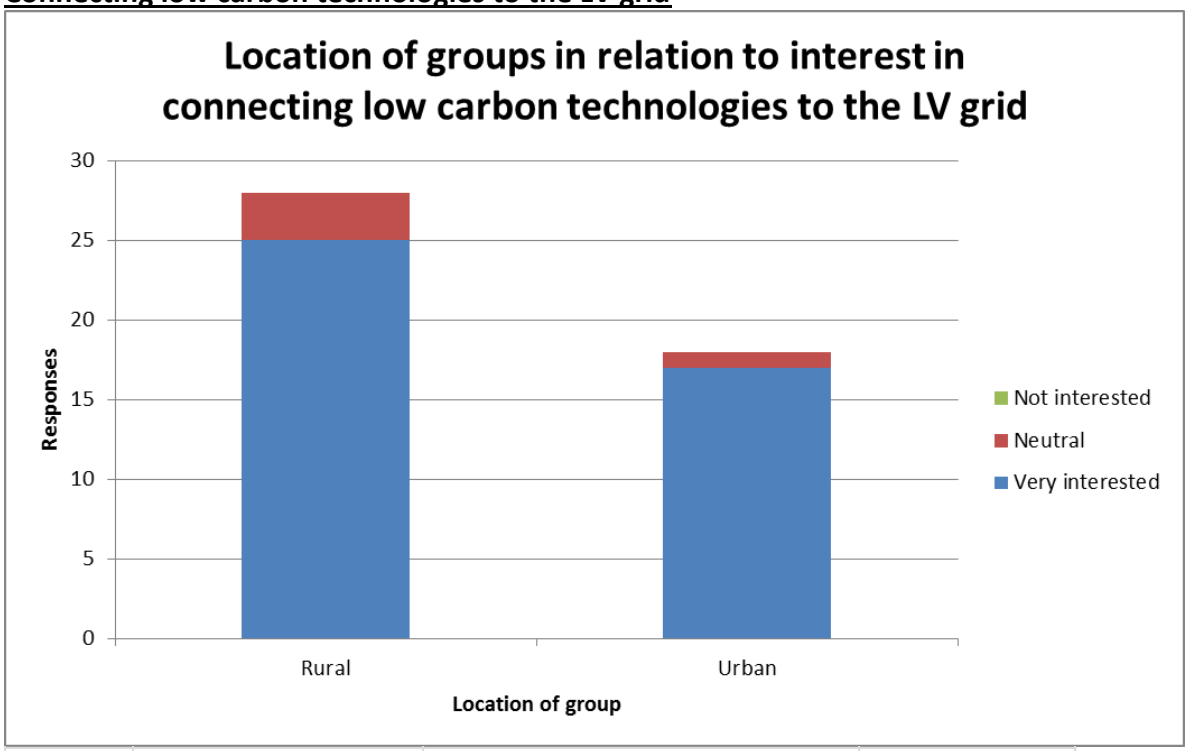


	Very interested	Neutral	Not interested
Rural	25	2	1
Urban	17	1	0

Figure 1: Rurality and its relationship to interest in apps that support understanding community electricity demand

Urban communities appear to show slightly more interest in understanding community electricity demand. This could be seen as a result of just one rural group being un-interested, or could be interpreted that groups that have more people on one substation may find it more useful than those who have fewer people relying on a single substation.

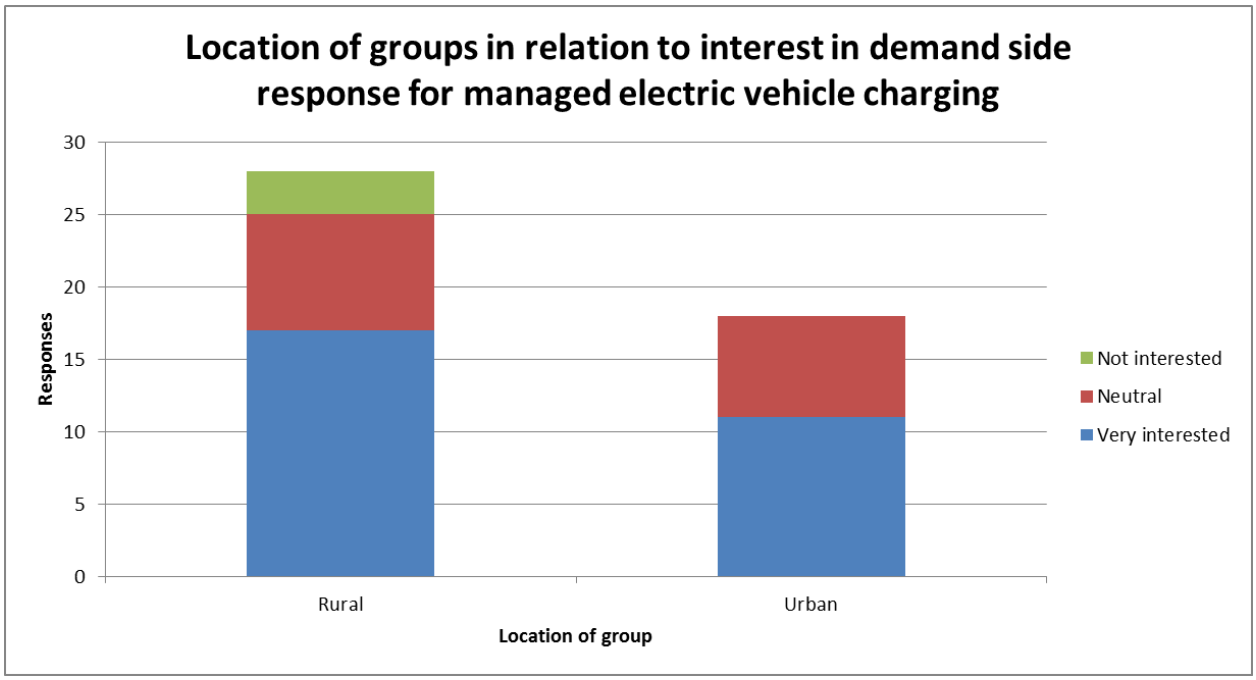
Connecting low carbon technologies to the LV grid



	Very interested	Neutral	Not interested
Rural	25	3	0
Urban	17	1	0

Figure 2: Rurality and its relationship to interest in apps that support connecting low carbon technologies to the LV grid

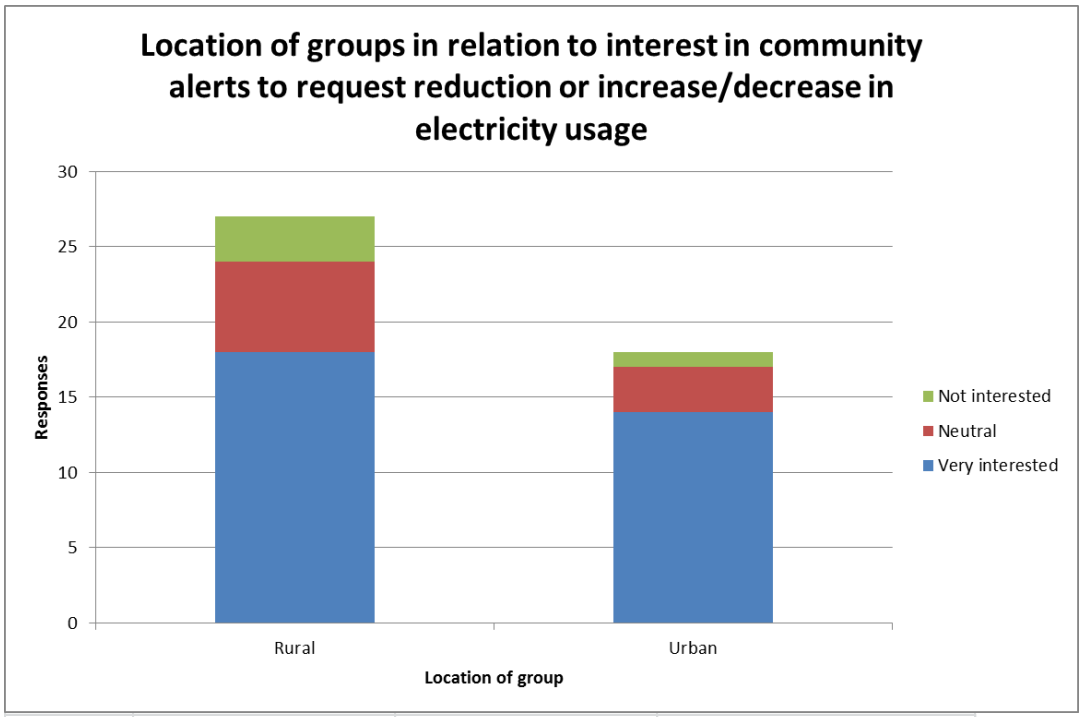
Both rural and urban groups express much interest in this app idea, and it most likely reflects a general interest in community groups looking into energy activity in developing their own assets. As previously mentioned, a key step in the recruitment of groups from this point on will be assessing how realistic their assumptions are about how straightforward it might be to develop such projects. Rurality, in and of itself, does not seem to be a significant driver of interest in this.



	Very interested	Neutral	Not interested
Rural	17	8	3
Urban	11	7	0

Figure 3: Rurality and its relationship to interest in apps that support electric vehicle charging

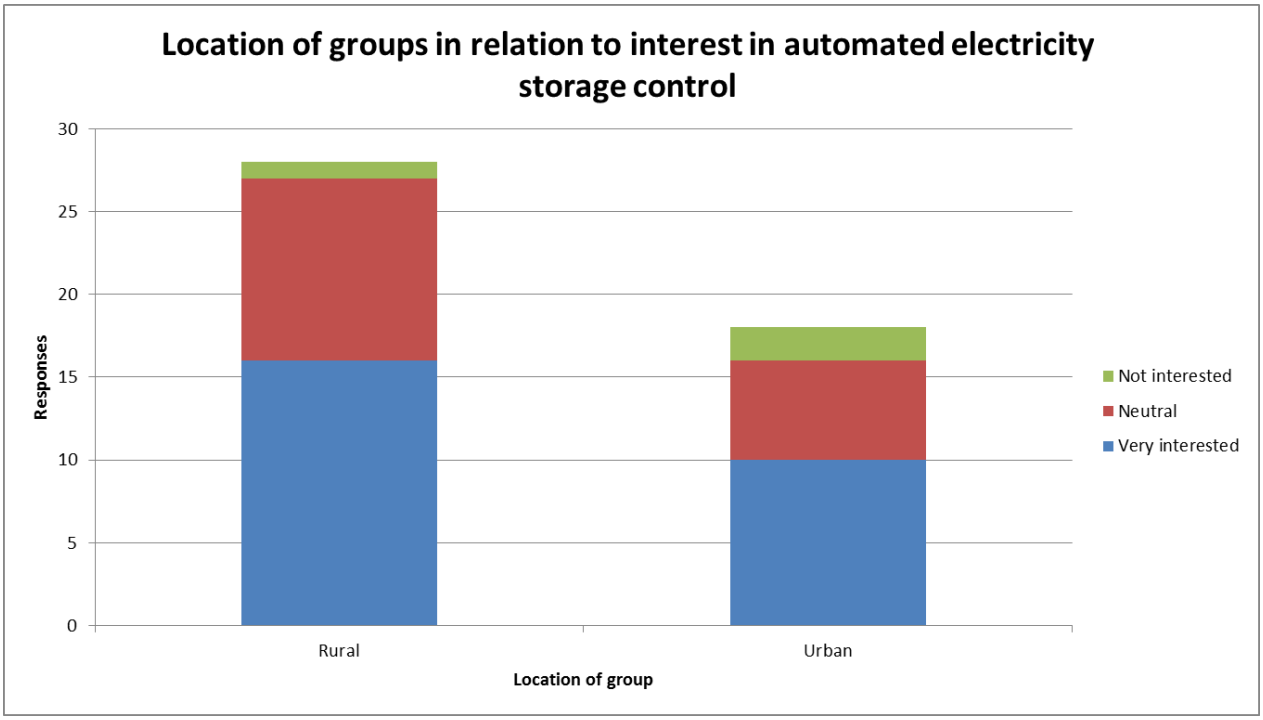
One might expect urban groups to show greater interest in electric vehicle based activity, as EV projects are more feasible in dense, urban areas where they would be used for short journeys and charging stations would be more accessible. 65% of urban respondents say they are very interested in apps to support EV charging, which is higher than the proportion of rural respondents and suggests that there should be opportunities to pursue these projects even if rural communities cannot participate for technical reasons.



	Very interested	Neutral	Not interested
Rural	18	6	3
Urban	14	3	1

Figure 4: Rurality and its relationship to interest in apps that deliver community alerts to increase/decrease consumption

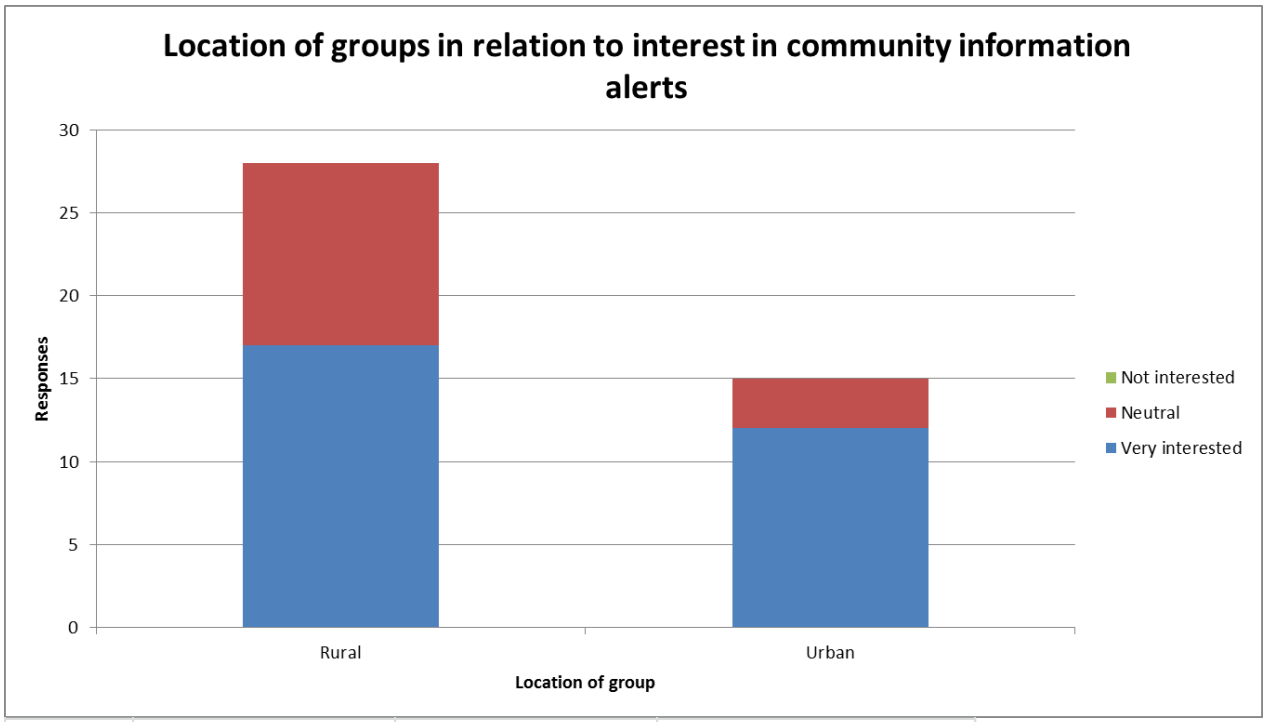
Both rural and urban groups show a majority who are interested in this app idea, but a significant proportion of both are either neutral or not interested. These results are similar to those shown when groups are divided into those that possess and do not possess generating assets, suggesting that it is a reflection of the aims of these groups (i.e. some aim to reduce usage and combat fuel poverty, while others are more focused on carbon emissions or local economic resilience). Rurality does not seem to be an influence.



	Very interested	Neutral	Not interested
Rural	16	11	1
Urban	10	6	2

Figure 5: Rurality and its relationship to interest in apps that support automated electricity storage control

Both rural and urban groups have around 56% of respondents saying they are very interested in this idea, and a similar proportion saying they view this app in a neutral light, or as one they are not interested in. Once again, rurality seems to play little part, and interest is more likely to be linked to possession of generating assets than location of the group.



	Very interested	Neutral	Not interested
Rural	17	11	0
Urban	12	3	0

Figure 6: Rurality and its relationship to interest in apps that deliver community information alerts

There is at least some interest from all groups in this idea, though it is interesting to note that rural groups produced significantly more 'neutral' responses than urban groups. This could be down to the differing aims of the respondents.