1   Appendix B – Methodology

1.1.   Overview

The State of the Sector community energy report is based on the collation of data from several sources and aims to form the most comprehensive overview of the community energy sector in England, Wales and Northern Ireland during 2017.

The State of the Sector 2018 is the first annual review following Community Energy England's inaugural State of the Sector report ('First Report') released at the UK Community Energy Conference in June 2017.

The report uses data obtained from a variety of sources, though primarily focused on data obtained through an in-depth online survey. It is important to note that the response rate to the online survey does not constitute a complete picture of the community energy sector, with further research techniques employed to bridge gaps in the data where necessary.

This appendix will provide an overview of the research design, sampling and data gathering techniques, and means of analysis. All actions and assumptions made within the research are detailed below.

1.2.   Research Design

Several key resources provided a basis for the research, including:

- The first State of the Sector report and database;
- Community Energy England's Members Directory;
- Community Energy Wales' Members Directory;
- Scene Connect's Energy Archipelago Database[1].

Drawing on these resources, a revised database was drawn up to include organisations who participated in the last State of the Sector survey as well as newly identified or constituted community energy organisations.

The First Report's survey database provided a platform to build a revised online survey, which was made available from the 16th January 2018 – 23th February 2018.

1.3.   Sample Definition

Two key variables were used to ensure that all respondents could be considered both 'community' and 'energy groups.'

Community organisations were defined as organisational bodies owned or managed (entirely or in part) by a number of 'community actors' to the benefit of the local area or people. Due to the complexity and often grey area between local and community initiatives, only groups with community reinvestment and development listed as a focal point were included. Particular focus on registered community benefit societies (BenCom), Community Interest Companies (CIC) and Cooperatives helped to reduce sampling errors in this regard. All data was verified to ensure the community element of the project was definable and agreed upon before inclusion.

---

[1] Mapping interface accessible at: www.energyarchipelago.com

Due to a sectoral trend of utilising special purpose vehicles (SPV) to own or manage energy assets or initiatives, all groups were processed for duplication across a wide range of variables to ensure double counting of data did not occur.

Where non-community groups were involved in partnership projects, the survey explicitly asked for ownership structures and percentages to ensure the community element of the projects in question were captured.

Energy groups were defined as being involved in one or more of the below activities:

- Energy generation (including electricity and heat);
- Energy supply;
- Energy storage;
- Energy efficiency (including advice, service provision and funding);
- Demand reduction (including advice, service provision and funding);
- And, electric vehicle or low carbon transport initiatives.

As with the community credentials of the respondent groups, all data was verified to ensure that they met the sample criteria as an 'energy group.'

As the report aims to define the 'State of the Sector,' data was collected solely for groups with active or imminently active projects (e.g. currently or soon to be generating electricity or providing energy efficiency improvements). There are a large number of groups aspiring to deploy low carbon technologies or initiatives but are in early stages, or currently outside the criteria set out above. This limited the research to identifying and surveying the 'active' part of the community energy sector, thus focusing on groups contributing to carbon reduction and providing local community benefits.

1.4.   Data Collection

1.4.1.   Foundation Data

Data collected prior to the study by the project partners was used as a basis for identifying and contacting new community energy groups, with identified groups approached for surveying.

A contact database was created using contacts from the first State of the Sector project, augmented through desk-based research of community energy groups within the sampling criteria.

All identified organisations were then included in the survey outreach stage, firstly as a candidate for online surveying and latently for desk-based research.

1.4.2.   Desktop Research

The primary source of contact information was the first State of the Sector research project, which surveyed 144 community energy organisations and identified 222 organisations in total. These organisations were verified to be active and still relevant to the research before inclusion.

Web searches of umbrella groups within the community energy sector (e.g. Energy4all, Low Carbon Hub, Sharenergy) provided access to aggregated details on new community energy groups. Further investigation of specific community energy news and organisational websites was also used to obtain basic details about community energy organisations, including contact details.

Secondary data was collected at a later stage of the research, to ensure that double counting groups who had responded to the online survey was not an issue. Data collection focused primarily on groups identified and verified as 'community energy' groups but whom had not responded to initial survey requests.

Due to limited coverage of community energy activities, as well as limited resources to update organisational websites, only active projects that were verified to be generating power or offering energy services were included. This was achieved through the selection of data sources within specified timeframes (Jan – Dec 2017), as well as groups with concrete evidence of their activity (i.e. evidence that organisations had completed and are still operating their project(s)).

Of the 78 organisations who were selected for desk-based research as part of the First Report, 38 responded to this year's survey. A number of those who did not respond were found to be no longer active, incorporated into wider community energy entities (e.g. Low Carbon Hub) or uncontactable. Those no longer active or uncontactable were discounted from the survey and data collection database.

1.4.3. Surveying

Surveying was primarily achieved through the use of an online survey, designed using the online platform SoGoSurvey[2]. The full survey document can be found in Appendix C.

The survey was designed in line with the initial database to provide an overview of the sector through several key themes:

- Organisational information
  - Including governance, human resources and legal structures
- Primary and Secondary Activities
  - Including electricity and heat generation, energy efficiency, demand management, and transport.
- Finance Raising
  - Including development funding and investment.
- Community Outcomes
  - Including financial, environmental and social benefits.
- Sectoral policy, barriers and future outlook

Deviating from last year's survey, 4 separate surveys were conducted a part of the State of the Sector 2018. This included a survey for repeating organisations, new organisations (i.e. did not participate in last year), organisations with stalled or inactive projects and a Welsh specific survey.

In total, 228 community energy organisations were included within the State of the Sector 2017. This included:

- 115 returning organisations
- 47 newly identified organisations
- 9 stalled projects
- 57 unsurveyed organisations

In total 171 organisations responded to the State of the Sector survey, with desktop research used to gather data on the further 57 identified organisations who did not respond.

Of the 144 organisations surveyed as part of the First Report, 27 did not respond to this year's survey due to reasons including a lack of contact, lack of organisational capacity to complete the survey or because groups had wound up their operations.

---

[2] www.sogosurvey.com

1.5.   Analysis

The first stage within data analysis was to collate and clean the data, due to the openness of many questions asked within the survey and the variant data gathering techniques utilised.

The database was separated in line with the survey structure to enable more efficient analyses, with data cleaned into string and numeric values. Where data was considered insufficient or incorrect (e.g. erroneous generation values), a non-response value was recorded. The database was organised into sections including:

- Organisational details (including focus, networks, human resources, etc)
- Activities (including generation, energy efficiency, etc)
- Stalled Projects
- Funding & Finance
- Geography (including generation and organisation activity sites / areas)

Analysis focused on providing an accessible understanding of the community energy sector in England, Wales and Northern Ireland through aggregated statistical analysis, mapping and qualitative data presentation. Data was analysed using Tableau, allowing for the creation of infographics detailing the state of the community energy sector. Quantum GIS was used to conduct heat map and locational analyses.

Survey data from stalled or inactive projects was processed qualitatively, providing subsidiary evidence of the barriers to community energy development.

1.6.   Carbon Reduction Calculations

All carbon emission reductions have been calculated using UK Government emission conversion factors, published by the Department for Business Energy & Industrial Strategy (BEIS) on the 4th August 2017.

Renewable electricity technologies, including wind, solar photovoltaic and hydroelectric generation, are compared against a national grid carbon intensity of **0.35156 kg CO_2e per kWh.**

Total electrical energy generated = 202,071,925 kWh
Total carbon saving of 202,071,925 kWh x 0.35156 kg/CO_2e = **71,040,406 kg CO_2e**

Renewable heat technologies, including biomass, ground-source heat pumps and air source pumps were compared against a blended average carbon intensity of **0.2277 kg CO_2e per kWh** to include gas (0.215 kg CO_2e per kWh), oil (0.320 kg CO_2e per kWh), electric (0.148 kg CO_2e per kWh) heating sources.

Carbon emissions from renewable technologies included biomass (0.02089 kg CO_2e per kWh) and heat pumps (0.037 kg CO_2e per kWh).

Total generation = 3,173,154 kWh
Business as usual (BaU) carbon emissions = 3,173,154 kWh x 0.2277 kg/CO_2e= 722,527 kg CO_2e

Biomass energy generated = 2,715,667 kWh
Total carbon emissions from biomass = 2,715,667 kWh x 0.02089 kg CO_2e = 56,730 kg CO_2e

Heat pump energy generated = 457,486 kWh
Total carbon emissions from heat pumps = 457,486 kWh x 0.0370 kg CO_2e = 16,927 kg CO_2e

Total carbon reduction = Business as usual – renewable heat generation emissions (biomass + heat pump)

$$722{,}527 \text{ kg CO}_2\text{e} – (56{,}730 \text{ kg CO}_2\text{e} + 16{,}662 \text{ kg CO}_2\text{e}) = \textbf{649{,}135 kg CO}_2\textbf{e}$$

Totals
Electricity generation carbon saving: **71,040 tonnes CO$_2$e**
Heat generation carbon saving: **649 tonnes CO$_2$e**

All calculations have been reported in tonnes of Carbon Dioxide Equivalent (tCO$_2$e) and rounded to the nearest thousand for electricity generation and nearest ten for heat generation.

1.7. Ethics

All data collected within both the surveying and desk-based research, including all contact details, were processed in anonymous forms and not shared outside the project team.

Privacy questions within the online survey allowed respondents to authorise the use of more in depth case studies within our reporting, as well as allowing their data to be displayed on Community Energy England's Community Energy Hub.

All contact information has been securely stored within protected database files, with all outputs anonymised in line with 2018 GDPR principles. Data sharing has and will only be undertaken with the expressed authorisation of the respondent (included in the survey consent form) and will be anonymised and shared under a strict non-disclosure agreement to third parties.

Where case studies were used, respondents were asked to review and confirm the study before the report was finalised.