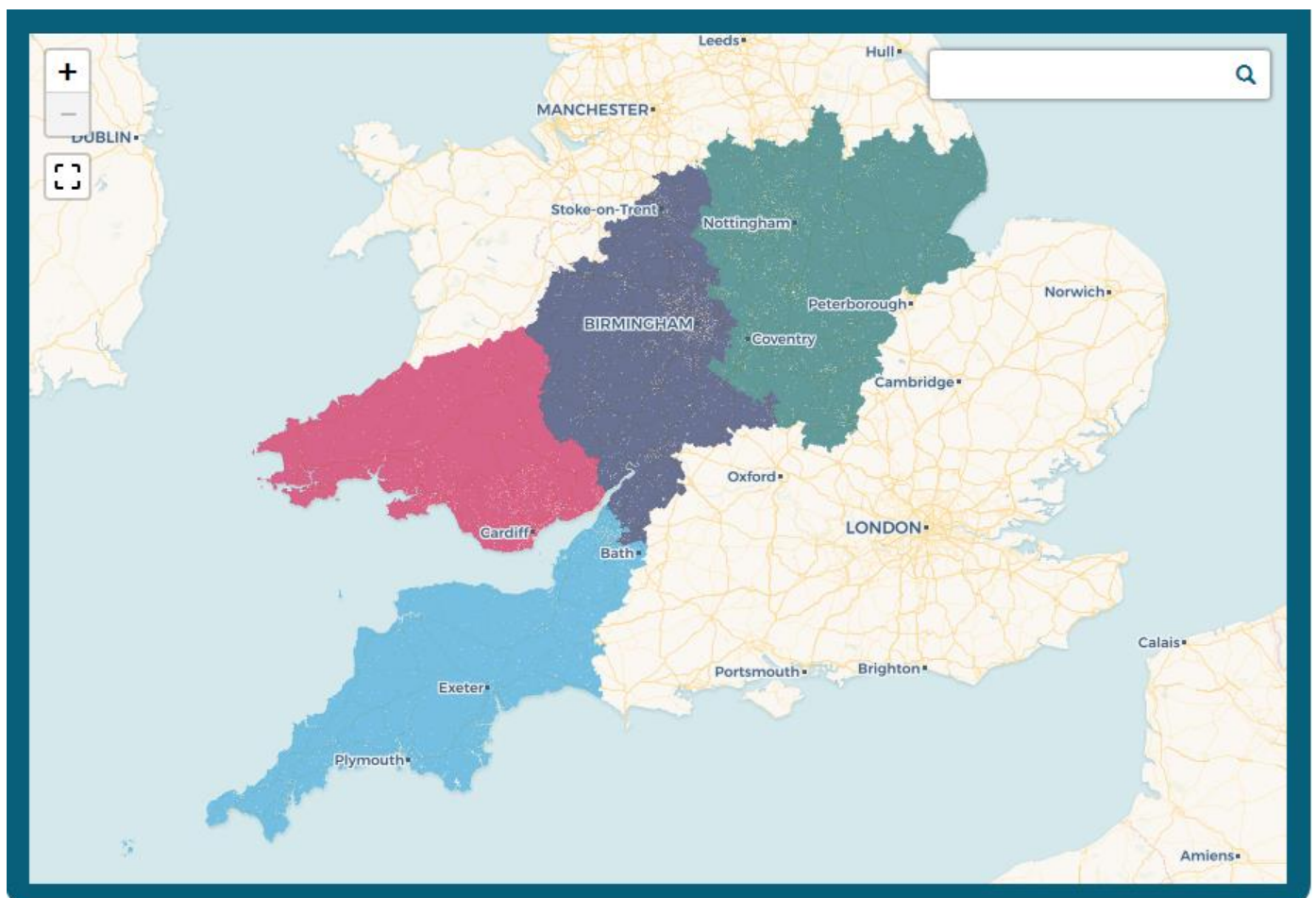


# Western Power Distribution Social Indicator mapping: Data sources and user guide



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## 1 Introduction

In 2019, CSE was commissioned by Western Power Distribution (WPD) to produce a web application that mapped different social indicators, statistics on vulnerable circumstances and Priority Services Register data across WPD's distribution area, including the South West, South Wales, West Midlands and East Midlands distribution regions.

Underpinning the map was a data set compiled from multiple data sources. This report outlines the process of deriving the data set and the list of individual sources of data included in the application. Section 2 provides an overview of the project and methods used. Section 3 of this report provides an overview of the data sources used in developing this data set, and indicates which data sources were used to derive each indicator, the sources of this data and the date it was published.

The web application and maps can be found online at:

<https://www.westernpower.co.uk/customers-and-community/priority-services/social-indicator-mapping>

## 2 Overview of method

The process used to develop the web app involved two main stages:

1. Data collection and processing to develop data sets that represented multiple indicators vulnerability at different geographies across WPD's distribution network area.
2. Web development of an online tool that visualised and mapped the derived data, and which allowed users to explore and identify different social indicators and vulnerable situations.

The data processing stage was conducted using R software, and focused on producing data sets at Lower Super Output Area (LSOA) and local authority level. (LSOAs are described in more detail below in Box 1.)

As part of the analysis, all LSOAs across WPD's distribution area were identified. The unique LSOA code was used as a data spine with which to join a range of different data sets published by a variety of different authorities. Data was processed so as to represent both numbers of people in vulnerable situations (e.g. the number of households in fuel poverty) and also the proportion of people in a vulnerable situation (e.g. the proportion of all households in an LSOA that are in fuel poverty).

As described in more detail below, both open data sources and data owned by WPD were used in the web application.

### **Box 1: Lower Super Output Areas (LSOAs)**

A Lower Layer Super Output Area (LSOA) is a geographic area and is part of a geographic hierarchy designed to improve the reporting of small area statistics in England and Wales. LSOAs are built from groups of contiguous Census Output Areas (COAs) and have been automatically generated to be as consistent in population size as possible, and typically contain from four to six Output Areas. The minimum population is 1000 and the mean is 1500. There is a LSOA for each postcode in England and Wales.

### 3 Data sources

The data compiled for the web app relied on data from three key sources: open data presenting small area statistics; data provided by WPD; community group data provided by Regen SW (via WPD)

#### **Open data**

##### **Vulnerability data and social indicators**

The main data sets used to identify vulnerable situations and derive social indicators came from open data sources, such as those freely available from sources such as ONS, Census 2011, Government departments and other organisations. These are available at various different geographic granularities, such as local authority, LSOA and some at postcode level. The lower the level of granularity, the more useful the data can be at pinpointing small neighbourhoods that contain a disproportionately high level of vulnerable individuals or households. However, for various reasons (e.g. concerns surrounding disclosure), most data is not available at levels below LSOA, hence this was the predominant level of geographical granularity used in the mapping.

The full list of data fields that are presented on the social indicator map are provided overleaf in Table 1, which includes the sources of the data and the year of publication. Some of these data sources required significant processing. For example, to represent EPC data at LSOA level, a large set of address level files (one file for each local authority in England and Wales) were processed. All records which were rated in EPC band E or below were identified and this data was then aggregated to LSOA level.

The majority of the fields listed in Table 1 were also aggregated to local authority level and this data was also presented on the map. Users of the web application can switch between 'LSOA mode' and 'Local authority' mode.

A further set of health data was added to the map at local authority level and can be explored when operating the application in 'local authority' mode. This data describes the prevalence of certain illnesses and health issues derived from statistics published by Public Health England at local authority level, but not available at lower levels of geography. The full set of health data visualised on the map in 'local authority' mode is shown below in Table 2.

Some data is also published at postcode level, as shown below in Table 3. Off gas postcode data identifies which postcodes have no dwellings connected to the gas grid and this was represented on the web application by using point data for the centroid coordinates of each postcode. Off gas and on gas postcodes were colour coded differently. (Users can search the web app by postcode and the map will locate the postcode and identify whether the postcode is 'off gas' or not.)

Table 1: Social indicators presented in the WPD map at LSOA level and associated data sources

Data field	Geography	Data source	Year of publication
Under 5 years	GB	ONS	2018
Under 16 years	GB	ONS	2018
Over 65 years	GB	ONS	2018
Over 75 years	GB	ONS	2018
Over 85 years	GB	ONS	2018
Fuel poor household (England/Wales)	England, Wales	Department for Business, Energy and Industrial Strategy (BEIS) Welsh Government (StatsWales)	2018
Dwellings not connected to the gas grid	GB	BEIS	2018
Dwellings off gas, within 23m of gas grid	GB	BEIS	2018
Dwellings off gas, between 23-50m from gas grid	GB	BEIS	2018
Dwellings without a central heating system	GB	Census 2011	2011
Dwellings rated in EPC bands EFG	England and Wales	Ministry of Housing, Communities & Local Government (MHCLG)	2019
Dwellings electrically heated in EPC bands EFG			2019
Premises unable to meet broadband USO	GB	Ofcom (see postcode data)	2019
Households with no car	GB	Census 2011	2011
Combined distances to services (Score; deciles)	England, Wales	MHCLG (IMD) Welsh Government (WIMD)	2019
Children in low income households	GB	Census 2011	2011
People with low qualifications	GB	Census 2011	2011
People in low income employment	GB	Census 2011	2011
Long-term unemployment	GB	Census 2011	2011
Disability benefits	GB	DWP - Stat Xplore tool	2020
Child disability benefits	GB	DWP - Stat Xplore tool	2020
Mental health benefits	GB	DWP - Stat Xplore tool	2020
People in bad or very bad health	GB	Census 2011	2011
People whose health condition limits activities a lot	GB	Census 2011	2011
Air pollution(Index, deciles)	GB	Consumer Data Research Centre (CDRC)	2018
Access to health services (Score; deciles)	GB	Consumer Data Research Centre (CDRC)	2018
People providing over 20hrs/week of care	GB	Census 2011	2011
Number of residential care homes	England, Wales	Care Quality Commission Care Inspectorate Wales	2020
Number of care home beds	England, Wales	Care Quality Commission Census 2011 (Wales only)	2020
Households in private rented housing	GB	Census 2011	2011
Households in social housing	GB	Census 2011	2011
Lone parents	GB	Census 2011	2011
Ethnic minorities	GB	Census 2011	2011
Lone pensioners	GB	Census 2011	2011

**Table 2: Additional health indicators presented in the WPD map at local authority level.**

Indicator/data	Source of data
Chronic heart disease (prevalence - all ages)	Public Health England Public Health Profiles <sup>1</sup>
Chronic kidney disease (prevalence - 18+)	
Dementia (prevalence - all ages)	
Diabetes (prevalence - 17+)	
Hypertension (prevalence - all ages)	
Mental health (prevalence - all ages)	
Stroke (prevalence - all ages)	

**Table 3: Social indicators presented in the WPD map at postcode level.**

Indicator/data	Source of data
Postcodes in which all dwellings are off gas	Xoserve <sup>2</sup>

### ONS Postcode Directory

The ONS Postcode Directory (ONSPD) is a data set that combines information from a range of sources including Royal Mail, Ordnance Survey, National Records of Scotland, Land & Property Services (Northern Ireland) and ONS. It links all current and terminated UK postcodes to a wide range of administrative, health and other geographic areas in which each postcode falls.

The ONSPD was used to link address level and postcode level data to LSOAs, and LSOAs to other administrative boundaries. It was also used to join WPD's Priority Services Register (PSR) data (see below) to LSOAs. The ONSPD is available for download from the Open Geography portal (ONS)<sup>3</sup>.

### LSOA and LA shape files

The LSOA data was joined to Lower Layer Super Output Areas (December 2011)<sup>4</sup> and Local Authority boundaries (December 2019)<sup>5</sup> obtained from the ONS Open Geography portal, in order to represent the data spatially.

<sup>1</sup> <https://fingertips.phe.org.uk/>

<sup>2</sup> This data is also available on the CSE website: <https://www.cse.org.uk/news/view/2441>

<sup>3</sup> <http://geoportal.statistics.gov.uk/>

<sup>4</sup> <http://geoportal.statistics.gov.uk/datasets/lower-layer-super-output-areas-december-2011-boundaries-ew-bgc>

<sup>5</sup> <https://geoportal.statistics.gov.uk/datasets/local-authority-districts-december-2019-boundaries-uk-bfc>

## **Data provided by WPD**

### **Distribution region shape files**

WPD supplied CSE with distribution network area GIS shape files, which detailed the boundaries of the WPD area and included the four separate distribution region areas (South West, East Midlands, West Midlands, and South Wales). This shapefile was used to identify all LSOAs that fall within the WPD distribution area and to identify the region in which each LSOA was located. By using this shape file, it allows users of the social indicator map to filter LSOAs to a specific 'WPD region' and focus the mapping on that region only if desired.

### **Priority Services Register data**

WPD also provided CSE with a set of pseudo-anonymised PSR records, containing the postcode of each PSR record currently held on the register. This postcode-level PSR data was aggregated and summarised by LSOA and by local authority to estimate total number of PSR records in a specific geographical area.

CSE estimated a theoretical total eligibility number for the PSR in each LSOA using external open data sources included in the core mapping data. For example, the age profile statistics published by the ONS were used to estimate the total number of persons in an LSOA and each local authority who could qualify for inclusion on the PSR due to being over pensionable age, being in bad health or being a young child under the age of five. The total estimate of PSR eligibility was compared to the total number of PSR records currently held on the register to estimate a 'PSR gap' – the difference between the total number of people who were estimated as being eligible for inclusion on the PSR and the total number currently registered.

As a result, the following data for was presented on the social indicator map:

- PSR: Estimate of total PSR eligibility (population)
- PSR: Total number of PSR records (from WPD data)
- PSR: Estimate of PSR gap (between eligibility and number of records)

### **Community Group Layer**

WPD also provided a list of Community groups from a review by Regen SW and this data set was used as a basis for developing a community group data layer. Additional research was conducted and staff within CSE's Local and Community Energy (LACE) team were consulted to search for additional community groups and validate existing groups on the Regen list. Projects were also reviewed for their current status and any defunct projects were removed. In addition, registered address details and project websites were identified to provide accurate location and further information for the projects on the WPD social indicator map, any found to be located outside of the WPD distribution area were also removed.

The final community group data set was converted into a data layer on the web application, with each community group located by a green dot. Additional functionality allowed users of the map to toggle this layer on or off to display or hide the community group data as desired. The layer was



interactive and allowed users to click on the community group to reveal a popup box with information about the project (as shown below in Figure 1). The regen data indicated whether the projects involved community energy generation and this information was used to code the dots on the map and also include in the popup box.

**Figure 1: Example of community group data available on the WPD web application**





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