



Who's On Our Wires?

Methodology Report: Social Indicators

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1. Introduction

Western Power Distribution (WPD) commissioned the Centre for Sustainable Energy (CSE) to help to develop a better picture of the households connected to WPD's network. The 'Who's On Our Wires?' project combines WPD's datasets about substations and customer locations with a range of other datasets to obtain an insight into the characteristics of customers attached to specific substations.

2. Project aims and outline

Project Aims

The project aims were:

- To create a database of customers (identified by MPAN and postcode only - no personal information has been used) and the substations to which they are attached.
- To use the database to inform the identification of substations likely to experience the highest increases in load over the period to the early 2020s (that is, covering the current price control period and the subsequent one, RII0-ED1), based on household data and (to a lesser extent) data about businesses. The project does not set out to model load, although where possible installed capacity figures are estimated. The project is focussed on looking at the characteristics of individual households which are attached to each substation, including the households most likely to increase demand or on-site generation. *This is the subject of a separate report.*
- To use the database to support targeting of affordable warmth and other social programme initiatives to customers. *This is the subject of the current report.*

Outline

This strand of the work covered in this report uses government statistics about benefits claims, disability and age to estimate which areas have the highest numbers of vulnerable people. This can help WPD find customers who should be on the Priority Services Register, and can also link with programmes aimed at alleviating fuel poverty, helping to fulfil WPD's social obligations in relation to fuel poverty.

WPD data on the number of customers currently on the Priority Services Register is also included in the model, for comparison.

The data is presented at LSOA level (a Census geography¹ with a minimum of 400 households) and at substation level.

¹ The 2001 Census areas are used because the latest available data on benefits etc at the time of production of the model used these areas. The Office for National Statistics has altered the boundaries of some areas between the 2001 and 2011 Censuses as the population of each Census geography has to stay within the set limits, but they also aim for stability in the boundaries where possible. Across all output area types (OA, LSOA and MSOA), no more than 5% had their boundaries altered. At the time of writing, Census 2011 data is still being released.

3. Social indicators

In order to use the database to support targeting of affordable warmth and other social programme initiatives to customers, we have developed some indicators which are referred to here as 'social indicators'. These indicators are based on LSOA-level government statistics². For this reason the indicators are first reported at LSOA level and then re-calculated to substation level. The indicators are provided in spreadsheets (separated into separate licence areas), at LSOA and substation level.

Domestic customers have been assigned to an LSOA based on their location, using a GIS operation. Where a customer record has no coordinates (true for 4% of domestic customers across the four licence areas), the customer is assigned to an LSOA based on the postcode. Given the size of LSOAs, which are much larger than postcode areas, a postcode match will in most cases be just as accurate as a match on exact location.

The ECO Score and PSR scores do not show the *number* of households in the area which meet the criteria for ECO Affordable Warmth³ / PSR, but a high score indicates that the area is likely to have more households which qualify than an area with a low score.

ECO Score - LSOA level

The following government datasets⁴ provide information at LSOA level about characteristics which are closest to the qualifying criteria for ECO Affordable Warmth:

- Number of individuals claiming Income Support and incapacity benefits
- Number of individuals claiming Income Support, who are also lone parents
- Number of individuals claiming Pension Credit Guaranteed Element
- Number of individuals claiming Disability Living Allowance who are under 16
- Number of individuals claiming Disability Living Allowance Mobility Award Higher Rate
- Households with more than one person with a limiting long-term illness

First, these numbers are added together. The resulting figure is likely to be close to the total number of individuals in an LSOA who fall into one or more of the categories above; it is not the exact number, as one individual may be counted in more than one dataset, and the figure also combines datasets about individuals with one a dataset about households. In addition, the government datasets are rounded to the nearest five and so are not exact numbers.

Next, the figure calculated above is reduced to reflect the fact that ECO Affordable Warmth is only available to privately owned or rented households. We have used Experian data to calculate the proportion of households in an LSOA which are in the private sector. The total, calculated in the first step above, is then multiplied by the private sector proportion. The ECO Score is the result of this

² An LSOA, or Lower Super Output Area, is a geography defined by National Statistics which contains a minimum population of 1,000 people and a maximum population of 3,000. In terms of households this is between 400 and 1,200. The statistics are for August 2011, as this was the most recent data available when the database was created.

³ ECO Affordable Warmth is a large scale energy-supplier funded insulation scheme which will provide free or discounted measures to qualifying households. ECO stands for Energy Company Obligation.

⁴ Data sources are given in the appendix on p.8.

operation. Therefore the resulting score attempts to get as close as possible to a count of qualifying individuals, but it should be borne in mind that the score is **not** the number of qualifying individuals. However, the score is useful for comparing LSOAs because those with a higher score should have higher numbers of qualifying individuals.

ECO Score - Substation level

For the substation level output, the scores calculated at LSOA level in the first step above are allocated at substation level. LSOAs cover larger areas than substations, so normally a substation is completely within an LSOA. In this case the substation is simply given the same score as the LSOA where it is located. Some substations straddle two or more LSOA areas, with some customers in one area and some in another. In this case the average of the totals for each LSOA covered is assigned, weighted according to the proportion of domestic customers in each LSOA. Therefore although at LSOA level the total is similar to (but not the same as) the number of qualifying individuals, at the substation level the score is simply a way of comparing different substations.

The second step (reducing the score to reflect the number of private sector households) is re-done at substation level, and so the resulting score can end up being very different from that of the corresponding LSOA. Again (but even more so at substation level), the score should not be interpreted as the number of individuals or households, but rather be used as a way of comparing different substations, with higher scores indicating a higher likelihood of the area having more qualifying individuals.

In the WPD customer data, a small number of substations appear to have one or more customers located far from the other customers on the substation. This could be because the customer record is linked to the wrong substation, or because the customer is linked to the correct substation but the customer's coordinates are wrong. Although it is possible to tell that there is something wrong with the locations of one or more customers on a substation, it is not always possible to tell which customer record has the error (at least, with a dataset of this size - in a smaller dataset the locations of each customer could be checked visually).

In the outputs we have added a flag to the substations which appear to have at least one customer in the wrong location, because where a customer is in the wrong location they may have been matched to the wrong LSOA, meaning that the substation-level score will incorporate data from an LSOA that should not be included. Therefore the ECO score is considered to be more reliable if the substation is not flagged as including some customers with bad coordinates. The flag has been labelled **Bad location flag**. This is identified by looking at the greatest difference between X coordinates and Y coordinates among customers on each substation. If the distance between the X or Y coordinates is more than 2 kilometres, it is likely that at least one customer has the wrong coordinates. A value of '1' means that there are one or more customers with bad coordinates; a value of '0' means that there are no obvious location errors in the data.

Priority Services Register Scores - LSOA level

The types of customers eligible for inclusion on the DNO Priority Services Register are:

- Customers who depend on electricity for medical reasons by virtue of being of pensionable age or disabled or chronically sick;

- Customers who have special communication needs.

It is possible to use government datasets at LSOA level to identify which LSOAs have higher numbers of people of pensionable age or higher rates of disability. This can be used to identify areas which are likely to have more people who are eligible to be included on the PSR. It is not possible to use these datasets to identify areas where customers are more likely to have special communication needs, and we have not found any other datasets which do so. Therefore we have concentrated on age and disability as indicators here.

The **disability score** for an LSOA is calculated using the following government datasets (these were also used in the ECO Score):

- Number of individuals claiming Disability Living Allowance who are under 16
- Number of individuals claiming Disability Living Allowance Mobility Award Higher Rate
- Households with more than one person with a limiting long term illness

The score is the total of these three datasets. As before, it is not the same as the number of individuals who would qualify for the PSR, but a higher score indicates higher numbers of qualifying individuals.

The **age score** for an LSOA is calculated by summing the numbers of people in the following datasets:

- Number of individuals claiming Pension Credit Guaranteed Element
- Number of individuals aged over 70 claiming the State Pension

The resulting age score does not show the *number* of individuals in the LSOA, because some individuals will be included in both datasets. The score combines information about the poorest pensioners (those in receipt of Pension Credit) with information about older pensioners (those over 70).

Priority Services Register Scores - Substation level

To arrive at PSR scores for substation level, the same process was followed as for the ECO score; where the substation's customers are located in more than one LSOA, the substation is given the average of these LSOAs, weighted by number of customers in each LSOA. Again, the bad location flag is included.

Other information in the social indicators tables

The social indicators tables also include the following columns:

- Number of domestic customers in the LSOA / on the substation: this is the number of energised MPANs with profile class 1 or 2
- Carbon Saving Communities area: This is a flag which shows whether the LSOA is a Carbon Saving Communities area. These are the most deprived 15% of LSOAs according to the Index of Multiple Deprivation and energy companies must deliver 20% of their Eco Carbon savings in these areas. DECC publishes a list of these LSOAs. At LSOA level this flag is simply shown as '1' for yes and '0' for no, but at substation level, where the substation has customers in more

than one LSOA, the substation is given the weighted average of these LSOAs. At substation level the indicator is renamed CSC_Score.

- Number of customers currently on the PSR in this LSOA / substation: this is the number of energised MPANs in the LSOA which are currently on the PSR. Some MPANs are included more than once on the PSR. We are not sure if this is due to one person qualifying for more than one reason, or whether it is two people at the same address who both qualify. Therefore we have used the number of distinct MPANs on the PSR in that LSOA, which should be equal to the number of households on the PSR. Only energised MPANs are included.
- Number of state pension claimants by age: this is split into those aged 60-69, 70-79, and 80+. This comes directly from the most recent government dataset and should be accurate to the nearest 5. These figures are not given at substation level because it would not be possible to split them accurately between substations.

At substation level, there are some null values for the ECO_Score and CSC_Score, despite there being domestic customers on the substation. This is because those customers could not be mapped due to lack of coordinates and therefore could not be assigned to an LSOA.

4. Appendix: Data sources

The government datasets used in the production of the ECO score and the PSR scores are shown in Table 1.

Table 1: Government datasets used for ECO and PSR scores

Dataset	Date	Source
Number of individuals aged over 70 claiming the State Pension	August 2011	Department of Work and Pensions http://83.244.183.180/NESS/BEN/sp.htm
Number of individuals claiming Disability Living Allowance Mobility Award Higher Rate	August 2011	Department of Work and Pensions http://83.244.183.180/NESS/BEN/dla.htm
Number of individuals claiming Disability Living Allowance who are under 16	August 2011	Department of Work and Pensions http://83.244.183.180/NESS/BEN/dla.htm
Number of individuals claiming Income Support and incapacity benefits	August 2011	Department of Work and Pensions http://83.244.183.180/NESS/BEN/is.htm
Number of individuals claiming Income Support, who are also lone parents	August 2011	Department of Work and Pensions http://83.244.183.180/NESS/BEN/is.htm
Number of individuals claiming Pension Credit Guaranteed Element	August 2011	Department of Work and Pensions http://83.244.183.180/NESS/BEN/pc.htm
Households with more than one person with a limiting long term illness	2001 (data for Census 2011 was not yet available at the time of production)	Office of National Statistics https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=62