Welsh Index of Multiple Deprivation 2014
Potential 'On/Off Gas' indicator for WIMD

Recommendation:
Having reviewed the evidence we are unconvinced that an indicator on off-gas is an appropriate indicator of housing deprivation. We therefore propose to include an indicator on 'Proportion of people in households without central heating', (as used in earlier WIMDs) as a proxy for housing quality. In recognition of the fact that lack of central heating is becoming an increasingly poor indicator of housing quality over time, we propose to lower its weight within the domain to 1/3 (with the overcrowding indicator assigned a 2/3 weighting).

Background
The Housing domain in WIMD 2011 included an indicator on 'Proportion of people living in households with no central heating'. The source for this indicator was the 2001 Census. This was a proxy measure for housing quality.

As part of the process for proposing indicators for WIMD 2014, it was suggested by the domain and governance groups that central heating is no longer an appropriate measure of deprivation - having central heating does not mean that a house can afford to run it (though this is arguably an 'income' issue), and the central heating system may not be efficient or effective. Also, a relatively small proportion of people live in households without central heating. In the November 2014 consultation on WIMD indicators, we therefore proposed to drop this indicator.

In the consultation, most respondents acknowledged the continuing significant challenges with this domain. Around five respondents stated a preference for keeping the domain with one indicator (though raised serious concerns about the lack of data). Four were against keeping the domain with one indicator. Many respondents did not explicitly say whether they felt that the domain should include only one indicator, but all raised concerns about the general lack of data.

In the consultation, several respondents agreed that central heating should be dropped. Another respondent noted the rationale for proposing to drop this indicator but preferred to retain it until further indicators are developed.

Several consultation respondents suggested that an indicator on fuel poverty should be included, with three suggesting that this was particularly important in the rural context with many households not connected to mains gas. They referenced research work which suggested that households dependent on oil or solid fuel have a relatively higher likelihood of being in fuel poverty. One suggested using data on type of central heating from the 2011 Census as a proxy for this. Another suggested using data on those off mains gas. Several others referred to being off-gas as an issue (in rural areas), and colleagues working on the Scotland Index of Multiple Deprivation are also exploring the potential of an off-gas indicator.

The advisory and steering group suggested that we consider further data on on/off gas (which could potentially be regularly updated) as a proxy measure for a household's access to more choice/cheaper central heating (and not necessarily as a proxy for fuel poverty).

Evidence: Is gas much cheaper than other options?

It is difficult to find evidence on like-for-like heating costs. Data published by DECC are not suitable for comparing central heating costs of similar properties. Sutherland Tables seem to be the source required:

"The Sutherland Tables provide comparative costs for space heating and hot water for the most common fuels across a range of standard house types throughout the UK and Ireland."

At the time of writing this paper, access to these tables was being pursued.

It has been suggested to us that those with electric central heating on an E7 tariff have access to a market roughly as competitive as those with gas central heating. Less choice is available for households off the gas grid and using heating oil.

Evidence: What type of properties are off-gas?

The following two tables are from the 2011 Census and are for Wales only.

Type of central heating by accommodation type (number), 2011 Census

	No central heating	Gas central heating	Electric (including storage heaters) central heating	Oil central heating	Solid fuel (for example wood, coal) central heating	Two or more types of central heating and other	All categories: Type of central heating	% gas (excluding those with two or more)	% gas (including all two or more)
Detached whole house or bungalow	7,017	230,629	11,041	78,146	9,001	25,336	361,170	63.9	70.9
Semi-detached house or bungalow	6,543	343,610	12,350	24,743	8,862	18,329	414,437	82.9	87.3
Terraced whole house or bungalow	9,422	308,470	11,911	8,598	6,257	16,075	360,733	85.5	90.0
Flatt, maisonette or other	6,552	110,848	36,874	2,497	867	8,698	166,336	66.6	71.9
All occupied households	**29,534**	**993,557**	**72,176**	**113,984**	**24,987**	**68,438**	**1,302,676**	**76.3**	**81.5**

Type of central heating by accommodation type (proportion), 2011 Census

	No central	Gas	Other	All
Detached whole house or bungalow	24	23	44	28
Semi-detached house or bungalow	22	35	23	32
Terraced whole house or bungalow	32	31	15	28
Flatt, maisonette or other	22	11	18	13
All occupied households	100	100	100	100

This data shows that semi-detached and terraced houses/bungalows are more likely to have gas central heating than detached houses/bungalows or flats.
44 per cent of households that have non-gas central heating are detached (28 per cent of all houses are detached).

NEED data can be used to produce off-gas estimates and to look at other household characteristics of off-gas households (data for England and Wales as a whole). The following extracts have been taken from a special feature article published in Energy Trends[1] does look at some of the characteristics of households that are off grid (England and Wales), using the National Energy Efficiency Data framework (NEED - see p.73):

The NEED data suggests that small modern properties are the least likely to have a gas connection, for example, 70 per cent of post 1999 flats have no gas connection. It is likely the majority of these properties without gas are in areas which are on the gas grid, but with no gas connection in the property (e.g. blocks of flats in high density urban areas). The data also show that more generally, the largest and smallest properties are least likely to have a gas connection, for example 43 per cent of properties with a floor area of more than 200 square metres and 42 per cent of properties with a floor area of 50 square metres or less have no mains gas in the home; compared with the average for all properties of 18 per cent. Figure 3 shows the proportion of properties without a gas meter by property age and floor area band.

Figure 3: Percentage of properties without a gas meter by floor area band and property age

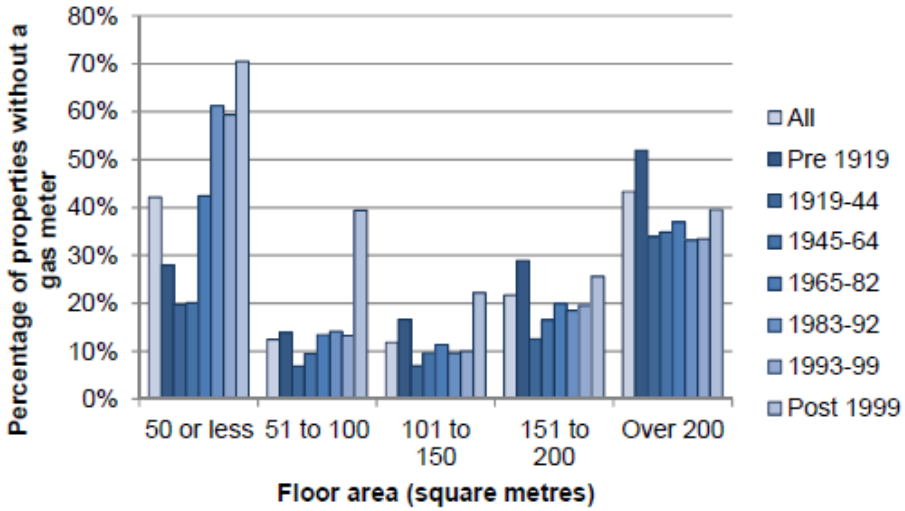
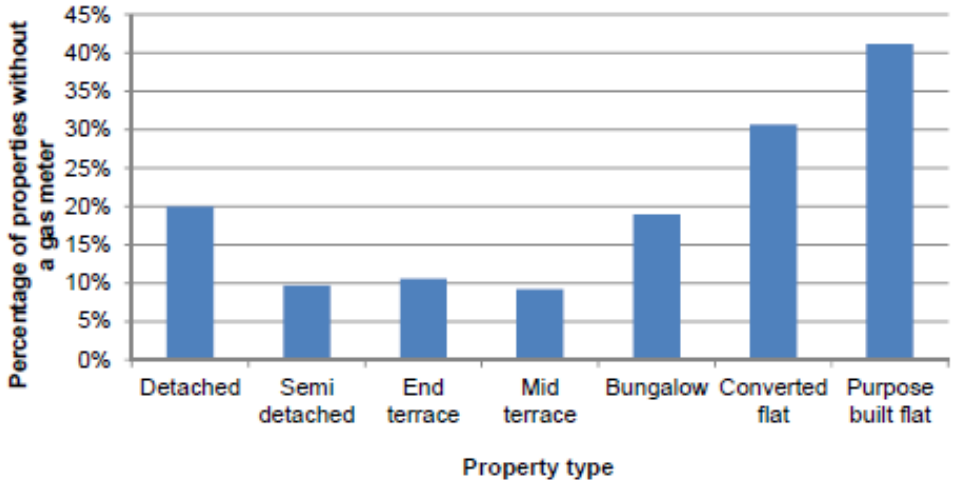


Figure 4 shows the equivalent information for different property types. It shows that purpose built flats are the least likely to have a gas meter, with 41 per cent of these having no gas meter.

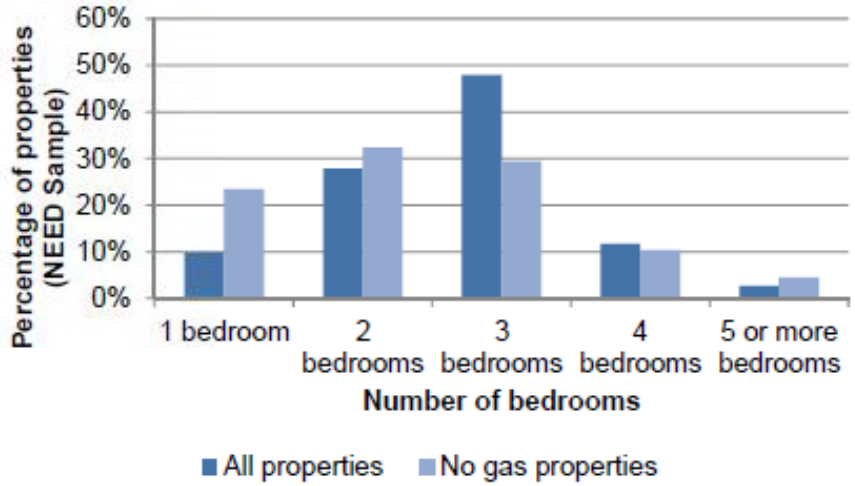
1 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/266468/off_gas_grid.pdf

Figure 4: Percentage of properties without a gas meter by property type



These data can also be used to help understand the composition of the off gas dwelling stock. Figure 5 shows that properties without gas are more evenly spread between one, two and three bedroom properties compared to the housing stock more generally. For example, 48 per cent of all properties have three bedrooms and only 29 per cent of properties without gas have three bedrooms.

Figure 5: Distribution of total and off gas housing stock by number of bedrooms.



Further breakdowns of the data from NEED are available on the DECC pages of the Government website (see ad hoc requests 2013, off gas): www.gov.uk/government/collections/national-energy-efficiency-data-need-framework.

Evidence: Off-gas and the links with fuel poverty

Historical Living in Wales data suggests that households using gas heating are far less likely to be in fuel poverty than households using other type of fuel for heating (but data relates to 2008). Up-to-date estimates are not available.

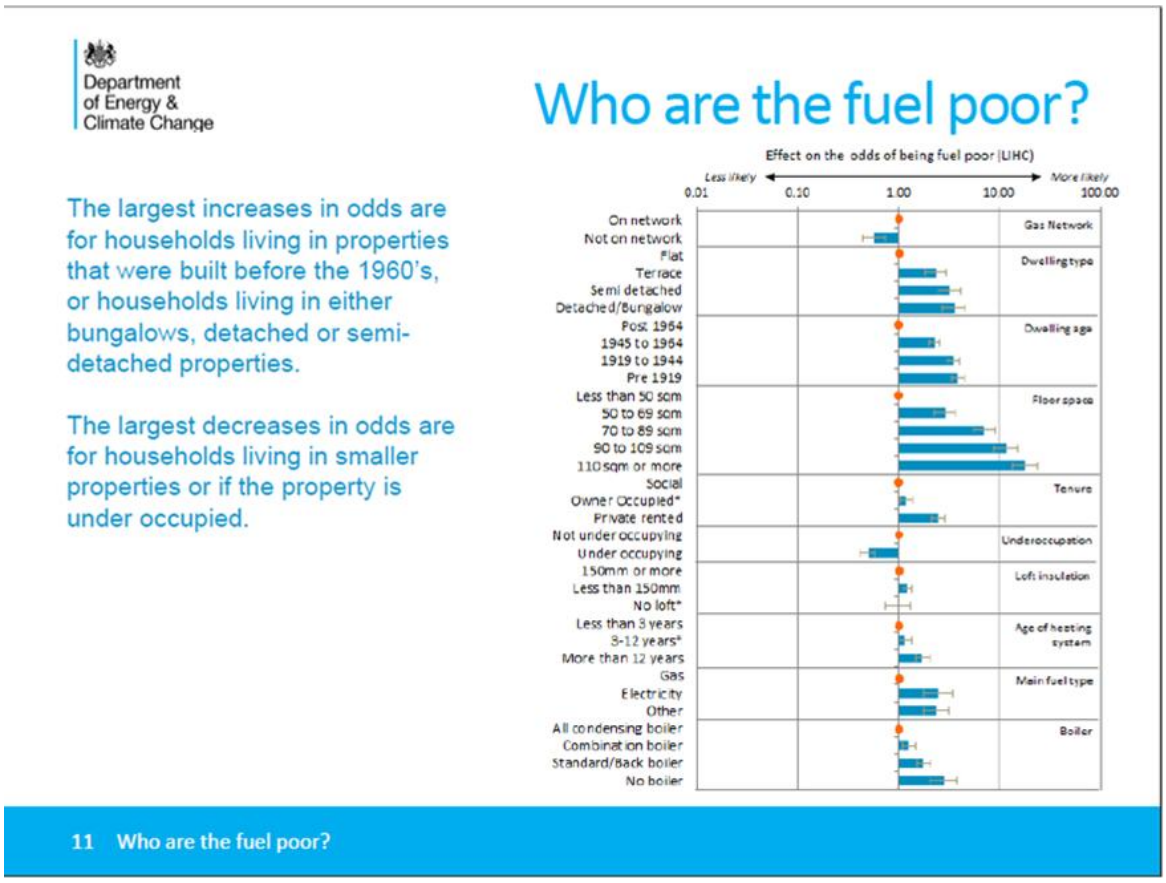
Table 4: Fuel poverty by main type of fuel used for heating

	Fuel Poverty (%)	
Fuel type	2004	2008
Solid Fuel	39	48
Oil	21	47
Electricity	29	39
Gas	7	22
Total	11	26

Weighted total: 1,268,000 (2008) and 1,209,000 (2004)

Source: Living in Wales 2008 and 2004

DECC have published the following on the characteristics of those that are fuel poor in England.



DECC has advised that the net overall effect of being off-gird and using electricity (or other non-gas fuel types) as a main fuel will therefore show a net positive impact on the likelihood of being fuel poor.

Options: Data Sources for On/Off Gas

We reviewed the existing data sources for on/off gas. There are two options in terms of calculating a potential off-gas indicator for WIMD. Note that it may be theoretically possible to produce a different indicator (eg using one of the above sources combined with distance from the gas network) to produce a different indicator. This has not been considered at this stage.

Option 1: DECC LSOA estimates of proportion of properties without a gas meter (uses information on active gas meter position from energy suppliers combined with Census information on number of households). In this dataset, there is no differentiation between properties which do not have a gas meter because they are in an area which is off the gas grid and those which are in an area on the gas grid but have a property which is not connected to it (such as inner city blocks of flats).

Option 2: Proportion of LSOA dwellings that are within an 'off-gas' postcode (derived from XoServe Off-gas Postcodes Data). This implies that if there's one domestic or commercial supply in a postcode, that the rest of the postcode could potentially be placed on the gas network. The ease with which this can be done will vary considerably.

Information on our investigations on the two options are available in Annex A.

Views from Our Stakeholders

Since the public consultation on WIMD indicators, we have discussed the concept of an off-gas indicator with our Housing domain group, Advisory and steering groups and with other colleagues. There are mixed views about whether such an indicator is suitable – both conceptually and in practice. On balance, most stakeholders were against including such an indicator.

- Internal Welsh Government colleagues suggested that whilst being off-gas means not having same level of choice, this doesn't necessarily mean paying more for central heating eg renewable energies; many off-gas households are larger/older homes in poorer condition and not energy efficient. Their preference was to retain the old central heating indicator.
- Some members of the domain group were unconvinced about the suitability of an off-gas indicator as a measure of housing deprivation
- Upon discussing the off-gas data sources, the advisory group felt there needed to be strong evidence that 'not having gas' is a housing deprivation issue. One member of the advisory group suggested retaining the old central heating indicator as he felt this was still relevant.
- The steering group were unconvinced that an indicator on off-gas was appropriate – lack of evidence that this is a suitable measure of housing deprivation.

Colleagues in Scotland have begun exploring the feasibility of an off-grid indicator as a proxy for access to a range of suitable affordable heating fuels.

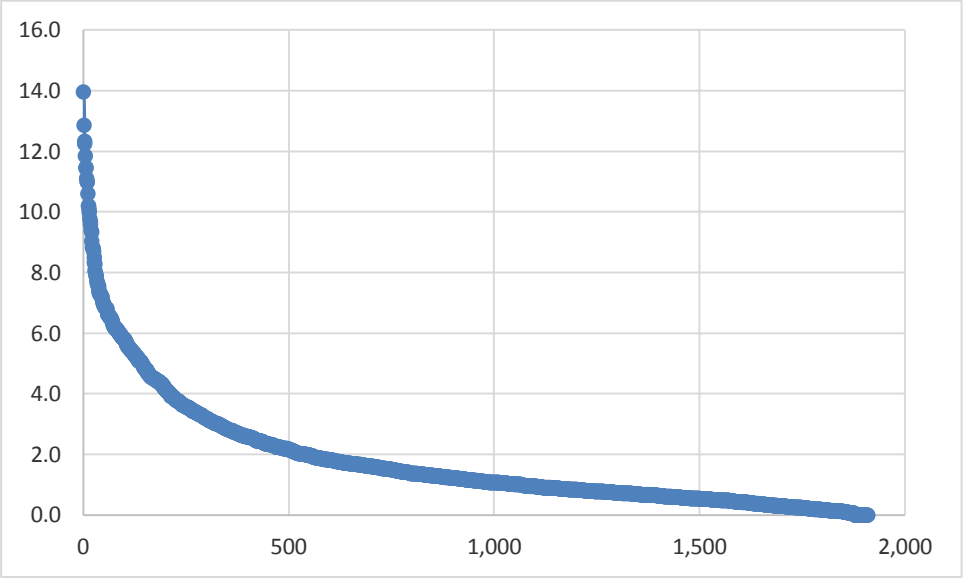
Options

1. No indicator at all.

2. Include an off-gas indicator (Option 1, Option 2 or use 2011 Census information on type of central heating).

3. Revert to old indicator on central heating:

Proportion of people living in households with no central heating (2011 Census), by LSOA (ordered highest to lowest)



Conclusions

Having reviewed the evidence we are unconvinced that an indicator on off-gas is an appropriate indicator of housing deprivation. Although off-gas properties are likely to have less choice in terms of heating this is not necessarily true. Detached houses and flats are less likely to have gas central heating than other types of properties. In particular, it would not be appropriate to count many modern purpose-built blocks of flats (which are off-gas) as being housing deprived. There are also practical limitations with the data sources reviewed (eg based on active meters).

Several respondents to our recent WIMD consultation agreed that an indicator on central heating should be dropped. We agree that an indicator on lack of central heating is not a strong indicator; however we have also taken on board the significant concerns raised about this domain and the lack of data on housing deprivation. We do not think it appropriate that the Housing domain include only one indicator (overcrowding), and we do not think it appropriate to remove the housing domain from WIMD (and it is nor practical to lower its weight from 5 per cent). We therefore propose to include an indicator on 'Proportion of people in households without central heating', (as used in earlier WIMDs) as a proxy for housing quality. In recognition of the fact that lack of central heating is becoming an increasingly poor indicator of housing quality over time, we propose to lower its weight within the domain to 1/3 (with the overcrowding indicator assigned a 2/3 weighting).

Annex: Options reviewed

Data Sources for On/Off Gas

We have reviewed the existing data sources for on/off gas. The following summary table is taken from a DECC report on gas usage:

Table 2 Summary of dataset comparisons

	DECC Off gas estimates	Xoserve off gas postcodes	NEED Off gas estimates
Strengths	• Provides assessment of level of gas connection in an area – helping to identify general areas and indication for inner city as well as rural areas. • Covers domestic only – so helps with domestic policies.	• Lower level geography (postcode). • Includes gas supply even if no meter yet installed. • Domestic and non-domestic (strength depending on purpose).	• Only source of information about types of properties and occupants.
Weaknesses	• Information not available at postcode level. • No information on gas supply if no meter installed. • Domestic cut-off based on arbitrary consumption figure used by industry.	• Binary variable.	• Limited detail on geography.
When to use	• To identify areas with low numbers of households with a gas meter.	• To identify whether a specific geographic location has a gas supply.	• To identify types of properties which may benefit from support.

There are two options in terms of calculating a potential indicator on off-gas for WIMD. Full information on the sources are given in a December 2013 article in Energy Trends: https://www.gov.uk/government/publications/energy-trends-december-2013

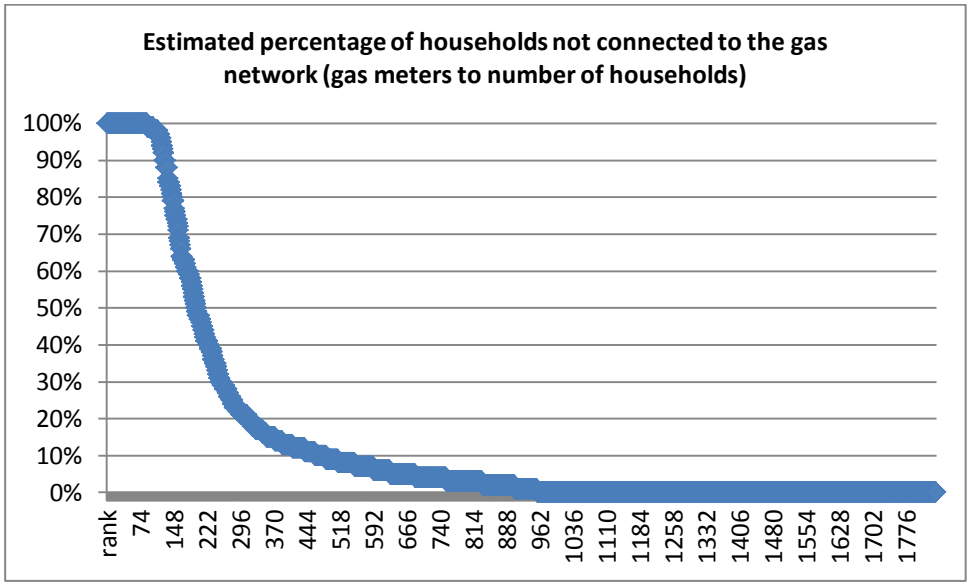
Option 1: DECC LSOA estimates of proportion of properties without a gas meter (uses information on active gas meter position from energy suppliers combined with Census information on number of households)
(www.gov.uk/government/collections/sub-national-gasconsumption-Data)

Estimates of the proportion of households without a gas meter are published at local authority (LA) and lower level super output area (LSOA) levels for 2012. These estimates are based on the gas meter point data used to produce DECC's sub-national consumption estimates2.

Working with energy suppliers and other energy industry representatives, DECC receives meter point gas and electricity consumption data for all meters in Great Britain. These data are collected by DECC in order to produce estimates of consumption for small geographic areas; down toLSOA3. The meter point data provide an estimate of the number of meters in each area. By comparing the number of domestic gas meters to the number of households in the area (2011 Census), the number of properties without a gas meter can be estimated.

The published data do not allow the identification of specific households within an area which are off the gas grid, but do allow small geographic areas which have few or no gas meters to be identified.

Indicator
(Around 60 LSOAs are excluded - see limitations below)



In 90 LSOAs, no households are connected to the gas network. In 888 LSOAs, all households are connected to the gas network.

	Number of LSOAs with given % of dwellings without active gas meter	Proportion of LSOAs with given % of dwellings without active gas meter
0%	888	48.2
0<x<=20%	640	34.7
20%<x<=40%	89	4.8
40%<x<=60%	45	2.4
60%<x<=80%	36	2.0
x>80%	146	7.9
total	1,844	100.0

Limitations (minor)

- The gas meter point consumption data is not supplied with a domestic indicator and instead DECC use the gas industry cut off threshold of 73,200kWh to determine whether a gas meter is domestic or not, with all meters with consumption of 73,200 kWh or below assumed to be domestic. This means a number of smaller commercial/industrial consumers are allocated as domestic and therefore estimates of the number of households without gas is an underestimate of the true number. The impact of this assumption on estimates will vary by area.
- Some meters cannot be allocated to a local authority or LSOA due to insufficient or incomplete address information4. Approximately 0.2 per cent of domestic meters could not be allocated to a local authority in 2012.
- In some cases incorrect address information may mean meters are allocated to the wrong area. The number of meters which are incorrectly allocated will vary by area.
- For these estimates it is assumed that each property always has one gas meter. Occasionally a property may have more than one gas meter, which would again mean the estimates provided are an underestimate of the true value. In 2012, approximately one per cent of properties allocated as domestic in this dataset had more than one meter.
- Data refer to the data collection during 2012 (or 2011 for LSOA) and therefore does not include any changes which may have occurred since 2012.
- In the case that the estimated number of gas meters in an LSOA is greater than the number of households or in the case that there is a very small difference in the number of households and number of meters (5 or fewer), it is assumed that all households are connected to the gas grid in that area

Limitations (major) and questions to consider

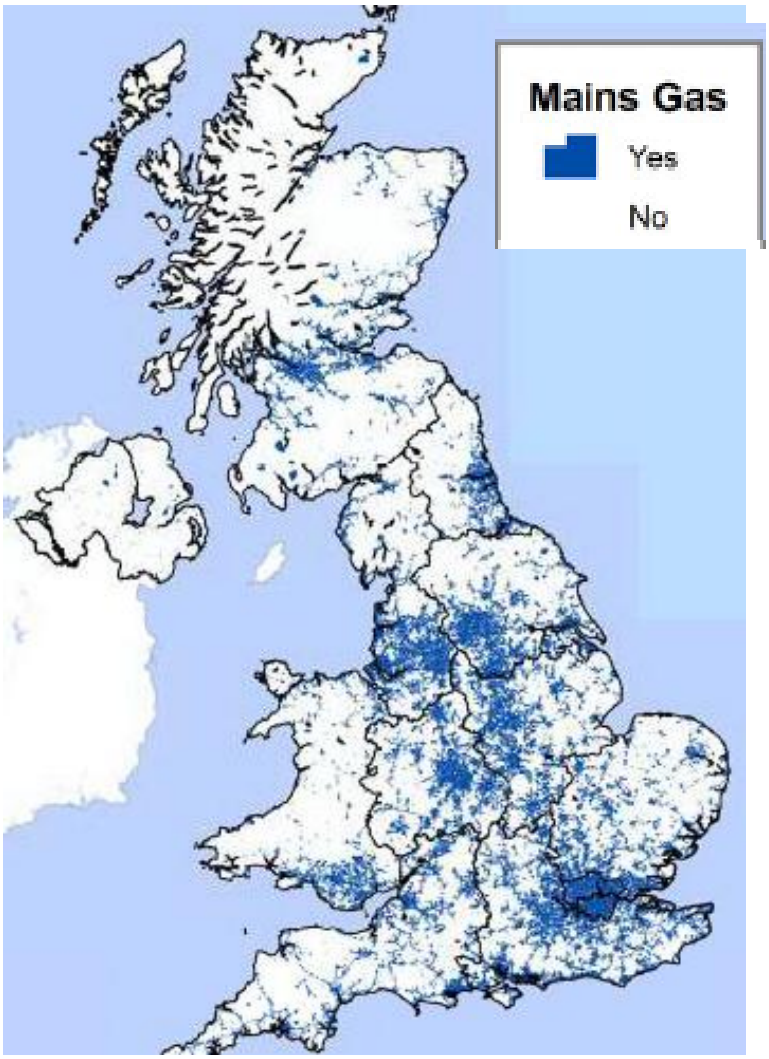
(1) In this dataset, there is no differentiation between properties which do not have a gas meter because they are in an area which is off the gas grid and those which are in an area on the gas grid but have a property which is not connected to it (such as inner city blocks of flats).
(2) A small number of LSOAs have been excluded where there was no information to allow the 2001 LSOA boundaries to be matched to the 2011 LSOA boundaries. This particularly impacts on LSOAs that were merged to prevent disclosure in the sub-national consumption 2011 gas estimates. This equates to around 50 LSOAs for Wales. We would need consent from energy suppliers in order to receive this data.

Option 2: Proportion of LSOA dwellings that are within an 'off-gas' postcode (derived from XoServe Off-gas Postcodes Data)

www.xoserve.com/wp-content/uploads/Off-Gas-Postcodes.xlsx.

A dataset with a list of all postcodes without a record of a gas supply is available on the Xoserve website. The list contains all postcodes -based on the Royal Mail postcode list - where Xoserve hold no record of a gas supply (domestic or non-domestic) by either large or small gas transporters. In some cases a property may have a gas supply but not yet have a meter connected to it, for example for new connections, so although there may appear to be no gas meters, there is a supply in the relevant postcode.

The map below shows areas of the UK which have access to a gas supply in blue and those which do not in white. The map has been created by shading all postcodes that were not on the Xoserve dataset[6].The figure provides a useful insight into which areas of the UK have access to a gas supply. It shows that areas which have no gas supply can be found in all parts of the UK; including urban and rural areas. In urban areas the postcodes which show as off gas are most likely to be near a gas connection, but not have a gas connection within the property (e.g. blocks of flats). The more rural areas are likely to have no gas supply because of the distance from the gas network.



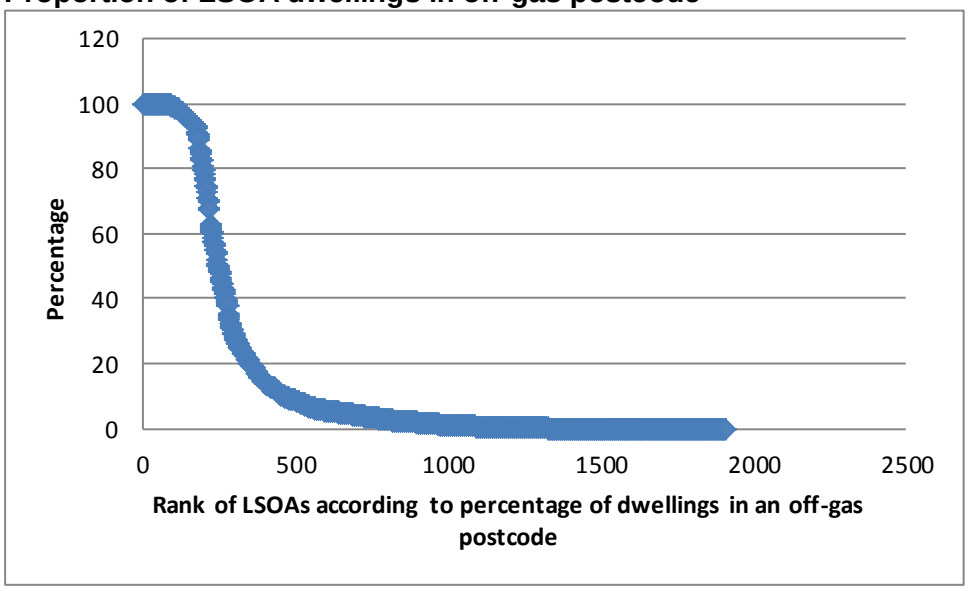
Both the sub-national and the Xoserve datasets are based on data from Xoserve and the independent gas transporters. This means that the data published by Xoserve has many of the same limitations as the DECC data. However, there are also some differences:

- The Xoserve data lists all postcodes where there is no gas supply recorded in them. There are cases - most commonly new connections - where there is a gas supply with no meter. The DECC dataset is based on meters and therefore would allocate a property with no meter as off gas while the Xoserve dataset should correctly reflect the availability of gas in the area.
- The Xoserve list of postcode areas off the gas grid includes all postcodes where there is no recorded gas supply. A postcode with very few gas supplies recorded in it would not be included in the list.
- The Xoserve data is based on all gas supplies regardless of whether the property being supplied is domestic or non-domestic. Therefore an area will not be classified as off gas on the Xoserve dataset if it contains only non-domestic gas supply. However, these areas would be shown as having no (domestic) gas meters on the DECC dataset.
- As with the DECC dataset, the Xoserve dataset is based on a point in time and therefore may not reflect the latest situation, for example if there have been some recent developments in an area. However, it will give a good picture of the situation.

Potential Indicator

We have recently calculated an LSOA level indicator based on % of dwellings in an 'off-gas postcode'. This assumes that if there's one domestic or commercial supply in a postcode, that the rest of the postcode could also potentially be on-gas. The appropriateness of this assumption will vary considerably from area to area.

Proportion of LSOA dwellings in off-gas postcode



The table below gives the number of LSOAs which have an indicator between the given ranges (ie. 30 of the 1909 LSOAs in Wales have a percentage of dwellings off-gas greater than 60% but less than or equal to 80%).

	No. of LSOAs with given percentage of dwellings off-mains gas	Percentage of LSOAs with given percentage of dwellings off-mains gas
x=0%	585	30.6
x<20%	973	51.0
20%<x<=40%	81	4.2
40%<x<=60%	44	2.3
60%<x<=80%	30	1.6
x>80%	196	10.3
Total	1909	100.0