Department
of Energy &
Climate Change

Sub-national consumption statistics

Methodology and guidance booklet

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Any enquiries regarding this publication should be sent to us at EnergyEfficiency.Stats@decc.gsi.gov.uk.

This document is also available from our website at www.gov.uk/decc.

Methodology and guidance booklet

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Contents

1 Introduction

This methodology and guidance booklet aims to assist local authorities and other users in interpreting the Department of Energy and Climate Change (DECC)[1] sub-national energy consumption statistics. The booklet provides detailed information about the collection and compilation of the sub-national estimates used for the datasets; in particular their coverage, limitations and comparability. It also provides guidance on the interpretation of historical trends for the different fuel categories.

The information provided in this booklet relates to the sub-national consumption datasets published on the DECC website at a local authority level, for four main fuel categories:

- **Gas.**
- **Electricity.**
- **Road transport fuels.**
- **Residual (non-electricity, non-gas and non-road transport) fuels.**

These four datasets are aggregated to comprise a dataset for **total final** energy consumption, for which guidance is also provided.

DECC also publishes gas and electricity datasets at a super output area[2] level and datasets for electricity consumption in Northern Ireland, for which detailed methodology and guidance have also been provided:

- Gas and electricity consumption at an **MSOA/IGZ** and **LSOA** level.
- Electricity consumption in **Northern Ireland** (both domestic and non-domestic) at a **District Council**[3] level.

To assist users in interpreting the sub-national statistics, the following Annexes have also been included in this booklet:

- **Annex A: Step-by-step guide to statistical areas**.
  This section gives step-by-step instructions on how to identify super output areas using a postcode, how to view them on maps, and how to use them to find the corresponding consumption statistics.
- **Annex B: Frequently Asked Questions (FAQs).**
  A collection of the most frequently asked questions from users.

[1] Prior to DECC's creation in 2008; sub-national work was carried out by the Department for Business, Enterprise and Regulatory Reform (2007 - 2008) and the Department of Trade and Industry (pre-2007).

[2] Middle layer super output area (MSOA) and lower layer super output area (LSOA) for England and Wales and intermediate geography zone (IGZ, similar to MSOA) for Scotland. Further information is included in chapter 4.

[3] Northern Ireland's District Councils are similar to local authorities.

- **Annex C: Comparison of consumption estimates, sub-national consumption, DUKES and ECUK.**

  This table gives detailed information on the differences between each sub-national consumption dataset and national estimates published in other DECC publications; Digest of UK Energy Statistics (DUKES) and Energy Consumption in the UK (ECUK).

Queries on the content of this guidance note or any of the outputs should be sent to: EnergyEfficiency.Stats@decc.gsi.gov.uk

1.1 Summary of datasets

Key points for each sub-national consumption dataset have been provided in the table below. For each dataset, it contains the consumption period; the geographical coverage; web links; and a brief summary of key points.

Table 1 Key information for sub-national consumption datasets

Consumption dataset	Dates covered	Coverage	Location of dataset	Key points
Gas	1 October – 30 September.	Great Britain. Regional (NUTS1) and local authority (LAU1). MSOA/IGZ and LSOA (domestic only).	Regional and local authority level gas data. MSOA/IGZ and LSOA level gas data.	• Latest publication: LA data in December 2013 (2012 data); SOA data in March 2014 (2012 data). • Next publication: LA data in December 2014 (2013 data); SOA data in March 2015 (2013 data). • Annual consumption based on meter point (MPRN) data provided by Xoserve and independent gas transporters. • Consumers using less than 73,200 kWh a year are classified as domestic. • Gas consumption figures have been weather corrected.
Electricity	*NHH*[4]: 27 January – 26 January. [5] *HH*[6]: 1 January – 31 December	Great Britain. Regional (NUTS1) and local authority (LAU1). MSOA/IGZ and LSOA (domestic only). Not weather corrected.	Regional and local authority level electricity data. MSOA/IGZ and LSOA level electricity data.	• Latest publication: LA data in December 2013 (2012 data); SOA data in March 2014 (2012 data). • Next publication: LA data in December 2014 (2013 data); SOA data in March 2015 (2013 data). • Annual consumption based on meter point (MPAN) data provided thanks to full co-operation from energy suppliers. • Consumption data is included for both NHH and HH meters. • Electricity consumption figures have *not* been weather corrected.

[4] A non-half hourly (NHH) meter is generally used for domestic or smaller non-domestic supplies. Reading of NHH meters is normally done manually.

[5] These dates may vary in previous years. Please see section 3.1.3.

[6] A half hourly (HH) meter is generally used for larger non-domestic supplies. A reading is automatically taken every half hour and relayed to the supplier.

Electricity – Northern Ireland	1 April – 31 March.[7]	Northern Ireland. District council (similar to local authority).	Northern Ireland District Council level electricity data.	• Latest publication: June 2013 (2011 data). • Annual consumption data provided by Northern Ireland Electricity (NIE). • These statistics are experimental, so year-on-year analysis should be done with caution. • Not directly comparable with Great Britain statistics due to differences in market structure.
Road transport	1 January – 31 December.	United Kingdom. Regional (NUTS1) and local authority (LAU1).	Regional and local authority level road transport fuel data.	• Latest publication: June 2013 (2011 data). • Next publication: June 2014 (2012 data). • Annual consumption data is modelled and provided to DECC by Ricardo-AEA. • Consumption estimates are based on where fuel is consumed, rather than where it is purchased. • Consumption in this dataset is given in thousand tonnes of fuel (by weight) and not thousand tonnes of oil equivalent (ktoe).

[7] 2009 and 2010 data cover the calendar year. Please see section 6.1.

Residual fuels (non-gas, non-electricity and non-road transport)	1 January – 31 December.	United Kingdom. Regional (NUTS1) and local authority (LAU1).	Regional and local authority level residual fuel data.	• Latest publication: September 2013 (2011 data). • Next publication: December 2014 (2012 data). • Annual consumption data is modelled and provided to DECC by Ricardo-AEA. • Contains information regarding consumption of petroleum products, coal, manufactured solid fuels and renewables and waste. • Fuel consumed by aviation, national navigation and heat sold are not included in the dataset.
Total final energy (aggregation of gas, electricity, road transport and residual fuel datasets)	Various (see above dates for each dataset).	United Kingdom. Regional (NUTS1) and local authority (LAU1). *Please note this dataset does not include gas and electricity data for Northern Ireland.*	Regional and local authority level total final energy data.	• Latest publication: September 2013 (2011 data). • Next publication: December 2014 (2012 data). • Annual consumption data is based on the amalgamation of the four sub-national data exercises (gas, electricity, road transport and residual fuels). • All fuel types are converted to thousand tonnes of oil equivalent (ktoe) when they are included in the totals dataset. • Northern Ireland gas and electricity consumption data is not included in this dataset due to the differences in market structure.

1.2 Statistical Geographies[8]

English region and devolved administration (formerly Government Offices for the Regions)

Government Office Regions (GORs) were the primary statistical subdivisions of England and the areas in which the Government Offices for the Regions fulfilled their role. They closed on 31 March 2011. However, there is still value in maintaining the geography – now known as 'Regions' – for statistical reporting purposes. The regional boundaries remain 'frozen', covering the same areas as the Government Office Regions when they closed in 2011. Each area was built up of complete counties/unitary authorities at the time the geography was frozen.

Sub-national consumption estimates are provided for the nine English regions and three devolved administrations. Totals for England, Scotland and Wales are included in gas and electricity consumption datasets. Totals for England, Scotland, Wales and Northern Ireland are included in road transport fuels, residual fuels and total final energy consumption datasets.

Local authorities

A local authority is an administrative body in local government. There are 326 local authorities in England, 22 local authorities in Wales and 32 local authorities in Scotland. There are 26 district councils in Northern Ireland. This level of disaggregation is similar to the local authority level for Great Britain.

Super output areas

Super output areas (SOAs) were designed to improve the reporting of small area statistics. SOAs are geographic areas made up of a number of output areas (OAs). They are used on the Neighbourhood Statistics[9] site, and have a wider application across National Statistics.

There are currently two layers of SOA, lower level super output area (LSOA) and middle layer super output area (MSOA). LSOAs and MSOAs are intermediate in size between 2011 Census Output Areas (OAs) and local authorities. This offers a choice of scale for the collection and publication of data, and allows for the release of local data that could be disclosive if published for OAs.

SOAs give an improved basis for comparison across the country because the geographies are more consistent in size of population than, for example, electoral wards. They are also intended to be stable, enabling the improved comparison and monitoring of policy over time. In addition, figures for user defined geographies can be aggregated and best fitted from data held for OAs and SOAs.

Lower Layer Super Output Areas

Lower Layer SOAs (LSOAs) in England and Wales were built by zone-design software using 2011 Census data from groups of Output Areas (typically four to six) and were constrained by

[8] More detailed information regarding statistics geographies can be found on the ONS geography homepage: http://www.ons.gov.uk/ons/guide-method/geography/ons-geography/index.html.

[9] The Neighbourhood Statistics site can be accessed here: http://neighbourhood.statistics.gov.uk/dissemination/.

the Standard Table wards[10] used for 2011 Census outputs. They have a minimum size of 1,000 residents or 400 households, but had an average of 1,500 residents. Measures of proximity (to give a reasonably compact shape) and social homogeneity[11] (to encourage areas of similar social background) were also included.

Following the 2011 Census, there are now 34,753 LSOAs in England and Wales.

Middle Layer Super Output Areas

Middle Layer SOAs (MSOAs) were defined in a two-stage process: an initial set was generated automatically but the boundaries were then modified in consultation with local authorities and other local bodies. The final boundaries were released to the public in August 2004.

As with the LSOAs, initial Middle Layer SOAs were generated automatically by zone-design software. They were built using 2001 Census data from groups of Lower Layer SOAs and had a minimum size of 5,000 residents and 2,000 households. They also fitted within the boundaries of local authorities as at the end of 2002 (corresponding with the geography of the Census).

A nationwide consultation exercise gave local authorities the opportunity to amend the initial Middle Layer SOAs to define areas more suited to local requirements. The consultation resulted in 7,193 MSOAs with an average population size of 7,200.

Following the 2011 Census, there are now 7,201 Middle Layer SOAs (MSOAs) in England and Wales[12].

Data Zones in Scotland

In Scotland a set of areas similar to Lower Layer SOAs were released in 2004. These areas are referred to as **'data zones'**. Their population range is smaller than their Lower Layer SOA counterparts, being between 500 and 1,000. There are 6,505 data zones. In 2005 Scotland also released a further layer, similar to Middle Layer SOAs. This layer is referred to as the **'intermediate geography'**. Again, the population range is smaller than their Middle Layer SOA counterparts, being between 2,500 and 6,000. There are 1,235 zones in the Scottish intermediate geography[13].

1.3 Users and uses of the data

The most significant use of the sub-national consumption data is by local authorities and devolved administrations for targeting and monitoring a range of carbon reduction and energy efficiency policies For example, they have told us they use it to:

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[10] More information on Standard Table wards can be found at the following location: http://www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/administrative/england/electoral-wards-divisions/statistical-wards--cas-wards-and-st-wards/index.html.

[11] The specific homogeneity criteria used related to type of dwelling – for example, detached/semi-detached, and so on - and nature of tenure – for example, owner-occupied, private rented, and so on.

[12] For more information on SOAs, LSOAs and MSOAs please see the ONS website: http://www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/census/super-output-areas--soas-/index.html.

[13] *For more information on Scottish data zones, please see the Scottish Neighbourhood Statistics website:* http://www.sns.gov.uk/.

- identify areas with high consumption to identify reasons and target measures;
- enable more effective deployment of renewable energy schemes by knowing where energy is consumed;
- estimate the proportion of energy reduced or replaced through local sustainable energy projects;
- help identify areas off the gas grid;
- establish a baseline consumption figure to set targets for reduction;
- enable more efficient targeting of investments and interventions;
- help in planning to improve the energy efficiency of homes.

Other external users include academics and industry who use the data for a variety of purposes. Most commonly data has been used to examine trends over time or assess the effectiveness of energy efficiency initiatives.

Internally, data are used by DECC policy colleagues and other analysts within the department to inform policy development and help with monitoring and evaluation of DECC policies. The meter point gas and electricity data collected for sub-national consumption outputs are also the most important input for DECC's National Energy Efficiency Data-Framework (NEED).

They also and form the basis of responses to a number of parliamentary questions and general enquiries.

1.4 Revisions policy

Revisions are made in line with the DECC organisational policy (https://www.gov.uk/government/ publications/energy-statistics-revisions-policy).

On occasions, previously published data will need to be revised. These revisions are usually due to forecasted values being replaced with actual data, where actual figures were not available at the time of publication. In particular, annual revisions are made to the road transport, residuals and total final energy publications, and these revisions have been explained in further detail in chapters 7, 8 and 9 respectively.

Changes to historic data will only be made as part of a new publication. Data that are revised from the previous release will be denoted with "r". Where a large revision has taken place reasons will be provided. In cases where entire historic datasets have been revised, this will be clearly marked in the dataset. Changes to methodology would be pre-announced and impact of revisions explained when changes are made (with at least one year of data produced by both methods if appropriate).

Where significant changes to most recent data are required as a result of an incorrect figure in a publication these will be made as soon as reasonably possible, with a note on the webpage stating that the output has been revised and which figures any change has affected. Reasons for these types of revisions would include:

- Revised and validated data received from a data supplier; or
- The figure in the publication was incorrect because of a typographical or similar error.

Information on revisions will also be included in the methodology note for the relevant release.

2 Gas consumption statistics

Sub-national gas consumption statistics (2012)

Dates covered:	1 October 2011 – 30 September 2012.
Sectors covered:	Domestic and non-domestic (LSOA: domestic only).
Features:	Annualised and weather corrected.
Years available:	2001 – 2012.
Source:	Xoserve and independent gas transporters.

Statistical releases:

English region and devolved administration (NUTS1) and local authority (LAU1):

Access the local authority level data and factsheet.

Latest release: 19 December 2013 (2012 data).

Next release: 18 December 2014 (2013 data).

MSOA/IGZ and LSOA:

Access the MSOA/IGZ and LSOA data.

Latest release: March 2014 (2012 data).

Next release: March 2015 (2013 data).

2.1 Overview (2005 – 2012 datasets)

2.1.1 Coverage

The datasets cover annual gas consumption in Great Britain. Data are published at sub-national level, including for; English region and devolved administrations; local authority; MSOA/IGZ; and LSOA. This chapter deals chiefly with the local authority level dataset, which also includes data for English region and devolved administrations. For guidance regarding the MSOA/IGZ and LSOA level datasets, please see chapter four.

The datasets include:

- Gas consumption for meters in Great Britain between 1 October and 30 September.
- All gas distributed through the National Transmission System.
- Gas consumers whose consumptions are recorded on a daily basis who are known as Daily Metered (DM) customers.

The datasets exclude:

- Data for Northern Ireland, due to the difference in market structure.
- A considerable amount of consumption fed directly to power stations and some very large industrial consumers, as this would be disclosive.
- Any gas passing through other transmission and distribution systems such as those owned by North Sea producers.

Unallocated and misallocated meters

The dataset also includes an aggregated total of consumption for unallocated meters. Unallocated meters are meters with insufficient address information, meaning that consumption for these meters is unable to be allocated to a local authority. This is due to incomplete postcode information being provided by the data suppliers or no postcode information being received at all (this usually accounts for less than 1 per cent of consumption).

In some cases a meter can be misallocated to the wrong statistical geography. For example, if an address contains a PO Box number, then the meter would be assigned to the LAU1 area of the Post Office sorting depot. This is particularly important for interpretation of the data at levels below that of LAU1 (see chapter 4) as consumption may be allocated to a different area than where it is actually taking place. Misallocation can occur when a meter is allocated to a company's HQ or PO Box rather than the actual address of the meter. Similarly to unallocated meters, this is caused by incomplete or incorrect address information.

2.1.2 Data suppliers

In 2005, there were some major structural changes in the gas distribution network in Great Britain with some of the Local Distribution Zones (LDZs) being sold off by National Grid. As a result National Grid, who previously released postcode sector gas sales data, were no longer able to do so, as they were not responsible for the whole of the gas distribution network in Great Britain. DECC entered into discussions with the gas industry on how to obtain annualised gas consumption estimates at industrial meter level.

In November 2005, DECC met with Xoserve, the company now responsible for the collation and aggregation of gas consumption, who agreed to generate annualised consumption estimates for all Meter Point Reference Numbers (MPRN), or gas meters, subject to permissions being provided by the owners of the LDZ network (that is, the four major gas transporters in Great Britain – National Grid, Scotia, Wales and West Utilities and Northern Gas Networks).

DECC also receives data from Great Britain's Independent Gas Transporters (IGTs). IGTs operate and maintain local gas transportation networks. Domestic and industrial and commercial premises are connected to IGT networks, but the new housing market constitutes the largest share of the IGT market.[14]

[14] For more information on IGTs, please visit the National Grid website: http://www.nationalgrid.com/uk/Gas/Connections/IGT/.

Annual Quantity (AQ) data limitations

The user should note that around **4 million MPRNs (approximately 18% of total MPRNs) have no new AQ value annually,** because no new meter readings for these meters have been taken.

An AQ is an estimate of annualised consumption using consumption recorded between two meter readings at least six months apart, and the closing reading is taken within the period 1 October to 30 September.

National Statistics Postcode Look-up (NSPL)[15] from ONS.

The NSPL is an Office for National Statistics (ONS) Geography product which is used to link all United Kingdom postcodes to the super output area in which they fall. From this data can then be aggregated to other geographies such as local authority or region.

2.1.3 Sectors

The data received from Xoserve and the independent transporters does not currently contain a reliable profile marker to indicate if the meter relates to either a domestic or non-domestic consumer.

DECC uses the gas industry standard "Annual Quantity" (AQ) cut-off point of 73,200 kWh and classifies all consumers using under that annual consumption as domestic consumers. Unfortunately, this classification incorrectly allocates many small businesses to the domestic sector and, conversely, a small number of larger domestic consumers to the non-domestic sector. This also implies that a small number meters can change sector from year to year.

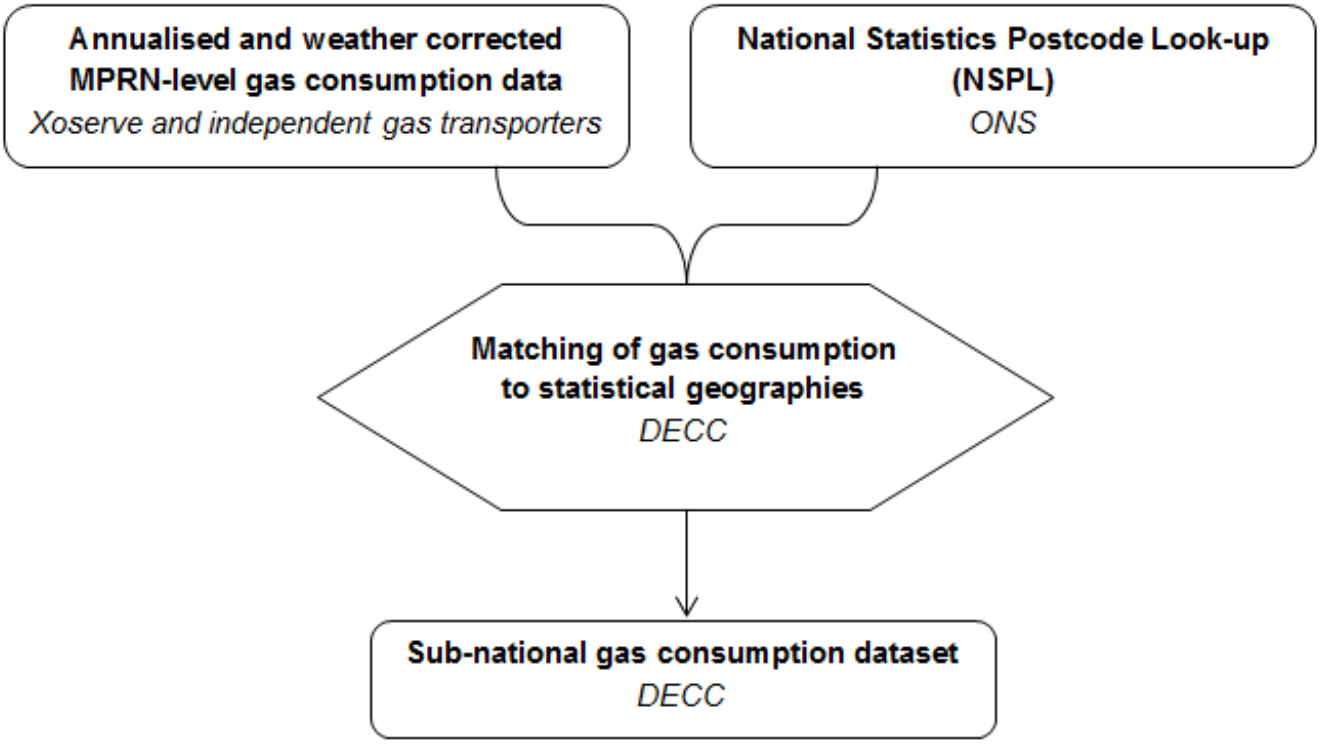
Domestic and non-domestic sectors

The gas industry cut-off point is **73,200 kWh**. All consumers using less than this figure are classed as domestic and it is estimated that around 2 million small businesses are incorrectly classed as domestic using this cut-off threshold.

[15] For further information on the NSPL and how to access it, please visit the ONS website: http://www.ons.gov.uk/ons/guide-method/geography/products/postcode-directories/-nspp-/index.html.

2.2 Methodology

Chart 1 Flowchart showing the production process of the sub-national gas consumption dataset



Annualised and weather corrected MPRN-level gas consumption data from Xoserve and independent gas transporters.

The base data for the analysis are obtained from Xoserve and groups of independent gas transporters. Xoserve provide annualised estimates of consumption for all Meter Point Reference Numbers (MPRNs) based on an Annual Quantity (AQ). The estimate is then adjusted by Xoserve using a weather correction factor based on a Met Office model which uses historic data and also forecasts ten years into the future[16]. DECC has combined this consumption information together with associated information on the location of the meters (also provided by Xoserve) and augmented it with data from independent gas transporters (companies that have installed and own the local gas distribution pipelines between the National Grid network and, usually, recently built properties). These independent gas transporters account for around 1.5 million customers and 22,300 GWh of consumption in 2012.

Unfortunately, the data available to DECC from Xoserve and the independent gas transporters does not enable the weather correction factor to be removed from the annual quantities at this time or for estimates on a calendar or financial year basis to be produced.

[16] For more information on weather correction, please see the National Grid's Gas Demand Forecasting Methodology note: http://www.nationalgrid.com/NR/rdonlyres/71CFD0F6-3607-474B-9F37-0952404976FB/52071/GasDemandForecastingMethodologyFeb12.pdf.

Dates for gas year

Gas consumption statistics cover the gas year **(1 October to 30 September).** For example, 2012 data covers the period from 1 October 2011 to 30 September 2012.

Matching of gas consumption to statistical geographies by DECC.

The gas consumption data are then matched to LAU1 (local authority) codes using postcode information. On occasions it has been possible to allocate an MPRN to an LAU1 code, but not at a lower level code.

Sub-national gas consumption dataset from DECC.

The sub-national gas dataset provides consumption as sales in gigawatt hours (GWh) as well as the number of meters for both domestic and non-domestic (commercial and industrial) customers. In addition, average domestic and industrial and commercial consumption is given as sales per meter in kilowatt hours (kWh). The data is provided at a local authority level and the dataset also includes English region and devolved administrational totals.

2.3 Comparability

2.3.1 Comparison to sub-national electricity data

The sub-national gas and electricity consumption statistics use varying methodology and cover slightly different time periods. The most important difference to bear in mind is that gas data are weather corrected, whilst the electricity data are not. Despite these differences, the combined electricity and gas provide a good indication of overall annual household energy consumption in Great Britain at local authority, MSOA/IGZ and LSOA level, due to the robustness of the data collection and collation process.

For information on how electricity consumption statistics are produced, please see chapter 3.

2.3.2 Comparison to other DECC publications

DUKES

It is important to take care when comparing sub-national gas data to data published in the Digest of United Kingdom Energy Statistics (DUKES)[17]. DUKES is an annual DECC publication which provides a detailed and comprehensive picture of energy production and use over the last five years, with extensive tables, charts and commentary covering all the major aspects of energy.

There are differences in reported gas figures in the sub-national and DUKES publications as DUKES data:

- Are based on a calendar year, whereas sub-national data covers the period 1 October – 30 September.
- Are not weather corrected whereas sub-national data have been.
- Covers consumption for the United Kingdom, whereas the sub-national statistics cover Great Britain only.

[17] DUKES can be accessed at the following page: https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes.

- Are compiled using a top-down approach, where statistics are gathered by energy companies on a national level, whereas sub-national datasets are compiled using a bottom-up approach, from an initial set of individual MPRN data.
- Include consumption from large power stations in its totals, which are not included in sub-national data (see section 2.1.1)

ECUK

There are also points the user needs to be aware of when comparing sub-national data to Energy Consumption in the UK (ECUK)[18]. ECUK is an annual DECC publication which includes a detailed overview of energy consumption at a UK-wide level.

Differences occur between ECUK and sub-national figures as data in ECUK:

- Are, in many cases, modelled and obtained from secondary analysis performed by DECC on data from a number of sources, including DUKES.
- Contains a more comprehensive sectoral split than sub-national statistics, and gives information on the end use of the majority of fuels.

NEED

For gas consumption, the mean consumption is very similar for the published sub-national gas consumption data and the Nation Energy Efficiency Data Framework (NEED)[19]. This is as expected since both datasets are derived from the same data source. However, the mean consumption is slightly lower in the NEED dataset than the sub-national gas consumption dataset. These differences occur because:

- In NEED, properties are defined as domestic based on the Valuation Office Agency property attribute database if they have consumption between 100kWh and 50,000kWh, whereas in sub-national data, meters are considered domestic if they have a consumption lower than 73,200kWh.
- The NEED dataset has suspected estimated readings removed, whereas sub-national gas consumption estimates do not.
- In NEED, data is matched to other sources by National Land and Property Gazetteer, Unique Property Reference Number[20] at property level, whereas the sub-national data are assigned to a Lower Layer Super Output Area.

The chart below shows a comparison of the estimates of mean domestic gas consumption per household taken from each of the different sources mentioned above in order to give a representation of the differences between the datasets.

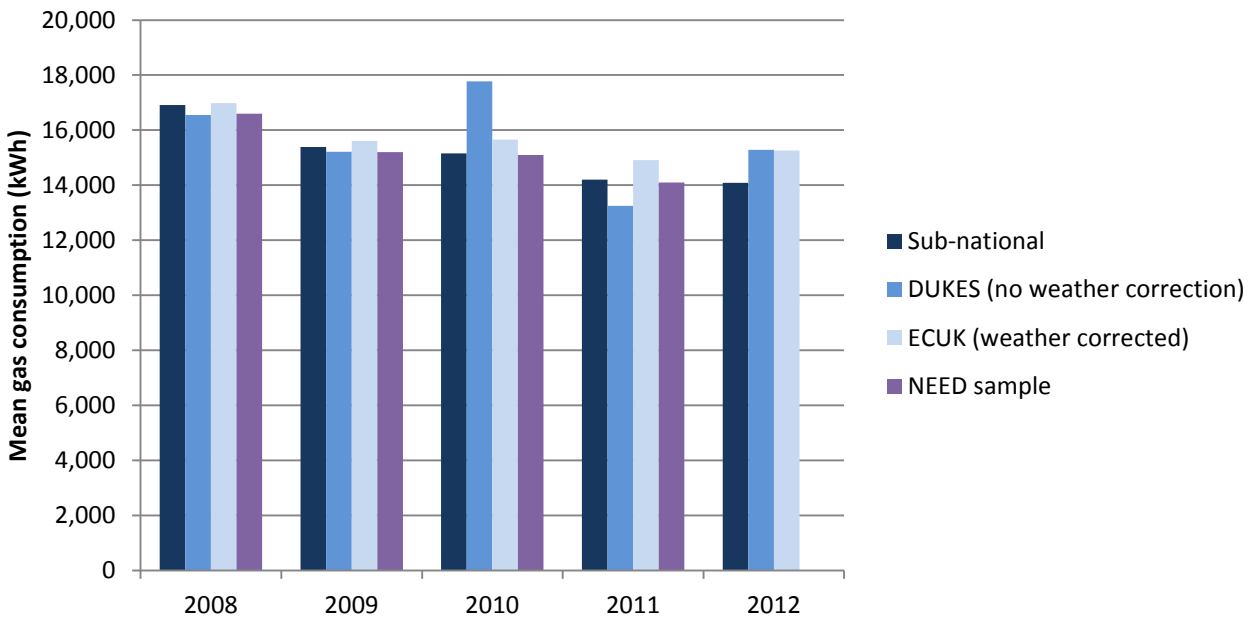
Note: The latest NEED release only contains consumption data up to 2011, so 2012 NEED data is omitted from the chart.

[18] ECUK can be accessed at the following page:
https://www.gov.uk/government/collections/energy-consumption-in-the-uk.

[19] All NEED publications can be accessed from the following page;
https://www.gov.uk/government/collections/national-energy-efficiency-data-need-framework

[20] NLPG UPRN. More info on the NLPG can be found at: http://www.nlpg.org.uk/nlpg/welcome.htm

Chart 2 Comparison of estimates of mean gas consumption per household



2.4 Pre-2005 datasets

Data from 2001 to 2004 at local authority and English region and devolved administrational level were published by DECC using base data from National Grid in 2004 and 2005.

Data were allocated based on gas sales figures at a postcode sector level made available by National Grid.[21]

For the analysis, DECC aggregated the consumption data from postcode sector to local authorities, however where a postcode sector covered more than one LAU1 area, the consumption was equally divided between the relevant LAU1 areas. There were also some circumstances where for confidentiality or other reasons, the National Grid dataset combined postcode sectors, and each sector was given an equal share of the data when deriving LAU1 area statistics.

The National Grid data were weather corrected to National Grid's standard 35-year trend. This standard weather condition was used for comparison purposes, although this has subsequently been replaced with a new 17 year condition that reflects observed warming in recent years (this correction is used for the revised 2004 dataset, and the datasets collected by DECC from 2005 onwards, which are generated from the re-structured industry).

Users should note that there are quality issues to consider before using the gas consumption data for the National Grid network between 2001 and 2004.

Data for these years are experimental since the methodology used for producing these data was still in development stages at the time. An important issue is that National Grid used an algorithm to amalgamate gas consumption at postcode sector levels to maintain the confidentiality of some larger non domestic consumers. The impact of this has meant that the data are not always consistent from year to year.

[21] The postcode sector is the postcode of the meter minus the last two characters, for example, SW1A 2.

Advice on time series analysis

In terms of making historical comparisons for the gas consumption data, **2005 data** should be used as the baseline year, as data from 2005 onwards (classed as National Statistics) have been produced with a consistent methodology. Major changes recorded in consumption figures before 2005 are caused mainly by data quality improvements.

It is important to recognise that when making comparisons at local authority level from year to year, total and average consumption levels are influenced by new industrial or commercial establishments or the closure or downsizing of existing businesses for economic reasons and the extent to which more or less smaller businesses were affected. The impact that these changes have on totals and averages is highly dependent on the size of the businesses.

2.5 Data below local authority level (MSOA/IGZ and LSOA)

Gas consumption data are available below local authority level, with the aim that this will enable councils and others to monitor and target small areas for further interventions as part of their local energy strategies and enhance implementation of energy efficiency programmes, thus reducing carbon dioxide emissions.

Data is published on the DECC website at a Middle Layer Super Output Area (MSOA)/Intermediate Geography Zone (IGZ) and Lower Layer Super Output Area (LSOA) level. Further information regarding the MSOA/IGZ and LSOA datasets is contained in chapter 4.

2.6 Estimates of households not connected to the gas network

Sub-national estimates of homes not connected to the gas network

Dates covered:	1 October 2011 – 30 September 2012.
Sectors covered:	Domestic.
Features:	Derived from sub-national gas consumption statistics.
Years available:	LA: 2012 only.
	LSOA: 2012 only.
Source:	Xoserve and independent gas transporters.

Statistical releases:

English region and devolved administration (NUTS1) and local authority (LAU1):

Access the local authority level data.

Latest release: December 2013 – 2012 data

Next release: December 2014 – 2013 data

Lower layer super output area (LSOA):

Access the LSOA level data.

Latest release: March 2014 – 2012 data.

Next release: March 2015 – 2013 data.

2.6.1 Overview

This dataset is based on the gas meter point data used to produce DECC's sub-national gas consumption estimates and provides estimates of the number of households within each local authority (2012 data) and lower layer super output area (2012 data) without a gas meter.

The datasets include:

- Estimates for the number of houses without a gas meter in Great Britain between 1 October and 30 September.
- Estimates based on data for all gas distributed through the National Transmission System.
- Gas consumers whose consumptions are recorded on a daily basis who are known as Daily Metered (DM) customers.

The datasets exclude:

- Data for Northern Ireland, due to differences in market structure.
- Any gas consumers flagged as non-domestic in the sub-national gas consumption estimates, since these estimates are designed to be based on domestic households only.

2.6.1.1 Local authority level dataset

This dataset contains estimates of the number and proportion of households without a gas meter in Great Britain. Data are published at the sub-national level, including for; English region and devolved administrations and local authority. This section deals chiefly with the local authority level dataset, which also includes information for English region and devolved administrations. For guidance regarding the lower layer super output area (LSOA) level datasets, please refer to section 2.6.1.2. DECC also advises that the user gains familiarity with the coverage and methodology of the local authority level gas consumption statistics (Chapter 2) before utilising this dataset.

Unallocated meters

The dataset also includes an aggregated total of gas meters that could not be allocated to a local authority. Some meters cannot be allocated to a local authority due to insufficient or incomplete address information, this is due to incomplete postcode information being provided by the data suppliers or no postcode information received at all. Approximately 0.2 per cent of domestic meters could not be allocated to a local authority in 2012. These meters are included in the overall estimates for Great Britain.

2.6.1.2 Lower layer super output area level dataset

This dataset contains estimates of the number and proportion of households without a gas meter in Great Britain. Data are published at the lower layer super output area (LSOA) level. This section deals chiefly with the LSOA level dataset, for guidance regarding English region and devolved administrations or local authority level data, please refer to section 2.6.1.1. DECC also advises that the user gains familiarity with the coverage and methodology of the LSOA level gas consumption statistics (Chapter 4) before utilising this dataset.

Estimates of the number of households not connected to the gas network have been made available at the LSOA level, with the aim that this will enable councils and others to monitor and target small areas for further interventions as part of their local energy strategies.

Data for the LSOA level dataset is taken from the same base consumption data used to produce the estimates of households not connected to the gas network at local authority level.

Unallocated meters and merged LSOAs

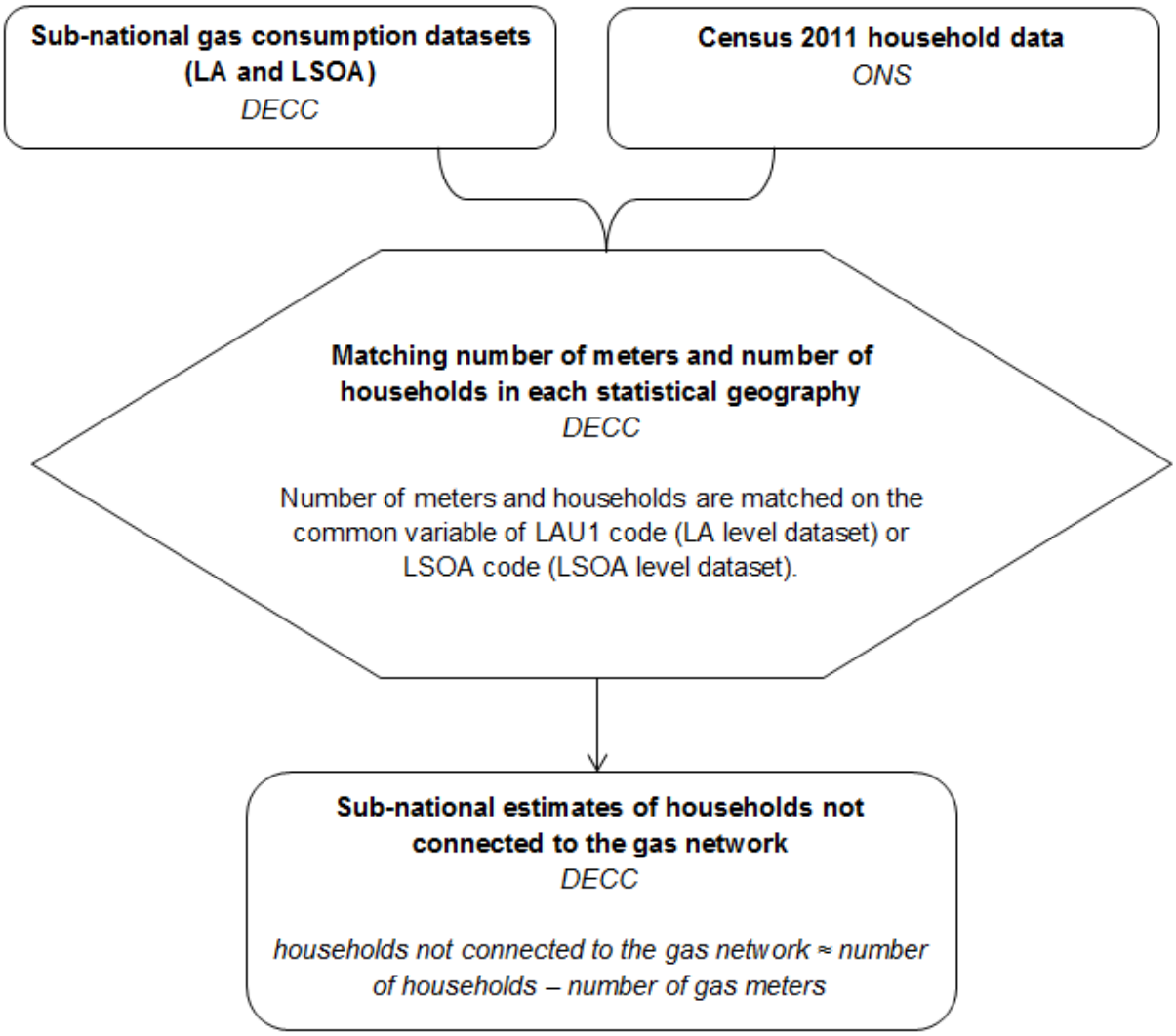
As in the local authority level dataset, some meters cannot be allocated to an LSOA due to insufficient or incomplete address information. These unallocated meters are included in the grand total of the dataset however.

Some LSOA codes have changed since the 2001 Census LSOA boundaries. As a result of this, some LSOAs have been merged in the dataset so as to allow comparison with LSOA boundaries.

As a result of this, 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, leading to a number more unallocated meters. This particularly impacts on LSOAs that were merged to prevent disclosure in the sub-national 2011 gas consumption estimates.

2.6.2 Methodology

Chart 3 Flowchart to show the production process of the sub-national estimates of households not connected to the gas network dataset



Sub-national gas consumption datasets (LA and LSOA)

DECC obtains its estimate for the number of households that *are* connected to the gas network from is sub-national gas consumption datasets. These datasets offer an estimate of the number of domestic gas meters in each area. This quantity is then used as a proxy measure for the estimated number of households in each area that are connected to the gas network.

Census 2011 household data

DECC uses household estimates from the 2011 Census as its measure of the number of households in each geographical area (both LA[22] and LSOA[23]).

Matching number of meters and number of households in each statistical geography

Using the two datasets mentioned above; DECC can estimate the number of households not connected to the gas network by subtracting the number of gas meters from the number of households in each area:

2.6.2.1 Limitations of the dataset

While these datasets give a strong indication of areas that have little or no connection to the gas network, there are some limitations that users should be particularly aware of:

- 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 information[24]. 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.
- 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).
- 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 and therefore does not include any changes which may have occurred since 2012.

[22] The Census 2011 household estimates for local authorities can be accessed from Table H01 at the following location:
http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-257414

[23] The Census 2011 household estimates for LSOAs can be accessed from Table PHP01 at the following location:
http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-284349

[24] These meters are included in the overall estimates for Great Britain, but are aggregated in the 'unallocated' row in the sub-national statistics outputs.

2.6.3 Comparability

A comparison of the sub-national estimates with Xoserve[25] and NEED[26] data have been summarised in Table 2 below. For a more detailed comparison of the differences between the two datasets, the user should refer to the article in the December 2013 issue of Energy Trends (page 68) entitled "Areas and types of properties off the gas grid"[27]

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.

[25] Xoserve provides centralised information and data services for gas transporters and shippers in Great Britain.

[26] NEED estimates of the number of properties without a gas meter by property attributes and household characteristics are available from:
www.gov.uk/ government/collections/national-energy-efficiency-data-need-framework.

[27] This December 2013 issue of Energy Trends can be found at the following location:
https://www.gov.uk/government/publications/energy-trends-december-2013

3 Electricity consumption statistics

Sub-national electricity consumption statistics (2012)

Dates covered:	NHH: 27 January 2012 – 26 January 2013.
	HH: 1 January 2012 – 31 December 2012.
Sectors covered:	Domestic and non-domestic (domestic only for LSOA).
Features:	Annualised, not weather corrected.
Years available:	2003 – 2012.
Source:	Data aggregators (on behalf of electricity suppliers).

Statistical releases:

English region and devolved administration (NUTS1) and local authority (LAU1):

Access the local authority level data and factsheet.

Latest release: December 2013 (2012 data).

Next release: December 2014 (2013 data).

MSOA/IGZ and LSOA:

Access the MSOA/IGZ and LSOA data.

Latest release: March 2014 (2012 data).

Next release: March 2015 (2013 data).

3.1 Overview (2005 – 2011 datasets)

3.1.1 Coverage of data

The datasets include:

- Non-Half Hourly (NHH) electricity consumption from 27 January 2012 to 26 January 2013 and Half Hourly (HH) electricity consumption over a calendar year in Great Britain (please see section 3.2 for more information).
- An aggregated total for unallocated consumption, that is, consumption that was not able to be matched to an area due to incomplete or a lack of postcode information (this usually accounts for less than 1 per cent of consumption).

The datasets exclude:

- Consumption for Northern Ireland, for which separate datasets and analysis are produced (for guidance, please see chapters 5 and 6).
- Central Volume Allocation (CVA) users; large industrial consumers who receive their electricity through high voltage lines of the transmission system and hence have different

arrangements with their electricity suppliers than HH and NHH metered customers. Consumption by CVA users generally account for 1.5 to 2 per cent of electricity sales.

- Electricity used by companies that generate their own electricity and consume it without passing over the public distribution network. In 2012, this amounted to 20.3 TWh in the UK – 6 per cent of total final electricity consumption in the UK. Much of this "auto-generation" is from Combined Heat and Power (CHP) schemes and an indication of the regional importance of such schemes can be obtained from Energy Trends[28].

Unallocated data

Meter consumption data is 'unallocated' if sufficient address information has not been provided to be able to allocate the meter to a local authority with any degree of accuracy. This is due to only a partial postcode being provided by the data suppliers or no postcode information being received at all, and DECC was able to locate the local authority in which meter lies in, but not the specific MSOA.

Unallocated data, at a local authority level, can also include consumption for street lighting or traffic lights, where the information provided does not indicate a specific local authority.

3.1.2 Sectors

Electricity data is divided between domestic and non-domestic categories according to the meter's profile type.

The domestic consumption is based on Non-Half Hourly (NHH) meters with profiles 1 and 2 (these are the standard domestic and economy 7 type tariffs respectively). Industrial and commercial consumption data are based on NHH meters with profiles 3 to 8 and all Half Hourly (HH) meters. In addition, profile 1 and 2 meters are reallocated to the industrial and commercial sector if annual consumption is greater than 100,000 kWh. Also re-allocated to the industrial and commercial sector are those consuming over 50,000 kWh with address information indicating non-domestic consumption.

Domestic reallocations to the non-domestic sector

The automatic cut-off point for non-domestic consumption is **100,000 kWh.**

Domestic consumers with consumption of between **50,000 and 100,000 kWh** is reallocated to the non-domestic sector following a validation process if address information indicates non-domestic consumption is taking place (for example, if an address contains 'plc.' or 'ltd').

3.1.3 Data limitations

The Meter Point Administration Number (MPAN) data used in this analysis consists of approximately 80 per cent actual ("Annual Advance") readings and 20 per cent estimated readings ("Estimated Annual Consumption"). This is explained further in section 3.2. From year-

[28] The article on CHP schemes can be found in the September 2013 edition of Energy Trends: https://www.gov.uk/government/organisations/department-of-energy-climate-change/series/energy-trends.

to-year some meter readings supplied by data aggregators change from actual to estimated readings and vice-versa, which can cause extreme values to be created when an estimate is corrected.

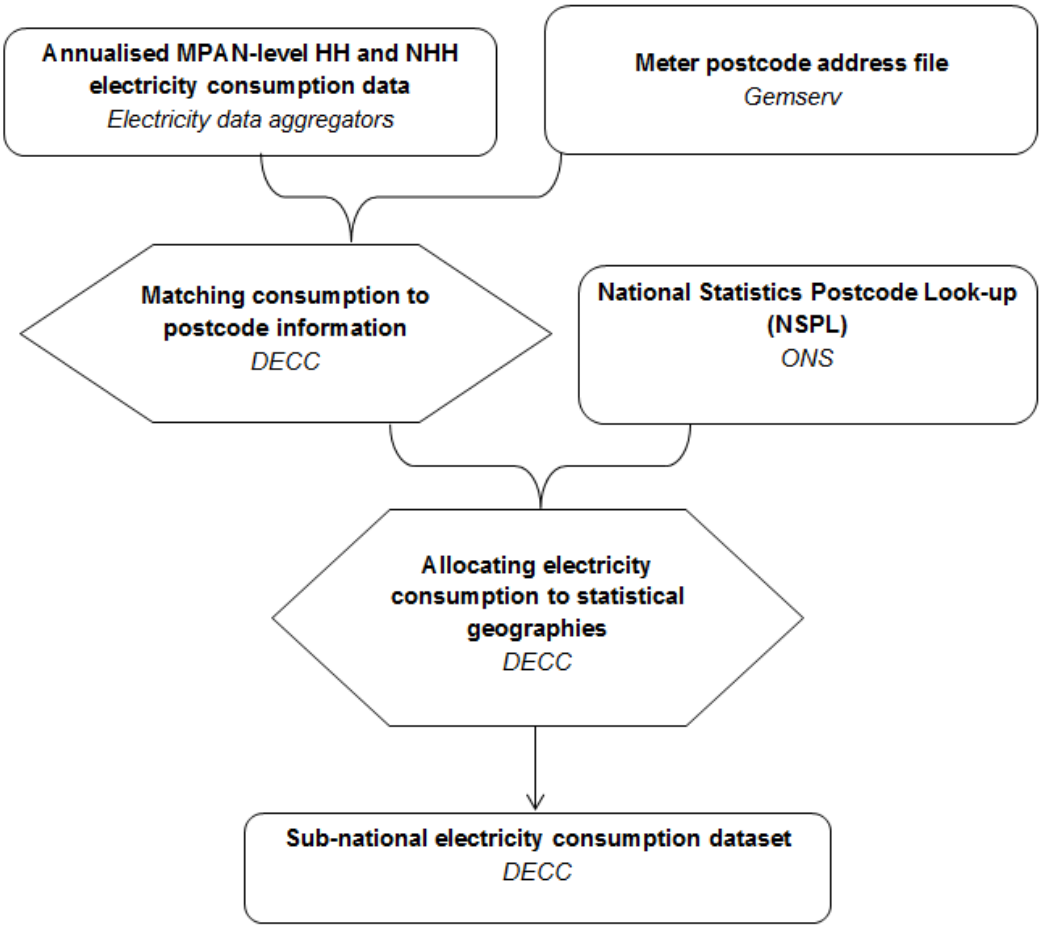
With the exception of Half Hourly (HH) data, it should also be noted that these data are not directly aligned with the calendar year and cover the year 27 January 2012 to 26 January 2013. These dates may vary slightly each year according to when the data extraction process takes place. The dates in previous years are as follows:

Table 3 Coverage of electricity consumption for Non-Half Hourly (NHH) data

Year of NHH electricity consumption	Dates covered
2012	27/01/2012 – 26/01/2013
2011	28/01/2011 – 27/01/2012
2010	31/01/2010 – 30/01/2011
2009	31/01/2009 – 30/01/2010
2008	30/01/2008 – 29/01/2009
2007	30/01/2007 – 29/01/2008
2006	30/01/2006 – 29/01/2007

3.2 Methodology

Chart 4 Flowchart to show the production process of the sub-national electricity consumption dataset



Annualised MPAN-level electricity consumption data from electricity data aggregators.

The data are collected for statistical purposes by DECC thanks to the full co-operation of the electricity industry. Annualised consumption data are provided by the data aggregators, agents of the electricity suppliers, who collate and aggregate electricity consumption data for each Meter Point Administration Number (MPAN). The electricity consumption data are generated for both Non-Half Hourly (NHH) meters (domestic and small or medium non-domestic customers) and for Half Hourly (HH) meters (larger non-domestic customers).

For the NHH data, annualised estimates are based on either an Annualised Advance (AA) or Estimated Annual Consumption (EAC). The AA is an estimate of annualised consumption based on consumption recorded between two meter readings at least 6 months apart, with the final reading occurring in the reference period. In comparison an EAC is used where two such meter readings are not available and an estimate of annualised consumption is produced by the energy company using historical information and the profile information relating to the meter. These data provide a good approximation of annualised consumption, but do not cover exactly the calendar year. In contrast, for the HH meter consumption estimates, data aggregators are asked to produce a simple report for each MPAN for the relevant calendar year.

Dates for HH and NHH consumption

Non Half-Hourly (NHH) consumption is produced for the period between **27 January 2012 and 26 January 2013.**

Half-hourly (HH) data covers consumption over the **calendar year.**

Meter postcode address file from Gemserv.

Information is obtained from the Gemserv meter postcode address file, which provides the geographical location of each MPAN, including the full address and postcode. For the 2003, 2004 and 2005 datasets the Gemserv data were from a quarterly-produced extract file produced by the electricity distribution companies' Meter Point Administration System (MPAS). In 2006 the MPAS data moved onto an on-line system named the Electricity Central Online Enquiry Service (ECOES), still managed by Gemserv.

Matching consumption to postcode information by DECC.

The electricity consumption and geographical data are then merged together (using the MPAN as this is common to both datasets) to enable consumption data to be mapped to postcodes and aggregated up to LSOA, MSOA/IGZ, local authority and English region and devolved administration levels. Where the address information within the Gemserv database is incomplete, invalid or missing, the Royal Mail Postcode Address File (PAF) is used, where possible, to obtain a full address and postcode and thus reduce the level of unallocated consumption.

National Statistics Postcode Look-up (NSPL) from ONS.

The National Statistics Postcode Look-up (NSPL)[29] is an ONS Geography product which links all United Kingdom postcodes to the geographical areas in which the postcode falls.

[29] Further information on the NSPL can be accessed at the ONS website: http://www.ons.gov.uk/ons/guide-method/geography/products/postcode-directories/-nspp-/index.html.

Allocating matched electricity and postcode data to statistical geographies by DECC.

To complete the data allocation process, the NSPL is used to allocate MPAN postcodes and the associated consumption to statistical local authority level (LAU1). This implies that any address containing a PO Box number will be assigned to the LAU1 area of the Post Office sorting depot. This is particularly important for interpretation of the data at levels below that of LAU1 (see chapter 4), as consumption may be allocated to a different area than where it is actually taking place. On occasions it has been possible to allocate an MPAN to an LAU1 code, but not at a lower level code.

Sub-national electricity consumption dataset from DECC.

The sub-national electricity dataset covers the years 2005 to 2012 and gives consumption as sales in gigawatt hours (GWh) as well as the number of meters for both domestic and non-domestic (commercial and industrial) consumers. In addition, average domestic and commercial and industrial consumption is given as sales per meter in kilowatt hours (kWh). The data is provided at a local authority level and the dataset also includes English region and devolved administrational totals.

Although total non-domestic consumption is provided in the local authority level dataset, Half Hourly consumption (consumption by the larger non-domestic customers) totals, at a local authority level are provided in the Middle Layer Super Output Area (MSOA) level datasets[30].

Number of meters versus number of properties

The number of meters does not exactly equal the number of properties. The reasons for this are as follows:

1. An apartment building may have a meter for the building complex (used to power building-wide appliances) in addition to each individual apartment having its own meter.
2. Some households may have a 3-rate meter system. A household with such a system will have one meter which measures all consumption at a peak rate and another meter which measures two other rates of off-peak consumption. This is the case for many households in Scotland, but it is extremely rare to find a similar case in England or Wales.
3. Some meters power street lighting or traffic lights rather than a property (many of these are unallocated).

3.3 Comparability

3.3.1 Comparison to sub-national electricity data

Please note that sub-national electricity and gas consumption statistics use varying methodology to compile the datasets and cover slightly different time periods. The most important difference to bear in mind is that electricity consumption data are not weather corrected while gas consumption data has a weather correction factor applied to it. Despite these differences, the combined electricity and gas provide a good indication of overall annual

[30] The MSOA dataset can be found here: https://www.gov.uk/government/statistical-data-sets/mlsoa-electricity-and-gas-2011. For guidance, please see chapter 4.

household energy consumption in Great Britain at local authority, MSOA/IGZ and LSOA level, due to the robustness of the data collection and collation process.

For more information on how gas consumption statistics are produced, please see chapter 2.

3.3.2 Comparison to DUKES and ECUK

DUKES

It is important to take care when comparing sub-national electricity data to the Digest of United Kingdom energy statistics (DUKES)[31]. DUKES is an annual DECC publication which provides a detailed and comprehensive picture of energy production and use over the last five years, with extensive tables, charts and commentary covering all the major aspects of energy.

There are differences in reported electricity figures in the sub-national and DUKES publications as DUKES data:

- Are based on a calendar year, whereas 2012 sub-national electricity data cover 27 January 2012 – 26 January 2013.
- Cover consumption for the United Kingdom, whereas the sub-national consumption statistics cover Great Britain.
- Are compiled using a top-down approach, where statistics are gathered by energy companies on a national level, whereas sub-national datasets are created from an initial set of individual MPAN data.
- Include consumption from Central Volume Allocation (CVA) users in its totals, which are not included in the sub-national data (see section 3.1).

ECUK

There are also issues when comparing sub-national data to Energy Consumption in the UK (ECUK)[32]. ECUK is an annual DECC publication which includes a detailed overview of energy consumption at a UK-wide level.

Differences occur between ECUK and sub-national figures as data in ECUK:

- Are, in many cases, modelled and obtained from secondary analysis performed by DECC on data from a number of sources, including DUKES.
- Contains a more comprehensive sectoral split than sub-national statistics and gives information on end use for majority of fuels.

[31] DUKES can be accessed on the DECC website:
https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes.

[32] ECUK can be accessed on the DECC website:
https://www.gov.uk/government/collections/energy-consumption-in-the-uk.

NEED

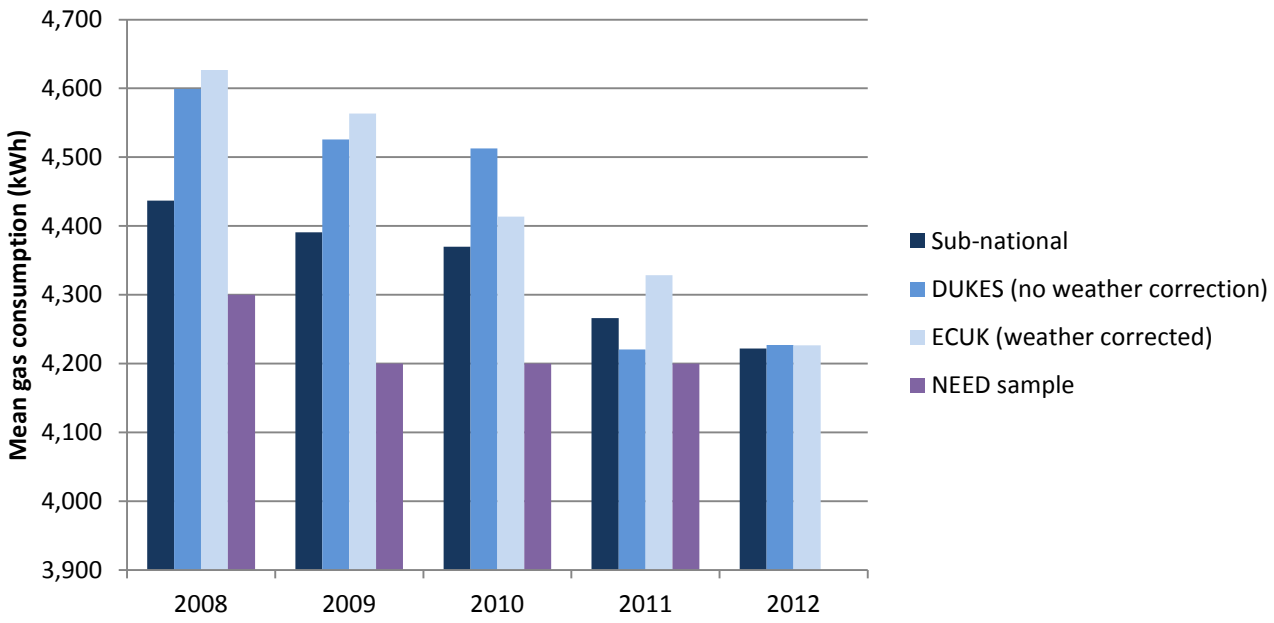
For electricity consumption, the mean consumption is very similar for the published sub-national electricity consumption data and the Nation Energy Efficiency Data Framework (NEED)[33]. This is as expected since both datasets are derived from the same data source. However, the mean consumption is slightly lower in the NEED dataset than the sub-national electricity consumption dataset. These differences occur because:

- In NEED, properties are defined as domestic based on the Valuation Office Agency property attribute database if they have consumption between 100kWh and 25,000kWh, whereas in sub-national data, meters are considered domestic if they are a profile 1 or 2 meter and have a consumption lower than 100,000kWh.
- The NEED dataset has suspected estimated readings removed, whereas sub-national gas consumption estimates do not.
- In NEED, data is matched to other sources by NLPG UPRN[34] at property level, whereas the sub-national data are assigned to a Lower Layer Super Output Area.

The chart below shows a comparison of the estimates of mean domestic electricity consumption per household taken from each of the different sources mentioned above in order to give a representation of the differences between the datasets.

Note: The latest NEED release only contains consumption data up to 2011, so 2012 NEED data is omitted from the chart.

Chart 5 Comparison of estimates of mean electricity consumption per household



[33] All NEED publications can be accessed from the following page;
https://www.gov.uk/government/collections/national-energy-efficiency-data-need-framework

[34] National Land and Property Gazetteer, Unique Property Reference Number. More info on the NLPG can be found at: http://www.nlpg.org.uk/nlpg/welcome.htm

3.4 Pre-2005 datasets

Users should note that there have been a number of methodological changes in the datasets released by DECC. It is important to recognise that differences in consumption between the 2003, 2004 and 2005 data are more likely to be due to data quality improvements rather than real changes in consumption between the two years. This is particularly relevant to industrial and commercial consumption.

The first set of local and regional electricity consumption estimates were released for 2003 in the December 2004 edition of Energy Trends. A revised set of 2003 local and regional data was released in the March 2005 edition of Energy Trends, after further validation procedures identified a significant number of domestic consumers with very high electricity consumption who were reclassified as industrial and commercial consumers.

When compiling the 2004 dataset a decision was taken to reallocate all domestic NHH meters (profile classes 1 and 2) with annualised consumption greater than 100,000 kWh to the commercial/industrial sector as it was found that that there were a significant number of private addresses consuming between 50,000 and 100,000 kWh, but relatively few over 100,000 kWh. As well as this any domestic meters identified as either unmetered, street lighting, landlord supply, staircase lighting or temporary builders' supply, were transferred to the commercial/industrial sector. The 2005 estimates were produced using the same methodology as 2004 but in 2006 some additional meters were transferred from domestic to commercial if terms such as PLC, Ltd and so on were identified in the address. This methodological change resulted in a small change in consumption levels from year-to-year compared with other improvements to methodology. The method was also implemented for subsequent years.

Users should also note that the quality of the Gemserv postcode address information has improved considerably, which has enabled DECC to substantially reduce the level of unallocated consumption since 2003. The NSPL (used from 2004) and PAF (used from 2006) have significantly improved the accuracy of the geographical mapping of electricity consumption from postcodes to LAU1 and NUTS1 areas.

The aggregate and average electricity consumption data are more reliable for the domestic sector than for the industrial and commercial sector as the postal address information held on the Gemserv extract file is more complete for the former. However, the quality of the industrial and commercial Gemserv data has improved at a faster rate than the domestic data, inevitably leading to more variability in the annual consumption estimates for the industrial and commercial sector.

Advice on time series analysis

In terms of making historical comparisons for the electricity consumption data, 2005 data should be used as the baseline year, as data from 2005 onwards (classed as National Statistics) have been produced with a consistent methodology. The robustness of post-2005 data mainly reflects the significant improvement in the quality of the postcode address file from Gemserv. Any changes recorded in consumption figures before 2005 are caused mainly by data quality improvements.

It is important to recognise that when making comparisons at local authority level from year to year, total and average consumption levels are influenced by new industrial or commercial establishments or the closure or downsizing of existing business for economic reasons and the extent to which more or less smaller businesses were affected. The impact that these changes have on totals and averages is highly dependent on the size of the business.

3.5 Sub-regional level data (MSOA/IGZ and LSOA)

Electricity consumption data are available below local authority level, with the aim that this will enable councils and others to monitor and target small areas for further interventions as part of their local energy strategies and enhance implementation of energy efficiency programmes, thus reducing carbon dioxide emissions.

Data are released on a Middle Layer Super Output Area (MSOA)/Intermediate Geography Zone (IGZ) and Lower Layer Super Output Area (LSOA) level. For further guidance on MSOA/IGZ and LSOA data, please see chapter 4.

3.6 Further information

For analysis on sub-national electricity consumption data prior to 2011, please see the articles in Energy Trends.[35]

[35] Analysis for 2010 is available in Energy Trends (page 52 of the March 2012 edition). The article can be accessed here:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/65933/4782-subnat-electricity-cons-stats-article.pdf.

4 Sub-regional gas and electricity consumption statistics (MSOA/IGZ and LSOA)

Sub-regional consumption statistics (2011)	
Dates covered:	Gas: 1 October 2011 – 30 September 2012.
	Electricity: 28 January 2012 – 27 January 2013.
Sectors covered:	Domestic and non-domestic (domestic only at LSOA level).
Years available:	*MSOA/IGZ:* 2004 – 2012.
	LSOA: 2007 – 2012.
Features:	*Gas:* Annualised, weather corrected.
	Electricity: Annualised, not weather corrected.
Source:	*Gas:* Xoserve and independent gas transporters.
	Electricity: Data aggregators (on behalf of electricity suppliers).

Statistical releases:

MSOA/IGZ and LSOA data:

Access the MSOA/IGZ and LSOA data.

Latest release: March 2014 – 2012 data.

Upcoming release: March 2015 – 2013 data.

4.1 Introduction

4.1.1 Purpose

Gas and electricity consumption data are available below local authority level, with the aim that this will enable councils and others to monitor and target small areas for further interventions as part of their local energy strategies, and enhance implementation of energy efficiency programmes and thus reduce carbon dioxide emissions.

This chapter provides specific guidance for use of the Middle Layer Super Output Area (MSOA)/Intermediate Geography Zone (IGZ) and Lower Layer Super Output Area (LSOA) level statistics for gas and electricity. DECC advises that the user gains familiarity with the coverage and methodology of the gas (Chapter 2) and/or the electricity (Chapter 3) datasets before reading further.

The table below outlines the sub-regional data that are currently available.

Table 4 Overview of sub-regional consumption statistics currently available

Sub-national geography	Area covered	Type of consumption available	Years available and status
Middle Layer Super Output Area (MLSOA)	England and Wales	• Domestic gas • Domestic electricity • Non-domestic gas • Non-domestic electricity (excluding half hourly consumers, which is only included at Local Authority level)	2004 (experimental), 2005 – 2012 (National Statistics)
Intermediate Geography Zone (IGZ)	Scotland	• Domestic gas • Domestic electricity • Non-domestic gas • Non-domestic electricity (excluding half hourly consumers, which is only included at Local Authority level)	2004 (experimental), 2005 – 2012 (National Statistics)
Lower Layer Super Output Area (LLSOA)	England and Wales	• Domestic gas • Domestic electricity	2007 (pilot study for 45 local authorities only) – 2012 (experimental)

4.1.2 Statistical geographies

MSOAs and LSOAs are part of a geographical hierarchy that was first introduced in the 2001 census and is expected to eventually become the standard across National Statistics and beyond. Further information regarding SOAs and their constitution can be found in section 1.1 or on the ONS website.[36]

Please note that data is not available at a Parish level. DECC advises that the user instead uses MSOA data, as they may cover a similar area.

Recognising that some local authorities would like data at a more granular level, DECC is currently in talks with energy suppliers regarding providing data at a lower level soon.

Trying to find out which output area your postcode falls in?

Please see Annex A for a step-by-step guide on how to locate your MSOA/IGZ/LSOA.

4.2 Main data features (2012 data)

4.2.1 Overview

Data for MSOA/IGZ and LSOA is taken from the same base consumption data used to produce the sub-national consumption datasets at a local authority level (as described in Chapters 2 and 3).

Consumption is given in kilowatt hours (kWh) along with the number of meters. Average consumption per meter is also provided.

[36] Information regarding Super Output Areas can be found on the ONS website here: http://www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/census/super-output-areas--soas-/index.html

Important things to note with regards to electricity data:

1. Consumption is split between ordinary and economy 7 meters.

   Economy 7 meters differ from ordinary meters in that they have a separate (cheaper) off-peak rate. Economy 7 meters still measure all household consumption however, meaning a household on an economy 7 tariff will still have only one meter.

2. For non-domestic MSOA data, industrial half-hourly (HH) consumption is provided for each local authority but it is not disaggregated further as doing so would break the UK Statistics Authority's Code of practice for Official Statistics relating to data disclosure.

4.2.2 MSOA/IGZ and LSOA

MSOA level data is provided for both gas and electricity consumption by domestic and non-domestic consumers, for England and Wales. For Scotland, gas and electricity consumption by domestic and non-domestic consumers are available on an IGZ level (similar to MSOA).

LSOA level data is provided for gas and electricity consumption in England and Wales as part of the domestic datasets only. Due to the small size of these geographical areas, the majority of the non-domestic consumption would be disclosive and would have to be aggregated. Since the non-domestic consumption is available at MSOA level, DECC took the decision that publishing non-domestic LSOA level data after aggregation would not add much value for users. In addition, the gas and electricity consumption data at a Data Zone (DZ) level is currently not available for Scotland, as the energy suppliers (who provide us with the data) have not granted DECC permission to publish consumption at this level for disclosure reasons.

4.2.3 Unallocated consumption

Unallocated consumption refers to consumption from electricity and gas meters which could be allocated to the local authority but not further down to a specific MSOA. This is mainly as a result of DECC receiving either a partial postcode or no postcode from the data suppliers. These calculations to determine unallocated consumption have not been repeated for the LSOA workbooks as some LSOAs have not been published and therefore the totals would not match the LA level data.[37]

4.2.4 Merged consumption

Merged consumption refers to MSOAs that have been merged together because one or more of them left disaggregated would be disclosive (an SOA is defined as disclosive if it contains 5 or fewer meters). When MSOA needs to be merged, the priority is to merge it with other disclosive MSOAs in the same Local Authority, when this is not possible it is merged with the non-disclosive MSOA in that local authority with the fewest number of meters. It should be noted that the proximity of the MSOAs is not taken into account in this process. The below image shows

[37] For more information on this, please see section 4.5.

an example of disclosive MSOAs that have been merged in the local authority King's Lynn and West Norfolk (UKH1308).

3642	King's Lynn and West Norfolk	UKH1308	E02005562, E02005563, E02005564, E02005565
3643	King's Lynn and West Norfolk	UKH1308	E02005566

The same process is carried out for disclosive areas in the LSOA datasets. Please note that LSOAs belonging to disclosive MSOAs are automatically disclosive and so these areas are not published.

4.2.5 Socio-economic data

DECC provides socio-economic census data for each sub-regional geography, which gives further information on population size, geographical size and number of households in these areas. This is to allow users to gain more of an appreciation of the composition of the individual areas. Census information from 2001 can be found alongside the gas and electricity consumption data in pre-2008 datasets and census information from 2011 is available as a separate spreadsheet.[38]

4.3 Data limitations

In a number of cases, there are substantial differences between the number of MPANs and number of households.

Whereas the data for the number of MPANs is consistent with the published electricity and gas consumption data, the household data comes from the 2011 census (with the exception of the Scottish data). As such, changes in the housing stock between these periods causes inconsistencies in the data.

Not all of the LSOA gas and electricity data has been published.

This is a result of the MSOA to which it belongs being disclosive and hence merged with another MSOA, making the LSOA automatically disclosive.

Improvements in data accuracy over time can affect consumption and the number of meters in an area from year to year.

It is important to take care when performing year-on-year comparisons, as changes in consumption and the number of meters in some super output areas can be attributed to updates caused by an improvement in the address database or more accurate profile type information provided by energy suppliers.

[38] Socio-economic data can be found on the DECC website: https://www.gov.uk/government/organisations/department-of-energy-climate-change/series/MSOA-and-LSOA-electricity-and-gas-estimates. Further socio-economic data at a sub-regional level is also available from the Office for National Statistics 'Neighbourhood Statistics' website using the following link: http://neighbourhood.statistics.gov.uk/dissemination/.

4.4 History of the data collection process

Beginning in late 2005, DECC ran a pilot scheme with just electricity data for 2004 involving 6 LAs - Crawley Borough Council, Bristol City Council, Redcar and Cleveland Borough Council, Guildford Borough Council, High Peak District Council and Kirklees Metropolitan Council. This was aimed at evaluating both the practicality of producing data at MSOA level and investigating the robustness of the consumption estimates at this level. The results suggested such data would be useful and that the robustness of the data for the domestic sector was sufficient to allow a national roll out (though a fuller evaluation of the reliability of the industrial and commercial data was not undertaken as the data is far more complex to analyse).

The MSOA electricity estimates for the domestic sector were validated using a combination of feedback from the local authorities themselves and the direct comparison of consumption patterns across each authority using socio-economic variables taken from the 2001 census. The variables taken from the census included the levels of economic activity, the size and type of the housing stock and average household size, which were used as proxy measures of the level of economic prosperity in the MSOAs.

On 25th March 2010, DECC released 2008 LSOA electricity and gas consumption data for domestic consumers within England and Wales. This was the first time that this data has been published for the whole of England and Wales and follows on from a successful pilot carried out during 2009, when the 2007 data were published for 40 local authorities. Since the methodology for producing these data is still developmental, DECC classes these statistics as experimental.

4.5 Previous datasets

The layout of the spreadsheets differs slightly from year to year, but this does not affect the data comparability. This section provides guidance to interpreting these datasets:

4.5.1 2008 – 2009 data (MSOA/IGZ and LSOA)

The data for 2008 and 2009 are separated according to whether they refer to MSOA/IGZ or LSOA, gas or electricity, and domestic or non-domestic. In other words, for each English Region and Wales, there are 6 separate Excel workbooks, which relate to:

1. MSOA/IGZ domestic electricity consumption
2. MSOA/IGZ domestic gas consumption
3. MSOA/IGZ non-domestic electricity consumption
4. MSOA/IGZ non-domestic gas consumption
5. LSOA domestic electricity consumption
6. LSOA domestic gas consumption

There are 4 separate Excel workbooks for Scotland, as only IGZ level data is available.

4.5.2 2005 – 2007 data (MSOA/IGZ only)

The datasheets for 2005, 2006 and 2007 show electricity and gas consumption data for England, Wales and Scotland. The first 8 rows contain information on the local authority regarding total consumption, number of meters and average consumption levels for domestic and non-domestic users, split by electricity/gas and includes a total of the two. See below an example of this, showing electricity statistics for 2006 in the Local Authority of Carmarthenshire:

	Electricity		
	Consumption (kWh)	Number of Meters	Average consumption per meter
Domestic consumption	336,377,168	78,767	4,271
Ind/Com consumption[1]	630,785,869	9,584	65,817
Total consumption	967,163,037	88,351	10,947
Of which electricity Industrial Half hourly	451,237,798	261	1,728,880

From row 13 downwards, the datasheet contains the full breakdown of consumption for each MSOA, identified by the local authority code followed by an individual MSOA code, e.g. UKL1403, W02000142 for Carmarthenshire 001. Data is shown by consumption in kWh (split by ordinary electricity, economy 7 electricity, industrial/commercial electricity, domestic gas and industrial and commercial gas), number of meters and average consumption per meter. An example of this data is displayed below, showing consumption in kWh again for Carmarthenshire in 2006:

			Consumption (kWh)				
MLSOA Allocation			Electricity			Gas	
LA Code	MLSOA Code	MLSOA Name	Ordinary domestic	Economy7 domestic	Ind/Com	Domestic	Ind/Com[1]
UKL1409	W02000142	Carmarthenshire 001	7,686,631	3,332,427	6,165,341	4,571,315	
UKL1409	W02000143	Carmarthenshire 002	8,427,098	3,640,046	8,820,046	16,173,006	6,826,382
UKL1409	W02000144	Carmarthenshire 003	10,623,102	5,993,763	12,522,930		
UKL1409	W02000145	Carmarthenshire 004	10,895,097	3,737,707	9,398,562	26,886,950	5,688,430
UKL1409	W02000146	Carmarthenshire 005	9,968,846	4,070,879	6,992,471		
UKL1409	W02000147	Carmarthenshire 006	10,691,490	3,586,454	6,116,820	28,583,994	14,434,200
UKL1409	W02000148	Carmarthenshire 007	7,637,703	1,915,541	1,844,259	36,894,614	6,778,644
UKL1409	W02000149	Carmarthenshire 008	9,363,541	3,033,333	24,433,886	44,703,469	30,473,152
UKL1409	W02000150	Carmarthenshire 009	10,166,479	3,135,317	12,198,174	22,183,116	3,137,180
UKL1409	W02000151	Carmarthenshire 010	12,647,741	1,299,615	3,091,201	35,985,700	2,849,378
UKL1409	W02000152	Carmarthenshire 011	12,254,183	2,883,279	4,179,392	34,129,995	7,739,046
UKL1409	W02000153	Carmarthenshire 012	12,092,529	4,349,564	7,778,679	12,164,968	
UKL1409	W02000154	Carmarthenshire 013	11,368,588	1,059,028	6,965,502	60,198,730	12,362,957
UKL1409	W02000155	Carmarthenshire 014	7,344,356	4,562,463	7,473,274		
UKL1409	W02000156	Carmarthenshire 015	13,084,618	2,294,565	8,732,740		
UKL1409		Carmarthenshire 003, 005, 014, 015				1,108,837	
UKL1409		Carmarthenshire 001, 012 ,015 and Unallocated					6,466,613
UKL1409	W02000157	Carmarthenshire 016	14,624,083	2,521,289	3,758,030	31,296,942	2,073,036
UKL1409	W02000158	Carmarthenshire 017	8,834,054	966,413	3,088,647	41,946,793	3,265,867
UKL1409	W02000159	Carmarthenshire 018	9,395,151	996,276	4,006,860	36,924,111	3,943,527
UKL1409	W02000160	Carmarthenshire 019	11,902,271	846,499	2,852,180	57,798,040	14,817,521
UKL1409	W02000161	Carmarthenshire 020	7,677,289	683,909	3,760,013	38,997,366	53,085,723
UKL1409	W02000162	Carmarthenshire 021	13,326,270	1,551,978	4,440,035	61,769,426	5,018,461
UKL1409	W02000163	Carmarthenshire 022	7,491,786	728,954	1,888,379	45,464,121	6,251,644
UKL1409	W02000164	Carmarthenshire 023	10,618,743	1,548,309	12,541,640	60,111,674	18,975,470
UKL1409	W02000165	Carmarthenshire 024	9,070,727	1,052,639	6,154,416	48,829,061	
UKL1409	W02000166	Carmarthenshire 025	11,880,897	718,126	2,802,939	60,165,623	
UKL1409		Carmarthenshire 024 and 025					125,398,575
UKL1409	W02000167	Carmarthenshire 026	12,872,210	1,847,923	5,933,922	69,289,991	25,466,510
UKL1409		Unallocated	1,546,989	528,402	1,607,731	6,672,239	

Following this are some combined figures calculated from the prior data and an indicator showing the percentage of domestic gas meters to domestic electricity meters. In cases where consumption and number of meters are suppressed due to disclosure issues, they are not represented in the combined figures and the percentage of domestic gas to domestic electricity meters will appear blank. Finally, additional socio-economic 2001 census data (unless otherwise specified) regarding population, area sizes (hectares) and the number of households

in each MSOA are shown in grey. Again, an example of this is shown below, for Carmarthenshire in 2006:

	MLSOA Allocation		Combined figures									
			Consumption (kWh)		Number of meters		Consumption (kWh)		% domestic gas meters	2001 Census data		
LA Code	MLSOA Cod	MLSOA Name	Electricity	Gas	Electricity	Gas	Domestic	Ind/Com	to electricity meters	Population	Area (hectares)	Households
UKL1409	W02000145	Carmarthenshire 004	24,031,366	32,575,380	3,679	1,333	41,519,754	15,086,992	43.3	7,009	32,012	2,943
UKL1409	W02000146	Carmarthenshire 005	21,032,196		3,082		14,039,725	6,992,471		6,411	26,100	2,573
UKL1409	W02000147	Carmarthenshire 006	20,394,765	43,018,194	3,457	1,685	42,861,939	20,551,020	52.8	7,056	12,822	2,864
UKL1409	W02000148	Carmarthenshire 007	11,397,503	43,673,258	2,505	2,021	46,447,858	8,622,903	82.7	5,291	561	2,274
UKL1409	W02000149	Carmarthenshire 008	36,830,761	75,176,621	3,937	2,491	57,100,343	54,907,038	77.7	5,808	2,972	2,719
UKL1409	W02000150	Carmarthenshire 009	25,499,969	25,320,296	3,369	1,163	35,484,911	15,335,354	41.6	6,868	15,536	2,845
UKL1409	W02000151	Carmarthenshire 010	17,038,558	38,835,078	3,606	1,729	49,933,056	5,940,579	50.3	7,159	5,951	3,037
UKL1409	W02000152	Carmarthenshire 011	19,316,854	41,869,041	3,605	1,616	49,267,457	11,918,438	47.2	7,205	3,455	3,024
UKL1409	W02000153	Carmarthenshire 012	24,220,771	12,164,968	3,697	621	28,607,060	7,778,679	19.2	7,378	14,491	3,046
UKL1409	W02000154	Carmarthenshire 013	19,393,118	72,561,687	3,732	2,867	72,626,345	19,328,459	84.2	7,127	1,427	3,082
UKL1409	W02000155	Carmarthenshire 014	19,380,092		2,471		11,906,819	7,473,274		5,151	15,979	2,081
UKL1409	W02000156	Carmarthenshire 015	24,111,922		3,683		15,379,182	8,732,740		7,428	4,558	2,979
UKL1409		Carmarthenshire 003, 005, 014, 015		1,108,837		54	1,108,837					
UKL1409		Carmarthenshire 001, 012 ,015 and Unallocated		6,466,613		13		6,466,613				
UKL1409	W02000157	Carmarthenshire 016	20,903,402	33,369,978	4,199	1,491	48,442,314	5,831,066	37.6	8,585	5,326	3,552
UKL1409	W02000158	Carmarthenshire 017	12,889,114	45,212,660	2,517	2,023	51,747,260	6,354,514	84.2	5,195	2,624	2,159
UKL1409	W02000159	Carmarthenshire 018	14,398,288	40,867,638	2,792	2,018	47,315,538	7,950,387	76.6	5,822	3,154	2,414
UKL1409	W02000160	Carmarthenshire 019	15,600,950	72,615,561	3,317	2,964	70,546,810	17,669,701	91.6	6,944	2,233	2,921
UKL1409	W02000161	Carmarthenshire 020	12,121,212	92,083,089	2,407	2,203	47,358,565	56,845,736	93.6	5,381	480	2,238
UKL1409	W02000162	Carmarthenshire 021	19,318,283	66,787,887	4,131	3,471	76,647,674	9,458,496	88.0	7,957	4,195	3,493
UKL1409	W02000163	Carmarthenshire 022	10,109,119	51,715,765	2,494	2,383	53,684,861	8,140,023	98.4	5,036	159	2,238
UKL1409	W02000164	Carmarthenshire 023	24,708,632	79,087,144	3,688	3,057	72,279,726	31,517,110	92.8	6,985	1,483	3,011
UKL1409	W02000165	Carmarthenshire 024	16,277,781	48,829,061	3,094	2,731	58,952,426	6,154,416	93.6	6,347	234	2,711
UKL1409	W02000166	Carmarthenshire 025	15,401,962	60,165,623	3,567	3,259	72,764,647	2,802,939	94.4	7,367	1,002	3,110
UKL1409		Carmarthenshire 024 and 025		125,398,575		64		125,398,575				
UKL1409	W02000167	Carmarthenshire 026	20,654,055	94,756,501	4,976	4,337	84,010,124	31,400,432	92.0	8,883	459	4,120
UKL1409		Unallocated	3,683,123	6,672,239	512	387	8,747,631	1,607,731	91.3			

Below this data there are totals of each column and an indicator of the percentage of each column that is unallocated. This unallocated data is consumption which could be allocated to the LA but not further down to a specific MSOA. This is similar to the data labelled “Unmatched but allocated to LA” in the 2004 data (see below).

4.5.3 2004 data – MSOA electricity only

The 2004 datasheets show electricity consumption data in 2004 for England and Wales. The first 7 rows of each worksheet contain information on the local authority regarding total consumption, number of meters and average consumption levels for domestic and non-domestic users; these are taken from figures published in the December 2005 edition of Energy Trends. Next to this data are figures for the percentage of the total domestic consumption within the local authority that DECC were able to allocate to a specific MSOA. Below is an example of this data for the Local Authority of Carmarthenshire:

Local Authority consumption statistics from Energy Trends table Dec 2005					
	Consumption (kWh)	Number of Meters	Average consumption per meter		
Domestic	331,712,105	76,722	4,324	Percentage of domestic consumption allocated to SOA	99.30
Industrial	642,075,781	9,893	64,903		
Total	973,787,886	86,615	11,243		
Of which Industrial Half hourly	473,208,573	239	1,979,952		

Rows 11 to 17 provide summary information on the MSOA data provided in the section below it. Information is provided regarding total consumption, total meters and average consumption for the following headings:

Unmatched but allocated to LA. This relates to consumption that could be allocated to the specified local authority but not any further. This is due to postcode information for some meters being invalid or incomplete, meaning allocation to a specific MSOA was not possible.

Domestic matched but transferred to commercial. This relates to consumers, identified as domestic users, but consuming more than 50,000kWh annually who were judged to have a greater probability of being small commercial/industrial consumers. The super output area analysis does not include this reallocation process, which is only shown at local authority level.

Allocated to LA not to SOA. This relates to consumption that has been allocated to the specified local authority but where additional geographical information below local authority level indicates that the consumption could actually be taking place outside.

Total unallocated. The aggregate value of the consumption relating to the three points above.

SOA allocated. This is all electricity consumption that could be accurately allocated to a specific MSOA in the correct local authority.

Below is an example of this section of the dataset for Carmarthenshire:

	Consumption (kWh)			Number of meters			Average consumption per meter		
Summary statistics of SOA allocation	ORDINARY	ECONOMY7	COMMERCIAL	ORDINARY	ECONOMY7	COMMERCIAL	ORDINARY	ECONOMY7	COMMERCIAL
(1) Unmatched but allocated to LA	478,952		717,031	129		30			
(2) Domestic matched but transferred to commercial	- 315,502		315,502	- 165		165			
(3) Allocated to LA not to SOA	1,170,042	675,407	858,764	269	74	59	4,350	9,127	14,555
(4) Total unallocated [= (1) + (2) + (3)]	2,008,899		1,891,296						
(5) SOA allocated	259,911,518	69,791,688	166,975,912	68,438	7,581	9,226	3,798	9,206	18,098

The section below this shows the full breakdown of consumption data for each MSOA identified by LA code followed by an individual MSOA code, e.g. UKL1403, W02000142 for Carmarthenshire 001. The breakdown includes consumption (in kWh), number of meters, average consumption per meter and 2001 census data regarding population, area and households. See below an example of this section of the dataset for consumption in kWh for Carmarthenshire:

SOA Allocation			**Consumption (kWh)**		
			ORDINARY	ECONOMY7	COMMERCIAL
UKL1403	W02000142	Carmarthenshire 001	7,615,051	3,983,513	5,471,873
UKL1403	W02000143	Carmarthenshire 002	8,176,670	3,975,644	8,284,425
UKL1403	W02000144	Carmarthenshire 003	10,653,875	6,602,311	12,300,699
UKL1403	W02000145	Carmarthenshire 004	10,475,260	4,103,204	9,761,925
UKL1403	W02000146	Carmarthenshire 005	9,521,331	4,446,721	7,284,813
UKL1403	W02000147	Carmarthenshire 006	10,102,225	4,002,121	5,710,581
UKL1403	W02000148	Carmarthenshire 007	7,532,372	2,294,210	1,904,056
UKL1403	W02000149	Carmarthenshire 008	8,900,220	3,367,540	22,272,492
UKL1403	W02000150	Carmarthenshire 009	9,710,792	3,505,357	10,794,753
UKL1403	W02000151	Carmarthenshire 010	11,880,040	1,660,574	2,840,594
UKL1403	W02000152	Carmarthenshire 011	11,282,543	3,170,048	4,564,959
UKL1403	W02000153	Carmarthenshire 012	11,385,715	4,756,562	7,949,250
UKL1403	W02000154	Carmarthenshire 013	10,848,859	1,269,670	6,600,431
UKL1403	W02000155	Carmarthenshire 014	6,972,739	5,248,946	7,599,611
UKL1403	W02000156	Carmarthenshire 015	12,507,004	2,718,382	6,951,416
UKL1403	W02000157	Carmarthenshire 016	13,665,939	2,849,337	3,559,572
UKL1403	W02000158	Carmarthenshire 017	8,242,277	1,065,407	3,574,506
UKL1403	W02000159	Carmarthenshire 018	8,793,608	1,258,167	3,540,209
UKL1403	W02000160	Carmarthenshire 019	11,192,784	966,691	2,777,886
UKL1403	W02000161	Carmarthenshire 020	7,351,032	768,119	3,309,933
UKL1403	W02000162	Carmarthenshire 021	12,915,027	1,769,922	4,044,326
UKL1403	W02000163	Carmarthenshire 022	7,244,238	888,702	2,255,033
UKL1403	W02000164	Carmarthenshire 023	10,506,009	1,728,058	11,034,691
UKL1403	W02000165	Carmarthenshire 024	8,765,473	1,166,180	4,793,707
UKL1403	W02000166	Carmarthenshire 025	11,129,818	870,045	2,194,468
UKL1403	W02000167	Carmarthenshire 026	12,540,619	1,356,260	5,599,705

4.5.4 Limitations

In 2004, data is only available for England and Wales.

It was not possible to produce electricity consumption data for IGZs due to technical difficulties in allocating electricity consumption into the appropriate intermediate geography zones. These difficulties have been overcome for the datasets from 2005 onwards.

Quality issues meant that in 2004, DECC was only able to match 40% of consumption to a specific MSOA.

This was due to a lack of complete postcode information for some electricity meters. Data quality has improved in successive years.

5 Northern Ireland domestic electricity consumption statistics

Sub-national Northern Ireland domestic electricity consumption statistics (2011)

Dates covered:	1 April 2011 – 31 March 2012 (financial year).
	(Earlier data cover the calendar year).
Years available:	2008 – 2011.
Features:	Experimental.
Source:	Northern Ireland Electricity (NIE).

Statistical releases:

District Council:

Access the district council level data.

Access the factsheet.

Latest release: June 2013 (2011 data).

5.1 Overview (2008 – 2011 data)

These datasets include:

- Electricity consumption covering the 26 District Councils of Northern Ireland, a similar level of disaggregation to the local authority level data that DECC has published for Great Britain since 2005.
- Consumption covering the financial year (1 April 2011 to 31 March 2012). Data for 2008 to 2010 covered the calendar year. As Northern Ireland statistics are experimental, year-on-year comparisons should be treated with caution.
- An aggregated total for unallocated consumption, that is, consumption that was not able to be matched to an area due to incomplete or a lack of postcode information.

These datasets exclude:

- Customers on ‘Power NI farm popular’ and ‘farm night saver’ tariffs. Although classified by Northern Ireland Electricity (NIE) as domestic these tariffs do not fall into this category for the production of energy statistics.

5.2 Background and methodology

On the 1 November 2007, the Single Electricity Market (SEM) was introduced to Northern Ireland to help provide a stable, transparent and competitive energy market.

This reflected the opening up of markets under EC legislation, and built upon the privatisation of the electricity supply market following the Electricity (Northern Ireland) Order 1992.

The data are based on billed units from customers that have been connected for at least 12 months.

As the data that is provided is billed information as opposed to the sales information reported, unbilled units are excluded and both meters and consumption numbers have been uplifted to match annual sales data.

5.3 Comparison to Great Britain electricity consumption data

Northern Ireland electricity data is not directly comparable with electricity consumption for Great Britain. This is due to the difference in market structure and hence the varying methodologies used to collect the data.

6 Northern Ireland non-domestic electricity consumption statistics

Sub-national Northern Ireland non-domestic electricity consumption statistics (2011)

Dates covered: 1 April 2011 – 31 March 2012.

Years available: 2009 – 2011.

Features: Experimental

Source: Northern Ireland Energy (NIE).

Statistical releases:

District Council:

Access the district council level data.

Access the factsheet.

Latest release: June 2013 (2011 data).

6.1 Overview (2009 – 2011 data)

6.1.1 Coverage of data

The datasets include:

- Electricity consumption covering the 26 District Councils of Northern Ireland, a similar level of disaggregation to the local authority level data that DECC has published for Great Britain since 2005.
- Consumption covering the dates 1 April 2011 to 31 March 2012. However, these dates are subject to change for future years, as this dataset is currently experimental.
- An aggregated total for unallocated consumption, that is, consumption that was not able to be matched to an area due to incomplete or a lack of postcode information.
- Both actual readings and estimated readings of electricity consumption. From year-to-year some meter readings change from actual to estimated readings and vice-versa, which can cause extreme values to be created when an estimate is corrected.
- Some meter points which have low or no consumption (explained further in section 6.1.2).

The datasets exclude:

- Electricity produced by companies that generate their own electricity and consume it without it passing over the public distribution network.

6.1.2 Data limitations

The datasets include some meter points which have low or no consumption.

These meter points represent sites that have been vacant for a short period of time, landlord's supply (for example, lights in apartment blocks), sites that have been de-energised throughout the year, and also meter points in, for example, church halls, playing fields and car parks where use is less than in industry. There are also some meter points which have no consumption attached to them. These are still included with this analysis.

6.2 Background and methodology

On the 1 November 2007, the Single Electricity Market (SEM) was introduced in Northern Ireland to help provide a stable, transparent and competitive energy market.

This reflected the opening up of markets under EC legislation, and built upon the privatisation of the electricity supply market following the Electricity (Northern Ireland) Order 1992.

To produce the 2011 estimates, data was derived from information held on NIE's Distribution Use of System (DUoS) Billing system.

These data largely cover the 12 month period 1 April 2011 to 31 March 2012, are based on billed units and relate to final consumption at the point when it was derived.

6.3 Comparability to Great Britain electricity consumption data

Northern Ireland electricity data is not directly comparable with electricity consumption for Great Britain. This is due to the difference in market structure and the varying methodologies used to collect the data.

7 Road transport fuel consumption statistics

Sub-national road transport fuel consumption statistics (2011)

Dates covered:	1 January 2011 – 31 December 2011.
Sectors covered:	Road transport (all users).
Features:	Modelled.
Years available:	2002 – 2011.
Source:	Ricardo-AEA.

Statistical releases:

English region and devolved administration (NUTS1) and local authority (LAU1):

Access the local authority level data.

Access the factsheet and Ricardo-AEA's methodology note.

Latest release: June 2013 (2011 data).

Next release: June 2014 (2012 data).

7.1 Overview (2005 – 2011 data)

7.1.1 Coverage of data

The datasets include:

- Road transport fuel consumption in the United Kingdom between 1 January and 31 December.
- Estimates of fuel (petrol and diesel) consumption by type of vehicle (bus, motorcycle, petrol car, diesel car, HGV, petrol LGV and diesel LGV). Buses, diesel cars, HGV and diesel LGV are all classed as diesel-consuming vehicles, while petrol cars, motor-cycles and petrol LGV are classed as petrol-consuming vehicles.
- Modelled consumption down to English region and devolved administration and local authority level. The estimates are based on where the fuel was consumed rather than where it was purchased, in order to make the dataset more comparable with both the gas and electricity datasets (based on consumption from individual meters). Therefore road fuel purchased abroad and consumed in the UK is included whereas road fuel purchased in the UK and consumed abroad has been excluded.
- Consumption given in thousand tonnes of fuel (by weight) as opposed to thousand tonnes of oil equivalent (by energy content).

The datasets exclude:

- Road transport consumption of biofuels – the estimates only take account of emissions arising from fossil fuels, making it difficult to know where exactly biofuels are being consumed.
- Liquefied petroleum gases (LPGs) – there are no reliable figures available on consumption of this fuel by vehicles and there is also a lack of geographical information.
- Electricity – there is a lack of geographical information needed to map regional consumption of this fuel.

Fuels included in road transport fuel consumption statistics

Please note that this dataset covers road transport consumption of **petrol** and **diesel** only.

7.1.2 Data limitations

Road transport fuel estimates are modelled.

The estimates are based on the use of a number of different information sources. As a result, the estimates are subject to potential modelling inaccuracies.

Although LGVs are classed as freight vehicles, some consumption may be related to personal travel.

LGVs can be used for a number of tasks such as carrying freight, providing transport, carrying equipment or for private use.

7.2 Methodology

The estimates published by DECC are produced by Ricardo-AEA as part of contract work for the regional energy project. Fuel consumption by road vehicles is calculated by the methodology used to estimate total UK emissions for road transport in the National Atmospheric Emissions Inventory (NAEI) and Greenhouse Gas Inventory (GHGI), and is consistent with internationally agreed procedures and guidelines for reporting emission inventories.

Calculating fuel consumption

The methodology for calculating fuel consumption combines traffic activity data (from DfT's national traffic census) with fleet composition data and fuel consumption/emission factors.

The vehicle fleet composition data are based on licensing statistics and new evidence from Automatic Number Plate Recognition (ANPR) data from DfT. These provide an indication of the vehicle mix by engine size, vehicle size and age, engine and exhaust treatment technology, Euro emission standards and fuel type as observed on different road types.

Fuel consumption factors are based on a combination of surveys on average fuel efficiencies of the vehicle fleet and published compilations of factors derived from vehicle emission test data from various UK and European sources. In the latter case, representative samples of vehicles are tested over a range of drive cycles associated with different average speeds on different road conditions. Vehicle speed is one of many parameters that affect the amount of fuel a

vehicle uses, so the NAEI uses functions that relate fuel consumption to average speed. These functions were updated by Transport Research Laboratory (TRL) on behalf of DfT in 2009[39] and were adopted in the 2008 inventory.

For LGVs, the DfT/TRL functions are used as provided in combination with average speed data and vehicle kilometre data for different road types and fleet composition information representative of the national fleet.

For HGVs, the fuel consumption factors are based on the fleet-averaged fuel efficiencies for different weight classes of HGVs from DfT' s Continuing Survey of Road Goods Transport (CSRGT). The shape of the DfT/TRL speed-related functions are then used to define the variation, relative to the averaged value, in fuel consumption factor with speed and hence road type.

For buses and coaches, the principal data source used was figures from DfT on the Bus Service Operators Grant (BSOG) system. This is an audited subsidy, directly linked to the fuel consumed on local bus services. From BSOG financial figures, DfT were able to calculate the costs and hence quantity of fuel (in litres) used for local bus services going back to 1996 and using additional bus km data were able to derive implied fuel consumption factors for local service buses. DfT believe that the BSOG data provide a relatively robust estimation of fuel consumption on local bus services and would be based on a larger evidence base than the DfT/TRL speed-related functions which are derived from a relatively small sample of buses and coaches tested. However, the BSOG data do not cover rural bus services and coaches. For these, an approach similar to that used for HGVs was used by utilising the DfT/TRL functions to define how the fuel efficiency of the average bus and coach in the UK fleet varied with average speed and road type and year.

Mapping fuel consumption

The base map of the UK road network is derived from the Ordnance Survey Meridian 2 dataset, which provides locations of all roads in Great Britain. A dataset of roads in Northern Ireland was obtained from the Land & Property Services which is responsible for all Ordnance Surveys of Northern Ireland. Traffic flow data is available on a census count point basis for Great Britain. Provisional data for Northern Ireland and only a small number of count points were available for 2011 when the road transport mapping process was undertaken; therefore, where 2011 traffic data were not available 2010 data were used and scaled to 2011. Once the base maps and traffic flow data were combined in order to map vehicle movements, fuel consumption factors were applied (Ricardo-AEA, 2013).[40]

[39] For more information, please see the Department for Transport publication here: https://www.gov.uk/government/publications/road-vehicle-emission-factors-2009

[40] For more information please see Ricardo-AEA's methodology note which can be found at: https://www.gov.uk/government/organisations/department-of-energy-climate-change/series/road-transport-consumption-at-regional-and-local-level.

7.3 Comparison to DUKES and ECUK

Users should note that there are differences between the national figures presented in this factsheet and those reported in the Digest of United Kingdom Energy Statistics (DUKES). Sub-national statistics are based on fuel consumption (which is derived from traffic activity) while DUKES figures are based on fuel sales. Table 4 below provides a comparison between UK road transport consumption as reported in the sub-national estimates and as reported in DUKES.

The difference between sub-national and DUKES figures varies year from year but the difference is never higher than ±8% (which is considered well within the uncertainty of the factors used to derive the fuel consumption from traffic activity). The gaps are likely to be caused by model uncertainty and other factors such as "fuel tourism" effects (when vehicles consume fuel on UK roads that was purchased abroad). Additionally, road transport consumption in the UK as reported by DUKES includes consumption of the LPG propane, while LPGs are not included in the sub-national statistics.

Table 5 Comparison of total road transport fuel consumption as reported in the sub-national estimates and in DUKES[41]

Year	Road transport consumption in the UK Thousand tonnes of fuel (Sub-national)	Road transport consumption in the UK Thousand tonnes of fuel (DUKES)
2002	40,492	37,821
2003	40,695	37,735
2004	40,814	38,110
2005 [1]	36,958	38,287
2006	37,245	38,416
2007	37,348	38,779
2008	36,825	37,416
2009	35,682	35,832
2010	34,882	35,448
2011	34,186	34,984

[1] The break in the data between 2004 and 2005 reflects the change in methodology used to produce the sub-national figures from 2005 onwards.

Much of the data in Energy Consumption in the United Kingdom (ECUK)[42] is modelled and obtained from secondary analysis performed by DECC on data from a number of sources, including DUKES, and is only available on a national level. For these reasons, sub-national consumption and ECUK statistics are not comparable.

[41] Figures from DUKES: https://ww.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes.

[42] ECUK can be accessed on the DECC website: https://www.gov.uk/government/collections/energy-consumption-in-the-uk.

7.4 Methodological changes impacting data comparability over time

Users should note that there have been methodological improvements in the datasets impacting the comparability of the historical data series:

- The 2002 and 2003 datasets were produced for DECC using the same methodology.
- There were changes applied to the 2004 and 2005 datasets to improve the accuracy of the estimates.
- Significant improvements were made for the 2008 estimates which were then applied to the 2005 to 2007 datasets.

Improvements made periodically to the information used in producing the most recent dataset are applied to previous years, resulting in annual revised datasets. The improvements to the methodology for 2011 data are as follows:

- The Department for Transport (DfT) has revised minor road vehicle km estimates between 2000 and 2010 for England and Wales as a result of a benchmarking exercise planned in 2010.
- Revised 2010 vehicle km activity data for Northern Ireland as provided by the Department for Regional Development.
- Revised assumption on the distribution of vehicle km between artic 34-40t and 40-50t weight classes across the whole time series, based on bespoke licensing statistics provided by the DfT.
- Updated London bus fleet composition data as provided by Transport for London in July 2012.
- Revised DUKES data for petrol and diesel sales (2007-2010), in particularly for petrol sales in 2010 (3% lower compared to the value used in 2010 inventory).

These changes have affected the distribution of fuel consumption between vehicle types and were summarised in a “Reasons for Change” document submitted with the 2011 GHGI. More detail is given in the methodology annex of the latest National Greenhouse Gas Inventory Report (NIR).[43]

Advice on time series analysis

In terms of making historical comparisons for the road transport fuel consumption data, **2005 data** (classed as National Statistics) should be used as the baseline year. This is due to the significant improvements in fuel consumption factors and detailed speed data, and hence the reliability of the road transport consumption estimates, since 2005 compared to the earlier datasets.

[43] The National Greenhouse Gas Inventory Report can be accessed here: http://naei.defra.gov.uk/reports/reports?report_id=747.

8 Residual fuel consumption statistics

Sub-national residual fuel consumption statistics (2011)

Dates covered: 1 January 2011 – 31 December 2011.

Sectors covered: All (except aviation and national navigation).

Features: Modelled.

Years available: 2003 – 2011.

Source: Ricardo-AEA.

Statistical releases:

English region and devolved administration (NUTS1) and local authority (LAU1):

Access the local authority level data and factsheet.

Access the methodology note by Ricardo-AEA.

Latest release: September 2013 (2011 data).

Next release: December 2014 (2012 data).

8.1 Overview (2005 – 2011 data)

The datasets cover:

- Residual (non-gas, non-electricity, non-road transport) fuel consumption in the United Kingdom between 1 January and 31 December.
- Estimates of consumption by fuel type and consuming sector. The following levels of disaggregation enable the data to be presented in the most robust manner.

Table 6 Fuel types and consuming sectors displayed in residual fuels datasets

Fuel type	Consuming sector
Petroleum products	Industrial
	Domestic
	Rail
	Public Administration
	Commercial
	Agriculture
Coal	Industrial and commercial
	Domestic
Manufactured solid fuels	Industrial and commercial
	Domestic
Renewables and waste	All (no sectoral breakdown is given)

The datasets exclude:

- Fuel combusted by the aviation and national navigation sectors, as this information cannot be allocated to regions and local authorities and also data for heat sold which is already modelled at a UK level and accounts for a very small percentage of total fuel energy use.
- Average domestic figures. These are not included because in the domestic sector average consumption figures for coal, manufactured solid fuels and oil consumption could be misleading given that few domestic properties use either solid fuel or oil fired central heating systems in their homes (with the exception of Northern Ireland which has limited access to mainline gas supplies).

Fuels and sectors not included in residual fuels dataset

Please note that **fuel combusted by the aviation and national navigation sectors** and **heat sold** are not covered in the dataset.

8.2 Methodology

The local and regional estimates for the remaining fuels are produced by DECC's contractor Ricardo-AEA Energy and Environment and are calculated from a number of different information sources. The main source used to calculate residual fuels are CO_2 estimates taken from the **National Atmospheric Emissions Inventory (NAEI)** database. The NAEI uses a combination of point and area source data at a 1km by 1km level to model estimates for a number of sources and fuels.

Other sources of data used to calculate estimates include:

- ONS Inter-Departmental Business Register (IDBR) data on employment at business unit level by Standard Industrial Classification (SIC) code.
- DECC's Energy Consumption in the UK data for industrial and service sector fuel usage.
- EA Pollution Inventory, Scottish Pollutant Release Inventory, Northern Ireland Department of the Environment Inventory of Statutory Releases, EU Emissions Trading System data (among others) on site-specific fuel consumption.
- Display Energy Certificates in England and Wales for rates of energy consumption for public sector buildings or offices larger than 1000m^2.
- Ordnance Survey Code-Point data.
- ONS 2001 Census returns on household types.
- DECC sub-national energy consumption statistics.
- Domestic Energy Model data for Scotland.
- BRE data on total energy use by dwelling and fuel type and regional data on numbers of households using different fuels.
- For domestic fuel mapping in Northern Ireland the following sources were used:
    - Ordnance Survey Code-Point data.
    - Ordnance Survey Address Point data.
    - Northern Ireland House Condition Survey.
    - Gas connections information for domestic properties from Phoenix Gas and Firmus Gas.

- Data from BRE on total energy use by dwelling and fuel type and regional data on numbers of households using different fuels.

For a more detailed description as to how these data sources are used in Ricardo-AEA's modelling process, please see the Ricardo-AEA methodology report for 2011.[44]

Data limitations

DECC advises users to recognise the limitations of the information contained in the datasets as they are based on modelled rather than real data, and as such are subject to potential modelling error.

8.3 Comparison to DUKES and ECUK

Residual fuel consumption from the sub-national datasets differs slightly from the statistics produced in the Digest of UK Energy Statistics (DUKES)[45]. DUKES is an annual DECC publication which provides a detailed and comprehensive picture of energy production and use over the last five years, with extensive tables, charts and commentary covering all the major aspects of energy. DUKES figures are based on information from UK energy suppliers, whilst Ricardo-AEA has used a variety of data sources to produce their estimates (see section 8.2).

The underlying factors for the differences between the two data sources are as follows:

Table 7 Comparison between the allocation of fuel types in DUKES and estimates by Ricardo-AEA

Fuel type	DUKES	Ricardo-AEA
Heat (generation)	Heat generation is listed as a separate category.	Heat generation is allocated to final users, so sub-national consumption figures for 'industry' and 'other' sectors are higher than those in DUKES.
Coal	Coal used in autogeneration is classed as transformational use and is not included in industrial consumption.	Coal used in autogeneration is included in industrial consumption, as autogenerators cannot be disaggregated.
Fuel oil	DUKES aggregates total fuel oil, gas oil and burning oil consumption to industry level.	Ricardo-AEA reallocates fuel oil, gas oil and burning oil consumption from industry to power stations to ensure consistency with operator data.
Petroleum coke	Some industrial petroleum coke is classed as 'non-energy use' and not included in final consumption.	Petroleum coke used by industry is included in the estimates.
Manufactured solid fuels	Benzole, coal tars, coke oven gas and blast furnace gas are included in final consumption. Additionally, coke consumed by sinter production differs from information provided for the sub-national estimates.	Benzole and coal tars are treated as non-energy consumption and coke oven gas and blast furnace gas are categorised as transformation fuel uses. These are excluded from the estimates.

[44] This report can be accessed here: https://www.gov.uk/government/publications/energy-consumption-for-2005-2010-sub-national-estimates-of-non-gas-non-electricity-and-non-road-transport.

[45] DUKES can be accessed on the DECC website: https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes.

Much of the data in Energy Consumption in the UK[46] is modelled and obtained from secondary analysis performed by DECC on data from a number of sources, including DUKES. Additionally, ECUK provides a more comprehensive sectoral split than the sub-national statistics and gives information on end use for the majority of fuels. However, this data is only available on a national level. For these reasons, sub-national consumption and ECUK statistics are not comparable.

8.4 Key methodological changes over time

For 2011 data, there were no significant changes in the methodology to that used in compiling the 2010 dataset. There were revisions to previous year's data, as more detailed information became available, but no fundamental changes to methodology.

For 2010 data, some updates and improvements were adopted in the mapping methodology to estimate regional fuel consumption.

The main improvements focussed on the industrial, commercial and public sectors and particularly on the sites whose fuel consumption was estimated based on proxy data on employment and energy use. These changes are as follows:

- Increased use of datasets with reported site-specific fuel consumption.
- Advanced matching of point sources and Display Energy Certificates to employment data.
- Use of data of different years statistics to improve the energy trend:
  - Regional level employment by 2-digit SIC2007 (ONS, 2012)
  - ECUK sector specific fuel use statistics
- Minimum alteration on matching NAEI sectors to SIC codes (e.g. energy use from construction professions like plumbers and electricians, are now included in the industrial energy distribution).
- Modification of oil consumption on grid squares covered by gas supply through the use of a weighting factor.

For the years 2008 and onwards, Ricardo-AEA used a different employment dataset to produce mapping distributions. These were developed using updated 2010 employment data from ONS, as opposed to 2007 data used in the previous study. For sectors where only employment statistics were used without any methodological change, the new mapping distributions (created after applying regional level employment by 2-digit SIC2007 to the detailed ONS figures) were applied to the years 2008 to 2010. Prior to 2008, employment data provided by ONS in 2007 was kept the same.

[46] ECUK can be accessed on the DECC website: https://www.gov.uk/government/collections/energy-consumption-in-the-uk.

For more information and to see these improvements quantified, please see “the effect of changes to the methodology and data sets” section of the report produced by Ricardo-AEA[47].

For 2007 data, Ricardo-AEA implemented some changes to their modelling methodology.

This included a different approach to employment distribution in heavy industries, affecting off-road industrial fuel use. The methodological changes were also applied to data from 2005 to 2007 so that estimates from 2005 onwards were produced using the same methodology.

In 2004 there were significant improvements in the accuracy of domestic solid and liquid fuel use (coal, manufactured solid fuels and oil) for the local and regional estimates.

This was due to the provision of additional sources, including 1km square estimates of domestic gas consumers and Middle Layer Super Output Area Level (MSOA) estimates of economy 7 electricity customers. This information enabled Ricardo-AEA to apportion more reliably all the non-gas domestic consumption across all local authorities. Additionally, new data from the EU-ETS trading scheme were used to allocate some of the energy consumption data at local authority level for the industrial/commercial sector.

8.5 Further information

For analysis on sub-national residual fuel consumption data prior to 2010, please see the articles in Energy Trends.[48]

[47] This report can be accessed here: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/244782/uk_sub_national_consumption_of_other_fuels_2011.pdf.

[48] Analysis for 2009 is available in Energy Trends (page 73 of the December 2011 edition). The article can be accessed here: http://webarchive.nationalarchives.gov.uk/20130109092117/http://decc.gov.uk/assets/decc/11/stats/publications/energy-trends/3917-trends-dec-2011.pdf.

9 Total final energy consumption statistics

Sub-national total fuel consumption statistics (2011)

Dates covered: Various.

Sectors covered: All (except aviation and national navigation).

Years available: 2003 – 2011.

Source: Various.

Statistical releases:

English region and devolved administration (NUTS1) and local authority (LAU1):

Access the local authority level data and factsheet.

Latest release: September 2013 (2011 data).

Next release: December 2014 (2012 data).

9.1 Overview (2005 – 2011 data)

The total final energy dataset brings together results from the four data exercises (gas, electricity, road transport and residual fuels) which take place over the year. See Chapters 2, 3, 7 and 8 respectively for more information on these datasets.

It presents total fuel consumption by English region and devolved administration and local authority with the following level of disaggregation.

Table 8 Fuel types and consuming sectors included in residual fuels datasets

Fuel type	Consuming sector
Petroleum products	Industrial and commercial Domestic Rail Road transport
Coal	Industrial and commercial Domestic
Manufactured solid fuels	Industrial and commercial Domestic
Gas	Industrial and commercial Domestic
Electricity	Industrial and commercial Domestic
Bioenergy and waste	All (no sectoral breakdown is given)

Although the dataset covers the United Kingdom, there are no local authority gas or electricity data included for Northern Ireland.

This is due to the differences in the market structure. For Northern Ireland data and related guidance, please see chapters 5 (domestic data) and 6 (non-domestic data).

The datasets exclude some sectors and fuels.

It was recognised that it would not be meaningful to allocate energy consumption locally or regionally for some energy uses, in particular aviation (air transport) and shipping (national navigation). As a result a decision was made to exclude these uses from the analysis. It was also not possible to model non–energy use of petroleum products and natural gas; nor was it practical to allocate heat sold at local or regional level since the source for this information is already heavily modelled.

The below table gives the overall quantity of fuel consumed in these sectors as stated in the Digest of United Kingdom energy statistics (DUKES), and with it, its share of total final energy consumption as stated in DUKES (for example, 322 ktoe of derived gases were consumed by the industrial sector in 2011 and this represented 0.2 per cent of total final energy consumption in the UK).

Table 9 Fuels not included in sub-national total final energy consumption statistics in 2011[49]

Fuel	Consumption sector	Quantity (ktoe)	Share of total final energy consumption
Derived gases	Industrial	322	0.2%
Petroleum products	Air transport	12,802	9%
Petroleum products	National navigation	376	0%
Heat sold	All sectors	1,206	1%
Petroleum and natural gas	Non-energy use	8,447	6%
Total	**All**	**23,154**	**15%**

9.2 Methodology

To produce this total dataset, the results from the gas, electricity, road transport and residual fuel exercises are simply converted to a common unit and combined. We advise that the user becomes familiar with the methods used to produce each of the individual datasets. Details are provided earlier in this guidance booklet (see chapters 2, 3, 7 and 8).

[49] Statistics in the table are from DUKES. Figures for derived gases are found in table 2.5 and the remaining fuels listed in the table can be found in table 1.2. These can be accessed online here: https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes.

In summary:

- **Gas consumption statistics** are produced by collecting consumption data for all gas meters within Great Britain from Xoserve and the independent gas transporters, aggregating them to a local and regional level and then mapping to statistical geographies using information held on the National Statistics Postcode Look-up (NSPL) file.
- **Electricity consumption statistics** are produced by collecting consumption data for all electricity meters within Great Britain from the electricity data aggregators, aggregating them to a local and regional level and then allocating these to LAU1 areas using the NSPL and the Postcode Address File (PAF).
- **Road transport fuels** figures are modelled for DECC by Ricardo-AEA using information on emissions from the National Atmospheric Emissions Inventory (NAEI) combined with traffic flow data produced by the Department for Transport (DfT).
- **Residual fuels** are also modelled by Ricardo-AEA using data produced for the NAEI and a range of other spatial data sources.

Before being included in the total final energy dataset, gas and electricity statistics (given in Gigawatt hours) are converted to the common unit of thousand tonnes of oil equivalent (ktoe) using the standard conversion factor of 1 ktoe to 11.63 GWh. Road transport fuels (given in thousand tonnes of fuel) are converted to thousand tonnes of oil equivalent using estimated average gross calorific values of fuels, and residual fuel statistics (already given in thousand tonnes of oil equivalent) do not need to be converted.[50]

The following chart gives an overview of the features of the four datasets which come together to form the total final energy consumption dataset.

[50] Standard conversion factors can be found on page 225 and estimated average gross calorific values of fuels can be found on page 228 of this DUKES publication:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/65884/5959-dukes-2012-annex-a.pdf.

Gas (2011)

Dates covered:
1 October 2010 – 30 September 2011.
Sectors covered:
Domestic and non-domestic.
Features:
Annualised and weather corrected.
Years available:
2001 – 2011.
Source:
Xoserve and independent gas transporters.
Published:
December 2012.

Electricity (2011)

Dates covered:
28 January 2011 – 27 January 2012.
Sectors covered:
Domestic and non-domestic.
Features:
Annualised, not weather corrected.
Years available:
2003 – 2011.
Source:
Data aggregators (on behalf of electricity suppliers).
Published:
December 2012.

Total final energy (2011)

Dates covered:
Various.
Sectors covered:
All (except aviation and national navigation).
Years available:
2003 – 2011.
Source:
Various.
Published:
September 2013.

Road transport fuels (2011)

Dates covered:
1 January 2011 – 31 December 2011.
Sectors covered:
Road transport (all users).
Features:
Modelled.
Years available:
2002 – 2011.
Source:
Ricardo-AEA.
Published:
June 2013

Residual fuels (2011)

Dates covered:
1 January 2011 – 31 December 2011.
Sectors covered:
All (except aviation and shipping).
Features:
Modelled.
Years available:
2003 – 2011.
Source:
Ricardo-AEA.
Published:
September 2013.

9.3 Data limitations and interpretation

It is important to note that the various data limitations on individual fuel source estimates will impact the reliability of total energy consumption estimates.

- Statistics in the individual datasets are based on the aggregation of data from different sources of information. Electricity and gas data are based on real consumption recorded from meters which is then aggregated upwards to local authority and regional level. Road transport fuel and residual fuel data are modelled using fuel consumption and emissions estimates gathered on a national level and then disaggregated throughout the United Kingdom using spatial data.
- The dates covered by each dataset differ, and so the total final energy consumption statistics dataset does not cover a fixed annual period. The dates covered by each individual dataset for total final energy consumption in 2011 are as follows:

Table 9 Dates covered in each fuel dataset

Fuel type	Dates covered
Gas	01/10/2009 - 30/09/2010
Electricity	31/01/2010 - 30/01/2011
Road transport fuels	01/01/2010 - 31/12/2010
Residual fuels	01/01/2010 - 31/12/2010

- The dataset does not provide complete coverage of total final energy consumption in all regions and local authorities in the United Kingdom; consumption within Northern Ireland is excluded from the gas and electricity datasets (due to the difference in market structure), as is consumption of some very large industrial users and power stations (for disclosure reasons).
- Gas consumption data is weather corrected, whereas all other fuel sources are unadjusted.
- Central Volume Allocation (CVA) users (very large industrial consumers receiving electricity via the high voltage system) are not covered in the local and regional electricity statistics.

Advice on time series analysis

In terms of making historical comparisons for the gas consumption data, **2005 data** (classed as National Statistics), should ideally be used as the baseline due to the reliability of the different datasets from this year onwards.

It is also important to bear in mind the change in the underlying employment data used to produce mapping distributions in the residual fuels dataset for data from 2008 onwards. This is further explained in section 8.4.

In general, the user should note the variability of the data quality of the different datasets and that they do not provide comprehensive coverage of all final energy consumption.

9.4 Data accuracy

DECC is committed to producing accurate, high-quality information. The data used are based on either the administrative data systems of energy suppliers, or on statistical models.

Data are quality assured at all stages of the data process and year-on-year comparisons are used to measure trends in order to make sure data is reliable. Another important way in which DECC assesses the reliability of sub-national consumption data is through comparisons to DUKES.

Sub-national total final energy consumption is reconciled to data from the Digest of UK Energy Statistics (DUKES), and this analysis can be found at the bottom of each dataset.

A detailed table explaining differences between the datasets for each individual fuel type (gas, electricity, road transport fuels and residual fuels) and figures found in DUKES and Energy Consumption in the UK (ECUK) are explained in detail in Annex C of this methodology booklet.

Gas and electricity consumption information is obtained from the administrative systems used by the energy companies for operating purposes including the production of bills. However the sub-national data are calculated using different time periods to that used for DUKES, and as such there are valid reasons why the totals from the two data sources differ.

Road transport fuel consumption and residuals fuels are closely compared with DUKES data, and extensive work is performed by Ricardo-AEA, DECC's contractors who produce the data, to ensure that sub-national figures match those provided in DUKES.

9.5 Further information

For analysis on sub-national total fuel consumption data prior to 2010, please see the articles in Energy Trends. Analysis for 2009 can be found on page 81 of the December 2011 edition of the publication.[51]

[51] Analysis for 2009 is available in Energy Trends (page 81 of the December 2011 edition). This article can be accessed here: https://www.gov.uk/government/organisations/department-of-energy-climate-change/series/energy-trends.

Annexes

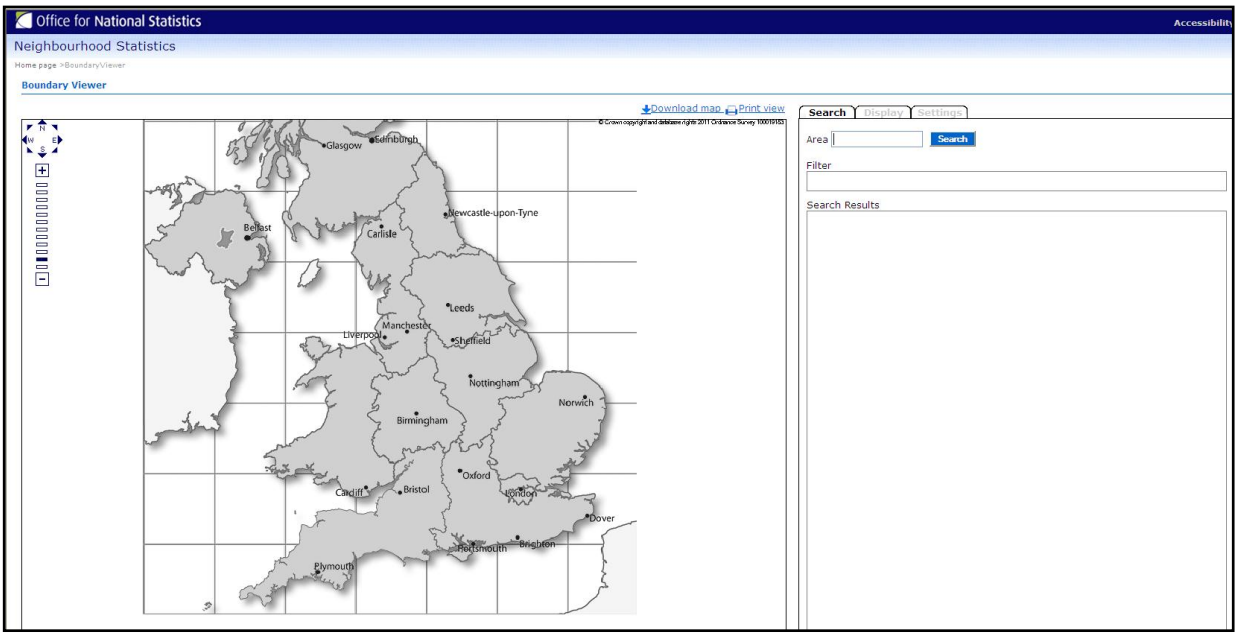
Annex A Step-by-step guide to statistical areas

This step-by-step guide shows you how to:

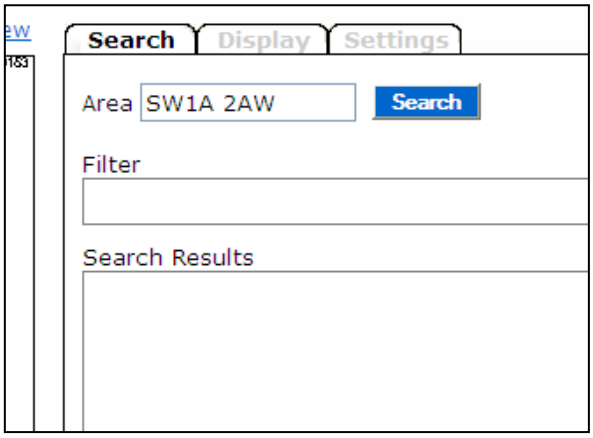
- Find your MSOA/IGZ or LSOA name using a postcode.
- View output areas on a map.
- Use MSOA/IGZ or LSOA names to find consumption statistics.

Find your MSOA/IGZ or LSOA name using a postcode.

Go to the Office for National Statistics (ONS) Boundary Viewer: http://www.neighbourhood.statistics.gov.uk/dissemination/LeadBoundaryViewer.do?xW=1600&xH=1200

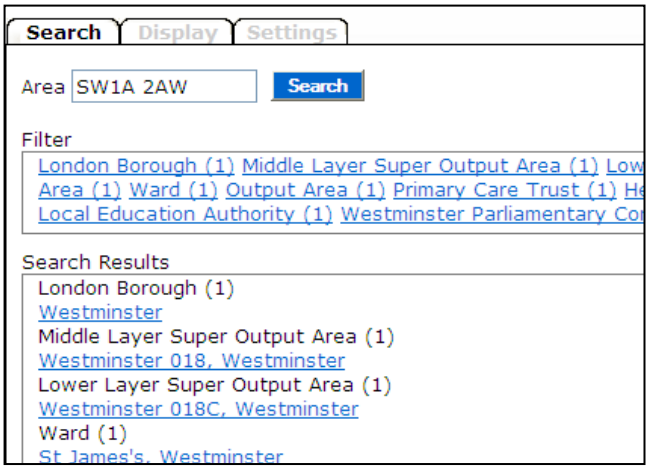


Enter your postcode in the “Area” field under search on the right hand side, and click “Search”.

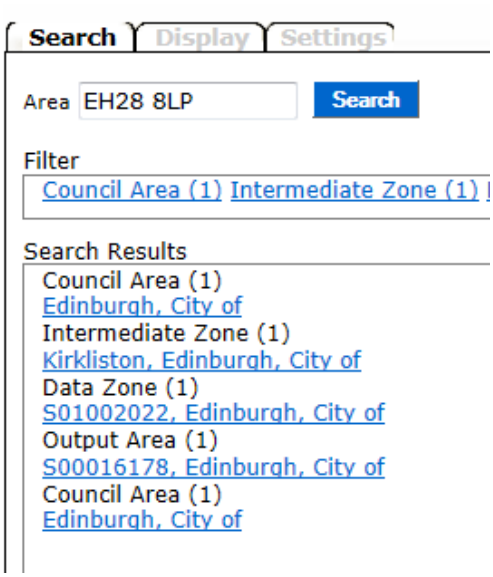


The search results will present a range of geographical and statistical areas within which your postcode falls.

The MSOA name under which the postcode SW1A 2AW falls is **Westminster 018** and the LSOA name is **Westminster 018C**.

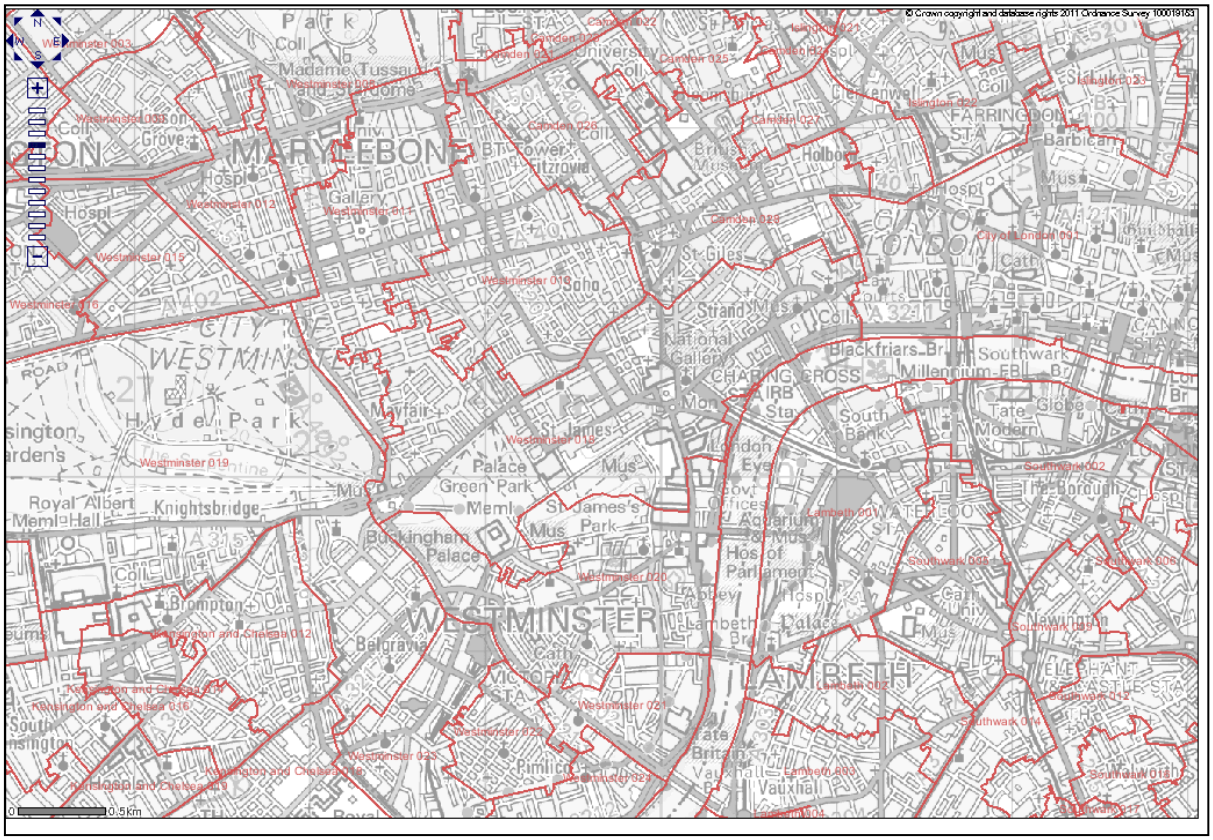


Please note that for Scotland, the IGZ names can be found under the “Intermediate Zone” category. Postcode EH28 8LP would fall under IGZ name Kirkliston, for example.

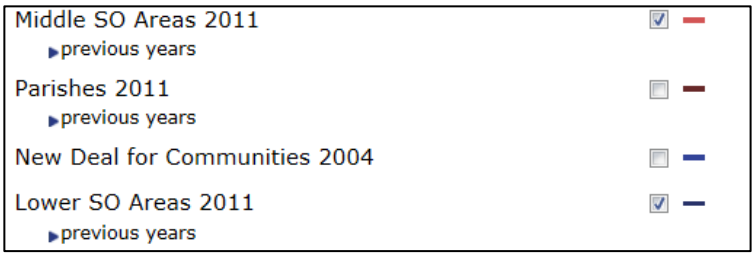


View output areas on a map.

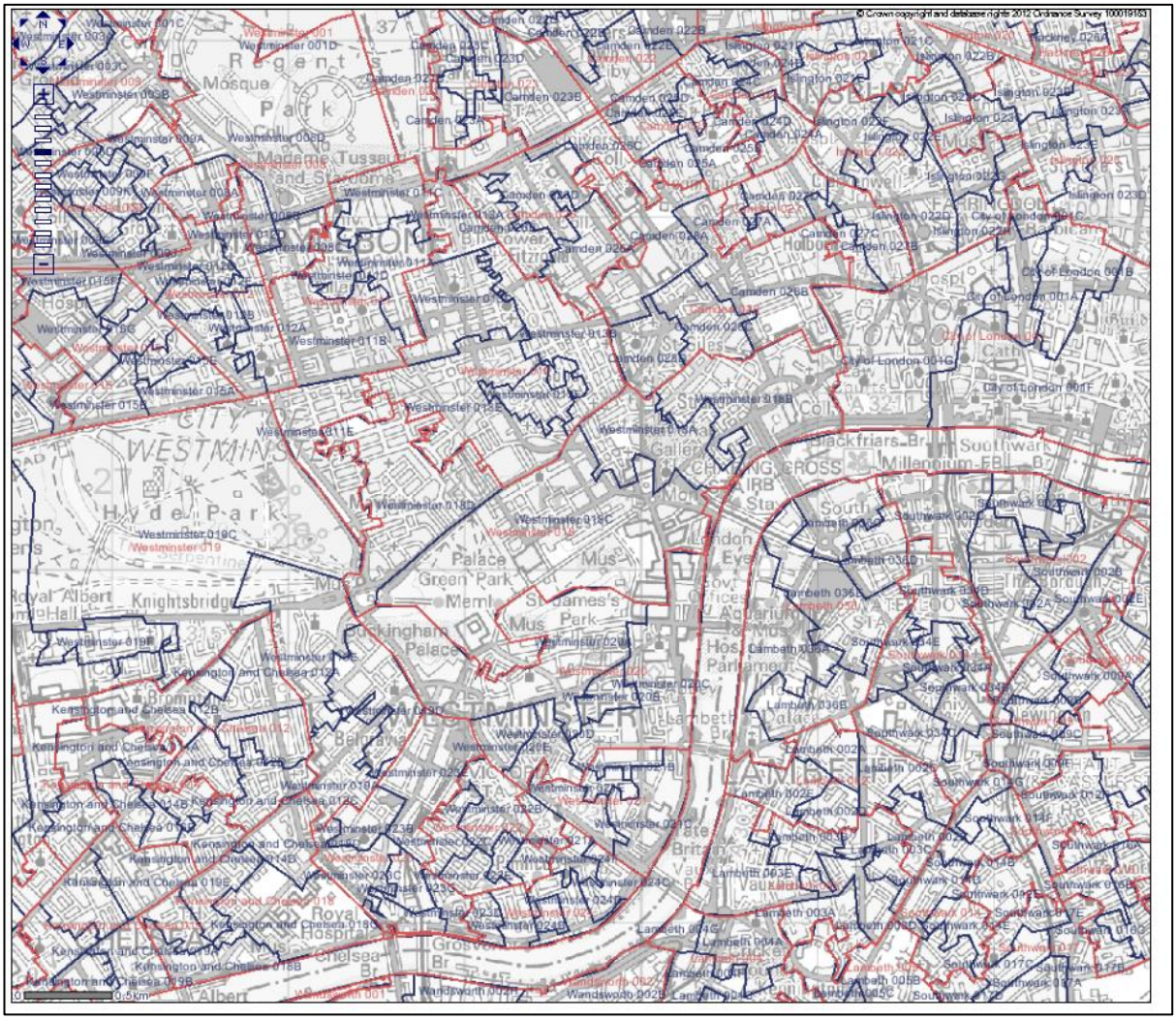
Select any of these in order to see the areas on a map. For example, if choosing to view Westminster 018 will lead to a map of MSOAs on the left hand side, with Westminster 018 in the middle.



It is possible to also view LSOAs on this map by selecting “Lower SO Areas 2011” and clicking



“Update Map” on the right hand side.



Use MSOA/IGZ or LSOA names to find consumption statistics.

DECC's MSOA/IGZ and LSOA data uses the MSOA/IGZ/LSOA code as a reference, rather than the MSOA/IGZ/LSOA name given by the ONS boundary viewer.

Westminster 018 will be used as an example to find domestic MSOA gas data in 2011.

Go to DECC's 'Socio-economic data for MSOA, IGZ and LSOA electricity and gas estimates' page: https://www.gov.uk/government/statistical-data-sets/socio-economic-data-for-MSOA-igz-and-LSOA-electricity-and-gas-estimates

Open the socio-economic data spreadsheet.

Select the 'MSOA England Wales' tab and search 'Westminster 018'.

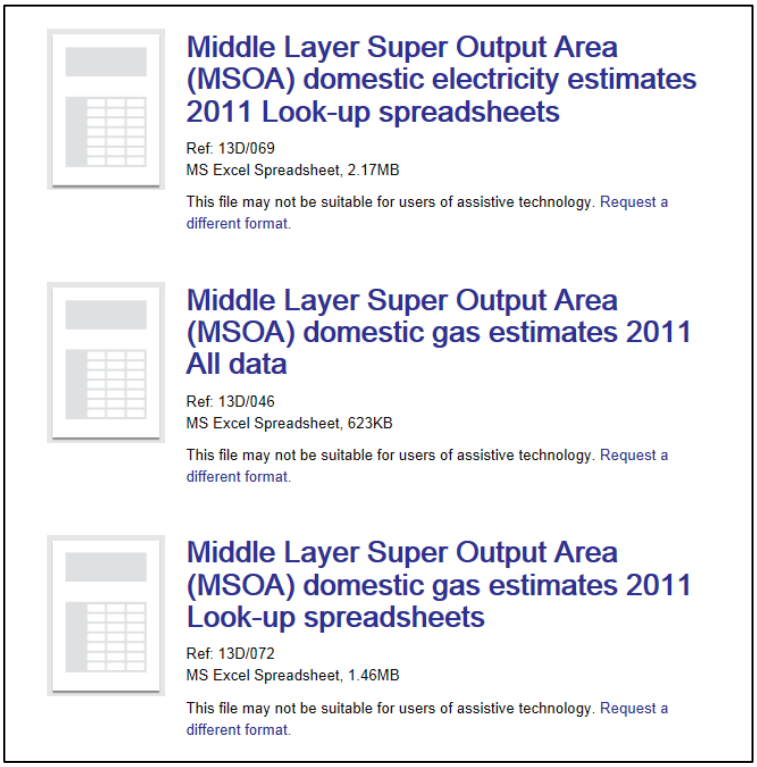
	A	B	C	D	E
1			**Census data[1] (2011)**		
2	**MLSOA Code**	**MLSOA Name**	**Population (all usual residents)**	**Area (hectares)**	**Households (households with at least one usual resident)**
3	E02004297	County Durham 001	7,900	1,558	3,550
4	E02004290	County Durham 002	5,981	884	2,518
5	E02004298	County Durham 003	9,703	1,878	4,178
6	E02004299	County Durham 004	8,474	898	3,758
7	E02004291	County Durham 005	6,787	787	3,131
8	E02004300	County Durham 006	7,686	1,195	3,491
9	E02004292	County Durham 007	7,916	662	3,523

4388	E02000973	Westminster 014	10,090	54	5,312
4389	E02000974	Westminster 015	8,794	69	4,380
4390	E02000975	Westminster 016	8,757	48	4,621
4391	E02000976	Westminster 017	9,946	46	5,041
4392	E02000977	Westminster 018	7,490	251	3,895
4393	E02000978	Westminster 019	9,270	359	3,882
4394	E02000979	Westminster 020	8,081	139	3,892
4395	E02000980	Westminster 021	8,684	45	4,498
4396	E02000981	Westminster 022	8,991	36	4,853

We now have the corresponding MSOA Code that will be used to find the energy statistic that we are looking for (domestic gas consumption in 2010). This is '**E02000977**'.

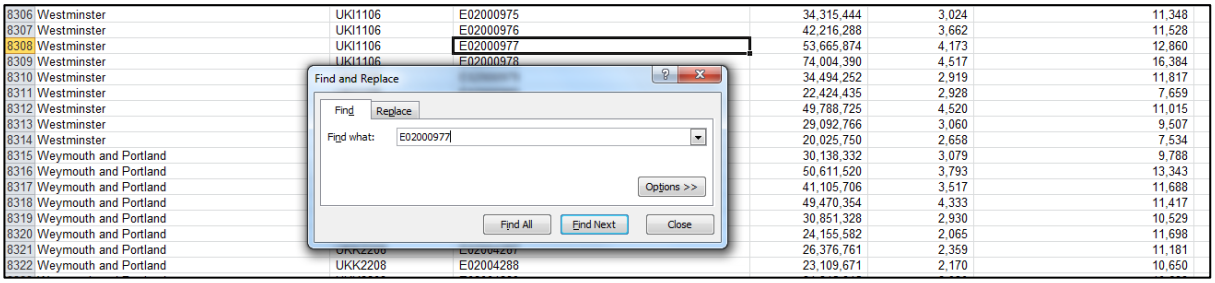
Go to the 'MSOA electricity and gas: 2011' page on DECC's website:
https://www.gov.uk/government/statistical-data-sets/mlsoa-electricity-and-gas-2011

Open the 'Middle Layer Super Output Area (MSOA) domestic gas estimates 2011: All data' file.



	A	B	C	D	E	F
1	Local Authority Name	Local Authority Code	Middle Layer Super Output Area (MSOA) Code	Consumption (kWh)	Number of meters	Average consumption (kWh per meter)
2	Aberdeen City	UKM5001	S02000001	18,428,322	1,235	14,922
3	Aberdeen City	UKM5001	S02000002	31,814,236	1,981	16,060
4	Aberdeen City	UKM5001	S02000003	29,338,023	1,747	16,793
5	Aberdeen City	UKM5001	S02000004	60,386,803	2,238	26,982
6	Aberdeen City	UKM5001	S02000005	21,636,342	1,476	14,659
7	Aberdeen City	UKM5001	S02000006	27,728,013	1,781	15,569
8	Aberdeen City	UKM5001	S02000007	31,676,335	1,202	26,353
9	Aberdeen City	UKM5001	S02000008	27,612,016	2,087	13,230
10	Aberdeen City	UKM5001	S02000009	37,131,777	1,747	21,255
11	Aberdeen City	UKM5001	S02000010	33,717,414	2,257	14,939
12	Aberdeen City	UKM5001	S02000011	39,467,153	2,088	18,902
13	Aberdeen City	UKM5001	S02000012	32,496,932	2,690	12,081
14	Aberdeen City	UKM5001	S02000013	43,032,249	2,164	19,886
15	Aberdeen City	UKM5001	S02000014	45,319,358	1,975	22,947
16	Aberdeen City	UKM5001	S02000015	22,150,302	2,043	10,842
17	Aberdeen City	UKM5001	S02000016	29,299,199	2,636	11,115
18	Aberdeen City	UKM5001	S02000017	52,059,969	3,168	16,433

Search ‘E02000977’.



8306	Westminster	UKI1106	E02000975	34,315,444	3,024	11,348
8307	Westminster	UKI1106	E02000976	42,216,288	3,662	11,528
8308	Westminster	UKI1106	E02000977	53,665,874	4,173	12,860
8309	Westminster	UKI1106	E02000978	74,004,390	4,517	16,384
8310	Westminster			34,494,252	2,919	11,817
8311	Westminster			22,424,435	2,928	7,659
8312	Westminster			49,788,725	4,520	11,015
8313	Westminster			29,092,766	3,060	9,507
8314	Westminster			20,025,750	2,658	7,534
8315	Weymouth and Portland			30,138,332	3,079	9,788
8316	Weymouth and Portland			50,611,520	3,793	13,343
8317	Weymouth and Portland			41,105,706	3,517	11,688
8318	Weymouth and Portland			49,470,354	4,333	11,417
8319	Weymouth and Portland			30,851,328	2,930	10,529
8320	Weymouth and Portland			24,155,582	2,065	11,698
8321	Weymouth and Portland			26,376,761	2,359	11,181
8322	Weymouth and Portland	UKK2208	E02004288	23,109,671	2,170	10,650

We now have the data we were looking for. In the MSOA Westminster 018 (or E02000977) in 2011, domestic gas consumption was 53,665,874 kWh, there were 4,173 meters and average consumption was 12,860 kWh.

Annex B Frequently Asked Questions (FAQ)

Commonly asked questions from sub-national consumption statistics users are as follows:

General

How do sub-national energy consumption statistics compare to ECUK?

Sub-national energy consumption statistics should not be compared to statistics in Energy Consumption in the UK (ECUK). [52] While sub-national gas and electricity are aggregated from a meter point-level and road transport and residual fuel consumption statistics are modelled by Ricardo-AEA, much of the data in ECUK is modelled and obtained from secondary analysis performed by DECC on data from a large number of sources. ECUK data (available only on a national level) also provides a more comprehensive sectoral split than the sub-national statistics and gives information on end use for the majority of fuels. For these reasons, sub-national consumption and ECUK statistics are not comparable.

Which fuels are not included in sub-national energy consumption statistics?

Fuels not included in the sub-national energy consumption datasets are derived gases consumed in the industrial sector, petroleum products used by air transport and national navigation, heat sold in all sectors and non-energy use of petroleum and natural gas. More information on this and a numerical breakdown of these fuels in 2011 can be found in section 9.1.

What are unallocated meters/consumption?

Unallocated gas or electricity meters are meters with insufficient address information, meaning that consumption for these meters is unable to be allocated to a Local Authority, Middle Layer Super Output Area (MSOA) or Lower Layer Super Output Area (LSOA). This is due to either incomplete postcode information being provided by the data suppliers, or no postcode information being received at all, and DECC was able to identify the local authority in which consumption was taking place, but not the specific MSOA (please see chapter 4 or the Statistical geographies section (1.1) for more information on super output areas). Unallocated electricity data at local authority level can also include consumption for street lighting or traffic lights, where the information provided does not indicate a specific local authority.

Where can I go to access statistical products from the Office for National Statistics?

Users can search for ONS statistical products on the newly launched Open Geography Portal which can be accessed here:

https://geoportal.statistics.gov.uk/geoportal/catalog/main/home.page.

[52] ECUK can be accessed here: https://www.gov.uk/government/collections/energy-consumption-in-the-uk.

Gas

How is gas consumption allocated between domestic and non-domestic consumers?

DECC uses the gas industry cut-off point of 73,200 kWh. All consumers using less than this figure are classed as domestic consumers and those using more are classed as non-domestic consumers. For more information, guidance on gas consumption statistics can be found in chapter 2.

Electricity

How is electricity consumption allocated between domestic and non-domestic consumers?

The automatic cut-off point for domestic consumption is 100,000 kWh; all consumers using more than this figures are classed as non-domestic. Domestic consumption between 50,000 kWh and 100,000 kWh is reallocated to the non-domestic sector following a validation process if address information indicates non-domestic consumption is taking place (for example, if an address contains ‘plc.’ or ‘ltd’). For more information, guidance on electricity consumption statistics can be found in chapter 3.

Do domestic electricity consumers on an economy 7 tariff have two meters (one measuring peak consumption and the other measuring off-peak consumption)?

No. Consumers on an economy 7 tariff will have one meter, and this meter will measure both peak and off-peak rates of consumption.

What is the difference between NHH and HH consumption?

Non-Half Hourly (NHH) consumption refers to electricity consumption by domestic consumers and small and medium businesses while Half Hourly (HH) consumption refers to electricity consumption by the larger non-domestic consumers. For 2012, NHH consumption covered the period 27 January 2012 to 26 January 2013 (these dates may change from year to year, and guidance on this is provided in section 3.1.3).

What is the reason for the difference in the number of electricity meters and the number of properties?

The number of electricity meters does not exactly equal the number of properties. One reason for this is that an apartment building may have a meter for the building complex (used to power building-wide appliances) in addition to each individual apartment having its own meter. Another is that some households may have a 3-rate meter system. A household with such a system will have one meter which measures all consumption at a peak rate and another meter which measures two other rates of off-peak consumption. This is the case for many households in Scotland, but it is extremely rare to find a similar case in England or Wales. Additionally, some meters are used to power street lighting or traffic lights as opposed to a property (many of these are unallocated). Please see chapter 3 for further guidance on electricity consumption statistics.

Road transport

Where can I find information on the number of licensed vehicles on the road?

Vehicle licensing statistics are available from the Department for Transport. These can be found here:

https://www.gov.uk/government/organisations/department-for-transport/series/vehicle-licensing-statistics.

For more information, please contact the Vehicle Licensing team at:

vehicles.stats@dft.gsi.gov.uk.

Statistical geographies

How can I find out which geographical area my postcode falls in?

DECC has produced a step-by-step guide on how to find out which geographic area a postcode falls in, and this can be found in Annex A.

How can I find out which postcodes are included in a geographical area?

The ONS Postcode Directory will provide you with this information. To access it, please visit the ONS website here:

http://www.ons.gov.uk/ons/guide-method/geography/products/postcode-directories/-nspp-/index.html.

Annex C Table for differences between sub-national consumption data, DUKES and ECUK

Fuel type	Sub-national	DUKES	ECUK
Gas	Statistics are available on a sub-national level.	Statistics are available on a national level.	Statistics are available on a national level.
	Based on the gas year (01/10/2009 - 30/09/2010 for the year 2010).	Based on a calendar year.	Based on a calendar year.
	Weather corrected.	Not weather corrected.	Not weather corrected.
	Cover Great Britain.	Cover the United Kingdom.	Cover the United Kingdom.
	Statistics are aggregated up from an meter-point level data.	Statistics are produced using a top-down approach.	Statistics are modelled and obtained after secondary analysis using a number of data sources (including DUKES).
	Statistics are split by domestic and non-domestic consumers.	Statistics are split by a wider range of sectors (for example industry, public administration, commercial and others).	Statistics are split by a wider range of sectors (for example domestic, industry, services and others) and also include information on end use.
Electricity	Statistics are available on a sub-national level.	Statistics are available on a national level.	Statistics are available on a national level.
	Covers the dates 31/01/2010 - 30/01/2011 for the year 2010.	Based on a calendar year.	Based on a calendar year.
	Cover Great Britain.	Cover the United Kingdom.	Cover the United Kingdom.
	Statistics are aggregated up from an meter-point level data.	Statistics are produced using a top-down approach.	Statistics are modelled and obtained after secondary analysis using a number of data sources (including DUKES).
	Statistics are split by domestic and non-domestic consumers.	Statistics are split by a wider range of sectors (for example industry, public administration, commercial and others).	Statistics are split by a wider range of sectors (for example domestic, industry, services and others) and also include information on end use.
	Excludes consumption from some Central Volume Allocation (CVA) users	Includes consumption from CVA users.	Includes consumption from CVA users.
Road transport	Statistics are available on a sub-national level.	Statistics are available on a national level.	Statistics are available on a national level.
	Statistics are split by vehicle type.	Statistics are split by vehicle type.	Statistics are split by vehicle type and end user.
	Estimates are modelled from a national level using a fuel consumption, emissions and traffic flow data.	Estimates are based on sales volume data recorded by UK energy suppliers.	Statistics are modelled and obtained after secondary analysis using a number of data sources (including DUKES).
Residual fuels	Statistics are available on a sub-national level.	Statistics are available on a national level.	Statistics are available on a national level.
	Statistics are split by fuel type and sector.	Statistics are split by fuel type and sector.	Statistics are split by fuel type, sector and end use.
	Estimates are modelled using a fuel consumption, emissions and spatial data.	Figures are based on information from UK energy suppliers.	Statistics are modelled and obtained after secondary analysis using a number of data sources (including DUKES).
	Differences in the underlying datasets used in sub-national estimates are DUKES are as follows:		
	Heat generation is allocated to final users, so sub-national consumption figures for 'industry' and 'other' sectors are high than those in DUKES.	Heat generation is listed as a separate category.	
	Coal used in autogeneration is included in industrial consumption, as autogenerators cannot be disaggregated.	Coal used in autogeneration is classed as transformational use and is not included in industrial consumption.	
	Ricardo-AEA reallocates fuel oil, gas oil and burning oil consumption from industry to power stations to ensure consistency with operator data.	DUKES aggregates total fuel oil, gas oil and burning oil consumption to industry level.	
	Petroleum coke used by industry is included in the estimates.	Some industrial petroleum coke is classed as 'non-energy use' and not included in final consumption.	
	Benzole and coal tars are treated as non-energy consumption and coke oven gas and blast furnace gas are categorised as transformation fuel uses. These are excluded from the estimates.	Benzole, coal tars, coke oven gas and blast furnace gas are included in final consumption. Additionally, coke consumed by sinter production differs from information provided for the sub-national estimates.	
Total	Statistics are available on a sub-national level.	Statistics are available on a national level.	Statistics are available on a national level.
	Based on a variety of dates.	Based on a calendar year.	Based on a calendar year.
	Statistics are based both on data aggregated up from a meter-point level and data gathered at a national level.	Statistics are produced using a top-down approach.	Statistics are modelled and obtained after secondary analysis using a number of data sources (including DUKES).
	Differences between sub-national, DUKES and ECUK estimates for each fuel type above also apply.		

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