

Sub-national electricity consumption statistics for 2008

Introduction

This article presents the findings of the latest analysis of electricity consumption data at Government Office Region (NUTS1) and Local Authority (LAU1, formally NUTS4) level, which were published on the DECC website in December 2009. These data, which relate to 2008, follow on from the results of similar exercises for data relating to the years 2003 to 2007, and rely on the excellent co-operation of the electricity industry. Since the 2008 data were published – and as referred to in the December 2009 edition of Energy Trends - some additional consistency checking has taken place in examining the trends shown in these data, and those shown at the UK level in the Digest of UK Energy Statistics. Further work examining the UK trends will take place in the run up to the publication of the 2010 edition of the Digest.

In November 2009, the data for 2005 onwards retained their National Statistics status following an assessment by the UK Statistics Authority (UKSA). A copy of their report, which covers all of DECC's energy statistics, can be found at:

www.statisticsauthority.gov.uk/assessment/assessment-reports/assessment-report-20---energy-statistics.pdf.

Data for 2003 and 2004 are also available on the DECC website, though users should note that these are experimental statistics based on a different methodology to the data from 2005 onwards.

Methodology

The base data for this analysis were provided to DECC at Meter Point Administration Number (MPAN) level by the data aggregators, agents of the electricity suppliers, who collate/aggregate electricity consumption levels for each MPAN. In addition to this, information was obtained from the Gemserv ECOES database, which provides the geographical location of each MPAN, including the full address and postcode. 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. To complete the data allocation process, the National Statistics Postcode Directory (NSPD) was used to allocate MPAN postcodes and the associated consumption to statistical geographies at a Government Office Region (NUTS1) and Local Authority level (LAU1, formally NUTS4). This approach enabled 98.7 per cent of consumption within Great Britain during 2008 to be accurately allocated to a Local Authority area.

From this data, DECC produces a domestic/non-domestic (industrial and commercial) split, classifying non-half hourly (NHH) profile 1 and 2 customers as domestic use and NHH profiles 3 to 8 and all half hourly (HH) meter customers as non-domestic users. However, as part of the data validation process all profile 1 and 2 customers with a recorded consumption greater than 100,000 kWh, and those with consumption greater than 50,000 kWh with address information indicating non-domestic use were re-classified as industrial and commercial customers.

Further background on the methodology can be found in the guidance note available on the DECC website at: www.decc.gov.uk/en/content/cms/statistics/regional/regional.aspx.

Coverage

The sub-national electricity consumption statistics illustrated here only cover Great Britain. No data has been collected from Northern Ireland, as up until November 2007 the electricity was provided by one single supplier, Northern Ireland Electricity plc, leading to concerns over disclosure. However, following the creation of a single electricity market in Ireland, consumers can now choose their electricity supplier. DECC has been in discussion with organisations covering the Northern Ireland electricity market and aims to publish electricity consumption data for the whole of the United Kingdom in December 2010.

Special feature – Sub-national electricity consumption

In addition, electricity consumption relating to very large industrial consumers who receive their electricity via high voltage lines of the transmission system are not covered in this sub-national dataset. These consumers are classified as Central Volume Allocation (CVA) users and have different arrangements with their electricity suppliers, compared to HH and NHH metered customers. Electricity consumption by CVA users generally accounts for around 2 per cent of electricity sales.

Also excluded is electricity used by companies that generate their own electricity and consume it without it passing over the public distribution network. This amounted to 24.2 TWh in the UK as a whole in 2008. Much of this “autogeneration” is from CHP schemes and an indication of the regional importance of such schemes can be obtained from an article on pages 16 to 23 of the September 2009 edition of Energy Trends (“Combined Heat and Power in Scotland, Wales, Northern Ireland and the regions of England in 2008”).

Regional and local estimates of final electricity consumption data

Table 4, found at the end of this article, illustrates the amount of electricity consumed within selected local authorities and each Government Office Region. The table illustrates a domestic/non-domestic (industrial and commercial) split of electricity consumers and shows the total amount of electricity consumed in GWh and the total number of MPANs. Average consumption (per meter) levels for domestic and non-domestic meters are also provided. The local authorities selected for Table 4 were chosen to show some variation within the wider region. In most cases, the highest and lowest average domestic and non-domestic consumption per meter point sales in 2008 were selected.

The full table showing consumption by all local authorities is available on the DECC website, at: www.decc.gov.uk/en/content/cms/statistics/regional/electricity/electricity.aspx.

Preliminary analyses

Table 1 shows the average (mean) domestic consumption per MPAN in 2008 was 4,198 kWh for Great Britain, with West Midlands and Scotland being closest to this average in regional terms. The South East, East of England and South West had the highest average domestic consumption in 2008. These three region’s housing density and structure (a high prevalence of properties using electricity as their main source of heating), and socio-economic factors influencing the purchase and use of electrical appliances could be responsible for this high electricity consumption. Conversely, the North East and Yorkshire and the Humber regions had the lowest average domestic consumption.

Table 1: Average domestic electricity consumption per meter in 2008 by Government Office Region

Region	Average (mean) domestic consumption in 2008 (kWh)
South East	4,543
East of England	4,538
South West	4,481
Scotland	4,236
West Midlands	4,234
East Midlands	4,135
North West	4,054
Greater London	4,031
Wales	3,965
Yorkshire and the Humber	3,863
North East	3,584
Great Britain	4,198

The local authority with the lowest average domestic consumption per MPAN in 2008 was South Tyneside (in the North East), which had an average consumption of 3,257 kWh per meter. Conversely, the local authorities with the highest average domestic consumption was the Isles of Scilly (in the South West) and the Orkney and Shetland Islands (in Scotland) which had an average consumptions of 7,135, 6,354 and 6,069 kWh per meter respectively. In general, high electricity consumption is dominated by local authorities whose properties use electricity as their main source of heating, as a result of limited connection to the gas network. The map on page 28 gives further details about geographical location and electricity consumption, displaying the average domestic electricity consumption in each local authority in 2008.

Map 1: Average electricity consumption for domestic customers, 2008

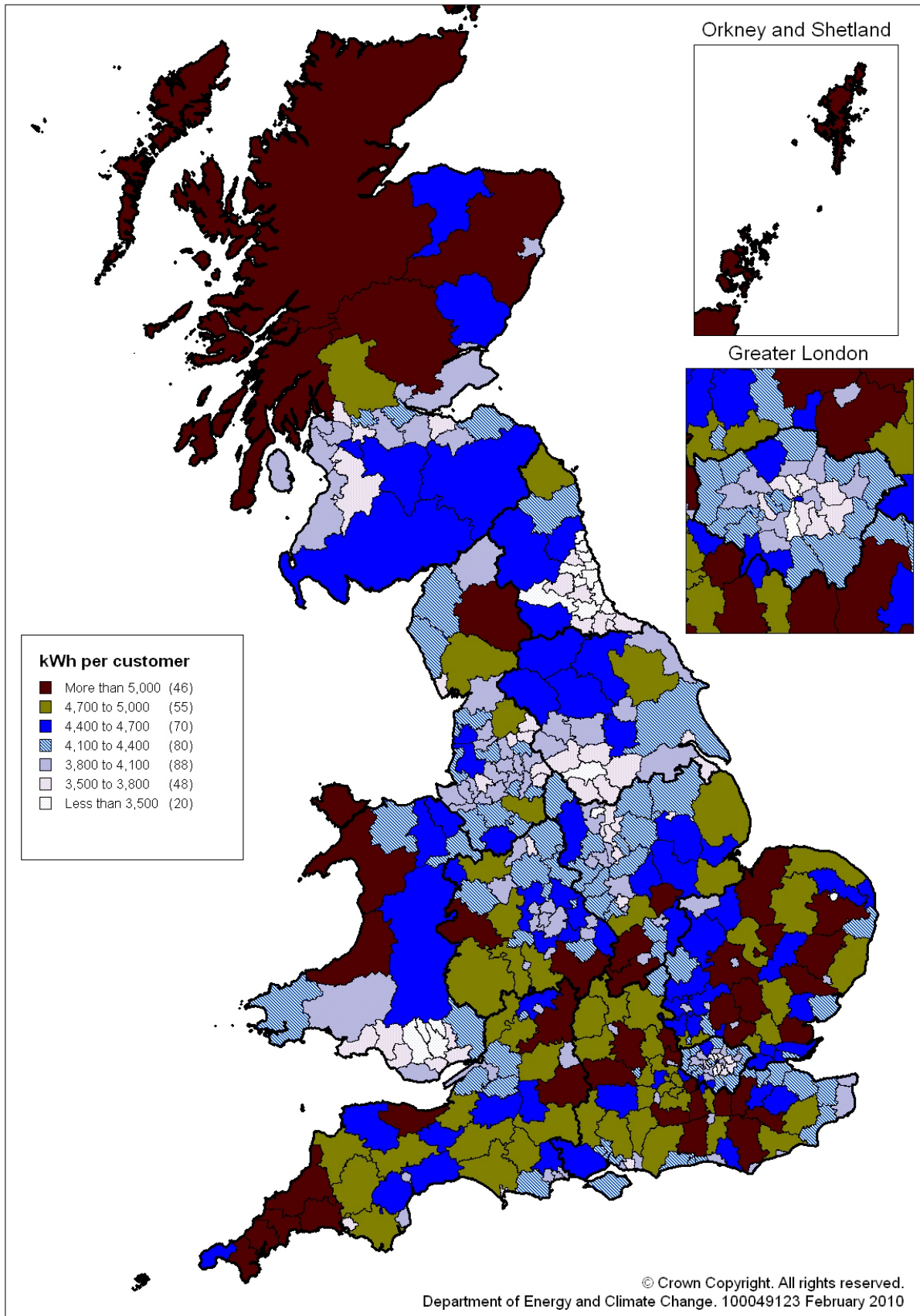
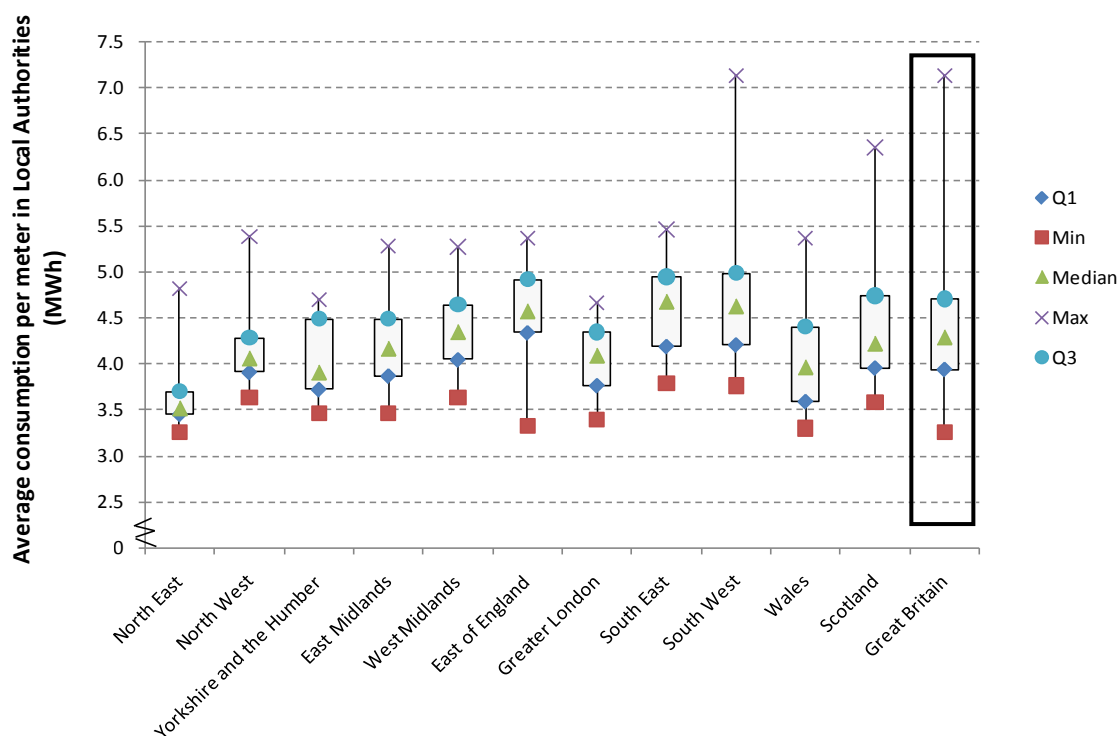


Chart 1: Box plots of average domestic electricity consumption for local authorities within each Government Office Region



Although point estimates are a useful tool, more insight can be gained by looking at distributional aspects. Box plots are often a useful way of displaying differences between populations without making any assumptions of the underlying statistical distribution and can help to indicate the degree of dispersion and skewness in the data. Chart 1 above shows a box plot displaying aspects of the distribution of *average* domestic electricity consumption in local authorities for each of the Government Office Regions, as well as one for all local authorities in Great Britain as a whole. For each Government Office Region, the box plot shows the minimum and maximum *average* domestic electricity consumption, the upper and lower quartile and the median *average* electricity consumption. The lower quartile is the value such that 25 per cent of all the data in the same sample/population are lower than that value. The upper quartile is the value such that 25 per cent of all the data in the sample/population are higher than that value.

Chart 1 illustrates that the spread (between the upper and lower quartiles) of average domestic electricity consumption in local authorities is greatest in Wales and Scotland, whereas the spread in the Government Office Regions of North East and North West is relatively small. Chart 1 also shows that the minimum consumptions for Government Office Regions has a small range, from 3.3 MWh in the North East, East of England and Wales to 3.8 MWh in the South East and South West. Conversely, the maximum consumptions of Government Office Regions are more varied, from 4.7 MWh in Yorkshire and the Humber and Greater London, to 7.1 MWh in the South West. Moreover, the median of the North East is considerably lower than other Government Office Regions, at 3.5 MWh. The median is very close to the lower quartile (Q1) in the Government Office Regions of North East, North West, Yorkshire and the Humber, East of England and Scotland, which is indicative of a right-skewed distribution (the right tail of the distribution is longer meaning that there are relatively few high values). For information, detailed analyses of the distributional aspects of the 2007 gas and electricity data, including examples of right-skewed distributions, were published in the March 2009 edition of Energy Trends (pages 24 to 30):

www.decc.gov.uk/en/content/cms/statistics/publications/trends/trends.aspx.

Chart 2: Average domestic electricity consumption per meter by profile type, 2008

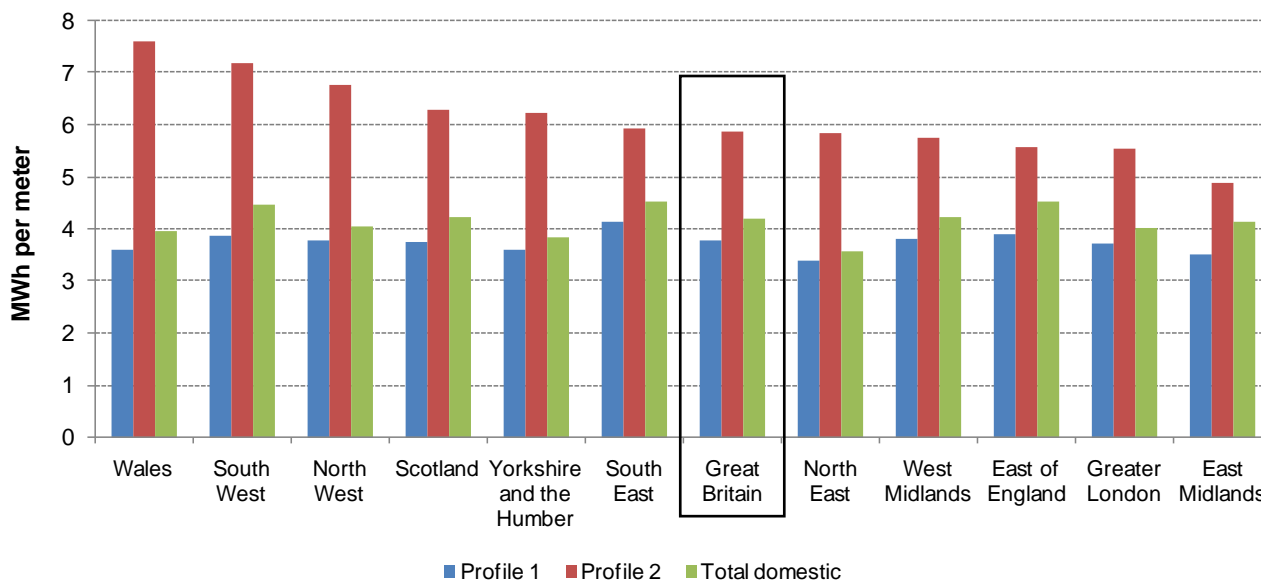


Chart 2 shows the regional consumption for the domestic sector split by profile type; profile 1 relates to ordinary domestic consumption, and profile 2 relates to consumers on an “Economy 7” type tariff, whereby a large proportion of the consumption is used for space heating. The regions are ordered in decreasing order of profile 2 consumption.

Table 2: Average non-domestic electricity consumption per meter in 2008 by Government Office Region

Region	Average (mean) non domestic consumption in 2008 (kWh)
North East	105,343
North West	94,192
Yorkshire and the Humber	92,089
East Midlands	90,191
Wales	89,182
West Midlands	81,453
East of England	75,796
Scotland	75,716
South East	71,984
Greater London	69,908
South West	60,674
Great Britain	79,809

Table 2 shows the average (mean) non-domestic electricity consumption per meter in each of the Government Office Regions in order of magnitude. Non-domestic electricity consumption is a function of both number of non-domestic sites in an area and the volume of electricity they use. Commercial centres such as Westminster, Birmingham, Leeds, Glasgow and Manchester have a high total overall volume of consumption but they also have a large number of non-domestic consumers so average consumption per non domestic meter point is usually relatively low.

At a local authority level, high average non-domestic consumption tends to occur where a number of relatively large consumers dominate an area with a relatively small total number of non-domestic meter points. As a result, the local authorities with the highest average non-domestic consumption per meter in 2008 were Ellesmere Port & Neston (North West) and the City of London (Greater London), with average consumptions of 368 MWh and 343 MWh respectively. The lowest average non-domestic consumption per meter are recorded in the Isles of Scilly and the Orkney Islands, with average consumptions of 19 MWh and 24 MWh respectively. This low level of non-domestic consumption in these areas reflect the region’s rural nature. Low average consumptions are also found in rural areas such as Penwith, Torrridge, Powys and Wealden, but also in some inner city areas such as Hackney, Wandsworth and Lewisham.

Chart 3: Box plots of average non-domestic electricity consumption for local authorities within each Government Office Region

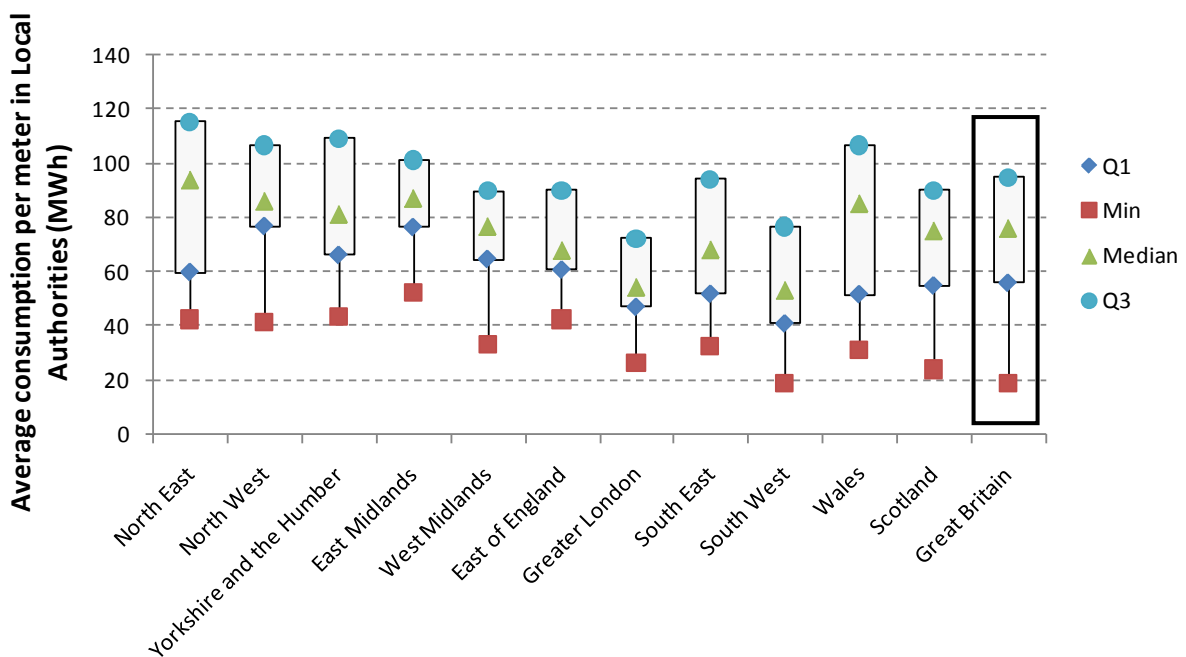


Chart 3 shows a box plot displaying aspects of the distribution of *average* non-domestic electricity consumption in local authorities for each of the Government Office Regions, as well as one for local authorities in Great Britain as a whole. For each Government Office Region, the box plot shows the minimum *average* non-domestic electricity consumption, the upper and lower quartile and the median *average* electricity consumption. Note that the maximums were excluded from the chart as they distorted the scales. For information, the maximums ranged from 368 MWh in North West to 152 MWh in the South West. From the chart it can be seen that the spread (between the upper and lower quartiles) of average electricity consumptions in local authorities is greatest in the North East, whereas the spread in the Government Office Region of the East Midlands is relatively small. The median is closer to the upper quartile (Q3) in the Government Office Region of North East, Wales and Scotland, which is indicative of a left-skewed distribution (the left tail of the distribution is longer meaning there are relatively fewer low values).

Chart 4: Industrial and commercial electricity consumption per £ thousand of gross value added, 2008.

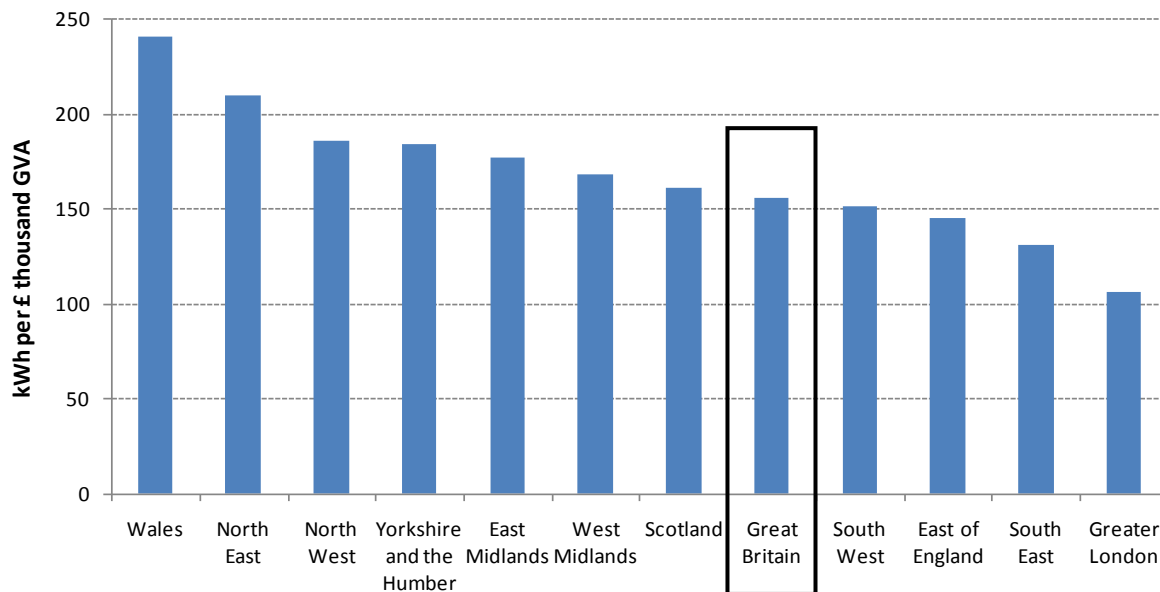


Chart 4 shows that Wales has the highest industrial and commercial electricity consumption per thousand pounds of Gross Value Added¹ (GVA), at more than twice the corresponding figures for Greater London.

Time series analysis

Table 3 contains information on the mean and median domestic consumption per meter at a national level (Great Britain). Consumption per domestic MPAN is not evenly distributed about the mean because households using electricity as their main source of heating will have much higher consumptions. However, the majority of households do not use electricity as their main source of heating, the reason why in each year, the median consumption was lower than the mean, indicating a right-skewed distribution.

Table 3: Mean and median electricity consumption for meters classified as domestic consumers, 2005 to 2008

	2005	2006	2007	2008
Mean (kWh)	4,602	4,457	4,392	4,198
Median (kWh)	3,690	3,615	3,550	3,400

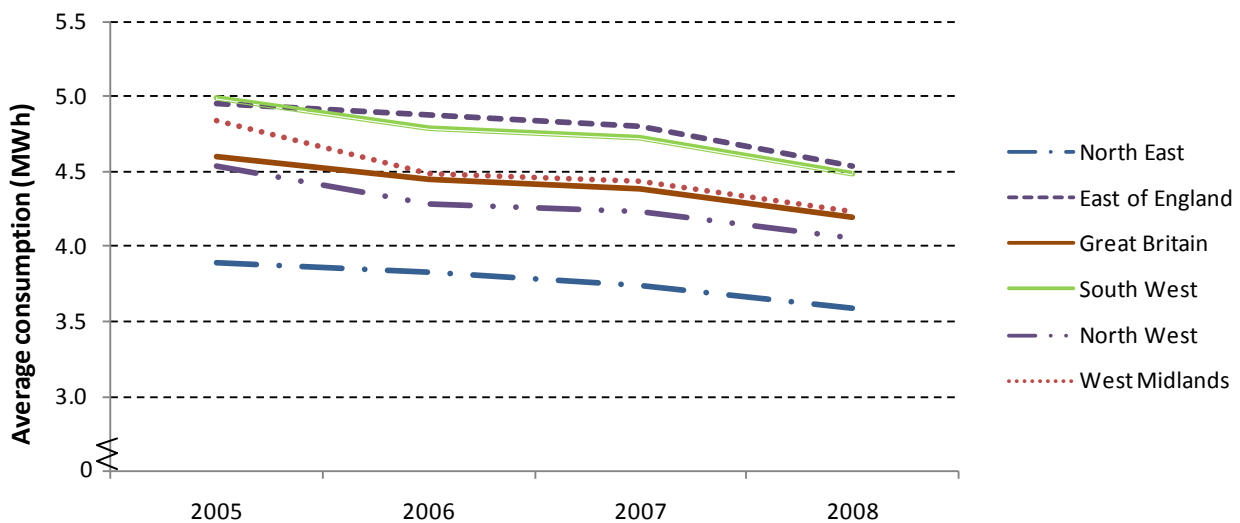
Although data for 2003 and 2004 are available on the Regional Energy website, methodological changes mean that these datasets are not directly comparable with data for 2005 and onwards. As a result 2005 has been used as a base-year for historical comparisons.

Chart 5 shows the mean electricity consumption per meter for North East, East of England, South West, North West, East Midlands and Great Britain as a whole in each of the years 2005 to 2008. These Government Office Regions are shown on the chart to illustrate the variable trend in domestic electricity consumption between 2005 and 2008. East of England and the North East Government Office Regions shown on the chart have the highest and lowest average domestic electricity consumption in each year respectively. In these Government Office Regions, it is clear that average electricity consumption has decreased gradually between 2005 and 2007, with the

¹ Using provisional Gross Value Added in 2008 at current basic prices (workplace based) published by ONS on 9 December 2009 and available at www.statistics.gov.uk/StatBase/Product.asp?vink=14650 (Table 1.6)

trend decreasing more steeply between 2007 and 2008. The average domestic consumption per MPAN for Great Britain as a whole has fallen from 4.6 MWh in 2005, to 4.4 MWh in 2007 and further to 4.2 MWh in 2008. Note that the average consumption for all other Government Office Regions were contained between North East and the East of England and follow approximately the same rate of decline. The Government Office Regions South West, North West and the West Midlands show a more prominent domestic electricity consumption decrease between 2005 and 2006. Key drivers behind the reduction in electricity consumption between 2005 and 2008 include increased prices and improved energy efficiency, with the increased uptake of small electrical appliances within the domestic sector inhibiting a more enhanced reduction in domestic energy consumption.

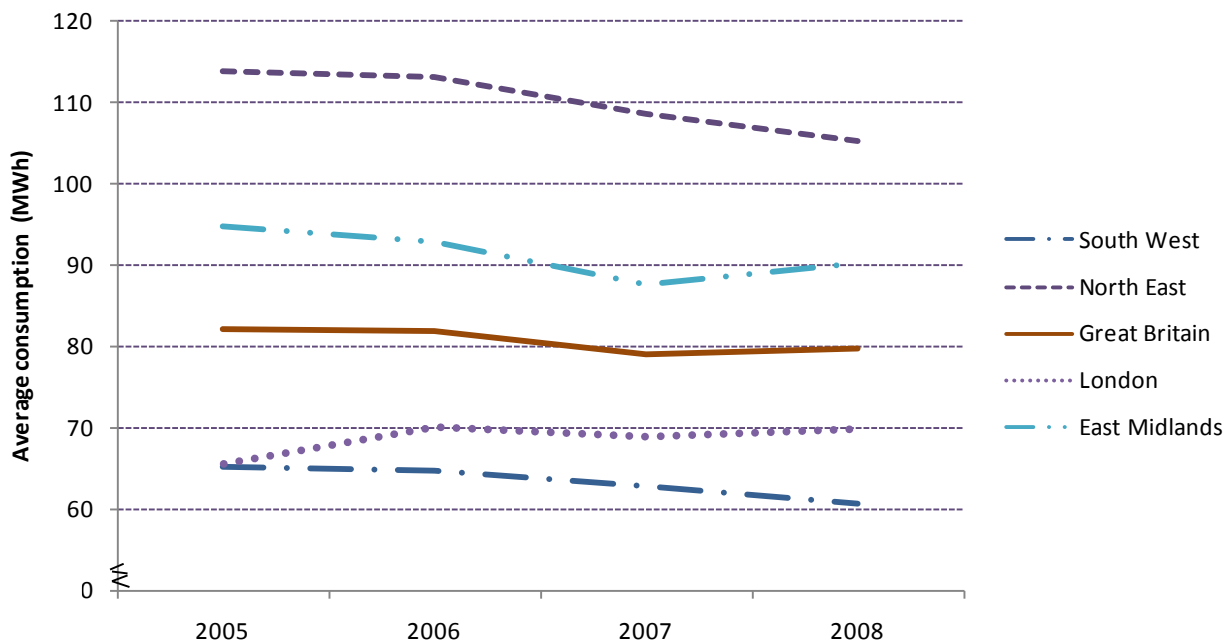
Chart 5: Average domestic electricity consumption for selected Government Office Regions, 2005 to 2008



The trends for average annual non-domestic electricity consumption between 2005 and 2008 were more variable than those for average domestic electricity consumption. Chart 6 shows the trends in average non-domestic electricity consumption for the South West, North East, London, East Midlands and Great Britain as a whole. North East and South West have the highest and lowest average electricity consumption respectively in each year, hence banding all other Government Office Region trends. Unlike the domestic trends, in several of the Government Office Regions the average annual consumption increased between 2005 and 2008. The Government Office Region East Midlands, as shown on Chart 6, increased between 2007 and 2008 from 88 MWh to 90 MWh. This trend is also reflected in the North West Government Office Region. Conversely, the average annual consumption in London increased between 2005 and 2006 from 65 MWh to 70 MWh respectively, stabilising around 69-70 MWh in 2007 and 2008. The average non-domestic consumption per MPAN for Great Britain as a whole had decreased from 82 MWh in 2005, to 79 MWh in 2007 but had increased to 80 MWh in 2008.

It is important to note that making comparisons between years at a local authority level is not always straightforward as there are several factors that may affect consumption from year to year. In the domestic sector, new housing developments can substantially change both total and average electricity consumption levels. Similarly, new industrial and commercial establishments, or the closure or run down of existing businesses, are likely to have a large effect on the total and average electricity consumption levels in a local authority. This is especially true if the incoming, or equally outgoing, business is a relatively large consumer.

Chart 6: Average non-domestic electricity consumption for selected Government Office Regions, 2005 to 2008



Consumption information below local authority area level

Gas and electricity consumption data are currently available for the years 2005 to 2008 at Middle Layer Super Output Area (MLSOA) level (a census geography, each of which typically covers around 2,000 households) in England and Wales and at Intermediate Geography Zone (IGZ) in Scotland. The latest 2008 data were published on 25th March 2010 and can be accessed from the DECC website at: www.decc.gov.uk/en/content/cms/statistics/regional/regional.aspx

DECC also published gas and electricity consumption data at a Lower Layer Super Output Area (LLSOA) level (around 500 households) on the 25th March 2010. An article giving a brief introduction to the newly published data is available in this edition of Energy Trends on pages 37-38, titled "Gas and electricity consumption data below Local Authority level". The data is available from the DECC website using the above link.

User feedback

We welcome all feedback from the users of this data, therefore if you would like to comment on these or on the content of this article, please contact Harriet Addison using the below contact details.

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Table 4: Sub-national electricity consumption statistics 2008 (National Statistics)

Government Office Regions and selected LAU1 Regions ⁽¹⁾	Domestic consumers		Commercial and industrial consumers		All consumers		kWh per MPAN	
	Sales 2008 - GWh	Number of MPANs (thousands)	Sales 2008 - GWh	Number of MPANs (thousands)	Sales 2008 - GWh	Number of MPANs (thousands)	Average domestic consumption	Average industrial and commercial consumption
Ceredigion	169.8	31.7	198.5	5.4	368.4	37.1	5,365	36,484
Neath Port Talbot	229.6	63.3	1,203.5	4.0	1,433.1	67.3	3,628	303,077
Blaenau Gwent	103.7	31.4	180.6	2.2	284.3	33.6	3,299	81,833
Powys	272.7	58.7	335.8	10.8	608.5	69.5	4,643	31,080
TOTAL WALES	5,307.2	1,338.5	10,960.0	122.9	16,267.1	1,461.4	3,965	89,182
Orkney Islands	84.0	13.2	54.3	2.3	138.3	15.5	6,354	23,891
Clackmannanshire	99.2	25.2	246.1	1.4	345.3	26.7	3,929	171,378
Glasgow City	1,201.4	335.1	2,167.7	25.2	3,369.1	360.4	3,585	85,859
Eilean Siar (Western Isles)	92.1	18.2	58.9	1.9	151.1	20.1	5,051	30,945
TOTAL SCOTLAND ⁽²⁾	11,577.7	2,732.9	16,732.4	221.0	28,310.1	2,953.9	4,236	75,716
Berwick-upon-Tweed	77.4	16.1	102.1	2.4	179.5	18.4	4,816	43,151
Redcar and Cleveland	224.2	62.1	940.9	3.7	1,165.1	65.8	3,609	256,943
South Tyneside	225.3	69.2	248.7	4.0	473.9	73.2	3,257	62,479
Alnwick	71.4	16.7	81.1	1.9	152.5	18.6	4,279	42,504
TOTAL NORTH EAST	4,223.7	1,178.4	8,537.4	81.0	12,761.1	1,259.5	3,584	105,343
Eden	129.6	24.0	280.9	4.3	410.6	28.3	5,390	65,578
Ellesmere Port & Neston	138.1	34.1	824.0	2.2	962.1	36.3	4,054	368,178
Barrow-in-Furness	118.3	32.6	423.5	2.2	541.8	34.8	3,630	193,192
Copeland	134.7	32.1	114.7	2.8	249.4	34.8	4,202	41,251
TOTAL NORTH WEST	12,417.1	3,063.1	22,151.3	235.2	34,568.5	3,298.3	4,054	94,192
Ryedale	112.7	24.0	195.2	3.8	307.9	27.8	4,705	51,447
North Lincolnshire	277.8	72.0	1,116.9	5.9	1,394.7	77.9	3,858	189,024
Barnsley	356.3	103.1	570.5	6.2	926.7	109.3	3,457	91,979
Craven	117.3	25.9	153.3	3.5	270.6	29.4	4,529	43,458
TOTAL YORKSHIRE AND THE HUMBER	8,899.5	2,303.8	16,350.5	177.6	25,250.0	2,481.4	3,863	92,089
South Northamptonshire	194.1	36.7	230.7	3.0	424.8	39.8	5,284	76,268
Rutland	79.4	15.8	315.7	1.7	395.1	17.5	5,013	188,920
Chesterfield	167.5	48.3	271.8	4.0	439.3	52.3	3,467	67,546
East Lindsey	303.9	64.4	395.2	7.6	699.0	72.0	4,716	52,305
TOTAL EAST MIDLANDS	8,095.5	1,957.7	14,180.4	157.2	22,275.9	2,114.9	4,135	90,191

Table 4: Sub-national electricity consumption statistics 2008 (National Statistics)

Government Office Regions and selected LAU1 Regions ⁽¹⁾	Domestic consumers		Commercial and industrial consumers		All consumers		kWh per MPAN	
	Sales 2008 - GWh	Number of MPANs (thousands)	Sales 2008 - GWh	Number of MPANs (thousands)	Sales 2008 - GWh	Number of MPANs (thousands)	Average domestic consumption	Average industrial and commercial consumption
Stratford-on-Avon	281.2	53.3	334.9	5.9	616.1	59.3	5,274	56,501
North Warwickshire	124.6	26.8	406.1	2.5	530.7	29.3	4,644	165,623
Stoke-on-Trent	400.7	110.1	543.3	8.0	944.1	118.1	3,639	67,948
South Shropshire	105.2	20.4	102.6	3.1	207.9	23.5	5,153	33,057
TOTAL WEST MIDLANDS	9,902.7	2,339.1	15,946.4	195.8	25,849.1	2,534.8	4,234	81,453
Maldon	142.6	26.6	155.9	2.6	298.5	29.1	5,371	60,485
Thurrock	294.6	64.9	792.8	4.3	1,087.4	69.2	4,538	184,200
Norwich	208.6	62.7	459.9	6.8	668.4	69.5	3,328	67,152
Castle Point	171.3	37.2	93.6	2.2	264.9	39.4	4,604	42,396
TOTAL EAST OF ENGLAND	11,321.2	2,494.5	16,201.3	213.7	27,522.4	2,708.2	4,538	75,796
Barnet	651.2	139.5	559.6	11.6	1,210.8	151.1	4,669	48,234
City of London	25.4	5.7	2,558.3	7.5	2,583.7	13.2	4,447	342,937
Islington	322.0	95.0	972.3	18.3	1,294.3	113.3	3,390	53,167
Hackney	341.9	97.1	438.0	16.7	779.8	113.8	3,520	26,209
TOTAL GREATER LONDON	13,410.0	3,327.1	28,403.9	406.3	41,814.0	3,733.4	4,031	69,908
South Bucks	148.7	27.2	205.8	2.8	354.6	30.0	5,462	74,340
Crawley	168.4	41.8	536.5	3.2	704.9	45.1	4,026	165,894
Portsmouth	331.4	87.5	681.7	7.3	1,013.2	94.7	3,790	93,942
Wealden	326.9	63.1	218.1	6.7	545.1	69.7	5,184	32,719
TOTAL SOUTH EAST	16,513.3	3,634.7	23,942.6	332.6	40,455.9	3,967.3	4,543	71,984
Isles of Scilly	8.4	1.2	8.1	0.4	16.5	1.6	7,135	18,826
Swindon	355.3	88.7	934.2	6.2	1,289.5	94.8	4,006	151,870
Plymouth	428.7	113.9	715.9	8.3	1,144.6	122.2	3,765	86,570
Penwith	157.1	34.0	121.5	4.4	278.6	38.4	4,615	27,729
TOTAL SOUTH WEST	10,633.8	2,372.9	14,931.8	246.1	25,565.6	2,619.0	4,481	60,674
Unallocated	228.9	62.5	3,756.5	17.5	3,985.4	80.0	3,663	214,363
GREAT BRITAIN	112,530.5	26,805.2	192,094.5	2,406.9	304,625.0	29,212.1	4,198	79,809

(1) The LAU1 name has replaced the previous term NUTS4 but covers the same level of administrative geography

(2) In Scotland the areas shown are Local Authorities rather than LAU1 areas.