

Annex C: Domestic Consumption

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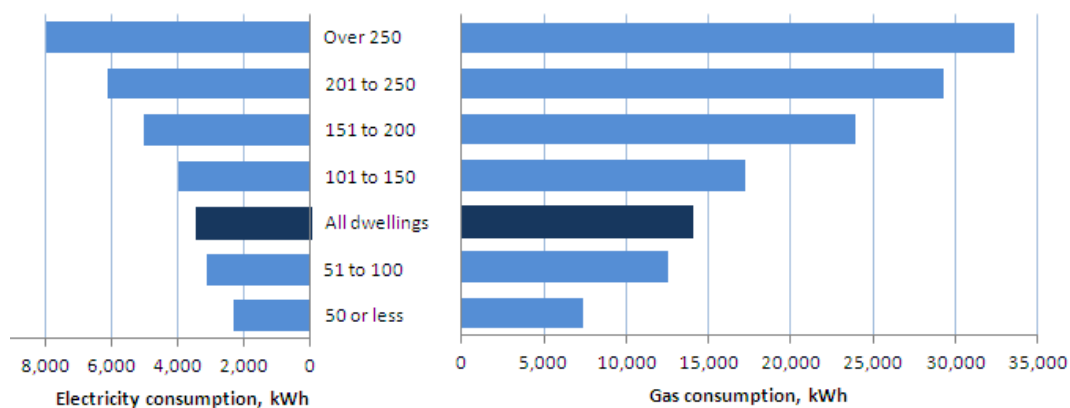
1. Executive Summary

This annex sets out how energy use varies for different property attributes and household characteristics and what the trends in household energy use since 2005 are for these households.

The relationship between energy use and any individual characteristic is complex, but there is a high correlation between certain characteristics and a household's energy use (for example, size of property, household income, tenure etc). This section provides insight into how each characteristic relates to energy use, but makes no attempt to control for other characteristics (this is explored in annexes E and F which consider models to explain variance in gas consumption).

The analysis shows that there is considerable variation in energy consumption for different types of household and property, and furthermore, that there is a range of consumption within each category. There is no one factor that explains differences in gas and electricity consumption on its own. However, property size appears to be the strongest individual driver of energy consumption, for both gas and electricity. Figure 1.1 below shows the relationship between size of property and energy use.

Figure 1.1: Median gas and electricity consumption in 2010, by property floor area, m²



The only physical attribute of a property where the relationship to energy use is not so clear is property age. There is no clear relationship between electricity consumption and property age. There appears to be a stronger relationship for gas use, with newer properties using less gas. However, properties built between 1919-1944 are an exception to this, using significantly more gas than properties built before 1919. This is shown in Figure 1.2 below.

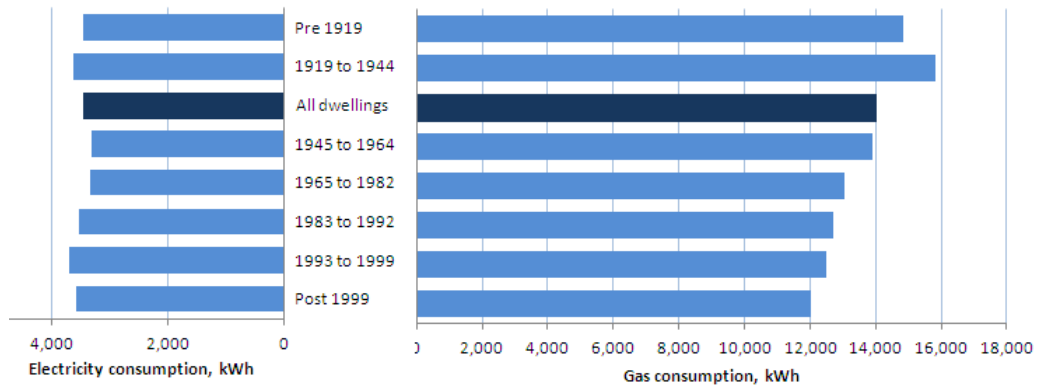
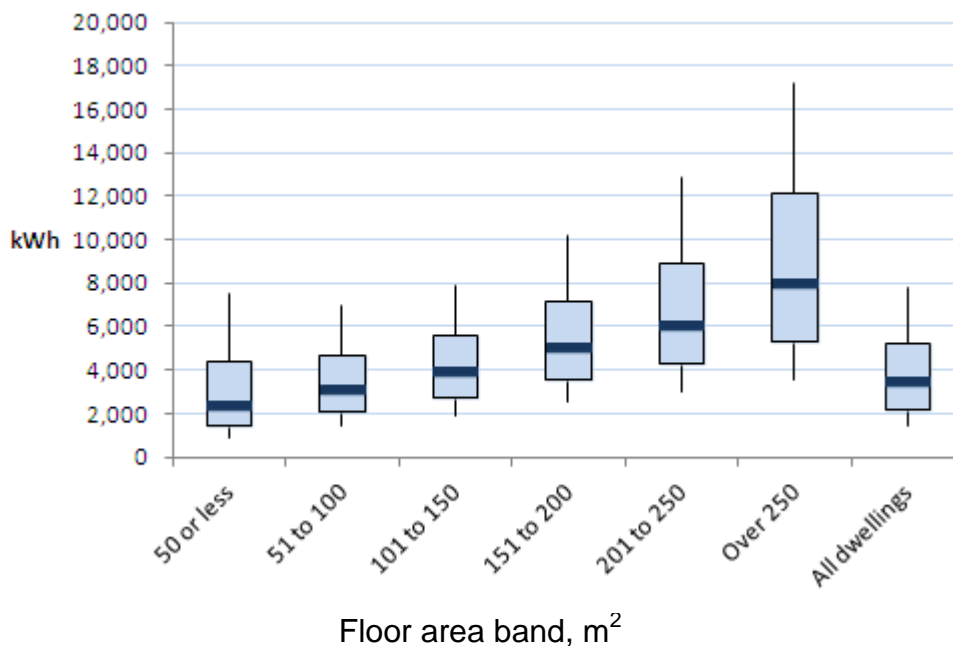
Figure 1.2: Median gas and electricity consumption in 2010, by property age

Figure 1.3 shows electricity consumption by the number of bedrooms, and provides an example of the range of consumption within each category. The boxes mark the quartile ranges and the tails show the 10th and 90th percentiles. For all categories of all property attributes and household characteristics there is a range around the median consumption. However, the distribution of the range varies for different attributes.

Figure 1.3: Distribution of electricity consumption in 2010, by number of bedrooms

This section also explores how changes in energy consumption over time may vary by the different characteristics explored. In general, there is wider variation in changes in gas consumption over time by characteristic than there is for electricity consumption. For gas consumption, households on lower incomes, and living in smaller properties have reduced their gas consumption by proportionately more than households on higher incomes or living in larger properties. This may partially reflect the focus on installing energy efficiency measures in priority group households over the period considered.

2. Introduction

A key purpose of NEED is to understand more about how energy is consumed in different properties and by different households. This section provides a more detailed version of the results presented in Section 4 of the report, covering consumption by property attributes and household characteristics. It uses data from the NEED sample of households covering 16 per cent of properties in England.

The median consumption has been used to represent typical consumption. It is a more appropriate measure than the mean because the mean can be influenced by a relatively small number of high consuming households that are not typical of the rest of the population. Supplementary data tables showing results for both the mean and the median gas and electricity consumption for England as well as data broken down by local authority are available at: http://www.decc.gov.uk/en/content/cms/statistics/energy_stats/en_effic_stats/need/need.aspx.

The consumption data used in NEED are based on administrative billing data held by energy suppliers and published by DECC as sub-national consumption statistics¹. There are some differences between the data published in the sub-national statistics and the data in NEED. Most significantly, the data used for the NEED analysis are a sample of data for England and further cleansing was undertaken before data were used, including a stricter definition of valid consumption. To be considered valid, domestic gas consumption must be between 100 kWh and 50,000 kWh, compared to the maximum domestic threshold of 73,200 kWh as used by the gas industry and for the sub-national consumption statistics. Domestic electricity consumption is considered valid if it is between 100 kWh and 25,000 kWh; meter profile is the main determinant of domestic consumption for sub-national consumption statistics. In both NEED and the sub-national statistics published by DECC the gas consumption data are weather corrected. This should remove some of the variation between years which occurs due to cooler or warmer winters. More details about this quality of the data and filters applied are available in Annex B.

Table 2.1 gives summary statistics for gas and electricity consumption in 2010. The median gas consumption in England was 14,000 kWh and for electricity it was 3,500 kWh². However, there is a wide range of consumption which is evident from the lower and upper quartiles shown.

Table 2.1: Summary consumption statistics for 2010³, kWh

	Mean	Standard deviation	Lower quartile	Median	Upper quartile
Gas	15,100	8,000	9,700	14,000	19,200
Electricity	4,200	3,100	2,200	3,500	5,300

The table also shows that there is more variation in electricity consumption than gas consumption. This is primarily due to the wider range of uses of electricity, including the variation between households that use electricity as the main heating fuel and those that do not.

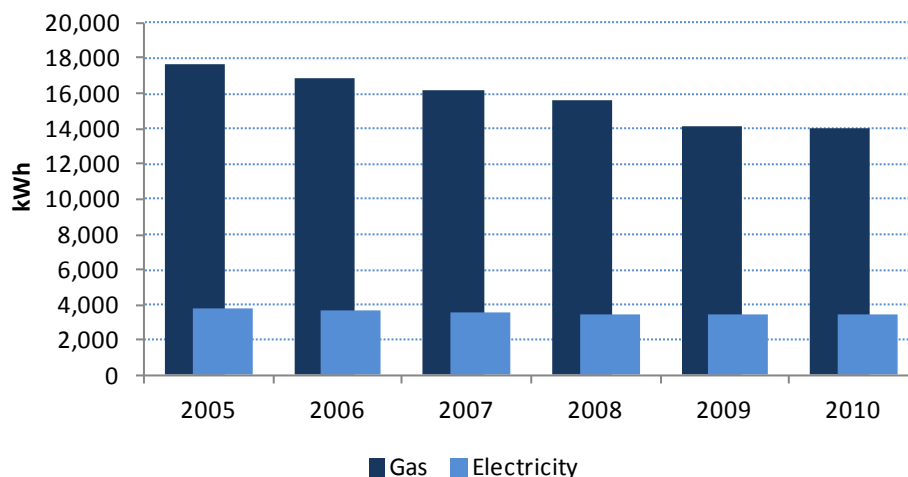
¹ http://www.decc.gov.uk/en/content/cms/statistics/energy_stats/regional/regional.aspx

² All consumption estimates are rounded to the nearest 100kWh.

³ Based on valid NEED sample.

Figure 2.1 shows the median annual consumption for gas and electricity between 2005 to 2010⁴. It shows that consumption has generally decreased over the period. The largest reduction was between 2008 and 2009 for gas consumption, with a decrease in annual consumption of nine per cent. The median consumption for both gas and electricity was stable between 2009 and 2010.

Figure 2.1: Median gas and electricity consumption by year



This annex sets out median gas and electricity consumption for 2010 by property attributes (Section 3) and household characteristics (Section 4). It also shows how consumption varies by region and output area classification (Section 5). Trends in consumption over time are covered in Section 6. With the exception of Section 5, the analysis in this annex is all presented at national level. Similar information for each local authority in England is available in the supplementary data tables⁵.

⁴ The median consumption shown here and for all results in this report are based on properties in the NEED sample with valid consumption.

⁵ Note that the NEED sample was not designed to be representative at geography lower than region. However, comparisons have been made with Valuation Office Agency property attributes data and all local authorities are adequately represented.

3. Property attributes

This section sets out how median gas and electricity consumption for different types of properties. Property information analysed in this section is obtained from the Valuation Office Agency (VOA) property attributes database.

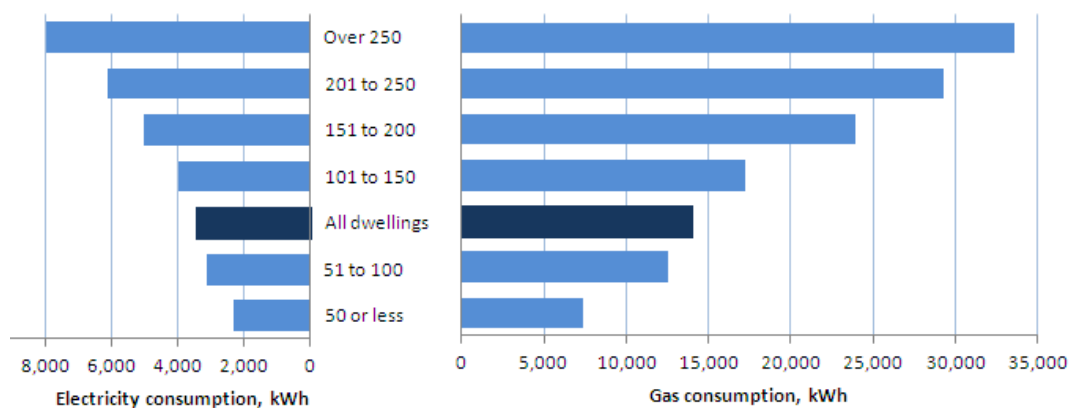
3.1 Floor area

There are two factors available in NEED that can be used to characterise the size of a property. They are floor area and number of bedrooms. This section covers floor area with number of bedrooms covered in the next section, however there is a strong correlation between the two variables.

The average useable floor area for properties in England is 92 square meters⁶. Over half of the properties in the NEED sample have a floor area between 51 and 100 square metres and about one third have a floor area greater than 100 square metres. Only three per cent have an area greater than 200 square metres.

Figure 3.1 shows median gas and electricity consumption by floor area band⁷. However, note that the floor area variable available from VOA is defined differently for houses and flats⁸.

Figure 3.1: Median gas and electricity consumption in 2010, by area of property, m²



The figure shows that energy use increases as the floor area of the property increases for both electricity and gas. For example, properties with a floor area between 101 and 150 square metres had a median gas consumption of 17,300 kWh in 2010. This is 3,300 kWh or 23 per cent more than the typical gas consumption for all properties in England. They also use 4,000 kWh of electricity, 500 kWh (15 per cent) more than typical electricity consumption for all properties. On the other hand, the median gas consumption for the smallest properties, of floor area 50 square

⁶ Source: English Housing Survey (EHS) Homes Report 2010 published by the Department of Communities and Local Government available at <http://www.communities.gov.uk/publications/corporate/statistics/ehs2010homesreport>.

⁷ Note the different scale used for gas and electricity consumption in this and other charts. This was necessary as electricity consumption is typically much lower than gas consumption..

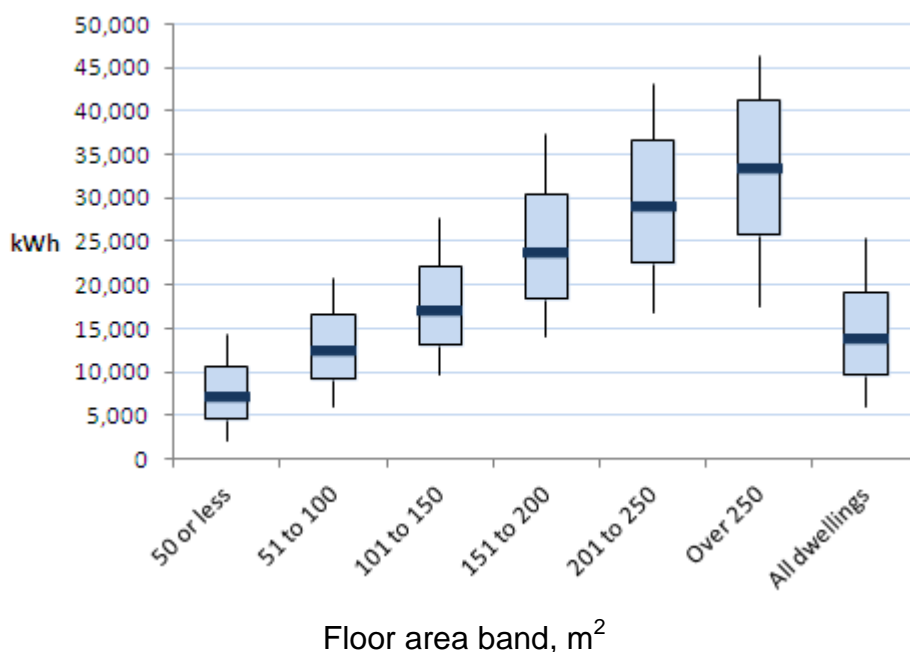
⁸ For houses the “Reduced Covered Area” is used while the “Effective Floor Area” is measured for flats. The floor area being captured for houses is measured externally and is effectively the building’s footprint. For flats, it is the internal floor area excluding some internal spaces such as bathrooms/showers and WCs which are not excluded for houses.

metres or less, was 47 per cent lower than that for all properties and their electricity consumption was 32 per cent less than the median consumption for all properties in England.

The increased consumption for larger homes is in line with the fact that more energy is needed to heat them and also because they are more likely to have more appliances. However, the range of consumption also varies more as the floor area increases. This is shown in the box plots⁹ in figure 3.2.

Figure 3.2(a) shows that, although the larger properties have a higher median gas consumption there is a considerable range in their consumption. In addition, in the top two floor area bands 90 per cent of properties have gas consumption higher than the typical consumption for all properties in England. Also, for properties over 250 square meters in area, the range between the lower quartile and the 10th percentile is larger than that between the upper quartile and the 90th percentile. This occurs because of the upper cut off for gas consumption applied to properties included in the NEED sample, masking the presence of a small number of potentially much larger consuming households.

Figure 3.2: Distribution of energy consumption in 2010, by floor area, m²
(a) Gas consumption



⁹ Box plots aid in visualising the range and distribution of energy consumption in households. Consumption values are first arranged in increasing order of magnitude and then divided into four equal groups by 'quartiles'. The bottom of the box represents the lower quartile, the consumption at which 25 per cent of households will have lower consumption and 75 per cent higher consumption. The top of the box is the upper quartile, where 25 per cent of households have consumption higher and 75 per cent have lower consumption. The blue horizontal line within the box is the median. The lines extending from each box show the range from the lower quartile to the 10th percentile and upper quartile to the 90th percentile. The bottom of the lower line is the 10th percentile, and 10 per cent of households have consumption lower than this value. The top of the upper line is the 90th percentile and 10 per cent of households consume more than this value.

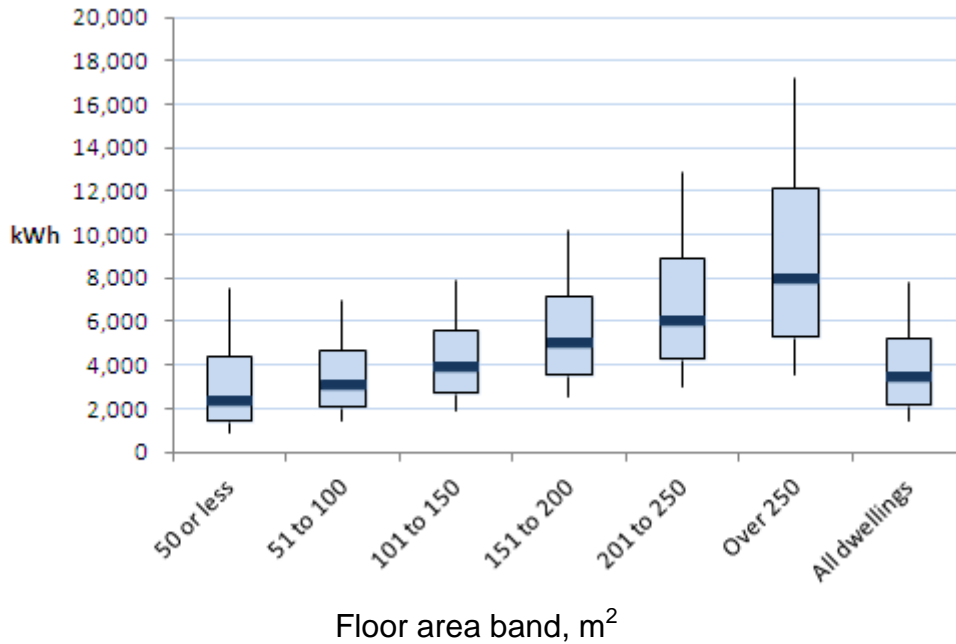
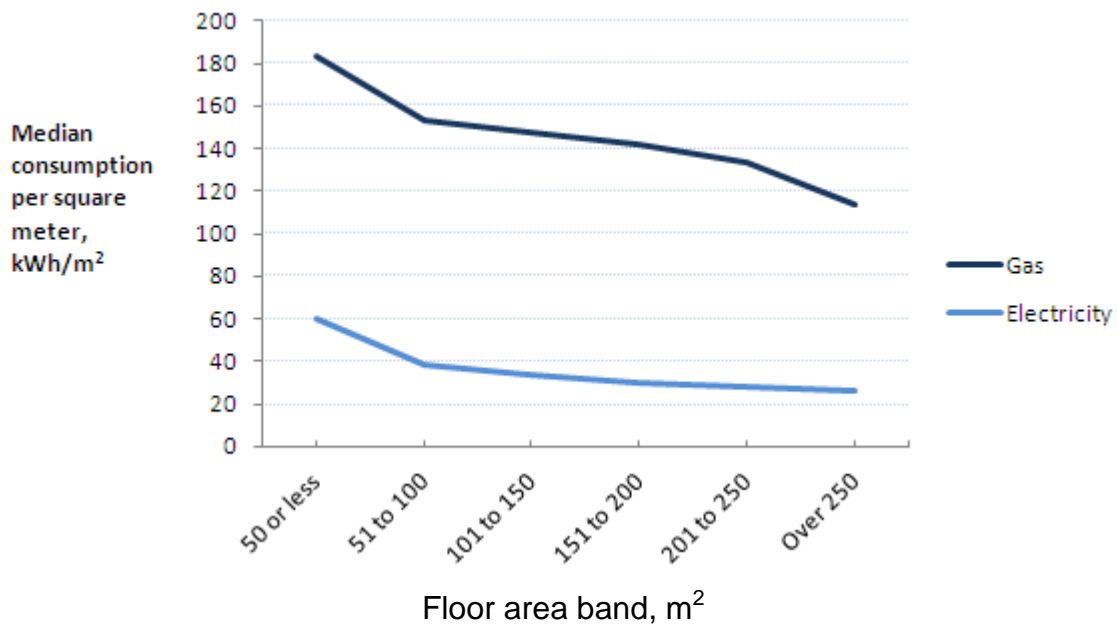
(b) Electricity consumption

Figure 3.2(b) shows the equivalent information for electricity. In this case, the cut off applied has little effect and it is clear that the small proportion of high consuming households are influencing the distribution. This is demonstrated by the fact that the range between the upper quartile and median is larger than the range between the lower quartile and median.

The relationship between energy consumption and floor area can also be seen in Figure 3.3. This figure shows the median consumption per square meter of floor area.

Figure 3.3: Median consumption per square meter, by floor area



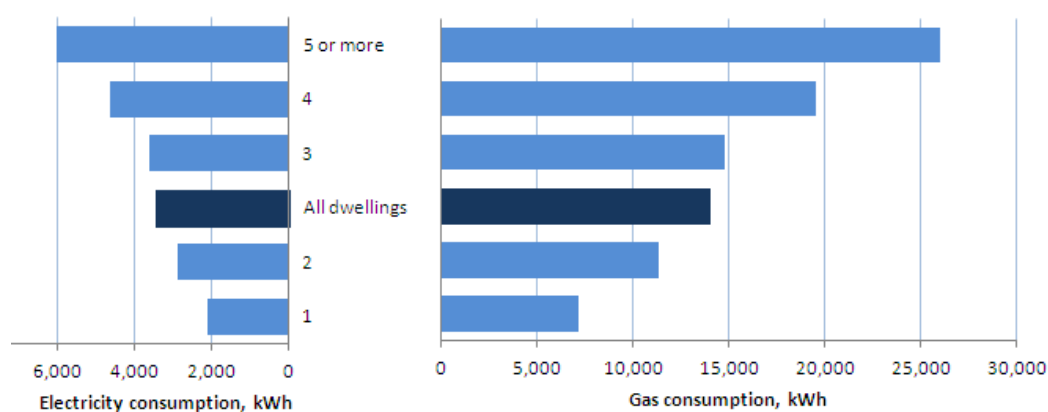
It shows that in general the consumption per square meter decreases as the size of the property increases. For both gas and electricity, the smallest properties with floor area of 50 square metres or less use more energy per square metre than any other property size. This highlights the fact that there is a core requirement for all household no matter what size the property.

3.2 Number of bedrooms

The number of bedrooms in a home can also be used as an indicator of its size¹⁰. Figure 3.4 shows how typical energy consumption varies by number of bedrooms.

About half of the properties (47 per cent) in the sample have three bedrooms. Median consumption for these properties was 14,800 kWh for gas and 3,600 kWh for electricity. This was only slightly higher than the median consumption for all properties in England (about five per cent higher in both cases).

Figure 3.4: Median gas and electricity consumption in 2010, by number of bedrooms

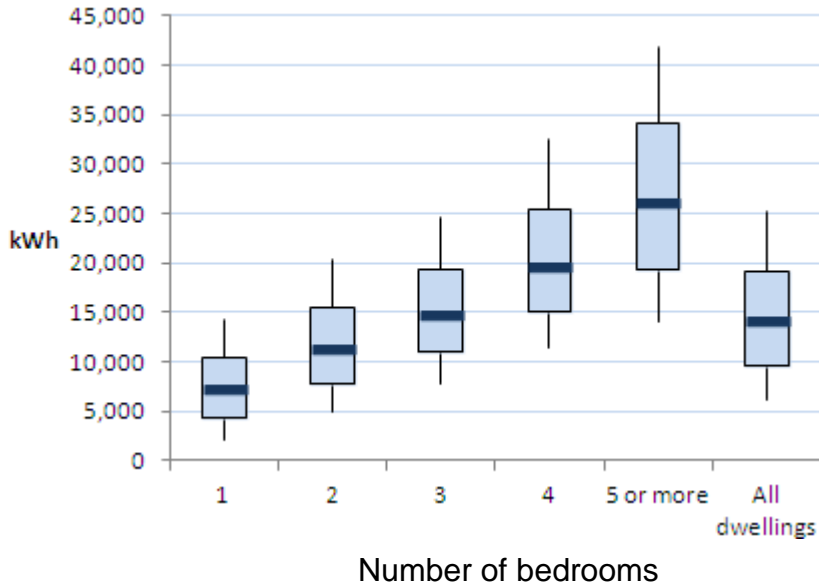


It is evident from the figure that the relationship between gas and electricity consumption and number of bedrooms is very similar to that of floor area. The amount of energy consumed increases as the number of bedrooms increases. Again the variation in consumption increases as the number of bedrooms gets larger, see Figure 3.5.

¹⁰ Note that the number of bedrooms includes rooms built as bedrooms even if they are not currently used as bedrooms, but excludes rooms incapable of comfortably holding a single bed.

Figure 3.5: Distribution of energy consumption in 2010, by number of bedrooms

(a) Gas consumption



(b) Electricity consumption

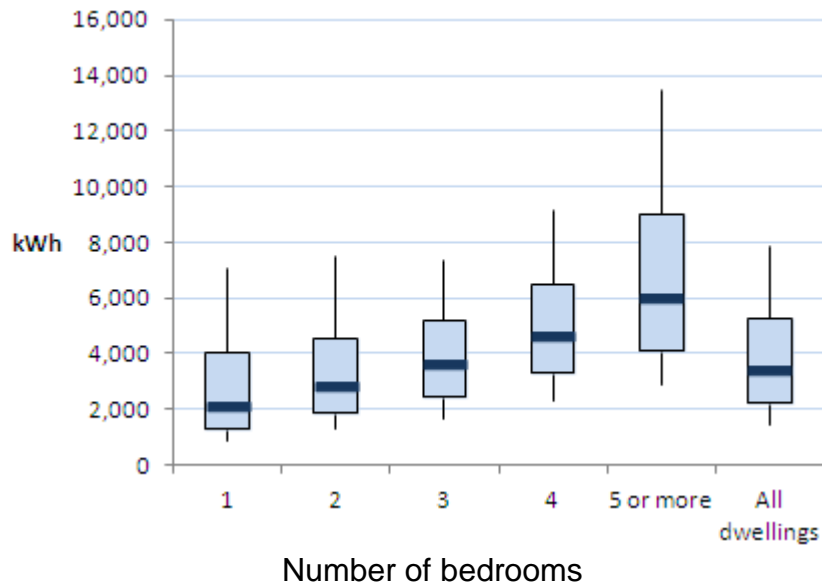
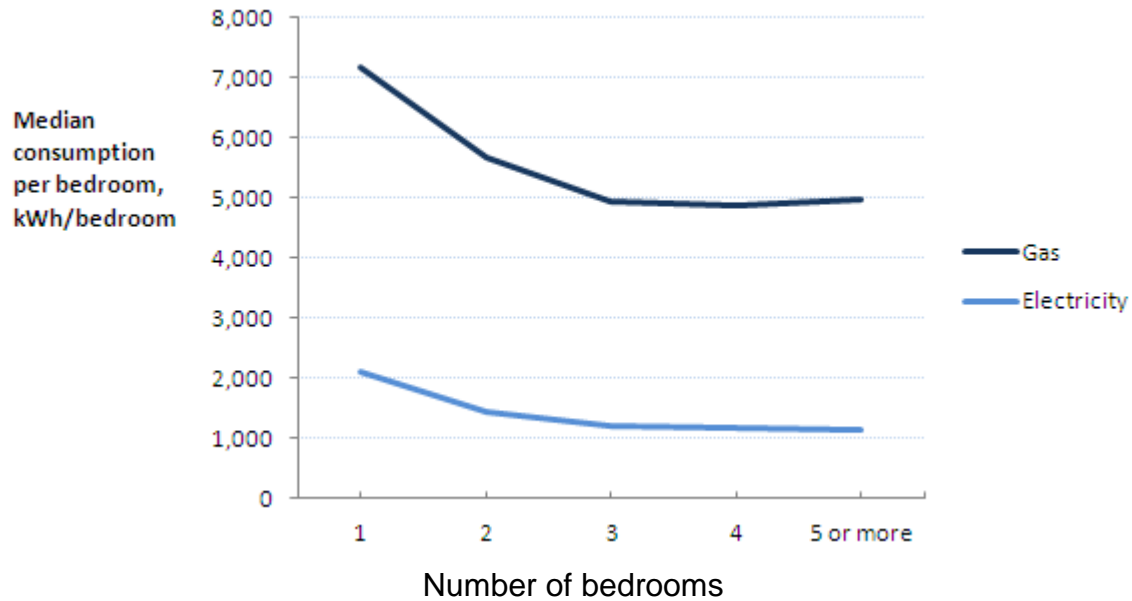


Figure 3.6 shows the relationship between median consumption per bedroom and number of bedrooms.

Figure 3.6: Median gas and electricity consumption per bedroom, by number of bedrooms

The figure shows that, particularly for gas, the median consumption decreases more between one bedroom and two bedroom properties and less so between two and three bedrooms. Beyond three bedrooms there are very small savings per extra bedroom. Each additional bedroom adding about 4,900 kWh of gas and 1,200 kWh of electricity to typical household consumption.

From the above it is clear that on average, larger properties have higher energy consumption. The typical consumption by other property attributes is set out below. Work carried out by and on behalf of DECC confirms that property size is the most significant determining factor of consumption. However, property size only appears to explain a small amount of the observed differences. Other physical attributes and household characteristics (as set out in the rest of this section) help explain variation but there remains a significant amount of variation which has not been explained. This has been demonstrated through models such as the local area gas model¹¹ developed by DECC, econometric work carried out by NERA (Annex E) and regression analysis by Katalysis (Annex F).

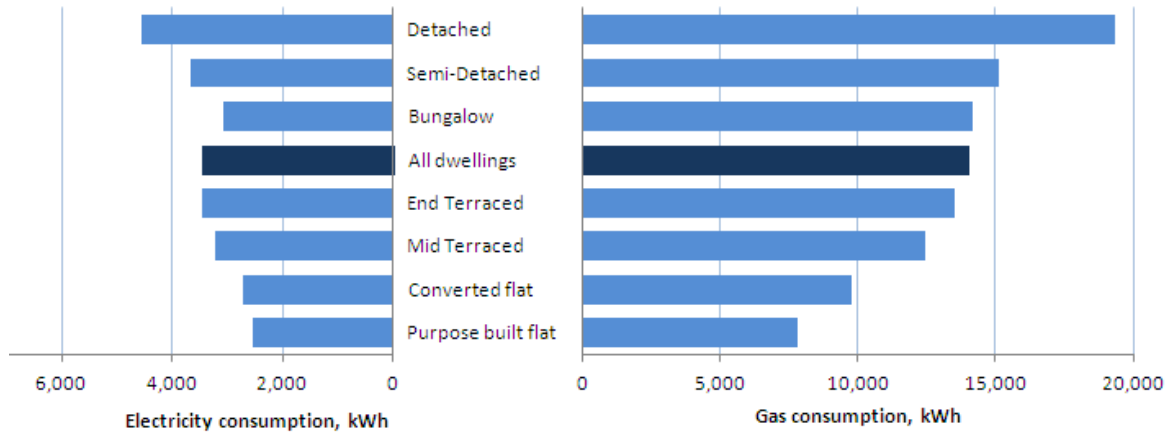
The results set out in the rest of this annex do not attempt to control for the size of property. This means that where there are correlations between property size and other categories the size of property will be a factor in the observed typical consumption. For example higher income households tend to live in larger properties.

¹¹ See the special feature 'Identifying local areas with higher than expected domestic gas use' in Energy Trends, March 2012 available at: <http://www.decc.gov.uk/assets/decc/11/stats/publications/energy-trends/4779-energy-trends-mar12.pdf>

3.3 Property type

Figure 3.7 shows how median gas and electricity consumption varies for different property types.

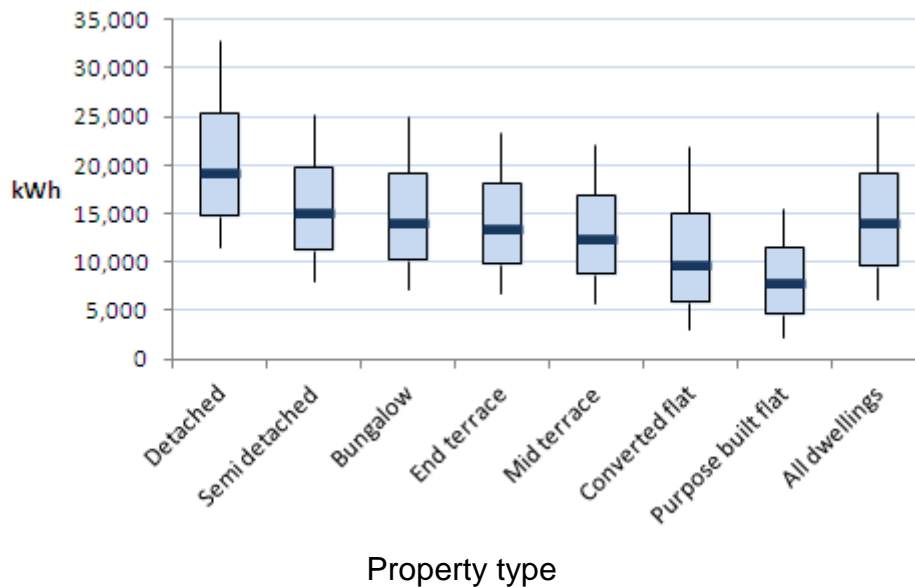
Figure 3.7: Median gas and electricity consumption in 2010, by property type



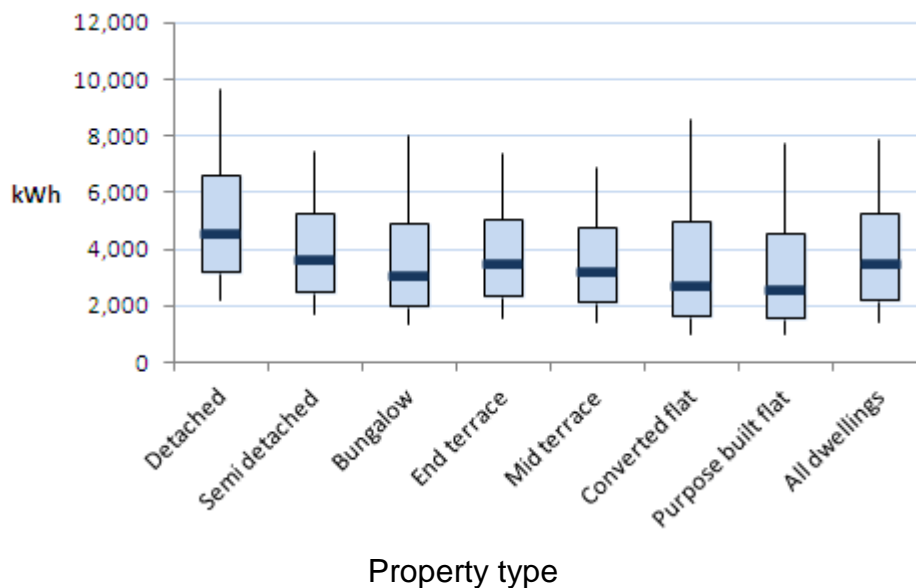
Depending on the type of dwelling, median consumption ranges from 7,800 kWh to 19,300 kWh for gas and 2,500 kWh to 4,600 kWh for electricity. Detached homes use the most gas, consuming about two and a half times more gas than purpose built flats, the lowest gas consumers. Bungalows have similar median gas consumption to the overall median; the median for bungalows is only one per cent more than that for all dwellings. Of categories relating to houses, terraces have the lowest typical consumption and bungalows use the least amount of electricity.

Gas use appears to vary more by property type than electricity consumption. Figure 3.8 shows that again electricity has a larger range of consumption above the median than below it, unlike gas which appears to be more evenly distributed.

Figure 3.8: Distribution of energy consumption in 2010, by dwelling type
(a) Gas consumption



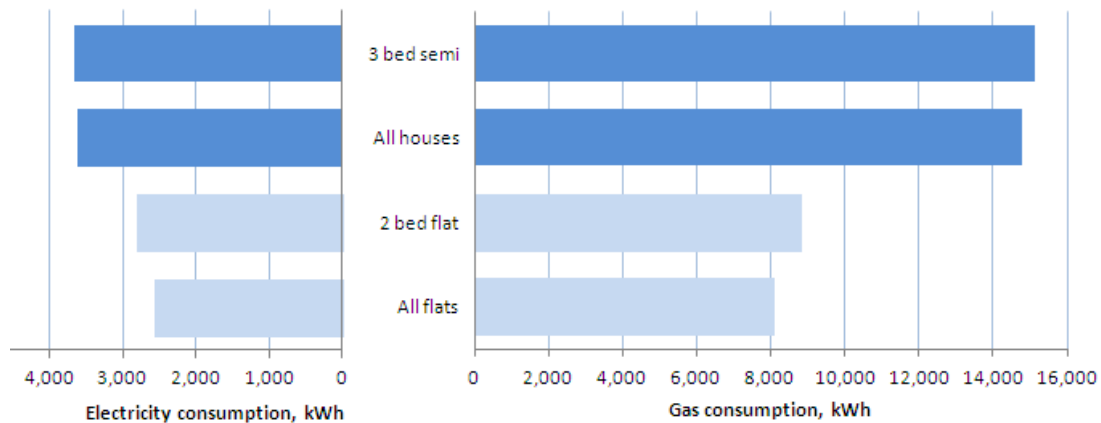
(b) Electricity consumption



The most common property in England is the three bedroom semi detached house¹². Around 18 per cent of all properties in England fall into this house type (and 22 per cent of all houses). The most common flat is a two bedroom flat, with nine per cent of all properties and 46 per cent of flats making up this property type.

Figure 3.9 shows how the consumption of these common property types compares with the consumption for houses and flats in general.

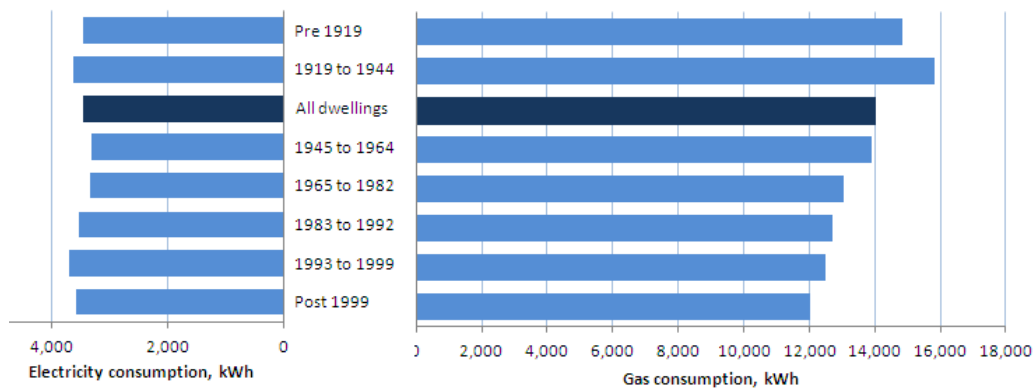
¹² Source: English Housing Survey Homes Report, published by the Department of Communities and Local Government and available at: <http://www.communities.gov.uk/publications/corporate/statistics/ehs2010homesreport>

Figure 3.9: Median gas and electricity consumption in 2010 for common property types

Three bed semis use comparable but slightly more energy than the typical consumption for all houses (two per cent more gas and one per cent more electricity). Two bed flats on the other hand have higher consumption than that in the typical flat (nine per cent more gas and ten per cent more electricity).

3.4 Property age

Two in five properties in England were built prior to the end of World War Two (pre-1945). A similar proportion were built within 40 years of the end of the war (1945 to 1982) with only one in five houses having been built since 1983¹³. Figure 3.10 shows how gas and electricity consumption varies according to the age of the property.

Figure 3.10: Median gas and electricity consumption in 2010, by property age

There is a noticeable relationship between gas consumption and property age. In general, homes in older age groups have a higher typical consumption than newer ones. This is probably due to improved building regulations regarding energy efficiency, particularly since the 1980s (see Annex G). However, there are some exceptions; properties built between 1919 and 1944 have higher median consumption than properties built pre-1919.

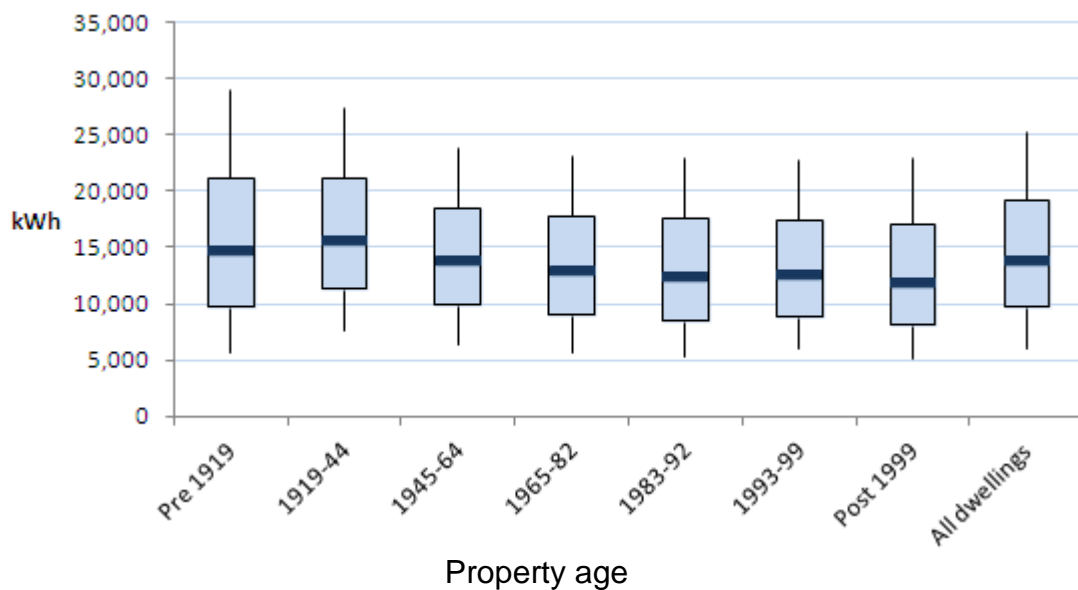
¹³ Source: English Housing Survey Homes Report, published by the Department of Communities and Local Government and available at: <http://www.communities.gov.uk/publications/corporate/statistics/ehs2010homesreport>.

Any relationship between property age and electricity consumption is not as clear. The highest electricity consumption is seen in properties built between 1993 and 1999, but the difference is small (seven per cent more than the median for all properties, and 11 per cent more than the category with the lowest median consumption).

Figure 3.11 shows that for both gas and electricity there is a lot of overlap in consumption for different property ages and that other factors appear to be having a greater influence on the consumption values observed.

Figure 3.11: Distribution of energy consumption in 2010, by property age

(a) Gas consumption



(b) Electricity consumption

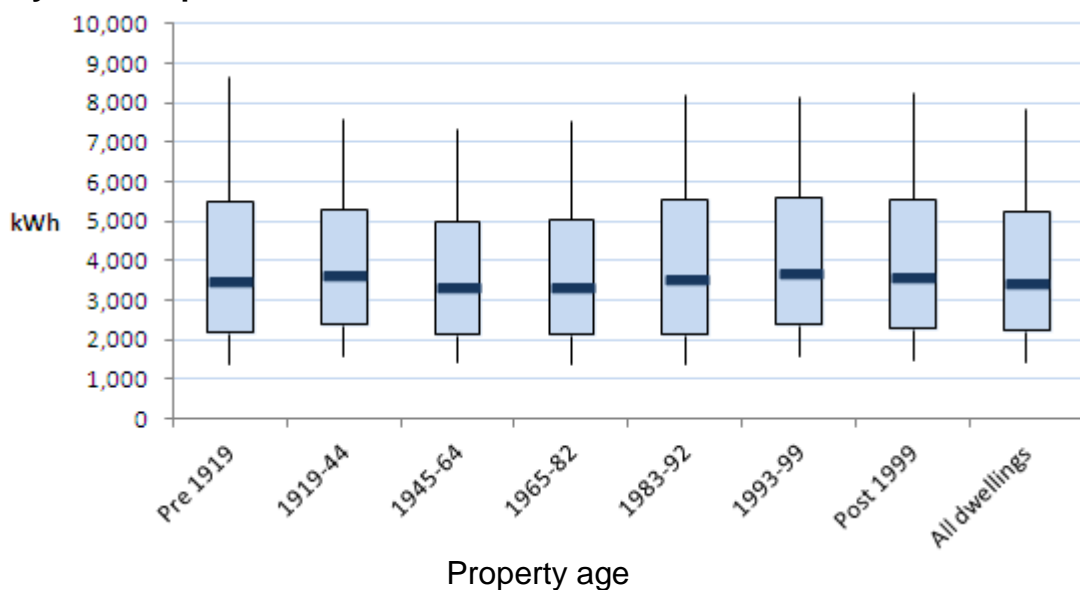


Figure 3.11(b) also shows that properties built before 1919 have the largest range in electricity consumption. The 10th percentile (the consumption value for which ten per cent of properties have lower consumption) is similar across all age groups, while there is a much greater variation in the 90th percentile.

4. Household Characteristics

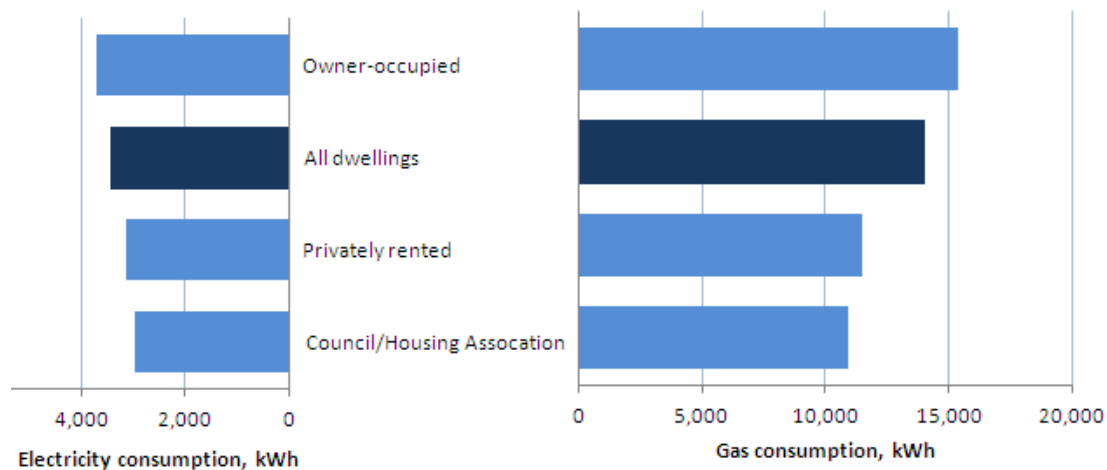
This section sets out median gas and electricity consumption in 2010 for different household characteristics. It covers consumption by tenure and household income band.

It should be noted that data for household characteristics are based on modelled data from Experian. DECC leased this information for about 3 million records (about three quarters of the analysis sample), representing about 10 per cent of households in England. As the data from Experian are modelled, estimates are indicative of characteristics of the household rather than actual data for any given household and therefore results should be interpreted in this context. Annex B provides more details of the quality of Experian data.

4.1 Tenure

The relationship between tenure and energy consumption is similar for gas and electricity, as Figure 4.1 shows. Owner occupiers have a higher typical gas and electricity consumption than households living in privately rented properties. Council/housing association occupants have the lowest gas and electricity consumption. Some of this difference is likely to be explained by the fact that social housing is generally more energy efficient than other properties, as indicated by their higher SAP rating¹⁴. The lower gas consumption in rented properties compared with owner occupiers may also be related to the size of property as rented properties are generally smaller; only about a quarter (26 per cent) of owner occupied properties have less than 3 bedrooms compared to 58 per cent for private rented and 64 per cent for social rented¹⁵.

Figure 4.1: Median gas and electricity consumption in 2010, by tenure

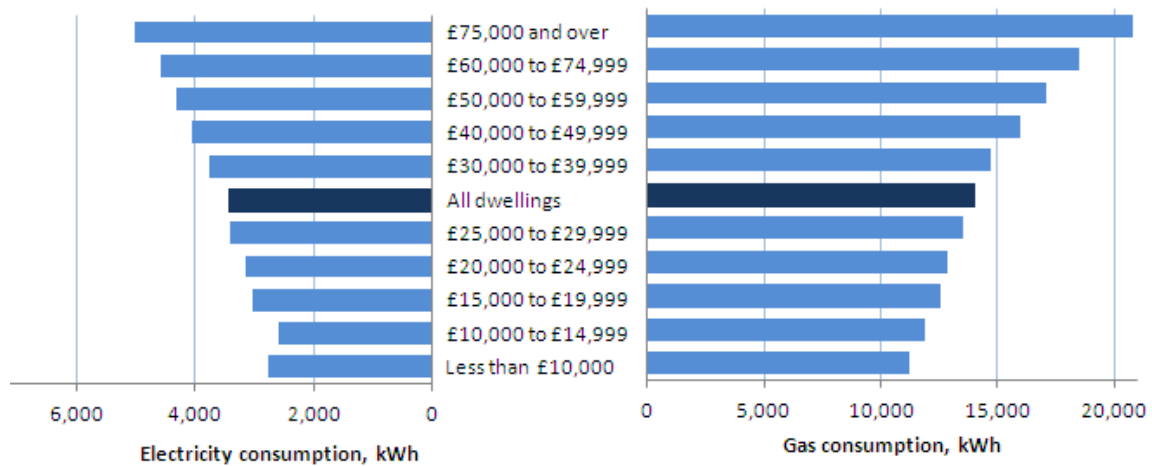


4.2 Household income

Figure 4.2 shows median gas and electricity consumption, with higher earners at the top and the lowest earners at the bottom.

¹⁴ Source: English Housing Survey Homes Report, published by the Department of Communities and Local Government and available at: <http://www.communities.gov.uk/publications/corporate/statistics/ehs2010homesreport>. The SAP rating is a measure of the overall energy efficiency of the dwelling.

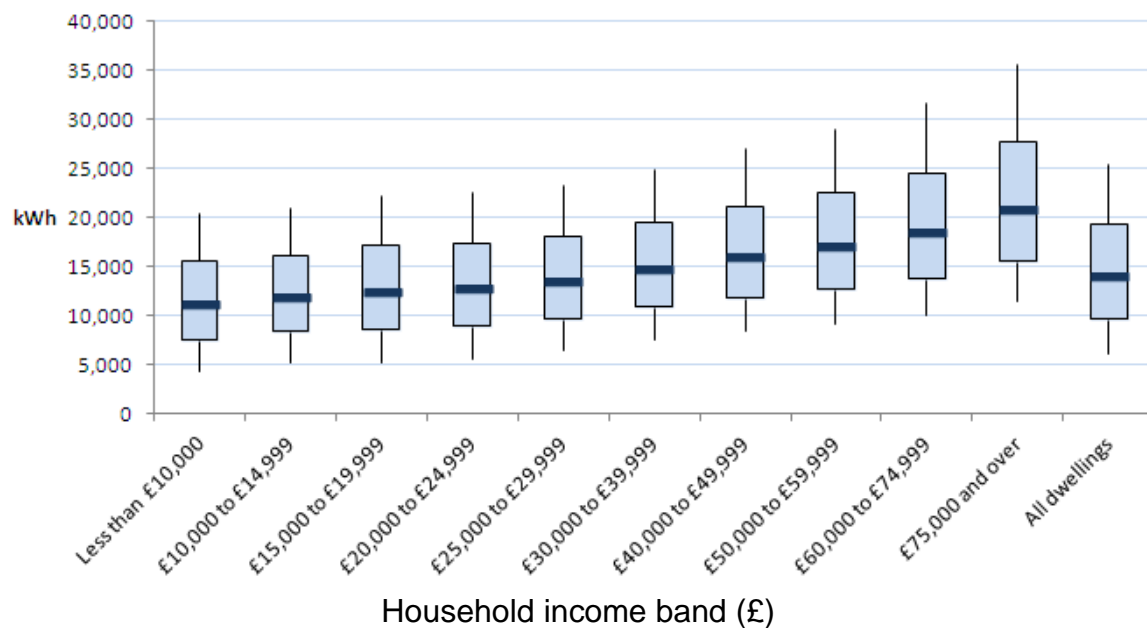
¹⁵ Source: English Housing Survey Homes Report, published by the Department of Communities and Local Government and available at: <http://www.communities.gov.uk/publications/corporate/statistics/ehs2010homesreport>.

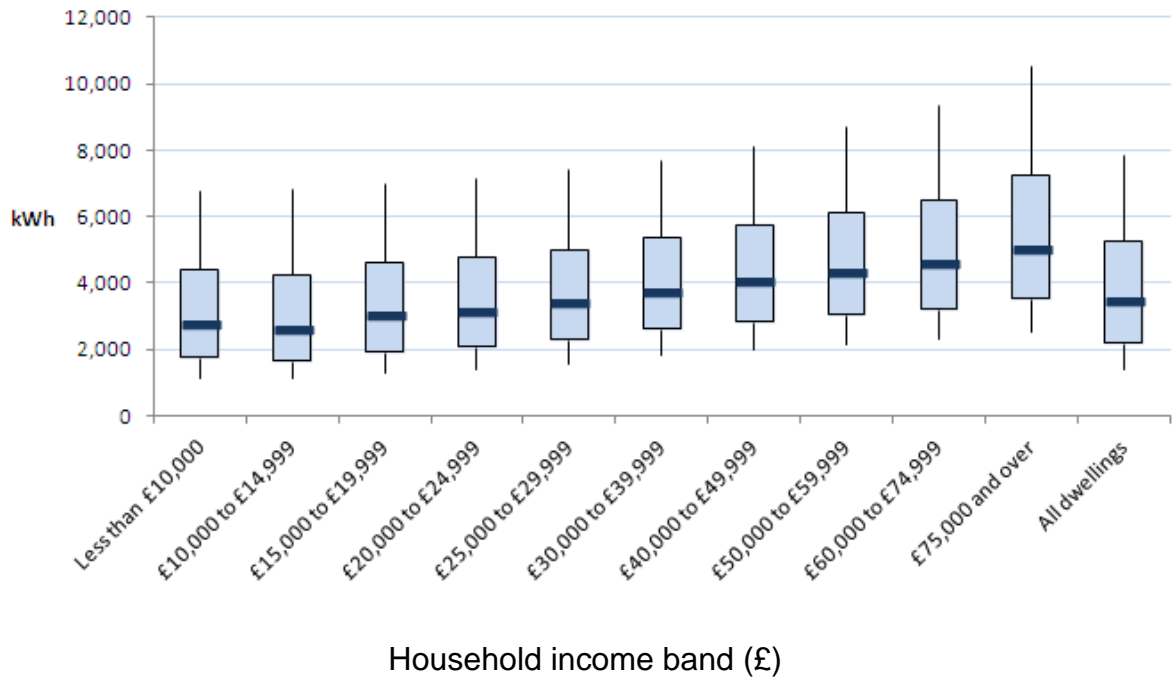
Figure 4.2: Median gas and electricity consumption in 2010, by household income

The figure shows that households with higher incomes typically consume more gas. The increase in gas consumption is most apparent for households on incomes of £30,000 and above. For these households, the difference in median gas consumption is in the region of eight per cent for each subsequent band.

The relationship between income and electricity consumption follows a similar pattern to that of gas. The only exception is for households with an income between £10,000 and £14,999 which had a lower median electricity consumption than those in the lowest income band. However, this may be due to the quality of the income data, which is least reliable for the lowest income bands.

The range in consumption values for gas and electricity is shown in Figure 4.3.

Figure 4.3: Distribution of energy consumption in 2010, by household income**(a) Gas consumption**

(b) Electricity consumption

The figure shows that for both gas and electricity consumption, the range between the upper quartile and median was larger than for the lower quartile and median. This is more noticeable for electricity consumption particularly for the higher income groups.

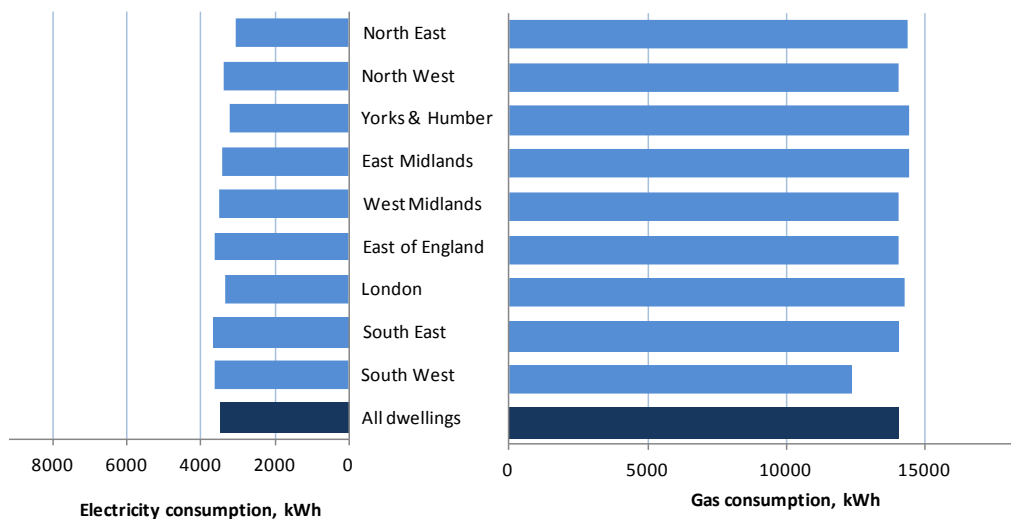
5. Geography and Area Classification

This section provides information about median gas and electricity consumption by geography and output area classification. Geographic and area classification information is derived from the address information. Every property in the analysis sample had a valid region and output classification area assigned to it.

5.1 Region

There is very little variation in consumption between regions, particularly for gas, except for the South West which has a typical consumption 12 per cent lower than that for England. This is seen in all years considered and could be due to a number of factors such as warmer weather or different types of properties.

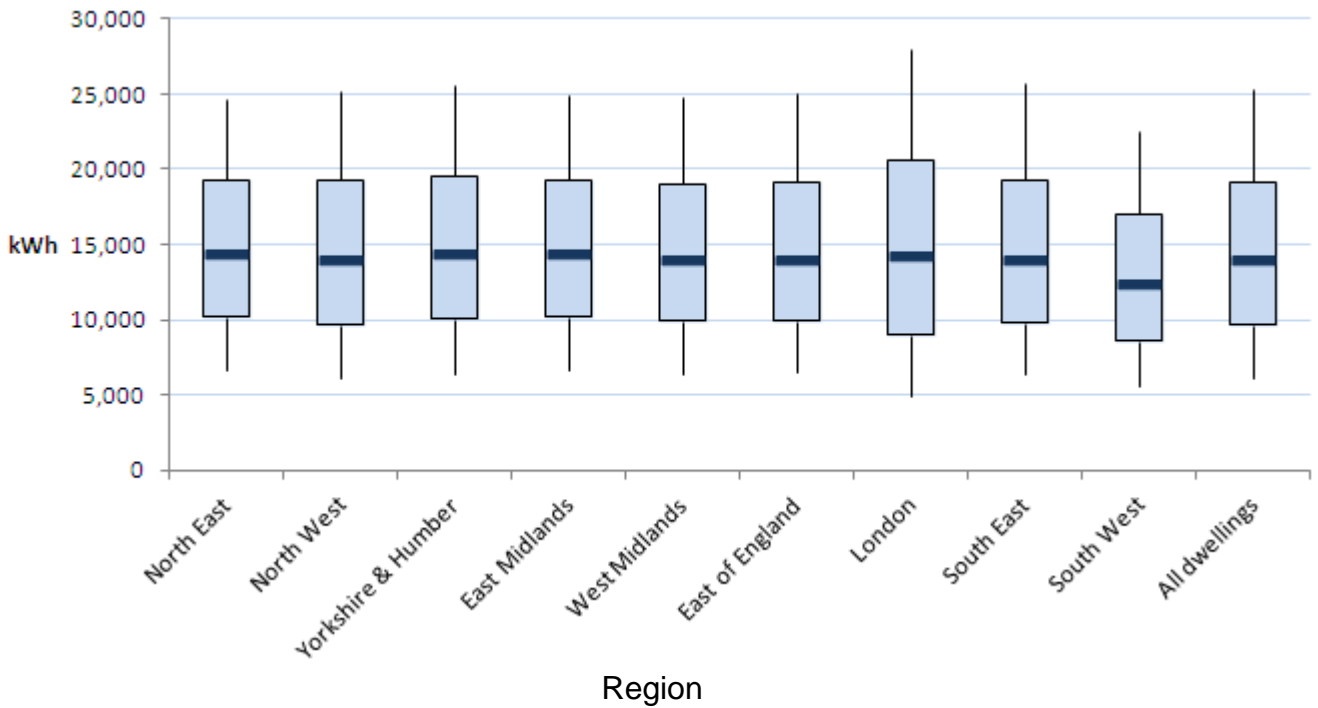
Figure 5.1: Median gas and electricity consumption in 2010, by region



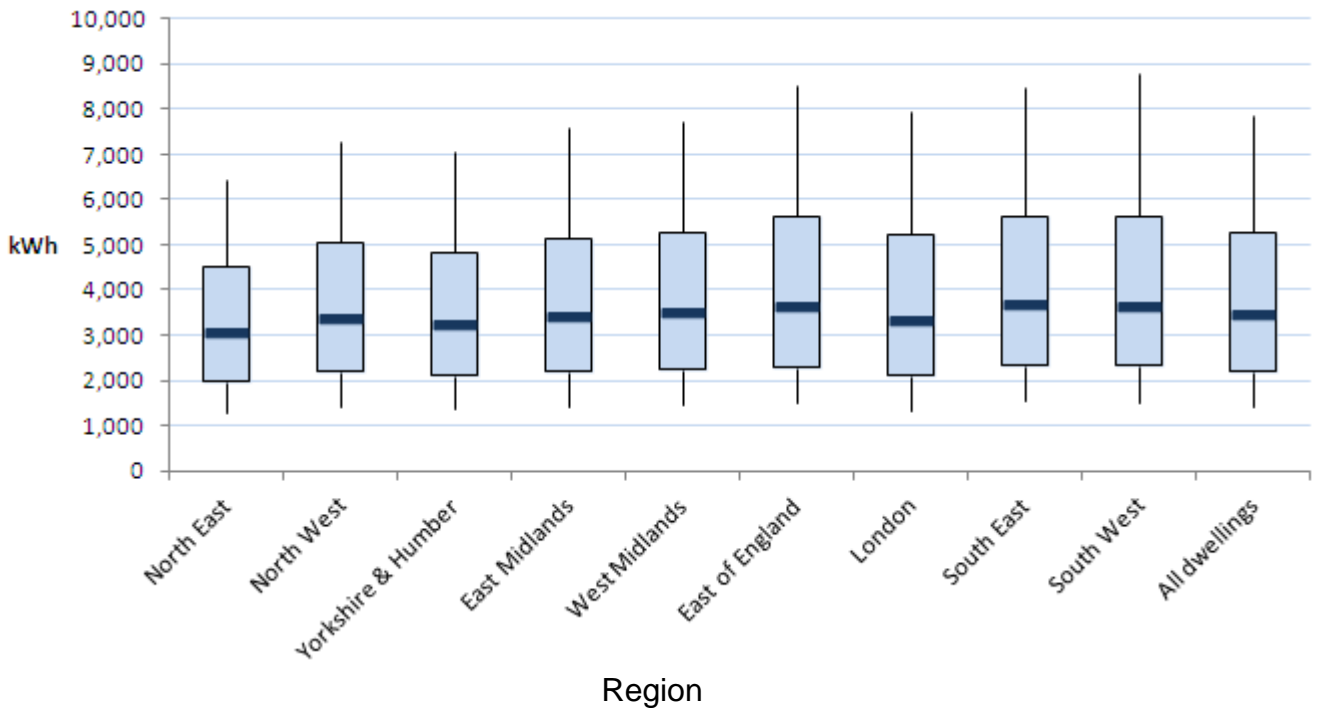
Yorkshire and the Humber had the highest median gas consumption, but it is not much above the median for all dwellings in England (only about three per cent higher). The figure also shows that for electricity median consumption is highest in the South East (seven per cent more than the median for all properties), while that in the North East is the lowest (11 per cent lower).

Figure 5.2 shows the distribution of consumption across the regions.

Figure 5.2: Distribution of energy consumption in 2010, by region
(a) Gas consumption



(b) Electricity consumption



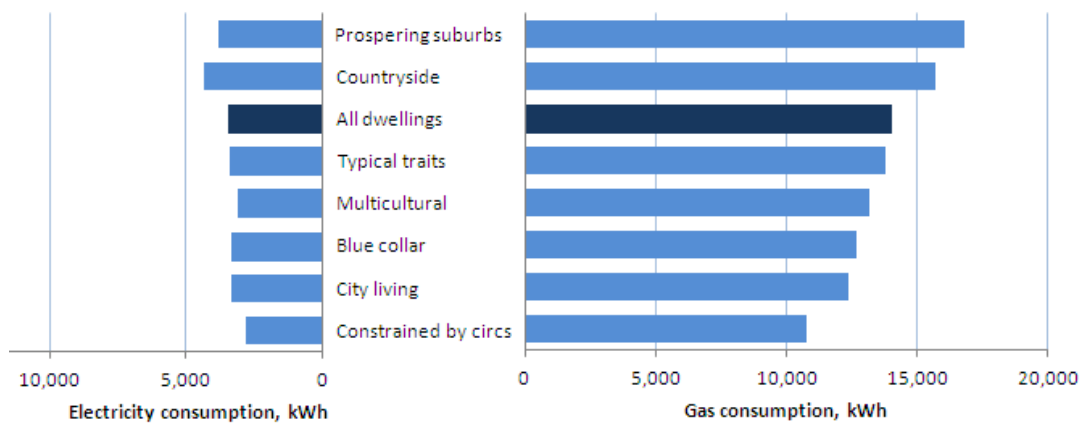
The figure shows that gas consumption is more variable in London, reflecting the diverse nature of properties and households there. Electricity consumption in the East of England, South West and South East is higher than typical, but the range of consumption in these regions is larger than in others.

As observed in this section, there is significant variation within each region, much of this will result from the different characteristics of properties and behaviours of occupants. Local authority data provides a further insight into this variation. For headline consumption estimates for local authority level and below, DECC's published sub-national consumption statistics should be used. However, NEED can provide information at local authority level for different types of properties and households, these detailed results are available at: http://www.decc.gov.uk/en/content/cms/statistics/energy_stats/en_effic_stats/need/need.aspx.

5.2 Output area classification

The neighbourhood classification from the Office for National Statistics is based on socio-economic data and can be used to make comparisons of energy consumption by type of neighbourhood. Figure 5.3 shows consumption for the seven super groups¹⁶.

Figure 5.3: Median gas and electricity consumption in 2010, by Output Area Classification



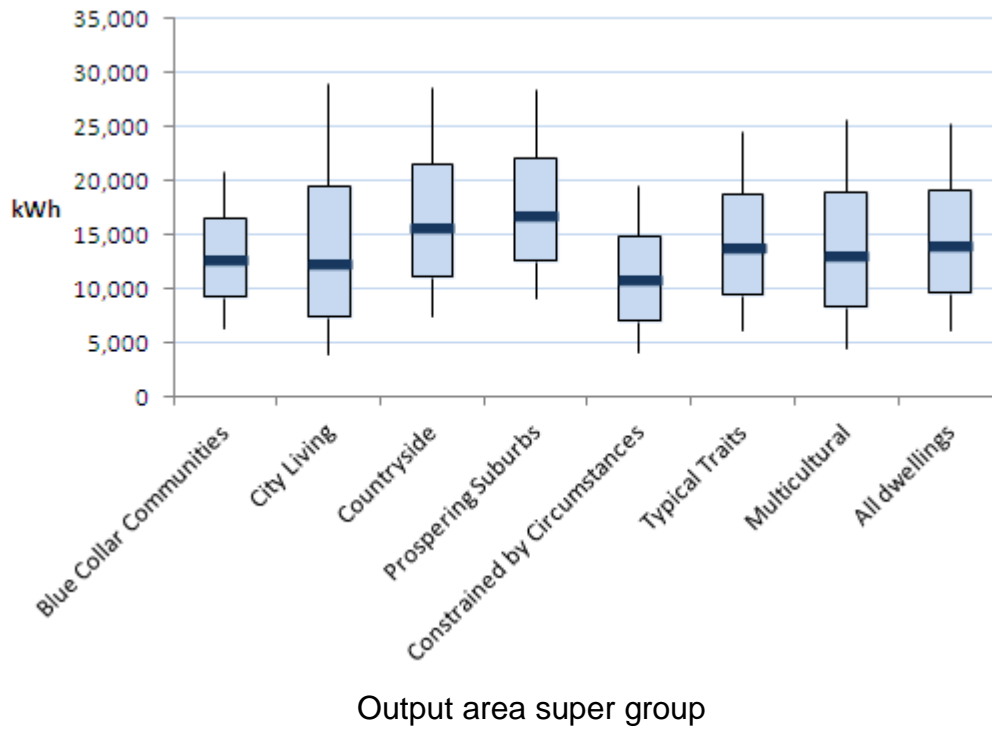
The figure shows that the highest gas consumers are the more affluent 'prospering suburbs'. This super group has a typical gas consumption about a fifth more gas than typical for all dwellings and close to three-fifths (56 per cent) more than the lowest gas consuming super group, those 'constrained by circumstances'.

There is not a clear relationship between gas and electricity consumption by the type of area, except that communities constrained by circumstances also use the least amount of electricity. The main difference is that areas in the countryside use more electricity than any other neighbourhood. This is likely to be driven by a larger proportion of rural households being off the gas grid in rural locations and therefore having more need to use electricity to help heat their homes.

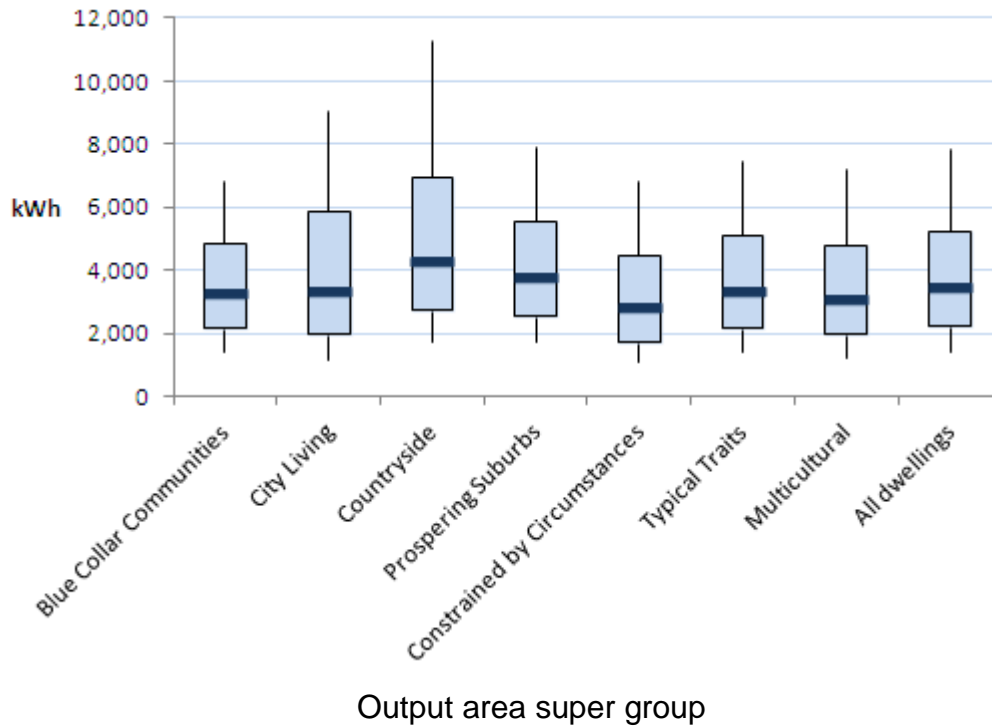
Figure 5.4 shows the distribution of consumption for Output Area Classification.

¹⁶ More detailed information for the 21 groups is available at the supporting data tables at http://www.decc.gov.uk/en/content/cms/statistics/energy_stats/en_effic_stats/need/need.aspx.

Figure 5.4: Distribution of energy consumption in 2010, by Output Area Classification
(a) Gas consumption



(b) Electricity consumption



The range of gas consumption is largest for city living communities. However, the consumption for which ten per cent of values are larger is similar for city living, countryside and prospering suburbs. For electricity, the range of consumption is largest for countryside communities.

6. Trends in consumption

This section provides more detail of the trends in annual gas and electricity consumption between 2005 and 2010 for various property and household types. Table 6.1 shows the trends in gas and electricity consumption for households in the NEED sample with valid consumption¹⁷.

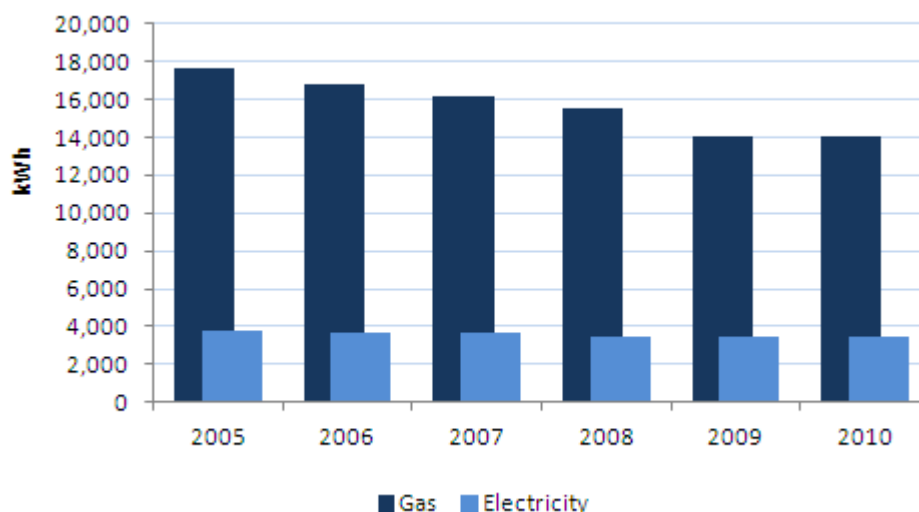
Table 6.1: Median gas and electricity consumption 2005 to 2010, kWh

	2005	2006	2007	2008	2009	2010
Gas	17,700	16,800	16,200	15,600	14,100	14,000
Electricity	3,800	3,700	3,600	3,500	3,400	3,500

The table shows that both gas and electricity consumption have been generally declining over the period. Gas consumption decreased steadily each year by about four per cent until 2009 when it decreased more sharply by nine per cent. This was followed by a slight decrease of one per cent in 2010. This resulted in the average annual decrease over the period of about four per cent.

There has been a steady year on year decrease of between two and four per cent in typical electricity consumption until 2008; since then it has remained fairly constant. These trends are also shown in Figure 6.1.

Figure 6.1: Median gas and electricity consumption 2005 to 2010, kWh



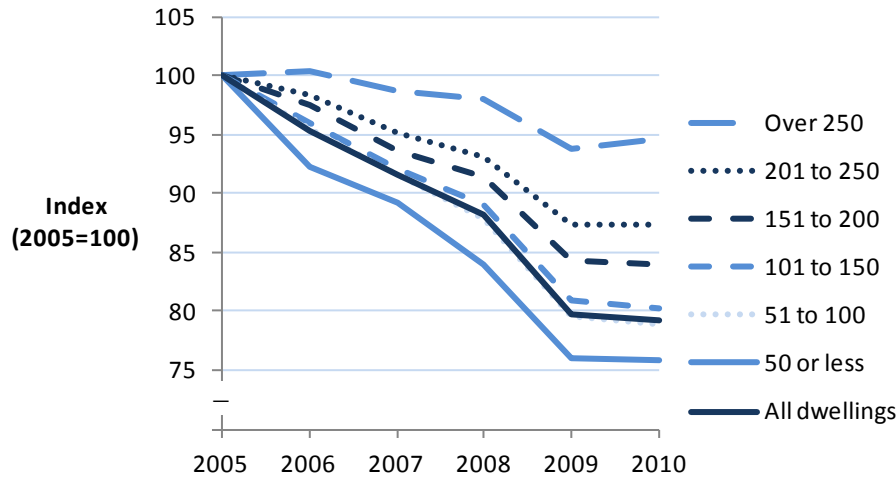
The reduction in median consumption for different types of properties and occupants follows a similar pattern as that for all dwellings. Though the general trend is the same, gas consumption shows more variation in the magnitude of the decrease than electricity. The rest of this section provides more information on the trends by property attributes, household characteristics and regional trends.

¹⁷ Note that in this table and the charts presented in this section, valid gas and electricity consumption is considered separately for each year and not simultaneously across the entire period.

6.1 Property attributes

Figure 6.2 which shows the trend in valid gas consumption for properties by floor area band. In the following charts, changes in consumption are shown relative to a baseline of 2005 (2005=100)¹⁸.

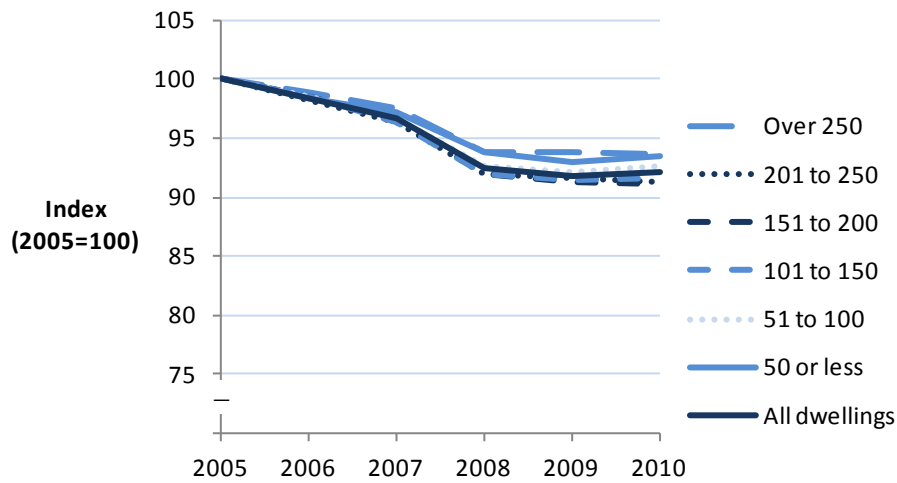
Figure 6.2: Gas consumption by floor area, m², 2005 to 2010



The figure shows that between 2005 and 2010 median gas consumption for properties in different floor area bands follows a similar trend to the national trend. It shows that median consumption has reduced between 2005 and 2010 for all bands. Generally, the smaller properties showed a greater percentage decrease in consumption over the period than larger properties. For example the reduction in median consumption for properties with a floor area of 201 to 250 square metres or more was 13 per cent and the reduction for properties with a floor area of less than 50 square metres was 24 per cent. The largest properties (greater than 250 square metres) had a decrease in median consumption of only five per cent but this group form only one per cent of the sample.

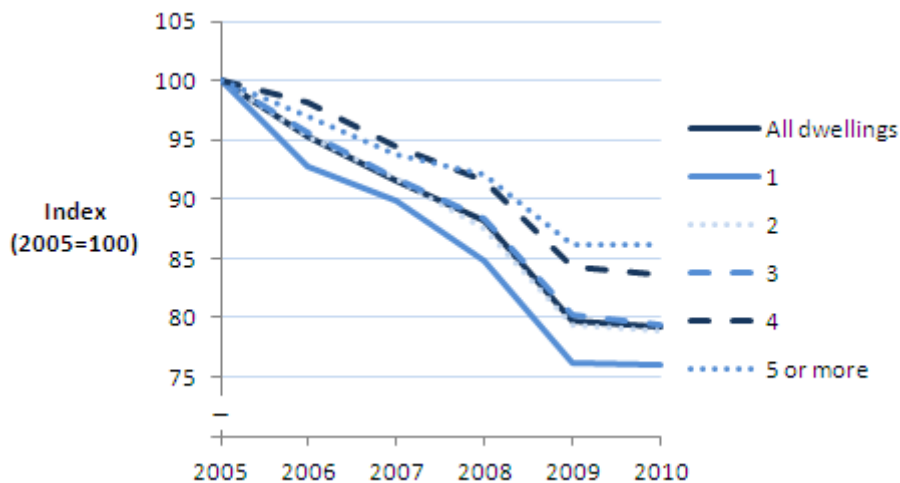
Figure 6.3 shows a similar figure for the trend in valid electricity consumption.

¹⁸ Note that the y axis for these charts does not start at zero in order to allow differences between groups to be seen more clearly.

Figure 6.3: Electricity consumption by floor area, m², 2005 to 2010

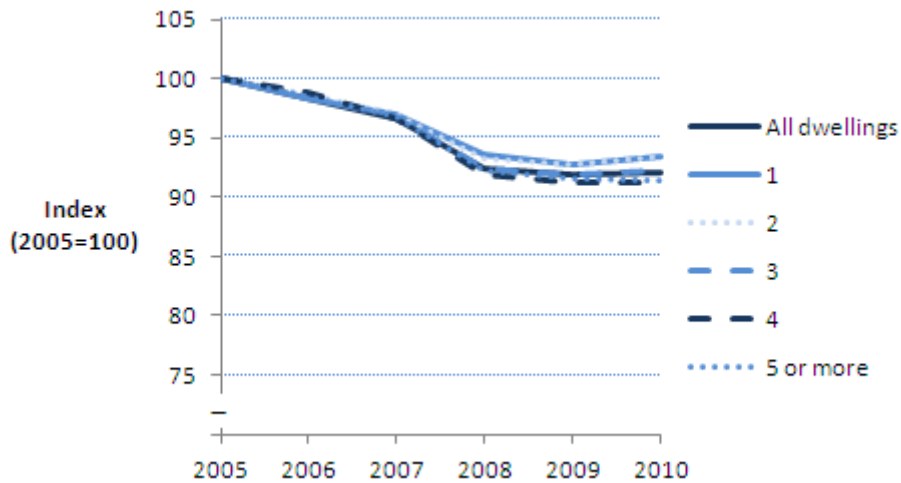
This demonstrates that there is a lot less variation in the trend for different floor area bands for electricity consumption. The figure also shows there is a smaller decrease in electricity consumption over the period compared to that of gas. For all bands, median consumption in 2010 was between six and nine per cent less than 2005. Unlike gas consumption, there is no obvious link between reduction in median electricity consumption and floor area band.

Figure 6.4 shows the trend in gas consumption for properties with different number of bedrooms. Gas consumption was between 14 and 24 per cent less than it was in 2005.

Figure 6.4: Gas consumption by number of bedrooms, 2005 to 2010

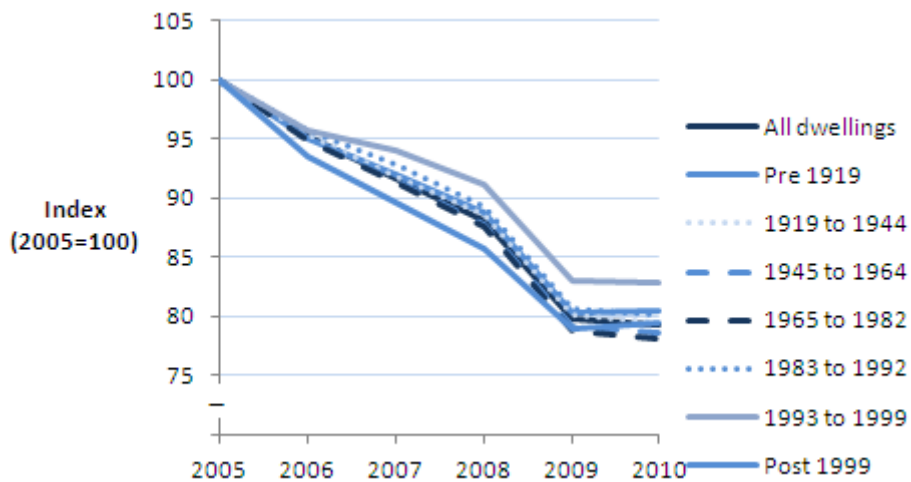
As was observed with floor area, the smallest properties (those with fewer bedrooms), reduced their consumption by more than the larger ones. However, note that properties with five bedrooms or more make up only three per cent of the sample.

Figure 6.5 shows a similar chart for electricity.

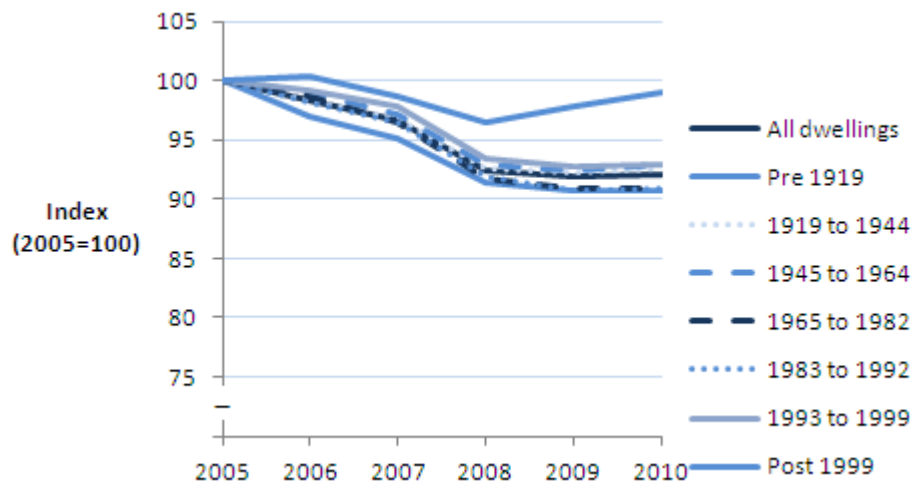
Figure 6.5: Electricity consumption by number of bedrooms, 2005 to 2010

The figure shows that the range in the percentage drop between 2005 and 2010 is smaller than it was for gas consumption. All properties, irrespective of the number of bedrooms, reduced their electricity consumption within one percentage point of the national trend of eight per cent over the period.

Figure 6.6 shows that the trend in gas consumption does not depend on the age of the property.

Figure 6.6: Gas consumption by property age, 2005 to 2010

In general, properties reduce their gas consumption by between 20 and 22 per cent which is similar to the percentage drop observed for all dwellings. However, properties built between 1993 and 1999 reduced their consumption by slightly less (17 per cent). Most properties reduced their electricity consumption by about seven to nine per cent (Figure 6.7).

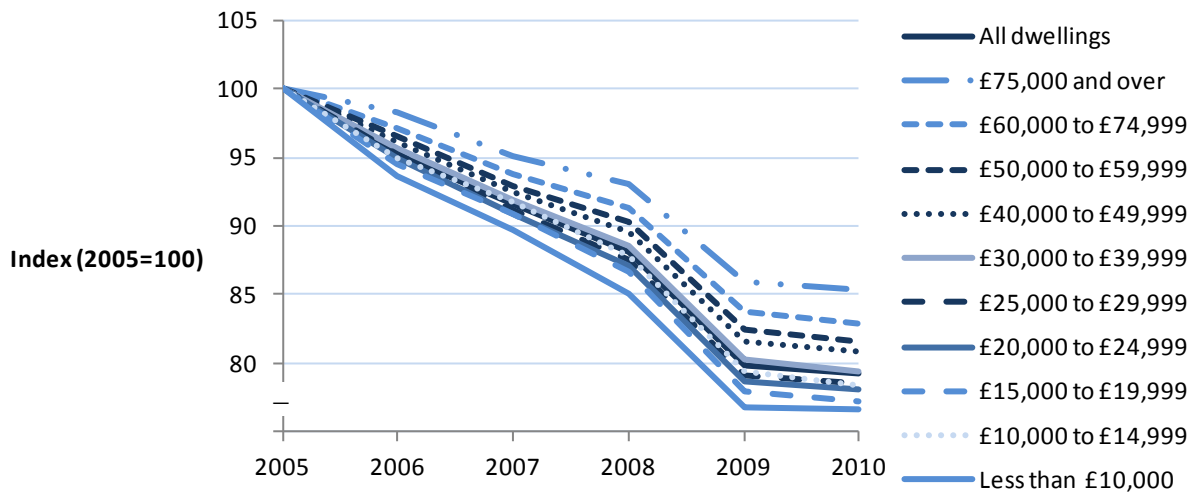
Figure 6.7: Electricity consumption by property age, 2005 to 2010

All except the newest properties, those built since 1999, showed a similar decrease in median gas consumption over the period.

The change in consumption for the newest group of properties is likely to be due to the fact that a significant proportion of these properties have been built during the period considered and for a number of reasons therefore have a large increase in consumption in one year in the period. While properties with no valid consumption in any given year are excluded, there are a number of cases where a property had a valid consumption in the year prior to its dwelling age (as assigned by VOA). This is likely to be because of gas or electricity being used during construction. However, this means that as soon as a property is occupied there is a large increase in consumption. It is also likely that a number of properties were occupied for a part year before the first full year of occupation.

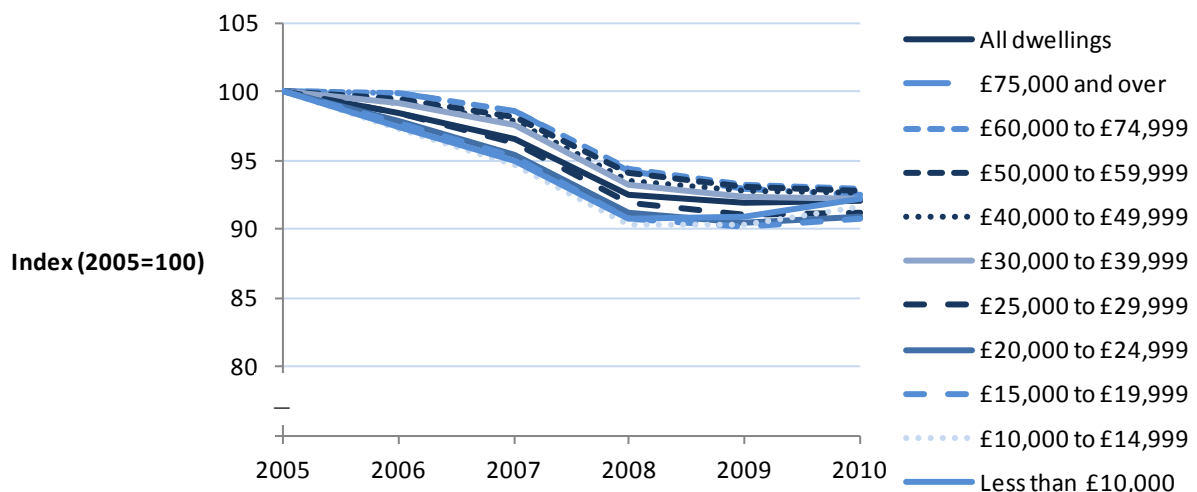
6.2 Trends in household characteristics

Figure 6.8 shows the trend in median gas consumption for households by income band.

Figure 6.8: Gas consumption by household income band, 2005 to 2010

The figure shows that median consumption for households in the higher income bands generally reduced by less than that for households in the lower income bands. Those in the highest band reduced median consumption by 15 per cent compared with 23 per cent for the lowest income band¹⁹.

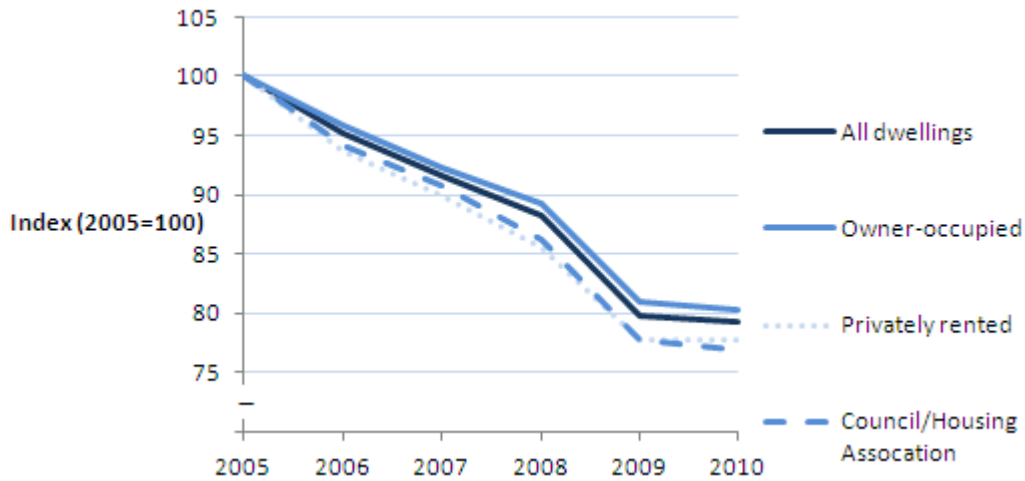
As with other variables considered, less variation was seen in the trend for median electricity consumption by income band. Across all income bands, median electricity consumption in 2010 was between seven and nine per cent below 2005. Figure 6.9 shows similar information for electricity consumption.

Figure 6.9: Electricity consumption by household income, 2005 to 2010

¹⁹ Note that the quality of income data is least accurate for the lowest and highest income groups so this comparison should be treated with caution – however the general finding that median consumption for households in the higher income bands reduced by less than that for households in the lower income bands is more reliable.

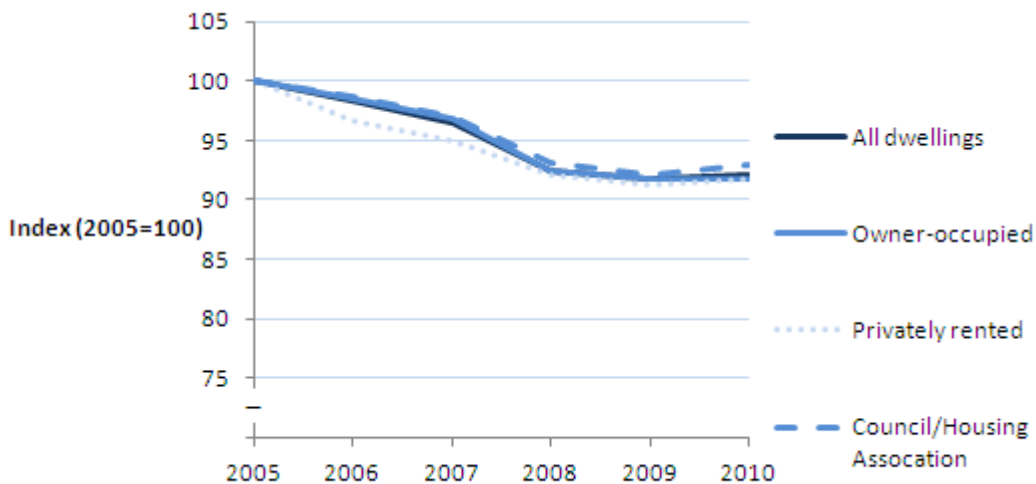
Figure 6.10 shows that there was little difference in the trend in median gas consumption for different tenures.

Figure 6.10: Gas consumption by tenure, 2005 to 2010



The figure shows that owner occupiers reduced their median consumption by less than households that were privately renting or in council/housing association properties, but only by two to three percentage points. There was very little observable variation in median electricity consumption by Tenure (Figure 6.11).

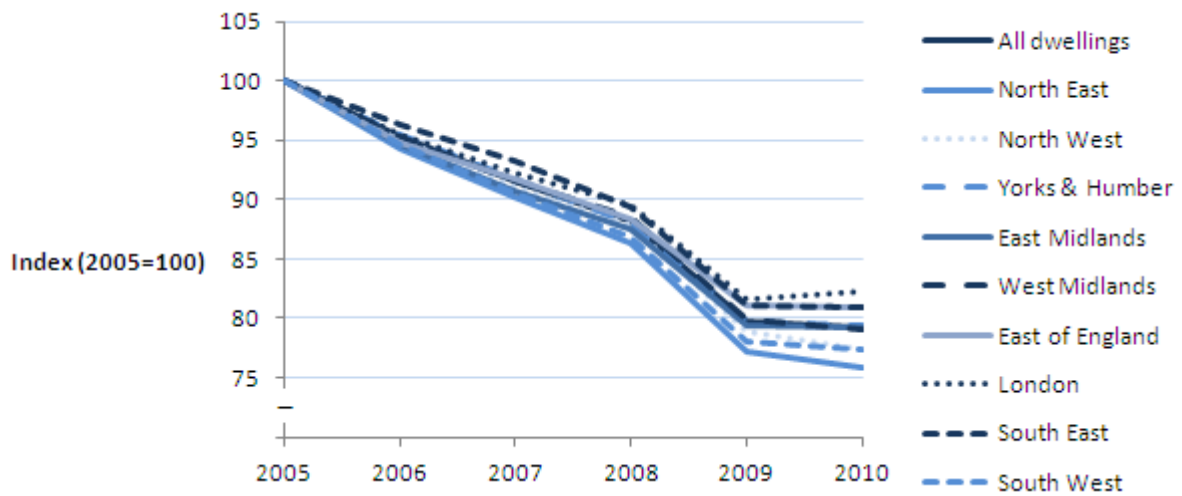
Figure 6.11: Electricity consumption by tenure, 2005 to 2010



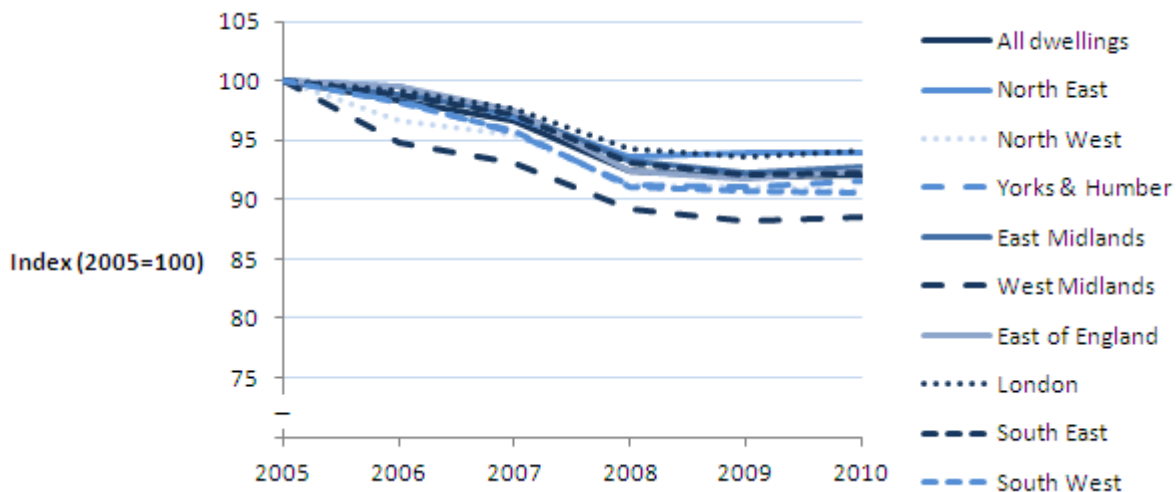
All groups reduced their consumption by about eight per cent.

6.3 Regional trends

The regional trend for gas consumption shows more variability year on year than some other characteristics. However, the overall reduction between 2005 and 2010 was similar for all regions, ranging from 18 per cent in London to 24 per cent in the North East (Figure 6.12).

Figure 6.12: Gas consumption by region, 2005 to 2010

The trend in electricity consumption is shown in Figure 6.13.

Figure 6.13: Electricity consumption by region, 2005 to 2010

The figure shows that London and the North East reduced their consumption by the least over the period (six per cent). The West Midlands reduced its consumption by the most, 11 per cent. All other regions reduce their consumption by a similar amount to the median over the period (seven to nine per cent).

7. Conclusion

This section has shown that there is considerable variation in typical consumption for different types of household and property, and even more importantly, that there is a range of consumption within each category. This illustrates that no one factor can be the primary influence on gas and electricity consumption. However, property size appears to be the strongest driver of gas consumption. A finding consistent with results from other work undertaken by or on behalf of DECC to model gas consumption²⁰.

Electricity consumption shows more variability than gas consumption. The larger variability in electricity is in part because of the variation in household choosing to use electricity to heat their homes. Unlike gas where almost all homes with a gas connection will use gas as the main heating fuel.

The trend in median consumption over time for all property attributes and household characteristics is generally similar to the median over time for all properties. However, gas shows more variation in the scale of the decrease than electricity, with smaller household and households on lower incomes tending to have a smaller percentage decrease in consumption between 2005 and 2010.

²⁰ Including work undertaken by NERA and Katalysis set out in Annexes E and F respectively and DECC's local area gas model (See the special feature 'Identifying local areas with higher than expected domestic gas use' in Energy Trends, March 2012 available at: <http://www.decc.gov.uk/assets/decc/11/stats/publications/energy-trends/4779-energy-trends-mar12.pdf>).