Annex 3B
Regional and local use of energy in the domestic sector

Introduction

3B.1 This article shows some of the trends in domestic gas and electricity consumption revealed by the regional and local data of consumption that DTI has recently published for the first time. The key driver for collecting this information and making it available has been the Government's Energy White Paper "Our Energy Future: Creating a low Carbon Economy", which was issued in February 2003.

3B.2 The White Paper emphasised the importance of decision-making at local and regional level for energy policy, such as fuel poverty, energy efficiency and carbon emissions. In the future, there will be much greater emphasis placed on more localised solutions to energy security and climate change, with bodies such as local authorities, Regional Development Agencies (RDAs), regional chambers and government offices increasingly playing an important role in delivering national policy objectives. Local authorities already have responsibility for the implementation of energy efficiency programmes in their areas. One of the main obstacles to this is the lack of available regional and local energy consumption data, which is needed by the local and regional bodies to monitor and target areas for further interventions.

Gas consumption

3B.3 Average consumption per household across Great Britain was 20,111kWh in 2003 and there was remarkably little difference between the regions despite their differing climates, different dwelling stocks, varying insulation rates and different levels of general prosperity. Only the South West stood significantly out from the national average with a consumption rate 11 per cent lower than the national average. The next lowest was Greater London which was 2 per cent below whilst the highest was the North East at 4 per cent above the national average.

Table 3B.1 Regional gas consumption by household and some influencing factors

Region	Average gas consumption per household (kWh)	Average dwellings size (number of rooms)	Average SAP rating of dwellings	Percentage of working age people on benefits
North West	20,435	5.36	51.4	13.73
North East	20,876	5.19	53.2	14.87
Yorkshire & Humber	20,062	5.28	49.9	11.49
West Midlands	20,163	5.42	48.8	11.56
East Midlands	20,292	5.49	48.8	9.76
Eastern	20,456	5.51	50.8	7.86
South East	20,542	5.57	50.5	7.04
Greater London	19,617	4.68	52.8	12.30
South West	17,888	5.52	48.7	8.08
England	20,048	5.33	50.6	10.48
Wales	20,442	5.59	..	14.40
Scotland	20,590	4.75	..	13.59
Great Britain	20,111	5.29		10.95

Source: DTI, ONS, DWP

3B.4 As already noted, the lowest rate of gas consumption per household was in the South West where its residents enjoy the mildest winters across the country. Greater London, which was next lowest, has the smallest dwellings in the country and the highest proportion of flats leading to lower heating requirements. The regions that surround London – South East and Eastern - had higher rates of consumption – indeed the third and fourth highest rates in the country – perhaps reflecting larger dwellings, higher incomes and fewer people on benefits tending to increase demand despite the relative mildness compared with more northerly regions.

3B.5 The highest average rates of gas consumption were in Scotland and the North East, the two coldest regions of the UK. Scotland is the coldest region but its consumption was slightly less than the North East, which may reflect smaller average dwelling sizes and a much higher proportion of people living in flats.

3B.6 Whilst there was not a lot of variation in average consumption rates across the regions, there were significant variations between local authority areas both across the country as a whole and within regions. The ten highest and ten lowest consuming local authority areas are shown in Table 3B.2. The highest rate of consumption was in Chiltern (26,393 kWh) and the lowest in Tower Hamlets

(14,814 kWh). However, consumption was close to the national average - between 18,000 and 22,000 kWh - in more than 70 per cent of authorities.

Table 3B.2 Gas consumption per household for selected authorities

kWh

Top ten authorities	Average consumption per household	Bottom ten authorities	Average consumption per household
Chiltern	26,393	Tower Hamlets	14,814
East Renfrewshire	25,592	Westminster	15,218
East Dunbartonshire	25,075	Plymouth	15,230
Epsom & Ewell	24,845	Kerrier	15,433
South Bucks	24,775	Penwith	15,611
Three Rivers	24,716	Exeter	15,834
Waverley	24,606	Portsmouth	16,241
Elmbridge	24,489	Caradon	16,431
Surrey Heath	24,375	Mid Devon	16,463
Barnet	24,313	Gosport	16,563

Source: DTI

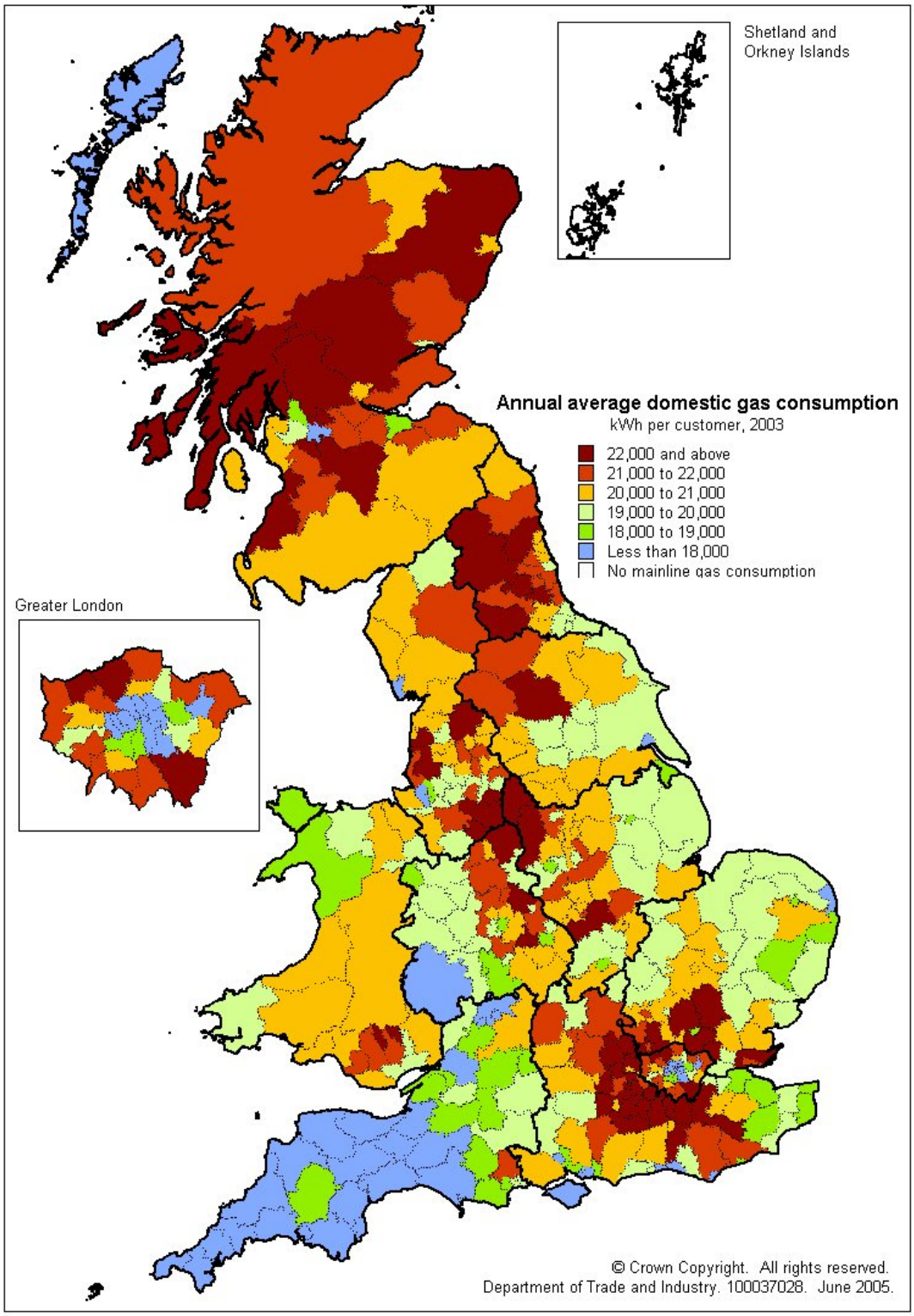
3B.7 The biggest groupings of authorities with high average consumption were in Scotland, the North East, around the Peak District and in areas just outside Greater London. Consumption rates were lowest in the South West, which is the mildest part of the country in the winter months, and in large towns and cities where there are more flats and, typically, dwellings are smaller. Map 3B.1 shows annual average domestic gas consumption by local authority.

3B.8 Nationally, an estimated 62 per cent of final consumption is for space heating and a further 23 per cent for hot water. It is not surprising, therefore, that, generally, the authorities with the highest consumption rates tend to be:

- either colder because they are more northerly;
- or colder because they are situated on higher ground;
- or their residents have bigger dwellings to heat;
- or more residents are on benefits, making energy costs an issue
- or some combination of these factors.

3B.9 Levels of insulation also impact significantly on fuel consumption but this information is not available at local authority level.

Map 3B.1 Average annual domestic gas consumption by area



Source: DTI

Electricity consumption

3B.10 There were wider variations in electricity consumption per household across the country than gas. This was mainly due to high rates of consumption in the areas to which the gas network does not extend. The average consumption across Great Britain was 4,600 kWh per household, with the highest rates the Eastern region and the South West where consumption was 10 per cent above the national average and the lowest rate in the North East region where consumption was 15 per cent below the average.

Table 3B.3 Regional electricity consumption by household and some influencing factors

Region	Average electricity consumption per household (kWh)	Prevalence of gas network (per cent)	Average gross weekly earnings (£)	Percentage of working age people on benefits
North West	4,246	88.4	402.86	13.73
North East	3,918	85.6	440.11	14.87
Yorkshire & Humber	4,239	85.9	427.46	11.49
West Midlands	4,684	84.4	438.49	11.56
East Midlands	4,596	83.0	439.49	9.76
Eastern	5,043	74.4	508.83	7.86
South East	4,953	81.4	537.41	7.04
Greater London	4,301	89.2	604.53	12.30
South West	5,038	68.6	448.39	8.08
England	4,593	82.5	483.39	10.48
Wales	4,289	81.8	416.04	14.40
Scotland	4,830	63.0	436.88	13.59
Great Britain	4,600	80.1	475.78	10.95

Source: DTI, ONS, DWP

3B.11 The three regions with the highest rates of electricity consumption are those were the least access to the gas network – Scotland, Eastern and the South West.

3B.12 The impact of the prevalence of the gas network is clear when looking at the average rates of consumption in different local authority areas. The highest rate of consumption was in the Orkney Islands with an average rate of 7,019 kWh per household. Indeed, all the ten highest consuming areas (see table 3B.4) were ones where no more than one-half of households or fewer had access to the gas network.

Table 3B.4 Electricity consumption per household in selected authorities

kWh

Top ten authorities	Average consumption per household	Bottom ten authorities	Average consumption per household
Isles of Scilly	7,644	Blaenau Gwent	3,369
Orkney Islands	7,019	Merthyr Tydfill	3,491
Shetland Islands	6,770	South Tyneside	3,528
Kennet	6,495	Rhonda, Cynon, Taff	3,553
North Cornwall	6,249	Wansbeck	3,609
Restormel	6,207	Caerphilly	3,615
Ceredigion	6,176	Easington	3,618
Mid Suffolk	6,167	Neath Port Talbot	3,630
Highland	6,150	Barnsley	3,650
Cotswold	6,131	Sedgefield	3,654

Source: DTI

3B.13 The same pattern can also be seen from map 3B.2 which shows that the highest rates of electricity consumption were in parts of the South West, East Anglia, the Midlands and Scotland.

3B.14 The high rate of electricity consumption in local authority areas where the gas network is less extensive confirms that many in these areas use electricity for heating purposes though this will not be the only fuel used. Map 3B.2 shows average annual electricity consumption by local authority.

3B.15 In areas where there is high access to the gas network the pattern that emerges (see table 3B.5) is a tendency for consumption to be higher in more prosperous areas and lower in less prosperous ones. The ten authorities with the lowest consumption all have high numbers of benefit claimants and, in every case except Islington, low average earnings too.

Table 3B.5 Electricity consumption per household by income and extent of gas network

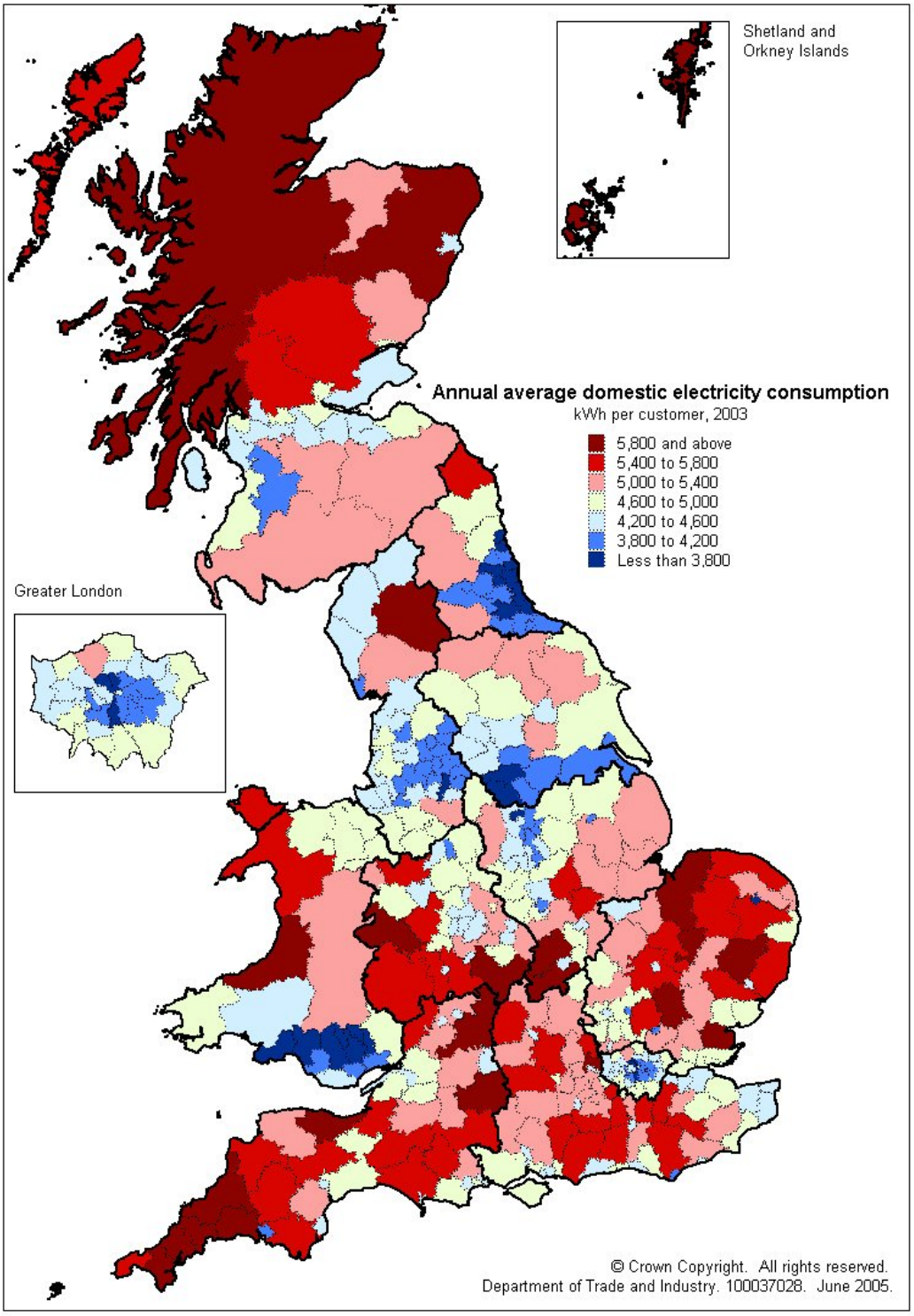
Average earnings of employees in employment or self employed	Prevalence of gas network[1]		
	Low	Medium	High
Less than £400	5,423.3	4,359.6	3,958.3
£400 - £450	5,417.3	4,607.7	4,217.4
£450 - £500	…[2]	4,762.6	4,482.0
£500 - £600	…	5,059.1	4,676.1
Above £600	…	…	4,807.9
All incomes	5,398.4	4,704.2	4,382,7

Source: DTI, ONS

[1] Low prevalence of gas network means less than 60 per cent of household connected; medium between 60 per cent and 80 per cent; high above 80 per cent

[2] … Is for less than 15 authorities.

Map 3B.2 Average annual electricity consumption by area



Source: DTI

Sources of information

3B.16 Information on gas consumption has been provided at postcode sector level (ie the full post code less the last two letters) by National Grid Transco. Information on electricity consumption through each meter was provided by electricity supply companies whilst electricity distribution companies gave their permissions for the release of postcode information for the location of the meters. DTI used this information to compile estimates of gas and electricity consumption in 2003 for each local authority area in Great Britain. The methodology was set out in Energy Trends articles - in the December 2004 issue in the case of the gas estimates and the March 2005 issue in the case of the electricity estimates. These may be found at:
http://www.dti.gov.uk/energy/inform/energy_trends/dec_04.pdf
http://www.dti.gov.uk/energy/inform/energy_trends/mar_05.pdf
In the description in this annex, it has been assumed that one meter represents one household. The averages exclude consumption by households not served by the national gas and electricity networks.

3B.17 DTI has made available separate figures for the domestic and business sectors. The analysis in this article focuses on trends in the domestic sector – the figure supplied by Transco distinguish domestic from other consumers on the basis that their consumption is below 73,200 kWh and everything above this is allocated to the business sector. In the case of electricity, domestic consumers are distinguished on the basis of the profile to which the meter is allocated for electricity industry settlement purposes.

3B.18 A later note will look at regional and local trends in electricity consumption in the business sector.

3B.19 As well as information on gas and electricity consumption, DTI has published estimates of energy consumption used in road transport - these estimates appeared in the June 2005 issue of Energy Trends. Gas, electricity and road transport fuels account for more than four-fifths of final energy consumption. It is also planned to make available later this year estimates of consumption of the residual fuels by local authority area in order to enable the calculation of total energy consumption for each local authority area.

Regional Profiles

North East

3B.20 This is the coldest region in England and had the highest average gas consumption per household (20,876 kWh) in Great Britain, despite the lowest average earnings and the smallest average size dwellings in the country. Electricity consumption (3,918 kWh) was well below the national average.

3B.21 Average gas consumption was highest in Castle Morpeth and Tynedale (over 24,000 kWh) with both having higher average earnings and larger than average dwellings compared with the rest of the region. The lowest rates of consumption (below 20,000 kWh) were in Hartlepool followed by Middlesbrough, Newcastle-upon-Tyne, South Tyneside and Stockton-on-Tees.

3B.22 Electricity consumption per household was highest in Berwick-on-Tweed (5,553 kWh) where access to the gas network is limited. Teesdale and Tynesdale electricity consumers also average more than 5,000 kWh per household, reflecting relatively low gas access. Consumption, however, averages less than 4,000 kWh in most authorities in the North East with South Tyneside recording the lowest average rate in England at 3,528 kWh. Wansbeck and Easington came next, both as slightly over 3,600 kWh.

Scotland

3B.23 Average gas consumption at 20,540 kWh per household was only 2 per cent above the national average despite this being the coldest part of Great Britain. This may reflect the fact that average dwelling sizes are smaller and many more people live in flats where heating demand is less intense. Electricity consumption was 5 per cent above the national average reflecting lower rates of access to the gas network.

3B.24 The highest rates of gas consumption were in East Renfrewshire and East Dunbartonshire where the average exceeded 25,000 kWh. Next came Stirling. These three areas have the highest average earnings in Scotland and some of the largest dwellings. The lowest rates of consumption were in Eilean Siar (17,280

kWh). Glasgow, has small dwelling sizes and a very high proportion of dwellings are flats.

3B.25 Electricity consumption was highest in the Orkney Islands (an average of 7,018 kWh per household) and Shetland Islands (6,770) where there is no gas network. Limited access to the network may also explain the high rates of consumption in Highland and Argyll and Bute (over 6,000 kWh) as well as some other mainly rural areas. The lowest consumption rates were in East Ayrshire and West Dunbartonshire, both at around 4,200 kWh per household.

The East of England

3B.26 This region was slightly warmer than the British average during the winter months whilst average gas consumption of 20,456 kWh was 1.7 per cent above the national average. The average number of rooms per dwelling is above average and average earnings are also above average. Electricity consumption per household was 9.6 per cent above the national average because of low rates of access to the gas network in parts of the region.

3B.27 Gas consumption per household was highest in the southern part of the region bordering on London, with the highest rates in Brentwood and three Hertfordshire authorities – Hertsmere, St Albans and Three Rivers - each with an average in excess of 23,000 kWh per household. Consumption was lowest in Great Yarmouth and Norwich (both around 18,000 kWh per household).

3B.28 Electricity consumption was highest in East Cambridgeshire, Forest Heath and Mid Suffolk (all over 6,000 kWh per household) which are all areas with low rates of connection to the gas network. Other areas with high consumption are rural areas where the rate of connection to the gas network is often below average. Consumption was lower on the southern and eastern edges of the region. Only Norwich had average consumption below 4,000 kWh whilst in Harlow and Stevenage consumption was below 4,200 kWh.

South East

3B.29 Average gas consumption per household was 2.1 per cent above the national average despite being one of the mildest areas of the country. High average earnings and the largest dwellings in the country may explain this trend.

3B.30 The highest rates of gas consumption were mainly those close the Greater London conurbation. The highest rate in Great Britain was in Chiltern (26,310 kWh per household) with Elmbridge, Epsom and Ewell, South Bucks and Waverley all in excess of 24,500 kWh. Average earnings are well above the regional average in all these areas and, in most cases, average dwelling sizes are well above average too. The lowest rates of consumption were in Portsmouth followed by the neighbouring authorities of Gosport, Southampton and the Isle of Wight - all in the mildest part of the region and with low average earnings compared with the rest of the region. Consumption was also low in the seaside authorities of Adur, Brighton and Hove and Eastbourne which are characterised by low average dwelling sizes.

3B.31 Electricity consumption was highest (over 5,600 kWh per household) in a diverse set of authorities - Chichester, Mole Valley, Sevenoaks, South Bucks, South Oxfordshire, Tandridge and West Berkshire - all areas with average earnings well above the regional average except Chichester where the relative lack of access to their gas network may be an explanation. The lowest consumption was in Eastbourne followed by Dover, Brighton and Hove, Portsmouth and Thanet.

North West

3B.32 Significantly colder than the English average, average gas consumption was 1.6 per cent higher than the national average. Dwelling sizes are close to the national average and average income significantly lower.

3B.33 Macclesfield had the highest average gas consumption per household - its average of 24,270 kWh was the highest outside the South East. The highest average earnings and the largest dwellings in the North West may explain the high figure together with its situation on high ground. Consumption was also high in the neighbouring authorities of Congleton and Stockport. The lowest rates of consumption were in Barrow-in-Furness and Liverpool both close to the sea, with small average dwelling sizes and relatively low average earnings.

3B.34 Electricity consumption was highest in Eden, with the least access to the gas network in the North West. The lowest consumption rates were in Manchester followed by Burnley and Tameside.

Yorkshire and Humberside

3B.35 Average gas consumption at 20,060 kWh per household was close to the national average. Dwelling sizes in this region are also close to the national average but average earnings are about 10 per cent lower than average. The climate is significantly colder than further south.

3B.36 Gas consumption was highest in three rural local authorities - Richmondshire, Craven and Harrogate. These authorities include large parts of the Pennines and have larger dwellings than the regional average. Consumption was also above the regional average in the West Yorkshire and South Yorkshire authorities reflecting the fact that large parts of these metropolitan areas are on higher ground compared with areas further east. The lowest consumption was in Kingston-upon-Hull.

3B.37 Five local authorities had average electricity consumption below 4,000 kWh per household - Barnsley lowest, then Sheffield followed by Rotherham, Doncaster and Kingston-upon-Hull. The highest consumption was in Ryedale followed by Richmondshire and Hambleton where access to the gas network is less extensive.

Greater London

3B.38 One of the mildest regions, Greater London has the second lowest rate of gas consumption per household in Great Britain though it was only 2.5 per cent below the national average. Its households' heating requirements are reduced because it has the smallest number of rooms per household and the highest proportion of flats. However, average earnings are the highest in the country. Electricity consumption, however, was 6.5 per cent below the national average.

3B.39 Average gas consumption was higher in the outer boroughs than the inner ones. All the latter had consumption rates below 20,000 kWh per household whilst only three outer boroughs fell below this level - Havering, Hounslow and Waltham Forest. This may reflect differences in dwelling sizes between the inner and outer boroughs and the greater predominance of flats in the inner boroughs. Tower Hamlets had the lowest rate of consumption in Great Britain (14,810 kWh) and Westminster was next (15,220 kWh). The highest rates of gas consumption were in Barnet and Harrow, both over 23,000 kWh.

3B.40 Electricity consumption follows a similar pattern, being higher in the outer boroughs than the inner ones. The average consumption was below 4,000 kWh per household in all inner boroughs other than Kensington and Chelsea and Westminster. All outer boroughs were above this threshold with the highest rate of consumption in Barnet (5,030 kWh).

West Midlands

3B.41 Both gas and electricity consumption per household were close to the national average in this region. Gas consumption was 0.3 per cent higher and electricity consumption 2 per cent higher than the national average. Average temperatures were slightly above the national average.

3B.42 Gas consumption exceeded 22,000 kWh in three areas - Lichfield, Solihull and Staffordshire Moorlands - in the latter case perhaps reflecting the higher ground close to the Peak District. Generally consumption was higher in the north and east of the region and lower in the west and especially the south west where the lowest consumption rate (17,860 kWh) was found in Herefordshire. Next lowest were Worcester and Wychavon.

3B.43 Electricity consumption was highest in Stratford-on-Avon (5,910 kWh per household) where gas network penetration is relatively low and average earnings are highest followed by South Shropshire (5,800 kWh) where the gas network is least prevalent in the region. The lowest consumption rates were in Stoke-on-Trent (3,900 kWh) with consumption also low (below 4,250 kWh) in Newcastle-under-Lyme and Sandwell.

South West

3B.44 This region had the mildest weather during the winter months and had the lowest level of average gas consumption per household across the UK. At an average 17,888 kWh per household, average consumption was 11 per cent below the national average, notwithstanding larger than average dwellings and the lowest average SAP ratings of its dwellings across the country. Electricity consumption was 9.5 per cent above the national average reflecting a low rate of access to the gas network.

3B.45 Within the region average gas consumption was lowest in the western counties. The lowest average consumption rates were in Plymouth, Exeter and the two most western Cornish authorities, Penrith and Kerrier, with average consumption rates below 16,000 kWh per household. The highest consumption rates were in East Dorset (21,653 kWh) and Costwold, both at the eastern end of the region.

3B.46 Average electricity consumption was 5,038 kWh per household making it 9 per cent above the national average, reflecting greater use of this energy source for heating because of low rates of connection to the gas network. Average electricity consumption per household was highest in rural areas, reaching over 6,000 kWh per household in Cotsworld and Kennet in the east of the region and three Cornish authorities - Kerrier, North Cornwall and Restormel in the west. These local authorities all have connection rates to the gas network that are well below the regional average. The lowest consumption rates were in Plymouth (4,196 kWh) and Bristol.

Wales

3B.47 Gas consumption averaged 20,442 kWh which is 2 per cent above the national average. Although a less prosperous region with a high rate of people on benefits, the heating requirement may be higher because of bigger average dwelling sizes and large numbers of residents living on higher ground. Electricity consumption, however was 7 per cent below the national average.

3B.48 The highest rates of gas consumption were in Blaenau Gwent and Merthyr Tydfil where average gas consumption per household was over 22,000 kWh. This may reflect that the main centres of population in these areas are in the mountains. Neighbouring authorities also had high consumption rates. The lowest consumption (below 19,000 kWh) was in Anglesey and Gwynedd.

3B.49 Electricity consumption showed the opposite trend. Consumption was lowest in the southern valleys with average consumption below 3,800 kWh in Caerphilly, Neath Port Talbot, Swansea and Torfaen and below 3,600 kWh in Blaenau Gwent and Merthyr Tydfil. The highest consumption was in Ceredigion (6,176 kWh per household) where the fewest have connections to the gas network. Similarly Gwynedd, Isle of Anglesey and Powys had high electricity consumption reflecting a below average connection to the gas network.

East Midlands

3B.50 Gas consumption was 1 per cent higher the national average, with average consumption across the region being 20,292 kWh per household. This region is colder than the more southern areas but milder than further north. Average dwellings sizes are above the national average and average SAP ratings below the national average both pointing towards a higher heating requirement. On the other hand, average earnings are significantly below the national average. Electricity consumption per household, averaging 4,596 kWh, was very close the national average.

3B.51 Gas consumption per household was highest in Derbyshire Dales (averaging 23,445 kWh) followed by High Peak, then Harborough. The first two of these areas are on higher ground whilst Harborough has the largest dwellings in the region. The lowest rates of consumption per household were in Lincoln (18,440 kWh) and Derby (18,505 kWh).

3B.52 The highest rats of electricity consumption were in South Northamptonshire (5,857 kWh) where the gas network is less extensive. Consumption was also well above the regional average in neighboring Daventry, Rutland and Melton. The lowest consumption rates were in Chesterfield (3,765 kWh) followed by Leicester and Mansfield.