Energy Use in Homes 2007

A series of reports on domestic energy use in England

Energy Efficiency

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This is one of a series of three reports on the energy characteristics of the stock as observed by the 2007 English House Condition Survey.

The reports in this series are:

1. Space and Water Heating
2. Thermal Insulation
3. Energy Efficiency

The English House Condition Survey is funded and provided courtesy of Communities and Local Government. More information about this survey can be found at www.communities.gov.uk/ehcs

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Energy Use in Homes 2007: Energy Efficiency

Executive Summary

The Standard Assessment Procedure (SAP) is the Government's recommended system for home energy rating. The SAP energy efficiency rating is based on the energy costs for space and water heating within each dwelling, representing a measure of the dwelling's energy efficiency. This report is based on the 2005 SAP methodology which employs a scale of 1 to 100 for the rating, with a higher rating indicating a better level of energy efficiency.

In 2007, the average SAP rating of the English housing stock is 49.8, representing an increase of 1.1 SAP points since 2005 and a near 14 point increase since 1991. Only 9% of dwellings now have a SAP rating less than 30 whilst more than a quarter (26%) achieve a SAP rating greater than 60.

Physical characteristics of a dwelling can strongly influence SAP rating. Dwelling age is a particularly important factor. The mean SAP of a dwelling generally improves as the dwelling age decreases, with a lower proportion of older stock having SAP ratings greater than 60 and more having ratings less than 30 when compared to newer stock. The type of dwelling also highly influences SAP rating. Purpose built flats perform particularly well with 56 % achieving a SAP rating greater than 60 – twice the proportion of mid-terraced houses, with the second highest percentage. Smaller dwellings with less external walls perform better in terms of energy efficiency, although converted flats have the worst mean SAP rating of the entire stock (44).

Other factors related to the specifications of the dwelling can determine SAP ratings, with the type of heating system and thermal insulation measures integral to the SAP calculation. The more effective these measures are, the more likely a higher SAP rating can be obtained. Therefore, unsurprisingly, dwellings with cavity wall insulation, the thickest loft insulation and entire dwelling double glazing have higher SAP ratings than those with lower levels or none of these insulation measures. Those dwellings with central heating tend to score higher SAP ratings than those without (i.e. those using portable and room heaters).

The social sector has the highest energy efficiency rating with a mean SAP of 58 in 2007 compared to the private sector with a mean SAP rating of 48. This is related to the type of heating prevalent and lack of thermal insulation measures in the private housing stock when compared to social dwellings. Private rented stock, although still below the overall mean, has seen the largest increase in its SAP rating since 1991, moving its current mean level with that of the owner occupied sector, which has seen the slowest rise in SAP.

The average SAP rating also reduces as the household income increases. The lowest income quintile has the highest proportion of SAP ratings greater than 60 with 32%. This figure decreases for each successive income quintile until, at the highest income quintile; the value has reduced to 22%. This shows that targeting of energy efficiency measures in dwellings containing low income households has pushed the mean SAP rating of this group from being one of the lowest in the 1990's to the highest in 2007.

Energy Efficiency Update Report 2007

Summary

- The mean SAP rating has increased steadily since 1991, with a further rise since the 2006 update report. Further evidence of energy efficiency improvements over time is visible when studying the performance of houses in different construction date bands.

- In 2007, almost three times as many dwellings have achieved a SAP of 60 or more (26%) than those with a SAP rating less than 30 (9%). This latter category still represents 1.9 million English dwellings, although this is significantly less than the 5.6 million dwellings with SAP less than 30 in 1991.

- Purpose built flats are the best dwelling type by a significant margin in terms of energy efficiency, which links to the fact that the social sector outperforms the private sector by some distance, as well as progressively higher SAP ratings for households in smaller floor area quintiles.

Introduction

The Standard Assessment Procedure (SAP) is the Government's recommended system for home energy rating. The SAP energy efficiency rating is based on the energy costs for space and water heating within each dwelling, representing a measure of the dwelling's energy efficiency. Until 2004 the Energy Efficiency Update Reports had been based on the 2001 SAP Methodology. This report continues analysis using the 2005 SAP methodology which employs a scale of 1 to 100 for the rating, with a higher rating indicating a better level of energy efficiency. The data and graphs for all years presented in this report have been derived using the 2005 SAP Methodology.

The calculation of the rating uses the estimated annual cost of energy required to achieve a standard temperature regime within the home, and to provide the household with appropriate supplies of hot water. The requirement for energy depends upon the size of the dwelling, so to achieve a measure of energy efficiency the energy use per square meter of floor area is used rather than the total energy requirement.

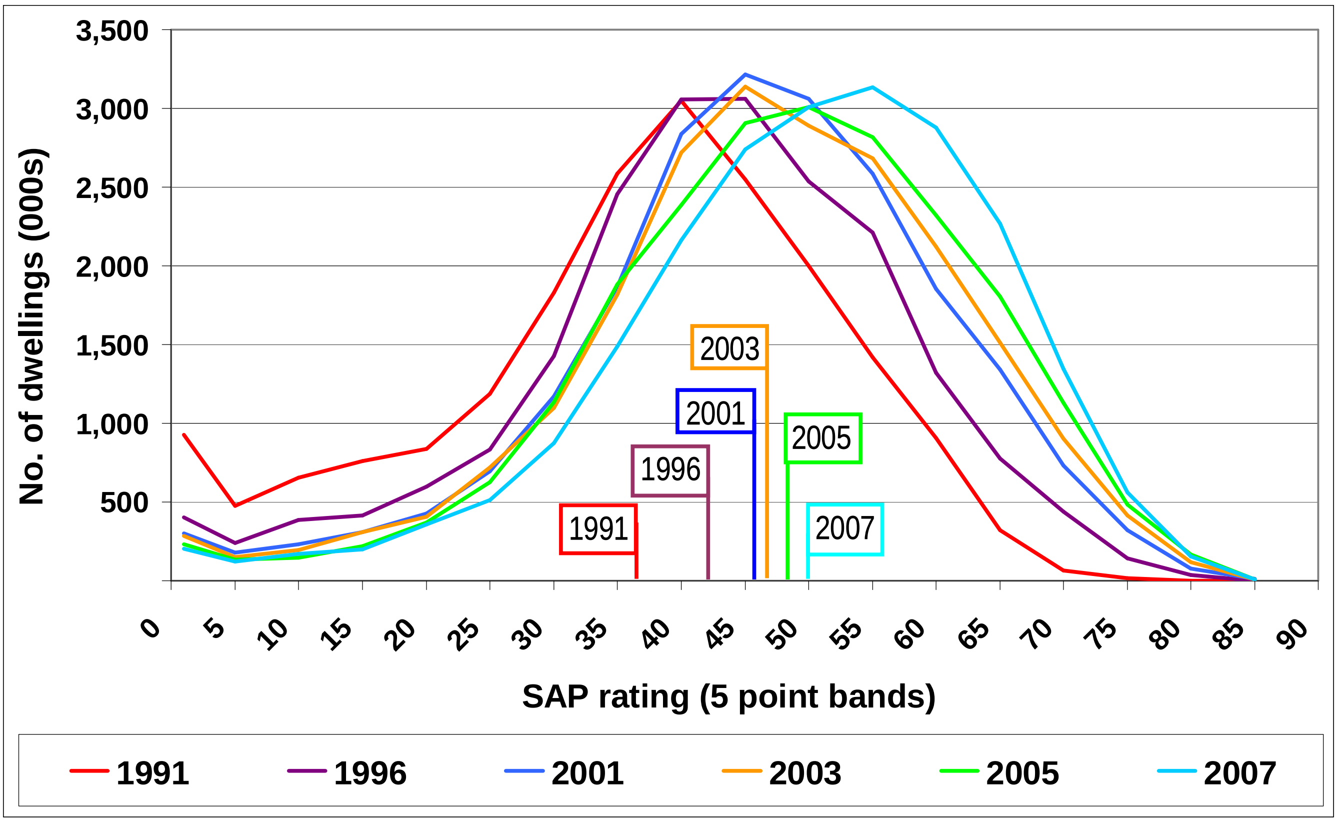

Figure 1: Distributions of 1991 to 2006 SAP ratings, vertical flags show the mean SAP rating for each year.

This report examines SAP ratings as observed by the 2007 English House Condition Survey (EHCS). Since 2002 the EHCS has been in a continuous format, providing annual data which is then analysed in two-year datasets. This report presents temporal analysis based on the continuous survey and will also look at data from previous surveys conducted in 1991, 1996 and 2001.

Figure 1 compares the SAP distributions of the 1991, 1996, 2001, and 2003 – 2007 EHCS datasets. Over time we see several effects on this distribution, reflecting improvements in thermal insulation and heating standards. The peak of the distribution has moved by around 15 SAP points towards the higher end, along with the overall mean SAP of the stock, which has increased by 14 points in 16 years, from 36 in 1991 to 50 in 2007. As can be seen, there is little year on year change since 2004, with the distribution shifting only slightly to the right each year, indicating a small increase in energy efficiency.

The distribution shift that occurs in Figure 1 towards the right from 1991 to 2007 reflects a combination of energy efficiency improvements made to dwellings and the effect of new building stock increasing each year (new build have higher SAP ratings due to stricter Building Regulations). The overall shape of the distribution has become more symmetrical and more closely centred on the mean, as more low efficiency dwellings have been upgraded to conform to stricter building regulations.

The following report will use EHCS data to examine typical SAP ratings categorised by distinct dwelling characteristics, whilst providing a link between household types and the energy efficiency of their dwellings. The report will then examine changes in mean SAP ratings for the total stock, and individual categories, over time. The mean SAP rating will be used as a measure of relative energy efficiency throughout the report, as will a measure of the proportion of the stock falling above or below a certain rating. A SAP score of 60 can be considered an acceptable standard under the SAP 2005 methodology for good energy efficiency. Dwellings with a SAP rating of less than 30 are considered to be below minimum standard in terms of energy efficiency.

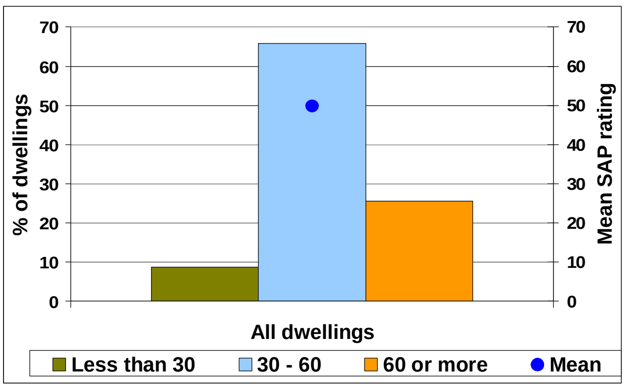

Figure 2: Spread of SAP ratings across all dwellings

Figure 2 shows the spread of the SAP rating across all dwellings in 2007. The largest percentage of dwellings falls in the SAP rating range 30-60 with a mean value of 50. Twenty-six percent of dwellings have a SAP rating greater than 60, leaving a remaining 9% of dwellings with a SAP rating below 30.

In this report the key measure of energy efficiency is the balance between the 'less than 30' and 'greater than 60' bands.

Comparison Over Time

Illustrated in Figure 3 are the mean SAP value, and the high, low and medium SAP band proportions of the English housing stock between 1991 and 2007. As can be see, between 1991 and 2007 the average SAP rating of the English housing stock has increased by almost 14 points, gaining a little under a point per year until 2001 since when the increase has slowed slightly. The proportion of dwellings achieving scores above 60 has risen continuously, increasing from just 4% in 1991 to 26% in 2007 (a rise of 4.6 million dwellings). The proportion of stock rated at less than 30 has fallen from 29% (5.6 million dwellings) in 1991 to 8.7% (1.9 million dwellings) in 2007. From Figure 3 we can see that between 1996 and 2001 the make up of the English housing stock moved to a point where there are a greater proportion of dwellings with a SAP rating above 60 than dwellings with a SAP rating below 30. The shift in the proportions of dwellings in the higher than 60 and lower than 30 SAP bands do not entirely cancel each other out and, as would be expected, there is some change in the central band. The proportion of dwellings with ratings between 30 and 60 initially increased to 74% between 1991 and 1996. This reflects the sharp drop of more than 10% in the lowest SAP band, but without the energy efficiency standards to attain a similarly higher proportion in the top SAP band. Since 1996 this SAP band has decreased each year to 66% in 2007, as new homes and refurbishments achieving new building regulations have expanded the 'greater than 60' band. The lowest rating band is now seeing little year-on-year decrease, partly due to the hard to treat stock dealt with in last years Hard to Treat Homes focus report.

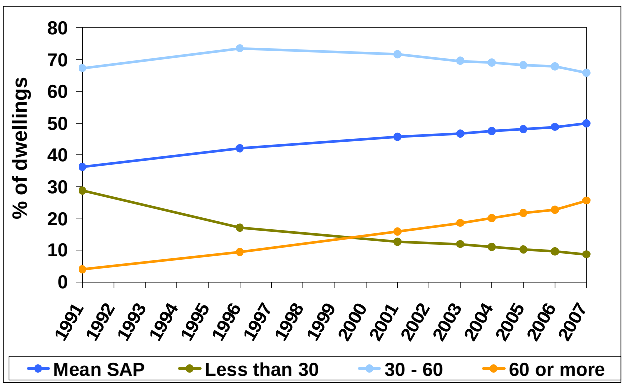

Figure 3: Timeline of SAP ratings for the total stock

Dwelling Type Analysis

Dwelling Type

Figure 4 examines energy efficiency by looking at the mean SAP ratings and the high/low SAP bands, split by dwelling type. No single dwelling type precisely matches the pattern shown in Figure 2 for all dwellings, with variations in the mean SAP between dwellings over a range of 16 points. The greatest difference is between purpose built flats and converted flats[1]. The latter have a mean of 44, which is 6 points below the stock average, whilst purpose built flats have a mean of almost 60, 10 points above average.

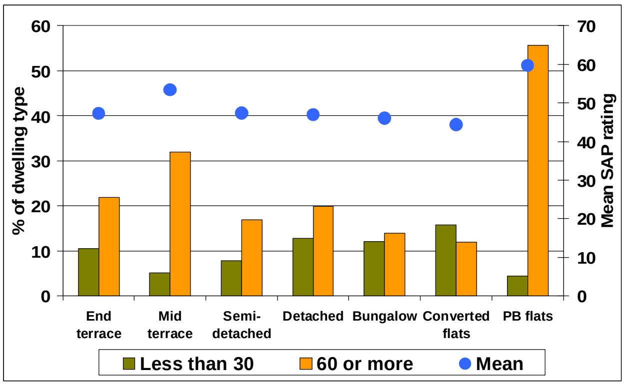

Figure 4: Comparison of highest and lowest SAP ratings by dwelling type

The good performance of purpose built flats is due to their typically small size and smaller number and area of external surfaces, giving a lower heat loss due to conduction through these surfaces. Purpose built flats are also more likely to be recently constructed and therefore benefit from higher insulation and heating standards. The difference in types of flat is visibly evident when looking at figure 4, particularly when comparing the proportion of dwellings with a SAP rating of 60 or more. The large difference in means has already been touched on.

The size and shape of houses also has a close relationship with the energy efficiency rating: mid-terraced dwellings have the second highest mean SAP with 53. These are typically smaller than semi-detached and detached dwellings, and, by definition, have fewer external walls, reducing heat losses. Although end terrace and semi detached houses have the same number of external walls, semi detached houses tend to be bigger than terraced houses and so have a lower mean SAP rating.

Figure 5 compares the SAP distribution of detached houses (not including bungalows) with purpose built flats for 2007. Detached houses are typically larger in size with a larger number of external walls, leading to a lower than average mean SAP rating of 47. As mentioned above, purpose built flats are typically smaller in size with fewer external walls which results in the high percentage of purpose built flats to the right of the distribution.

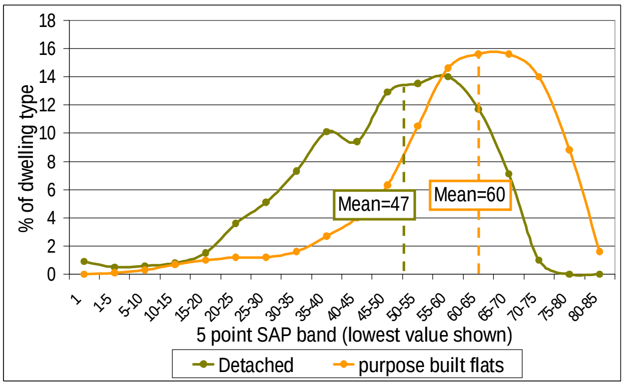

Figure 5: Distribution of SAP for detached houses and purpose built flats

Excluding converted and purpose built flats, all categories of dwelling type have seen a steady rise in mean SAP ratings between 1991 and 2007 (Figure 6). Over this period, converted flats show a fluctuating pattern which is partially explained by the significant decrease in the numbers of this dwelling type during this time. Purposes built flats show the largest total mean SAP increase, a rise of 18 points, but also show a slight fall in mean SAP since 2005.

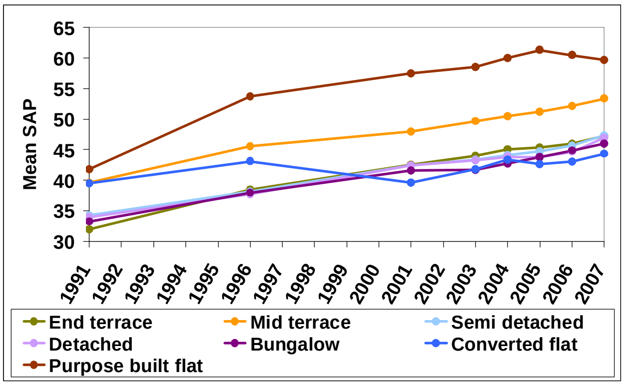

Figure 6: Timeline of mean SAP ratings by dwelling type

Mid-terraced houses are the dwelling type that performs at a level most closely matching the performance of purpose built flats. The mean SAP rating for end terrace, semi-detached, bungalows and detached homes have followed a very similar pattern from 1991 to 2007, increasing from around 33 to around 46.

Figure 7 gives an alternative view of the relative improvements in energy efficiency which shows the change in the percentage of stock with a SAP rating less than 30 over time, split by dwelling type. Fluctuations in the percentage of converted flats with SAP ratings less

[1] The converted flat category also includes a small number of non-residential flats.

than 30 can again be partially attributed to the decrease in the number of this type of dwellings over the time period considered.

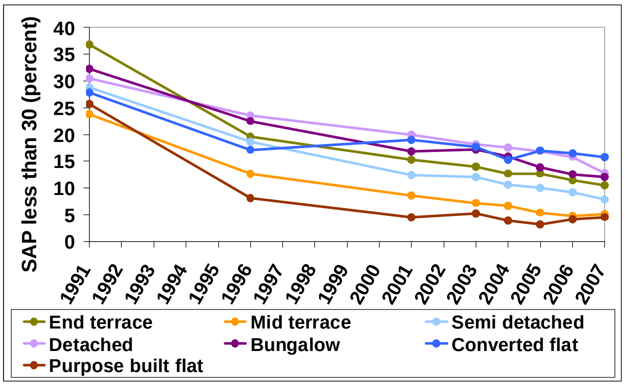

Figure 7: Timeline of percentage of SAP less than 30 by dwelling type

Dwelling Age

From figure 8 we can see that there is a clear correlation between dwelling age and SAP rating. The SAP distribution of pre 1919 and post 1990 houses using 2007 data shows that older houses tend to have worse SAP ratings. The distribution curve for post 1990 houses is much further right than for pre-1919 houses. Homes built before 1919 have an average SAP rating of 40, with over a fifth of this age group rating below 30 and only 7% achieving above 60. Dwellings built since 1990 attain far higher SAP ratings, with an average of 65. Less than 1% of this category has a SAP rating less than 30, whilst over three quarters achieve a SAP rating greater than 60. Dwellings built since 1990 is one of the few areas in which the majority of dwellings are found outside the central 30 – 60 SAP rating band.

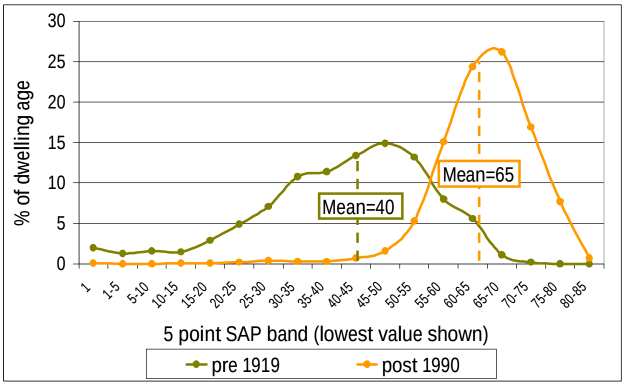

Figure 8: Distribution of SAP within the oldest and newest housing stock

The trend of higher SAP ratings in newer dwellings continues between 1919 and 1980 (see detailed tables), with mean SAP ratings of 46 where the construction date is between 1919 and 1944, 49 between 1945 and 1964, 52 between 1965 and 1980 and a mean of 57 in the 1980 to 1990 age band.

Focus on: Insulation measures.

Within a dwelling, two of the key ways heat is lost is through the roof and the walls. The wall type and presence of loft insulation can therefore have a major effect on the SAP rating of a dwelling. There are three main types of wall construction possible in the English housing stock: filled cavity walls, unfilled cavity walls and solid walls. There are a number of different levels to which a loft can be insulated, but for the current purpose we shall only consider uninsulated lofts and well insulated lofts (lofts with insulation at least 150mm thick). It is of interest to consider the combined effects of these two dwelling properties on the SAP value of the dwelling. Table 1 shows different combinations of wall type and loft insulation levels, as well as the corresponding mean SAP rating for dwellings with those properties. Due to the nature of loft insulation, only houses have been included in this analysis.

Case	Wall type	Loft insulation	Mean SAP rating
1	Filled cavity	Well insulated	57.3
2	Filled cavity	Not insulated	49.5
3	Unfilled cavity	Well insulated	51.6
4	Unfilled cavity	Not insulated	38.4
5	Solid wall	Well insulated	42.8
6	Solid wall	Not insulated	34.5

Table 1

As shown in the Thermal Insulation report, Table 1 shows that solid wall dwellings perform poorly with regards to energy efficiency, whilst unfilled cavity wall dwellings with no loft insulation also perform very poorly. Despite having a more energy efficient wall type than solid walls, the latter has a lower mean SAP than solid wall dwellings with well insulated lofts. The underlines the importance of upgrading a very poorly insulated loft to one which more closely matches current building regulations, an importance which is emphasised by the cost effectiveness of installing this measure.

Examining the construction date bands by mean SAP rating (figure 9) we see a similar trend for each category. Unsurprisingly the order of bands does not change, with progressively worse performance for older age bands. After 1996 the smallest increase has come in the oldest stock (pre-1919), suggesting a high level of stock in this category cannot easily have its energy efficiency measures improved. This is dealt with in more detail in last years Hard to Treat Homes focus report. The proportion of post 1980 dwellings with SAP values greater than 60 has increased steeply from 21% in 1991 to 67% in 2007, reflecting the standards to which new build stock has adhered during that time.

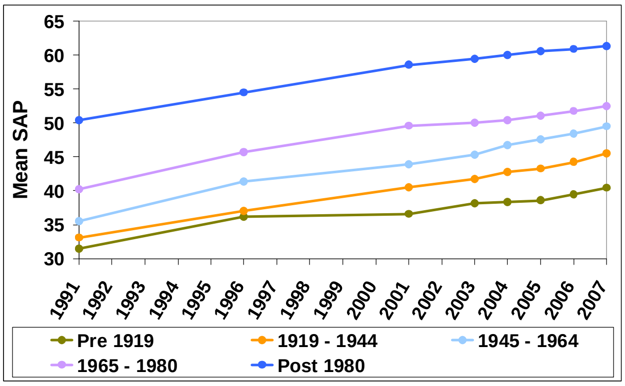

Figure 9: Timeline of mean SAP ratings by dwelling age

Floor Area

Figure 10 illustrates the impact of dwelling size (here measured in total floor area). The stock has been split into five equal floor area bands and the mean and banded SAP ratings compared. The higher average SAP ratings are found in homes with smaller floor areas. SAP ratings decrease with larger floor areas. The proportion of dwellings with ratings above 60 falls from 42% of the lowest floor area band to 18% of the highest floor area band, whilst the proportion of dwellings with a SAP rating less than 30 increases from 8% of the smallest floor area band to 13% of the largest floor area band.

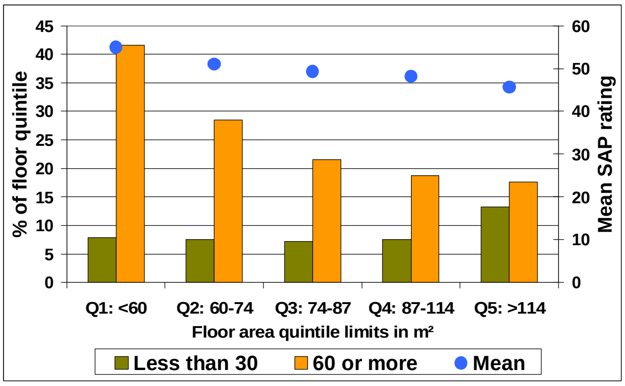

Figure 10: Comparison of highest and lowest SAP ratings by floor area quintile

Figure 11 shows the distribution of the SAP within the highest and lowest floor area quintiles. The smallest floor area quintile is distributed to the right of the largest floor area with a mean SAP rating of 55 compared to 44. The better performance of the lowest floor area quintile can be partly attributed to a high number of energy efficient purpose built flats within the quintile. With reference to Figure 4, we can see that typically larger dwelling types do not perform as well in energy efficiency terms as smaller dwelling types do.

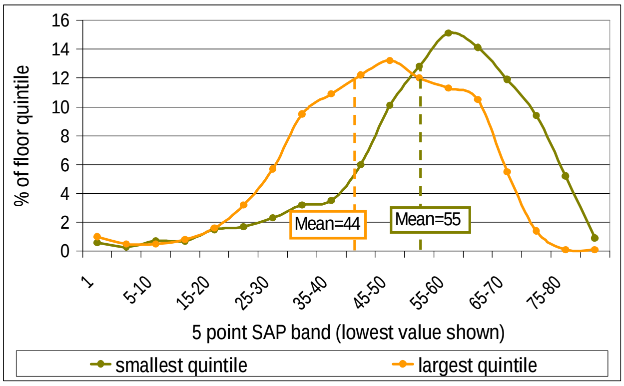

Figure 11: Distribution of SAP between the highest and lowest floor area quintile

Energy Efficiency Measures

The SAP rating is driven by the type of heating system and level of insulation within each dwelling, as well as factors such as the size and shape of the dwelling. Strong correlations between the heating system and the SAP rating would therefore be expected. However, it is useful to look at the impact that such measures have on the rating, as particular measures are often present in certain dwelling or household types, leading to a correspondingly high or low mean SAP rating.

Heating Systems

The SAP distribution curves of dwellings with central heating systems and non-central heating is shown in Figure 12, allowing for a comparison. Non-central heating systems include all fixed and portable room heaters. A more detailed breakdown of individual heating systems is given in Table 2.

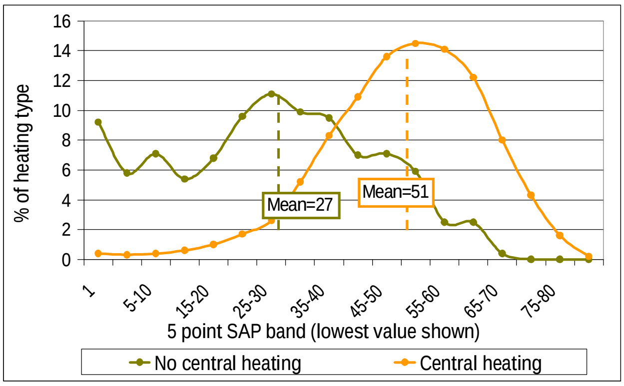

Figure 12: Comparison of SAP distribution by primary heating category

Dwellings using non-central heating systems have significantly lower SAP ratings than centrally heated homes. This is indicated by the fact that the distribution curve for centrally heated dwellings is much further to the right of the graph than the corresponding non-centrally heated dwellings curve. A mean of 27 for non-centrally heated homes compared with 51 for centrally heated homes is another indication of the difference between the two types of heating system. Unsurprisingly, a much lower percentage of non-centrally heated dwellings have SAP ratings above 60, compared with centrally heated dwellings (3% and 26%).

Boiler systems with radiators make up 87% of the total heating systems in the English housing stock meaning this category has the greatest influence on the overall mean SAP rating. Table 2 shows the SAP ratings for different heating systems. From this we can see that conventional boiler systems have a mean SAP of 51, with just 5% of boiler systems with radiators having a SAP rating less than 30 and 26% with a SAP rating greater than 60.

Type of Heating System	% Less than 30	% More than 60	Mean SAP
Boiler system with radiators	5	26	51
Storage radiators	29	17	41
Warm air system	4	31	53
Room heater	54	3	28
Other systems	57	0	24
Communal	1	70	65
Portable heaters only	88	0	12
Total	9	26	50

Table 2: Comparison of SAP ratings among heating systems

Two percent of dwellings in England have a communal heating system which has the highest mean SAP rating out of the seven heating categories (65). In total 70% of communal systems have a SAP rating greater than 60 and only 1% have a rating less than 30. A high proportion (84%) of communally heated homes are purpose built flats, which partially explains the high SAP rating of this dwelling type. The energy efficiency qualities of purpose built flats have already been discussed above, with their small size and external surface area key factors in their performance.

Focus on: Loft insulation.

Loft insulation is an energy efficiency measure of high importance for heat retention in dwellings, due to the nature of heat escaping through a homes' roof. Loft insulation can be installed to a range of different thicknesses, which have been banded into four different categories; no insulation, up to 100mm, between 100mm and 150mm, and 150mm or greater. Table 2 shows the difference in SAP between dwellings with different levels of insulation. This should give a more precise impression of the effect loft insulation can have on a dwelling than is portrayed in figure 16.

Case	Loft insulation thickness	Mean SAP rating
1	None	37.1
2	Up to 100mm	45.0
3	100mm - 150mm	48.9
4	> 150mm	53.0
5	> 0mm	49.4
6	All lofts	49.0

Table 2

Table 2 shows that the thicker the loft insulation, the higher the SAP rating. The biggest improvement in SAP rating (almost 8 points) comes from having no loft insulation to having a small amount (i.e. up to 100mm). There are significant increases in SAP of roughly 4 points between houses with loft insulation in bands 2 and 3, and bands 3 and 4. As can be seen, having some loft insulation (case 5) is much more beneficial than having none at all.

The SAP rating for all homes with lofts is given by the ''all lofts' category (case 6). The mean SAP of a dwelling where it is possible to have loft insulation is 49. This is lower than the overall mean SAP rating of the English housing stock because it does not include a large proportion of purpose built flats, the most energy efficient dwelling type.

The non central heating category shown in Figure 12 comprises of room and portable heaters. These two types of heating system have the lowest mean SAP ratings out of the seven heating system categories with 28 and 12 respectively. Eighty-eight percent of homes using only portable heaters have a SAP rating less than 30 and none have a SAP greater than 60. These categories have little effect on the overall mean SAP rating of the dwelling stock as combined they only constitute 4% of the total heating systems in English dwellings. The low SAP rating of non-centrally heated homes is characterised by older stock dominating the use of room heaters: 7% of pre-1919 dwellings compared with less than 1% of post-1990 stock.

Fuel Use

As with the heating system, the SAP rating of a dwelling depends strongly on the primary fuel used for its heating, indeed it is the combination of fuel cost and efficient use that drives the key stages of the SAP calculation. Figure 13 shows the comparison of SAP ratings for non-communally heated stock by primary heating fuel, split between gas, oil, solid fuel and electrical systems.

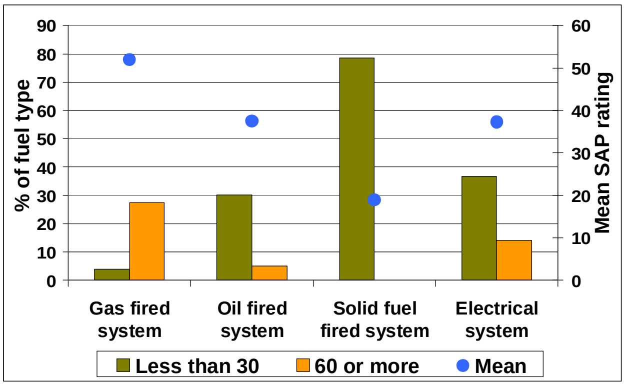

Figure 13: Comparison of SAP ratings by primary heating fuel

Gas is the predominant fuel (86% of the total fuel type used in English dwellings) and therefore has the most influence on the overall mean SAP. As can be seen from Figure 13, gas has the highest mean SAP rating by far of all fuels used (52, 15 points higher than the second most energy efficient fuel). Gas is also the only fuel with a higher proportion of stock with ratings above 60 than below 30. Dwellings with oil, solid fuel and electric systems all have means below the stock average with values of 37, 19 and 37 respectively. No solid fuel heated dwellings achieve a SAP rating above 60. Of the homes using electricity as the main heating fuel, almost half are purpose built flats which contributes to the higher SAP ratings for this dwelling type.

Figure 14 shows the distribution of the heating fuels with the highest and lowest average SAP ratings. Solid fuel fired systems include coal, wood, anthracite and manufactured smokeless fuels. Dwellings with solid fuel fired systems only account for a small proportion (1.5%) of the English housing stock and tend to be found in rural dwellings rather than urban stock. As can be seen, the distribution curve for gas fired systems is much further towards the right than the curve for solid fuel fired systems.

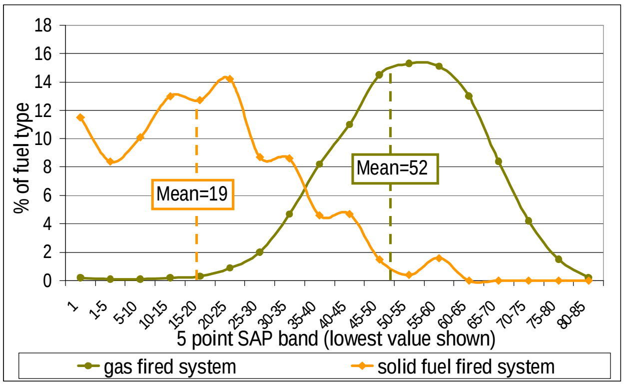

Figure 14: Comparison of SAP distribution by gas and solid fuel fired systems

Thermal Insulation

An additional factor that affects the SAP rating is thermal insulation measures within a dwelling. It is expected that there will be a strong correlation between high SAP ratings and effective insulation measures, which is illustrated in figure 15. This shows that dwellings with non cavity walls are the worst performing wall type in terms of mean SAP (42). Cavity walls perform better, with insulated cavity walls having the highest mean SAP (57). Only 2.5% of dwellings with filled cavity walls have a SAP rating less than 30 compared to almost a fifth of non cavity wall dwellings.

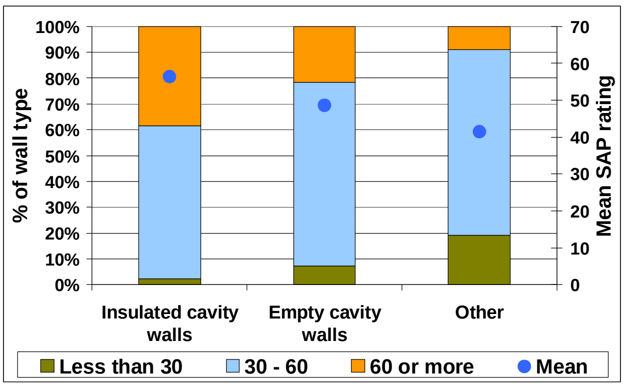

Figure 15: Comparison of SAP ratings by wall type

Dwellings with filled cavities tend to be newer dwellings with insulation fitted at the time of construction whereas solid wall dwellings are more commonly associated with older stock. Although fitting insulation to a solid wall dwelling may significantly improve the SAP rating it can also be very expensive, meaning that the option is often not utilised.

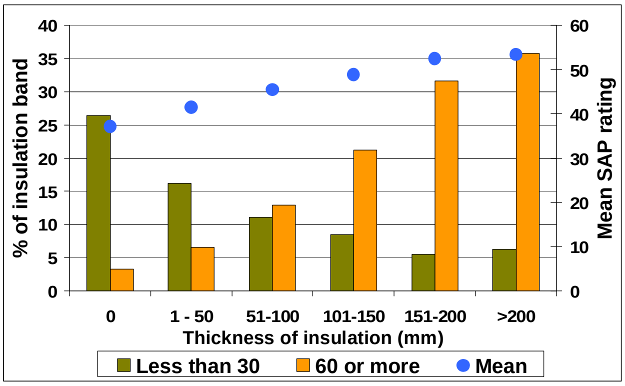

Figure 16: Comparison of highest and lowest SAP ratings by depth of loft insulation

In Figure 16 we see a pattern of higher mean SAP ratings in dwellings with thicker levels of loft insulation. This is examined in more detail in the 'focus on loft insulation'. The 51 – 100 mm band is the point at which the proportion of ratings above 60 outweighs the percentage below 30. The difference in the SAP distribution between homes with no loft insulation and homes with greater than 200 mm of loft insulation is illustrated in Figure 17. The >200 mm loft insulation distribution curve is shifted further towards the right than the distribution curve for dwellings with no loft insulation.

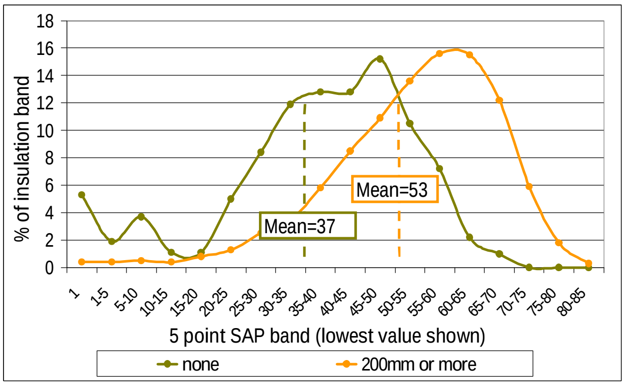

Figure 17: SAP distribution by loft insulation thickness

Another construction element affecting thermal insulation is the extent of double-glazing used in a dwelling, although the total heat loss is not as great through windows as through the walls and roof. Although we find that dwellings with double glazing have a higher SAP rating than those without, this pattern of better SAP scores greater coverage of double glazing is as much to do with the presence of other energy efficiency measures in homes with double glazing as with the glazing itself.

For example, although dwellings with full double glazing make up 67% of the total stock, they account for 80% of homes with insulated cavity walls and just 47% of those with non-cavity walls. Similarly, dwellings with full double glazing account for 75% of homes with loft insulation greater than 200 mm and only 47% of homes with no loft insulation. Although we find that stock which uses double-glazing in all windows has an average SAP rating of 53 whilst dwellings with no double-glazing typically have a SAP rating of 42, we must bear in mind that there are other energy efficiency measures contributing to this rating differential.

Dwelling Location Analysis

Government Office Region (GOR)

Figure 18 compares the highest and lowest SAP ratings by GOR. Individual differences between each GOR exist but the mean only fluctuates by five SAP rating points between the nine GORs. Although London and the North East have similar SAP profiles, they have achieved these through a different type of housing stock. London has a large quantity of purpose built flats (almost two fifths of the entire stock of purpose built flats) which are energy efficient due to low heat losses, whilst the North East has the highest percentage of cavity walls (more than 80% of dwellings in the north east) and the thickest loft insulation (on average, dwellings in the north east have over 150mm of loft insulation). This results in the high performance of government office regions as shown in figure 18.

In contrast, the South West is the worst performing GOR, with the lowest mean SAP rating (47) and the highest proportion of dwellings with a SAP lower than 30 (12%).

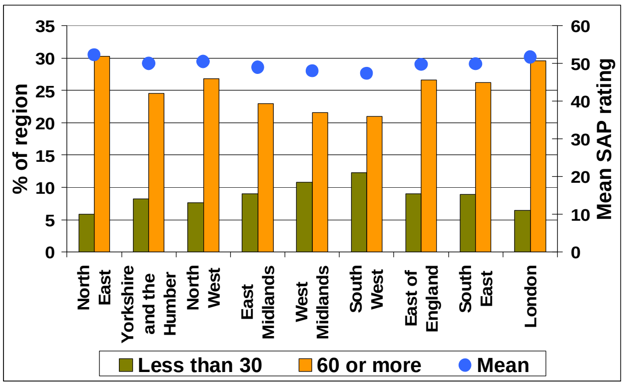

Figure 18: Comparison of highest and lowest SAP ratings by region

The distribution of the SAP within the London and South West GOR is shown in Figure 19. The distribution graph shows that the curve for London is slightly further to the right than the curve for the South West, which indicates that London has a slightly higher mean SAP rating than the South West.

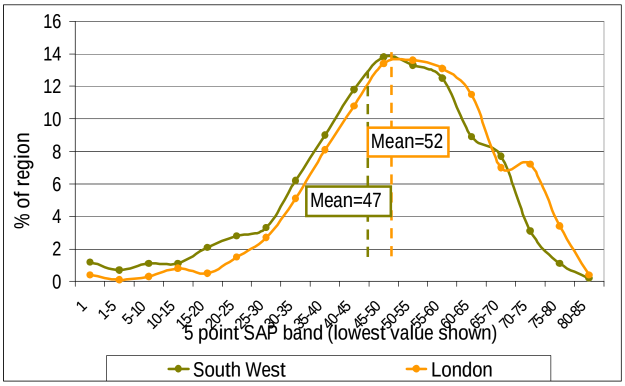

Figure 19: Distribution of SAP within the South West and London regions

The relatively poor performance of the South West can be partially attributed to the large number of non-centrally heated homes in the region (due to lack of access to the mains gas network) leading to lots of oil fired and electrical heating systems. There is also a low incidence of insulated cavity wall dwellings in the South West. Although London may have similar, if not worse insulation measures than the South West (e.g. insulated cavity walls and thick loft insulation), as has been touched on before London has a high proportion of energy efficient purpose built flats. This is one of the key factors leading to London's better energy performance despite an aging stock with relatively poor insulation.

Table 4 displays a league table of each individual region ranked by mean SAP in 2007. Also shown are the mean SAP ratings for the previous 3 years. It can be seen that all regions have improved over the last four years in terms of energy efficiency, although some have improved more than others. Yorkshire and Humberside and the east midlands have improved the most, with their mean SAP rating increasing by 3.3 points, whereas London has improved the least, increasing its mean SAP rating by just 1.2 points. This low increase in the London region explains why it was overtaken by the North East in 2006 as the best performing GOR in terms of energy efficiency.

Region	2004	2005	2006	2007
North East	49.9	50.9	51.5	52.3
London	50.5	50.9	50.8	51.7
North West	47.4	48.3	49.3	50.5
Yorks and Humber	46.8	47.3	48.5	50.1
South East	48.0	48.7	49.5	49.9
Eastern	47.2	47.7	48.0	49.8
East Midlands	45.7	46.5	47.4	49.0
West Midlands	45.3	45.6	46.7	48.0
South West	45.6	45.8	46.5	47.4

Table 4: Mean SAP by region since 2004

A further set of comparisons can be drawn by looking at the neighbourhood surrounding a dwelling, shown in Figure 20.

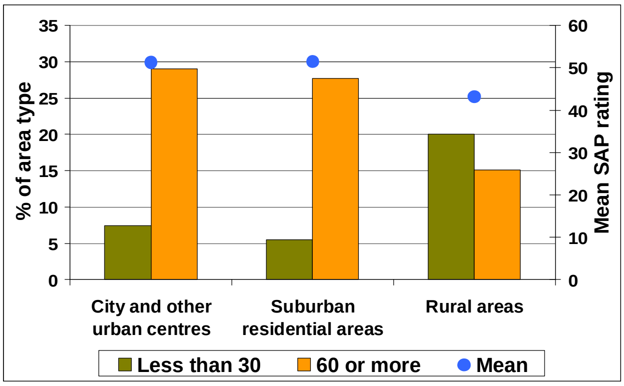

Figure 20: Comparison of SAP distribution by area category

Dwellings in city centre[2] and other urban centres[3] and suburban[4] locations achieve average SAP ratings slightly above 50 whilst dwellings located in rural areas[5] average a much lower SAP rating of 43. Dwellings in rural areas are more likely to have a SAP lower than 30 than a SAP above 60, with 20% and 15% in the respective groups. A much higher proportion of dwellings in city and suburban areas have an SAP rating higher than 60, with 7% and 6% of dwellings in these categories having an SAP below 30.

Although gas fired systems, and central heating systems are predominant in all areas, dwellings in rural areas have a greater number of oil fired, solid fuel fired and electrical systems which is partially responsible for the poor energy efficiency performance of such areas.

Tenure Analysis

Tenure

As demonstrated in the accompanying Energy Use in Homes reports, varying levels of insulation and proportions of different heating systems are associated with the different tenure categories, and this is reflected in their typical SAP ratings. A comparison of SAP ratings between tenure types is made in Figure 21. It demonstrates the effects of the differing energy efficiency measures installed in dwellings from different groups.

[2] The area immediately surrounding the core of large cities.
[3] The area around the core of towns and small cities.
[4] The outer area of a town or city.
[5] Traditional villages or the heart of old villages or isolated dwellings and small hamlets.

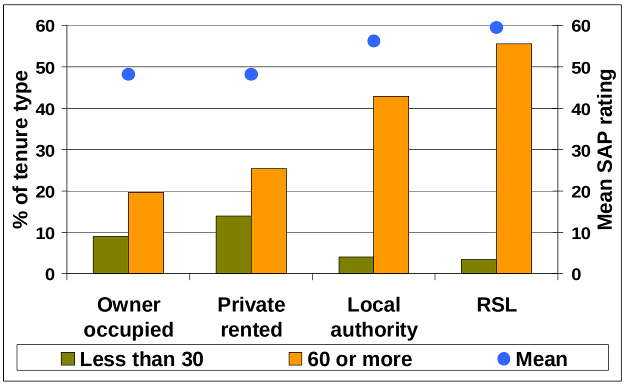

Figure 21: Comparison of SAP distribution by tenure

RSL and Local Authority housing are the best performing tenure types, with significantly higher SAP ratings than the Owner Occupied and Private Rented sector. RSL has a mean SAP rating of 59, Local Authority has 56, and both Owner Occupied and Private Rented tenures have means of 48. From figure 21, we can also see that RSL and Local Authority tenure groups have a much higher percentage of dwellings with SAP ratings over 60 and a much lower percentage of dwellings with ratings under 30 (56% and 3% for RSL and 43% and 4% for Local Authority tenure).

Comparing the tenure categories to physical features (as discussed earlier under energy efficiency measures), it can be seen that 7% of private rented dwellings use non-central heating for their primary space heating and 22% for their water heating systems, compared with 4% and 13% for the stock as a whole. In particular this sector relies on electricity as a primary fuel source, with 17% of private rented dwellings heated by an electric fired system compared to only 8.5% of the entire stock. The private rented tenure also has a poor energy efficiency make up with regards to the highest incidence of solid walls, the lowest incidence of insulated cavity walls, and the lowest incidence of well insulated lofts (only a quarter insulated to 150mm or more, and the highest percentage of lofts with no insulation).

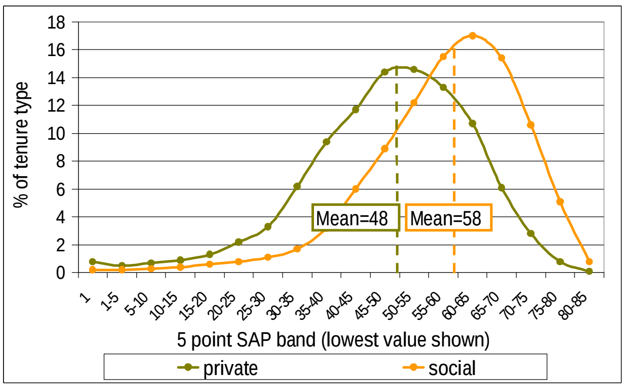

Figure 22: SAP distribution by tenure type

Focus on: Improvements.

Our examinations of thermal insulation measures and the effect that they have on SAP ratings have shown the significance of targeting dwellings with very poorly insulated lofts. Using this, we are now going to examine improvements that could be made to the energy efficiency of particular building types. The particular type of dwelling being examined is a mid terrace house with no loft insulation, heated by room heaters. Dwellings of this type have a very low mean SAP rating of 18.9.

Dwelling characteristics	
Dwelling type	Mid terrace
Loft insulation	None
Main heating system	Room heaters
SAP rating	18.9

Table 5

Due to the nature of a mid terrace house, there are only two external walls through which it will lose heat, making the roof even more important in terms of heat loss. Room heaters are also one of the least cost effective heating systems.

In terms of improving this type of dwelling, installing loft insulation to a high level, and changing the main heating system should result in large improvements in the SAP rating. The heating system chosen instead of room heaters is the conventional boiler system with radiators.

Dwelling characteristics	
Dwelling type	Mid terrace
Loft insulation	> 150mm
Main heating system	Boiler system with radiators
SAP rating	59.1

Table 6

As can be seen above, similar dwellings with the alternative level of insulation and different heating system have a much higher mean SAP rating, more than 40 points than the previous dwellings.

The marked difference between tenure types can again be seen by examining Figure 22 where the SAP distribution curves for private (owner occupied and private rented) and social (LA and RSL) dwellings are shown. The distribution curve for the private sector appears fairly even with a mean SAP rating of 48. The social sector curve has a higher peak than the private sector curve, and is distributed further to the right with a mean SAP rating of 58, 10 SAP points greater than the average private sector value. The social sector has 49% of the housing stock with a SAP greater than 60 compared to only 21% in the private sector, whilst the social sector has only 4% of the housing stock below a SAP of 30 compared to 10% in the private sector.

Figure 23 illustrates how well the social tenures perform in terms of energy efficiency, as well as the improvements that have taken place since 1991. The local authority and the registered social landlord (RSL) tenure have had the highest mean SAP rating since 1991 and have increased steadily over time. The owner occupied tenure has had the lowest mean SAP rating rise from 1991 to 2007, increasing by only ten points. This has resulted in it falling away from the more energy efficient tenure types. In 1991 it was almost on a par with Local Authority houses in terms of energy efficiency with a mean SAP of 38. Now it is has a mean SAP rating 8 points lower than Local Authority homes, and 11 points lower than RSL homes. The private rented sectors mean SAP has increased the most since 1991, going from the lowest mean SAP of 28 to 48 in 2007, placing it level with the owner occupied tenure.

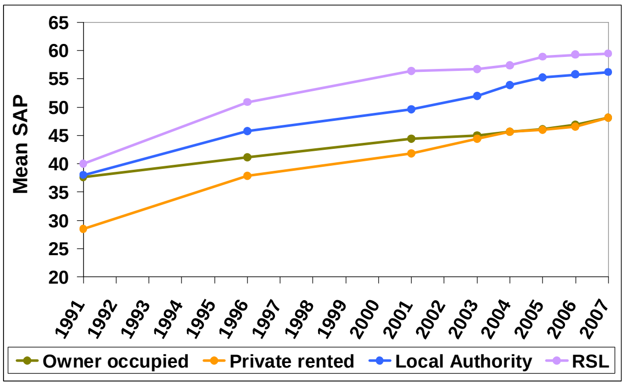

Figure 23: Timeline of mean SAP ratings by tenure

The change in the percentage of dwellings with a SAP rating less than 30 over time is shown in Figure 24. In 2007 Local Authority and RSL tenure groups have the lowest proportion of homes with a SAP rating less than 30 with 4% and 3% respectively, falling from 29% and 24% in 1991. The owner occupied tenure went from having the lowest proportion of stock with a SAP less than 30 with 23% in 1991 to having the second highest proportion in 2006 with 9%. Although this is still a fairly significant decrease, it just goes to highlight how vastly improved the energy efficiency of the social stock has been.

In terms of improvements in energy efficiency with respect to the proportion of dwellings below the minimum standard of energy efficiency, the private rented tenure group has performed best. This group has seen the greatest decrease in the percentage of dwellings with a SAP less than 30, decreasing from 48% in 1991 to 14% in 2007. However, this tenure still has the greatest percentage of stock with a SAP less than 30 and therefore the greatest potential for improvement, although this tenure is more closely associated with stock that is difficult to improve than other tenures.

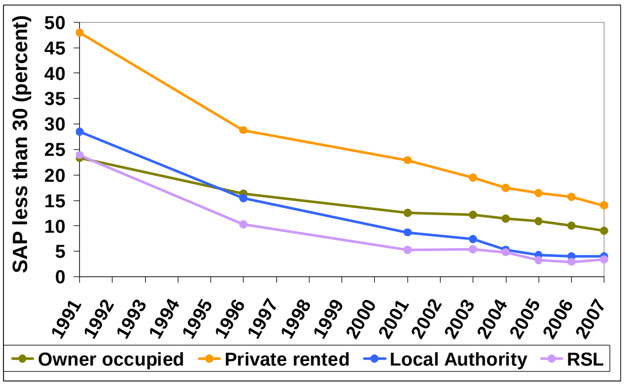

Figure 24: Timeline of percentage of SAP less than 30 by tenure

Household Analysis

Household Type

Household composition is split into seven categories; couple under 60, couple over 60, couple with children, lone parent with children, large adult household, one person under 60 and over person over 60. Due to the different dwelling types that different groups tend to live in, the SAP ratings depending on the household. The different household categories have been grouped according to their mean SAP scores, leaving us with three categories; adults only, families and single people. Figure 25 depicts these different categories and the key statistics.

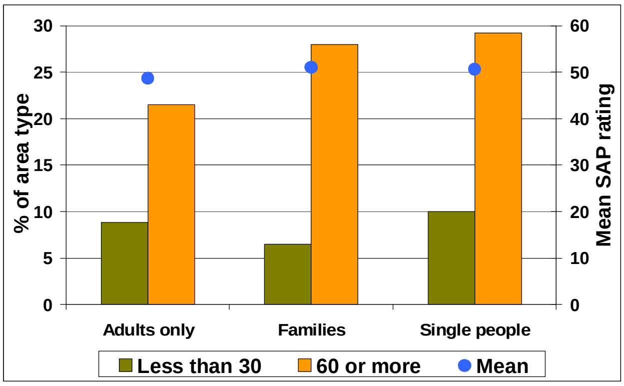

Figure 25: Comparison of SAP distribution by household type

Families are the group most likely to live in a dwelling heated by a gas system. As has been highlighted, this is the most energy efficient system with regards to SAP (Figure 13) which partially explains why families are the household group with the highest mean SAP (51). Families are also the most likely household group to live in a dwelling where the water is heated with the central heating system, another energy efficient measure. A further contributing factor may be that twenty three percent of lone parents with dependent children live in RSL dwellings, which have the highest SAP ratings. The household group with the second highest mean SAP (an average just below 51) is Single People (one person under/over 60). The high proportion of this group that live in energy efficient purpose built flats is likely to be the reason for the high SAP. Adult only households (couples or other multi-person households) have the lowest mean SAP of the three household groups, with an average of 49. This can be partly attributed to adult only households being the most likely to live in detached houses and the least likely to live in more modern energy efficient dwellings (post 1980). However, there is only two points difference between the highest and lowest mean SAP ratings so this is not a major issue. A larger difference is evident when looking at the percentage of dwellings in the 60 or over SAP band, and the lower than 30 SAP band.

Figure 26 shows a timeline of change in mean SAP for the three categories of household composition (adults only, families and single people). From the graph, we can see that all three household categories have increased in their mean SAP rating year on year from 1991 to 2007. In 1991 family households had the highest mean SAP rating with a value of 40. Although they had a lower SAP rating than single person households in the intervening years, family households also have the highest SAP rating in 2007. Single person households have had the highest increase in SAP rating, going from the lowest mean SAP rating with 36 to the second highest mean SAP rating in 2007 with a value of 51. From the early 1990's onwards, adult only households have had the lowest mean SAP.

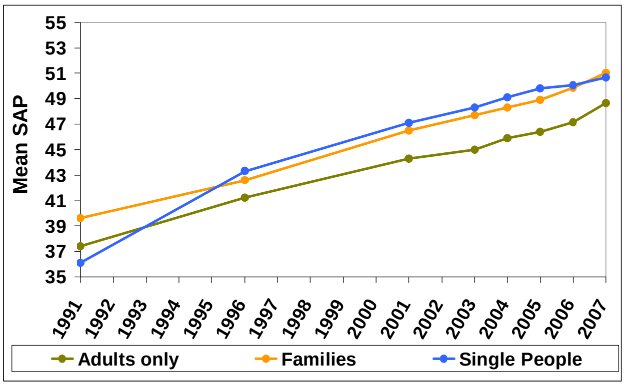

Figure 26: Timeline of mean SAP ratings by household composition

Focus on: Improvements 2.

The second dwelling type chosen for examination is a detached house with no loft insulation and a standard boiler. Using the EHCS database, these characteristics result in a low mean SAP rating of 29.7.

Dwelling characteristics	
Dwelling type	Detached
Loft insulation	None
Boiler type	Standard
Sap rating	29.7

Table 7

Improving the loft insulation will again be a priority, as will updating the heating system. This dwelling type already has a conventional heating system (boiler system with radiators), but it employs an older, less efficient standard boiler. Technology has moved on since many of these systems were installed and condensing boilers are now the most efficient boiler type, as shown in previous Energy Use in Homes reports. Therefore switching the boiler from a standard to a condensing boiler should improve the energy efficiency of these dwelling types. It is also a relatively cheap option as it does not require a complete overhaul of the heating system.

Dwelling characteristics	
Dwelling type	Detached
Loft insulation	> 150mm
Boiler type	Condensing
Sap rating	56.5

Table 8

The mean SAP rating for similar dwellings with the better loft insulation and boiler type is 56.5. This is a large improvement on 29.7, through two relatively small changes.

It should be noted that the improvements shown in these sections are indicative of changes in mean SAP for a wide range of dwellings with varying additional features, rather than a precise expected improvement in a single dwelling adopting the recommended changes.

The SAP distribution curves for the highest and lowest household representative age category (16 to 29 and 65 plus) are shown below in Figure 27. It can be seen that dwellings where the HRP is 65 or over have a lower average SAP than those where the HRP[6] is aged 16 to 29.

[6] The HRP is the person in whose name the dwelling is owned or rented. Where there are joint householders the person with the highest income and then highest age is the HRP.

Dwellings containing the older age group have a mean SAP of 48, compared to 54 for dwellings containing a younger HRP. This is partly due to a relatively high proportion of younger households living in purpose built flats, and residing in London (see fig 18).

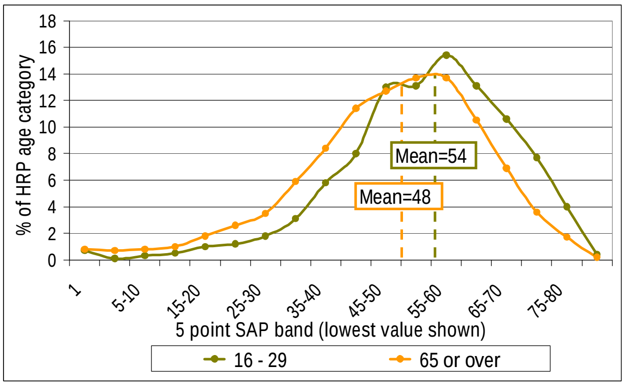

Figure 27: Comparison of SAP distribution by age of household response person

Income

Figure 28 examines the energy efficiency of dwellings with respect to household income. Dwellings are separated into quintiles according to the net income of the household. Looking at figure 28 we can see the SAP distribution within each quintile. A household in the lowest income quintile (less than £11,000) has an average SAP of 52. For the second, third and fourth income quintiles the average SAP rating is roughly 50. The highest income quintile, (greater than £35,000) has an average SAP rating of 48. This shows that higher income households live in less energy efficient dwellings.

Figure 28 also shows that the lowest quintile has the highest proportion of SAP ratings greater than 60 with 32%. This figure decreases for each successive income quintile to only 22% for the highest income quintile.

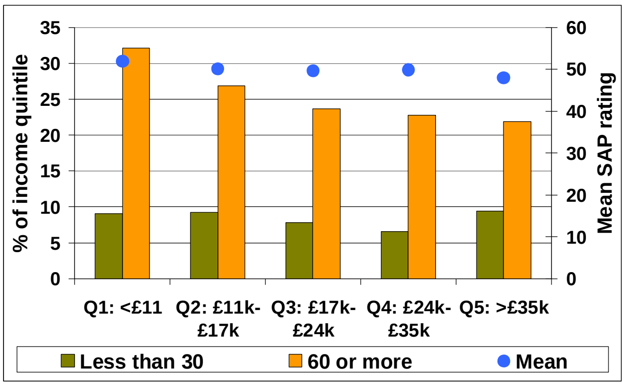

Figure 28: Comparison of highest and lowest SAP ratings by income quintile

One reason for this can be found in the types of dwelling that high and low income households typically live in. Over 70% of households with an income greater than £35,000 live in a detached house, whereas 30% of households with incomes in the lowest quintile live in flats. Although high income households will be able to afford a vast range of available energy efficiency measures, the size of the dwellings they occupy may restrict their ability to achieve a high SAP rating. In contrast, households with low incomes will benefit from the energy efficiency properties of the smaller dwellings that they tend to live in such as purpose built flats and terraced dwellings, leading to higher SAP ratings.

Figure 29 displays the timeline of the mean SAP rating by income split into five equal quintiles. In 1991 the two highest income quintiles, i.e. those households in receipt of the greatest earnings, had the highest mean SAP rating at 39 for quintile four and 41 for quintile five. In 1996 these two highest income quintiles became the categories with the lowest mean SAP, both with a rating of 42. In 2007 income quintile five remained the band with the lowest mean SAP at 48. The lowest income quintile has gone from having one of the lowest mean SAP ratings (one point off the lowest mean SAP of 36) to having the highest mean SAP, a jump from 37 to 52 between 1996 and 2007. Since 2001, income quintile one has remained the quintile with the highest SAP rating, quintile five has remained the quintile with the lowest SAP rating, but the rankings of the other quintiles have altered.

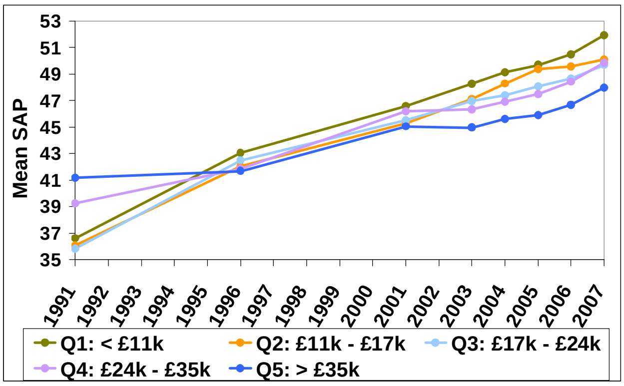

Figure 29: Timeline of mean SAP ratings by income quintile

The improved energy efficiency performance of lower income households over the period suggests that efforts to target these households types in respect of improving their energy efficiency since 1991 have been successful and will continue to be so, with the lowest income quintiles showing strong increasing trends over the time period shown (quintile 1 rising by 15 SAP points). The trend also reflects the tenures to which each income band belongs, with many low income households now living in the newer, more energy efficient social housing.

Household Satisfaction with Heating

Figure 30 shows the satisfaction with space heating, categorised into very, fairly, not very and not at all effective. It clearly shows that more energy efficient houses lead to a greater level of satisfaction. This is evident when looking at the percentage of dwellings with a SAP less than 30 in each of the categories. There are very few (6%) in the very effective category, but a greater proportion (24%) in the not at all effective category. The opposite is true of dwellings with a SAP above 60, with 28% in the very effective category and only 18% in the not at all effective category. The mean SAP decreases by 9 points from very effective to not at all effective.

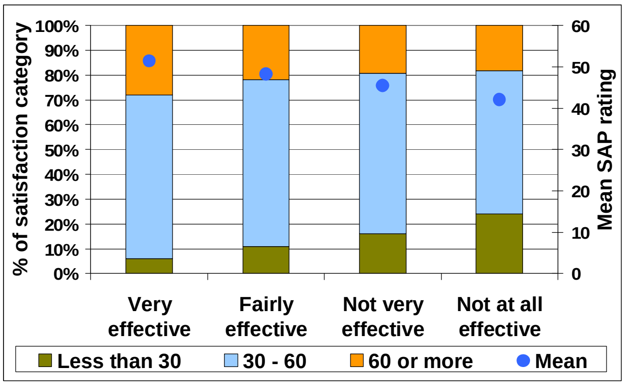

Figure 30: Comparison of SAP ratings by household satisfaction with space heating

The trend observed in Figure 30 is similar to attitudes associated with hot water, insulation and draught proofing i.e. the more effective the households assessments were for their insulation and draft proofing, the greater the mean SAP rating.

Conclusions and Future Issues

The overall mean SAP of the English housing stock has increased by 14 points from 1991 to 2007. The improvement in the SAP rating year on year reflects a combination of energy efficient improvements made to dwellings and the effect of new, more efficient building stock increasing each year.

This report has identified several areas in which a historically low mean SAP rating has increased significantly, such as in private rented stock and among low income households. It has confirmed categories in which we now expect high levels of energy efficiency, for example the RSL tenure, newer dwellings and those with higher insulation levels and purpose built flats. It has also confirmed categories in which we now expect low levels of energy efficiency, for example in dwellings with no central heating (particularly those that rely on portable and room heaters), older, detached and rural stock.

Future reports will identify whether these problematic areas are being improved and will also take the opportunity to examine other measures of environmental importance such as energy consumption and carbon dioxide emissions.

Energy Efficiency Update Tables 2007

These tables give detailed breakdowns of the banded SAP and mean SAP ratings against key variables, as an appendix to the Energy Efficiency Update Report 2007.

Index

Table 1.1 Analysis of SAP - total stock

	count(000s), (column%)
SAP Band	Dwellings
Up to 30	1,928
	(8.7)
30 - 60	14,586
	(65.7)
60 or more	5,675
	(25.6)
Total	22,189
	(100.0)
Mean SAP	49.8

Base: All Dwellings

Table 1.2 Analysis of SAP - by dwelling type

count(000s), (row%), (column%)

	Less than 30	30 - 60	60 or more	Total	Mean SAP
end terrace	218	1,408	456	2,082	47.2
	(10.5)	(67.6)	(21.9)	(100.0)	
	(11.3)	(9.7)	(8.0)	(9.4)	
mid terrace	212	2,615	1,331	4,158	53.4
	(5.1)	(62.9)	(32.0)	(100.0)	
	(11.0)	(19.9)	(23.5)	(18.7)	
semi detached	480	4,590	1,032	6,103	47.3
	(7.9)	(75.2)	(16.9)	(100.0)	
	(24.9)	(31.5)	(18.2)	(27.5)	
detached	509	2,673	791	3,973	46.9
	(12.8)	(67.3)	(19.9)	(100.0)	
	(26.4)	(18.3)	(13.9)	(17.9)	
bungalow	254	1,553	295	2,102	46.0
	(12.1)	(73.9)	(14.0)	(100.0)	
	(13.2)	(10.6)	(5.2)	(9.5)	
converted flat	119	548	91	757	44.3
	(15.8)	(72.3)	(12.0)	(100.0)	
	(6.2)	(3.8)	(1.6)	(3.4)	
purpose built flat, low rise	121	1,053	1,522	2,696	59.9
	(4.5)	(39.1)	(56.4)	(100.0)	
	(6.3)	(7.2)	(26.8)	(12.1)	
purpose built flat, high rise	16	145	157	318	57.4
	(5.0)	(45.7)	(49.3)	(100.0)	
	(0.8)	(1.0)	(2.8)	(1.4)	
Total	1,928	14,586	5,675	22,189	49.8
	(8.7)	(65.7)	(25.6)	(100.0)	
	(100.0)	(100.0)	(100.0)	(100.0)	

Base: All Dwellings

Table 1.3 Analysis of SAP - by construction date

count(000s), (row%), (column%)

	Less than 30	30 - 60	60 or more	Total	Mean SAP
pre 1919	1,014	3,422	330	4,766	40.4
	(21.3)	(71.8)	(6.9)	(100.0)	
	(52.6)	(23.5)	(5.8)	(21.5)	
1919-44	348	3,060	456	3,864	45.5
	(9.0)	(79.2)	(11.8)	(100.0)	
	(18.0)	(21.0)	(8.0)	(17.4)	
1945-64	285	3,208	852	4,345	49.5
	(6.6)	(73.8)	(19.6)	(100.0)	
	(14.8)	(22.0)	(15.0)	(19.6)	
1965-80	224	3,161	1,421	4,806	52.4
	(4.7)	(65.8)	(29.6)	(100.0)	
	(11.6)	(21.7)	(25.0)	(21.7)	
1981-90	38	1,147	692	1,878	56.6
	(2.0)	(61.1)	(36.9)	(100.0)	
	(2.0)	(7.9)	(12.2)	(8.5)	
post 1990	19	588	1,923	2,531	64.7
	(0.8)	(23.2)	(76.0)	(100.0)	
	(1.0)	(4.0)	(33.9)	(11.4)	
Total	1,928	14,586	5,675	22,189	49.8
	(8.7)	(65.7)	(25.6)	(100.0)	
	(100.0)	(100.0)	(100.0)	(100.0)	

Base: All Dwellings

Table 1.4 Analysis of SAP - by floor area

	Less than 30	30 - 60	60 or more	Total	Mean SAP
				count(000s), (row%), (column%)	
Quintile 1: < $64m^2$	350	2,240	1,848	4,438	55.0
	(7.9)	(50.5)	(41.6)	(100.0)	
	(18.2)	(15.4)	(32.6)	(20.0)	
Quintile 2: $64m^2$ - $78m^2$	333	2,840	1,264	4,438	51.1
	(7.5)	(64.0)	(28.5)	(100.0)	
	(17.3)	(19.5)	(22.3)	(20.0)	
Quintile 3: $79m^2$ - $92m^2$	321	3,157	951	4,428	49.3
	(7.2)	(71.3)	(21.5)	(100.0)	
	(16.6)	(21.6)	(16.8)	(20.0)	
Quintile 4: $93m^2$ - $121m^2$	337	3,278	829	4,444	48.2
	(7.6)	(73.8)	(18.7)	(100.0)	
	(17.5)	(22.5)	(14.6)	(20.0)	
Quintile 5: > $121m^2$	586	3,071	783	4,440	45.6
	(13.2)	(69.2)	(17.6)	(100.0)	
	(30.4)	(21.1)	(13.8)	(20.0)	
Total	1,928	14,586	5,675	22,189	49.8
	(8.7)	(65.7)	(25.6)	(100.0)	
	(100.0)	(100.0)	(100.0)	(100.0)	

Base: All Dwellings

Table 1.5 Analysis of SAP - by tenure type

count(000s), (row%), (column%)

	Less than 30	30 - 60	60 or more	Total	Mean SAP
owner occupied	1,401	11,088	3,071	15,560	48.1
	(9.0)	(71.3)	(19.7)	(100.0)	
	(72.6)	(76.0)	(54.1)	(70.1)	
private rented	383	1,658	696	2,738	48.1
	(14.0)	(60.6)	(25.4)	(100.0)	
	(19.9)	(11.4)	(12.3)	(12.3)	
local authority	79	1,057	851	1,987	56.2
	(4.0)	(53.2)	(42.8)	(100.0)	
	(4.1)	(7.2)	(15.0)	(9.0)	
RSL	66	782	1,056	1,904	59.5
	(3.4)	(41.1)	(55.5)	(100.0)	
	(3.4)	(5.4)	(18.6)	(8.6)	
Total	1,928	14,586	5,675	22,189	49.8
	(8.7)	(65.7)	(25.6)	(100.0)	
	(100.0)	(100.0)	(100.0)	(100.0)	

Base: All Dwellings

Table 1.6 Analysis of SAP - by household type

	count(000s), (row%), (column%)				
	Less than 30	30 - 60	60 or more	Total	Mean SAP
Couple under 60	323	2,763	887	3,973	49.0
	(8.1)	(69.5)	(22.3)	(100.0)	
	(18.1)	(19.7)	(16.4)	(18.7)	
Couple 60 or over	373	2,665	710	3,749	47.8
	(10.0)	(71.1)	(18.9)	(100.0)	
	(20.9)	(19.0)	(13.1)	(17.6)	
Couple with children	336	3,402	1,295	5,033	50.3
	(6.7)	(67.6)	(25.7)	(100.0)	
	(18.8)	(24.2)	(23.9)	(23.7)	
Lone parent with children	88	845	521	1,454	53.5
	(6.1)	(58.1)	(35.8)	(100.0)	
	(4.9)	(6.0)	(9.6)	(6.8)	
Large adult household	115	1,007	382	1,505	49.7
	(7.6)	(66.9)	(25.4)	(100.0)	
	(6.4)	(7.2)	(7.1)	(7.1)	
One person under 60	203	1,397	775	2,375	51.9
	(8.5)	(58.8)	(32.6)	(100.0)	
	(11.3)	(9.9)	(14.3)	(11.2)	
One person 60 or over	350	1,965	838	3,153	49.7
	(11.1)	(62.3)	(26.6)	(100.0)	
	(19.6)	(14.0)	(15.5)	(14.8)	
Total	1,789	14,045	5,409	21,242	49.9
	(8.4)	(66.1)	(25.5)	(100.0)	
	(100.0)	(100.0)	(100.0)	(100.0)	

Base: All Dwellings

Table 1.7 Analysis of SAP - by age of household representative

count(000s), (row%), (column%)

	Less than 30	30 - 60	60 or more	Total	Mean SAP
16 - 29	102	1,033	632	1,767	54.0
	(5.8)	(58.5)	(35.8)	(100.0)	
	(5.7)	(7.4)	(11.7)	(8.3)	
30 - 44	357	3,806	1,828	5,991	51.8
	(6.0)	(63.5)	(30.5)	(100.0)	
	(20.0)	(27.1)	(33.8)	(28.2)	
45 - 64	706	5,569	1,682	7,957	48.5
	(8.9)	(70.0)	(21.1)	(100.0)	
	(39.4)	(39.7)	(31.1)	(37.5)	
65 or over	624	3,636	1,266	5,527	48.4
	(11.3)	(65.8)	(22.9)	(100.0)	
	(34.9)	(25.9)	(23.4)	(26.0)	
Total	1,789	14,045	5,409	21,242	49.9
	(8.4)	(66.1)	(25.5)	(100.0)	
	(100.0)	(100.0)	(100.0)	(100.0)	

Base: All Dwellings

Table 1.8 Analysis of SAP - by household income

count(000s), (row%), (column%)

	Less than 30	30 - 60	60 or more	Total	Mean SAP
Q1: <£10k	386	2,487	1,359	4,232	51.9
	(9.1)	(58.8)	(32.1)	(100.0)	
	(21.6)	(17.7)	(25.1)	(19.9)	
Q2: £10k-£16k	390	2,710	1,139	4,239	50.1
	(9.2)	(63.9)	(26.9)	(100.0)	
	(21.8)	(19.3)	(21.1)	(20.0)	
Q3: £17k-£23k	332	2,908	1,006	4,246	49.7
	(7.8)	(68.5)	(23.7)	(100.0)	
	(18.6)	(20.7)	(18.6)	(20.0)	
Q4: £24k-£35k	279	3,009	970	4,258	49.9
	(6.6)	(70.7)	(22.8)	(100.0)	
	(15.6)	(21.4)	(17.9)	(20.0)	
Q5: >£35k	402	2,932	933	4,267	48.0
	(9.4)	(68.7)	(21.9)	(100.0)	
	(22.5)	(20.9)	(17.2)	(20.1)	
Total	1,789	14,045	5,409	21,242	49.9
	(8.4)	(66.1)	(25.5)	(100.0)	
	(100.0)	(100.0)	(100.0)	(100.0)	

Base: All Households