Energy Use in Homes 2004

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 2004 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 2004: 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 energy costs for space and water heating within each dwelling, representing a measure of the dwelling's energy efficiency. A scale of 1 to 120 is used for the rating, with a higher rating indicating a better level of energy efficiency.

The average SAP rating for the stock in 2004 is 51.8, with 20% of dwellings having a SAP rating less than 40 and an equal proportion achieving a rating greater than 65.

Physical characteristics of a dwelling can strongly influence SAP rating. Dwelling age is a particularly important factor. SAP ratings generally decrease for older dwellings, with a lower proportion of old stock having SAP ratings greater than 65, and more having ratings less than 40 than younger stock. The type of dwelling also highly influences SAP rating. Purpose built flats perform particularly well with over 40% achieving ratings greater than 65 – double the proportion of any other dwelling type, however converted flats show the worst SAP ratings with just over 30% having SAP ratings less than 40. Among houses, the number of external walls is an important factor, with detached dwellings gaining the lowest average rating, and mid-terraces the best.

Other factors related to the specifications of the dwelling can determine SAP ratings. For example, the type of heating system and thermal insulation measures installed. 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 of 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 storage heaters and room heaters).

Private rented dwellings have particularly low SAP scores averaging around 13 SAP points lower than RSL stock. This is related to the type of heating prevalent, a lack of thermal insulation measures and the typically earlier construction date of private rented homes.

SAP ratings have increased by 14 points since 1991, at around a point per year. The proportion of dwellings rated at below 40 has decreased from 48% to 20%, with the proportion achieving more than 65 rising from 3% in 1991 to 20% in 2004.

The private rented sector has seen the largest increase in mean SAP since 1991, whilst the North East has become the region with the highest typical energy efficiency ratings – in 1991 it was just behind London and the South East. The targeting of energy efficiency measures at dwellings containing low income households has pushed the mean SAP rating of this group from being the lowest in the 1990s to the highest in 2004.

Energy Efficiency Update Report 2004

Summary

- The mean SAP rating has increased steadily since 1991, with a further rise since the last update report in 2003.
- In 2004, an equal number of dwellings have achieved a SAP rating above 65 as have a rating below 40. This proportion represents one-fifth of the stock, or around 4.3 million dwellings. In 1991 almost one half of all homes had a rating of below 40.
- The social sector, which has seen significant growth during the last 15 years, has the highest energy efficiency ratings. Private rented stock, although still below the overall mean, has seen the largest increase in its SAP ratings.
- The targeting of energy efficiency measures at dwellings containing low income households has pushed the mean SAP rating of this group from being the lowest in the 1990s to the highest in 2004.

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. This report is based on the 2001 SAP methodology which employs a scale of 1 to 120 is used for the rating, with a higher rating indicating a better level of energy efficiency.

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.

This report examines SAP ratings in 2004 as observed by the English House Condition Survey (EHCS). It is based upon a sample of approximately 16,500 dwellings.

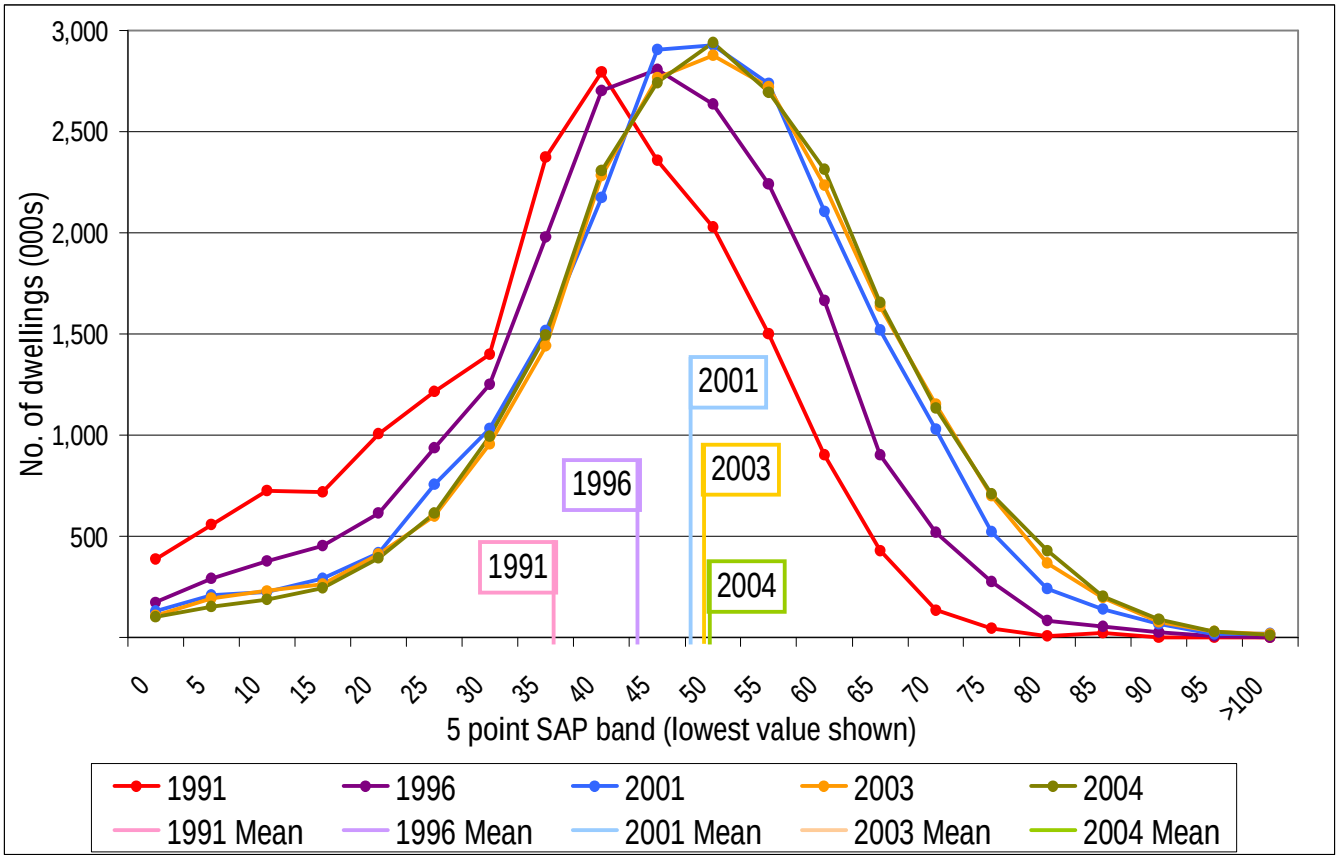

Figure 1: Distributions of 1991 to 2004 SAP ratings

Figure 1 compares the SAP distributions of the 1991, 1996, 2001, 2003 and 2004 EHCS datasets. Over time we see several effects on this distribution, reflecting improvements to thermal insulation and heating standards. The peak of the distribution has moved by around 10 SAP points towards the higher end, along with the overall mean SAP of the stock, which has increased by 14 points in as many years, from 38 in 1991 to nearly 52 in 2004.

We see that the size of the left hand tail of the distribution has shrunk considerably, reflecting the efforts that have been made to improve the energy efficiency of the worst dwellings. The high rating end of the figure has grown each year, with new build stock making up a high proportion of this increase.

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.

Dwelling Analysis

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 65 is becoming an accepted standard at which a household should be able to afford to heat their home to a required level. More precisely a household is unlikely to be fuel poor[1] if their home holds an energy rating of 65 or above.

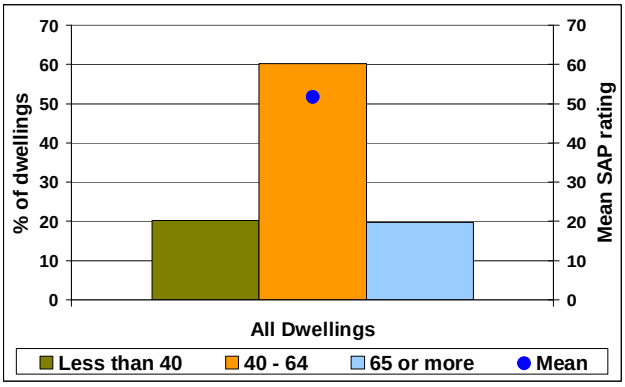

Figure 2: Spread of SAP ratings across all dwellings

Figure 2 shows that, in 2004, precisely 20% of the housing stock has a SAP rating of 65 or greater. We also find that 20% of dwellings have a SAP rating of below 40. Previously 30 SAP points had been used as a minimum standard, but with energy efficiency improvements targeted at this low rating stock, this improved minimum will be considered throughout the report.

This leaves almost exactly 60% of dwellings with SAP ratings between 40 and 65 and we find that this central proportion is approximately the same size for the various categories of dwelling or household that will be reported on. The key measure of energy efficiency is the balance between the 'less than 40' and 'greater than 65' bands.

Dwelling Type

Using the mean and high/low SAP bands to examine energy efficiency by dwelling in Figure 3, we see that no single type matches the pattern shown in the previous figure, with an imbalance between the high and low SAP bands. These are reflected in the range of mean ratings, with the greatest difference being between purpose built flats and converted flats[2]. The latter have a mean of 43, which is 9 points below the stock average, whilst purpose built flats have a mean of almost 61, 9 points above the stock average.

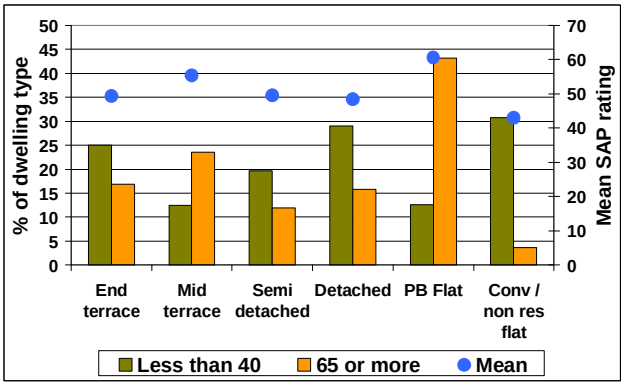

Figure 3: Comparison of highest and lowest SAP ratings by dwelling type

The good performance of the latter category is due to their typically small size and smaller number of external walls, giving a lower heat loss due to conduction through the surface area. They are also more likely to be more recently constructed and therefore benefit from higher insulation and heating standards. The difference in types of flat is emphasised by the proportion with a SAP rating greater than 65: 43% of purpose built flats compared with only 4% of converted flats.

[1] A fuel poor household is one which is required to spend more than 10% of its net income on fuel, in order to maintain a standard comfortable heating regime.

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

The size and shape of houses also has a close relationship with the energy efficiency rating: mid-terraced dwellings have the highest mean SAP and are the only house type in which more homes have a rating higher than 65 than below 40. These are typically smaller than semi-detached and detached dwellings, and, by definition, have fewer external walls, reducing heat losses.

Dwelling Age

There is a distinct correlation between dwelling age and SAP rating. Homes built before 1919 average 42 with 40% of this age group rating at below 40 and only 3% achieving above 65. Dwellings built since 1980 attain far higher SAP ratings, with an average of 66.7. Just 3% of this category has a SAP rating less than 30, whilst almost 59% achieve a SAP rating greater than 70, as shown in Figure 4. This most recent construction date category is one of the few areas in which the majority of dwellings are found outside the central 40 – 65 SAP rating band, identified at the beginning of this section.

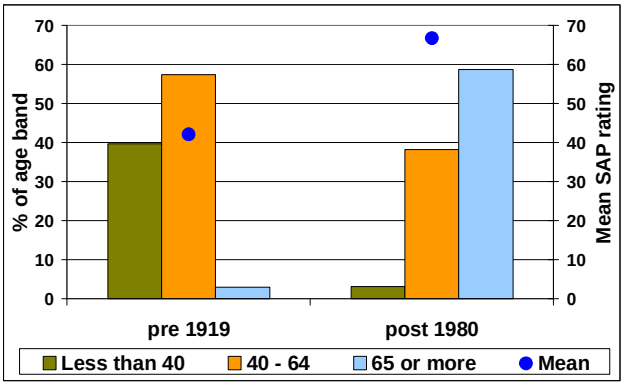

Figure 4: Comparison of SAP distribution within the oldest and newest housing stock

The trend of higher SAP ratings in newer dwellings continues between 1919 and 1980 (see detailed tables), with mean SAP ratings of 47 where the construction date is between 1919 and 1944, 50 between 1945 and 1964 and a mean of 54 in the 1965 to 1980 age band.

Government Office Region (GOR)

Although there are individual differences between each standard GOR, those with similar energy efficiency related characteristics can be grouped as shown in Figure 5. Here, the North consists of the North West, North East and Yorkshire, the Midlands comprises the East and West Midlands and the Eastern region whilst the South East includes London and the South East. The South West has been kept separate due to its individual SAP performance. Two of these areas – the North and the South East, have a SAP above the national average, and correspondingly a higher proportion above 65 than below 40, whilst the Midlands region is slightly below average.

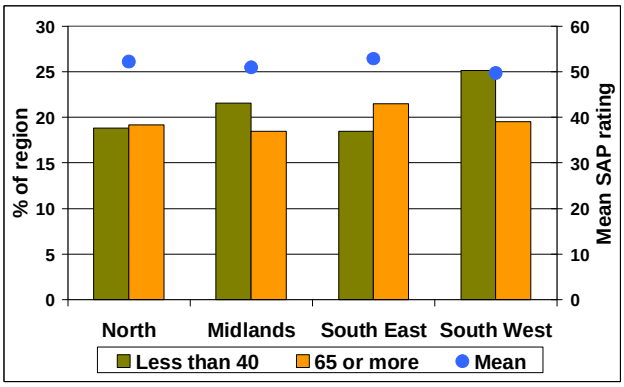

Figure 5: Comparison of highest and lowest SAP ratings by region

The high mean SAP of the North can be attributed to the necessity for better thermal insulation than the average for England due to lower annual temperatures. The high South East mean is partly due to the proportion of flats and the relatively new stock in this region. On the other hand the South West has the lowest mean SAP and the highest proportion of dwellings, around a quarter, with a SAP rating of less than 30. This can be attributed to a relatively high proportion of stock in this region off the gas network and, as a consequence, more non-centrally heated homes, with a relatively high use of heating oil. There is also a lower than average proportion of dwellings with insulated cavity walls in the South West.

Floor Area

The impact of dwelling size (here measured in total floor area) can be seen in Figure 6. The stock has been split into floor area quintiles[3] and the mean and banded SAP ratings compared. We see that higher average SAP ratings are found in homes with smaller floor areas, which can partly be attributed to a high number of energy efficient purpose built flats within the 1st quintile and less energy efficient detached dwellings among the 5th quintile.

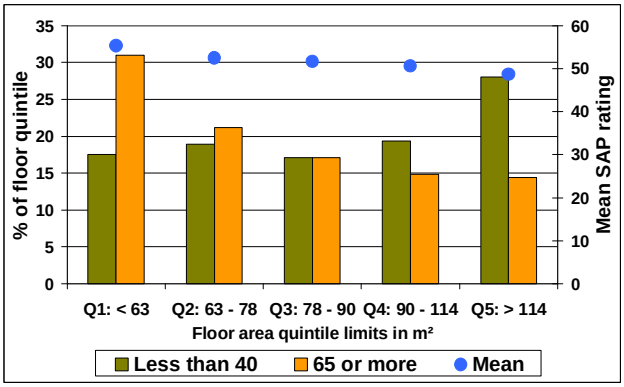

Figure 6: Comparison of highest and lowest SAP ratings by floor area quintile

[3] Five equal bands each representing 20% of the stock.

The mean SAP rating decreases by around 7 points between the smallest and largest quintile, whilst the proportion of dwellings with ratings above 65 falls by half, from 31% to less than 15%.

Energy Efficiency Measures

The SAP rating is, of course, driven by the levels of insulation and types of heating system present in each dwelling, so strong correlations between the system and the score would be expected. However, it is useful to look at the impact that such measures have on the rating, as these measures often predominate in a particular dwelling or household type with a correspondingly high or low mean SAP rating.

Heating Systems

A comparison of central heating systems against non-central heating is shown in Figure 7, with the latter category including all fixed and portable room heaters. A more detailed breakdown of individual heating systems is given below in Table 1.

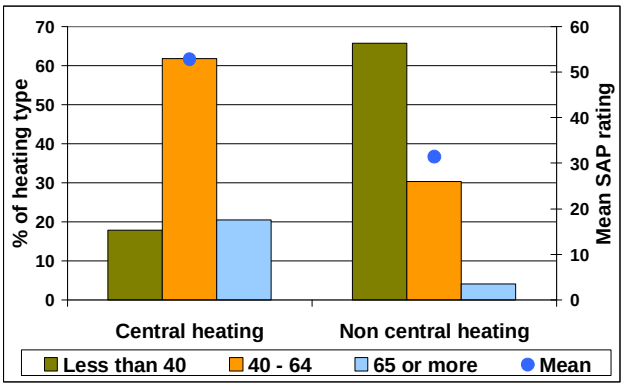

Figure 7: Comparison of SAP distribution by primary heating category

Dwellings using non-central heating systems have significantly lower SAP ratings, with a mean of 31, compared with 53 for centrally heated homes. Only 4% of these dwellings have SAP ratings above 65, whilst centrally heated stock approximates the overall proportion with 20%.

As shown in Table 1, the statistics of dwellings using boiler and warm air systems come close to those of the total stock, whilst communally heated homes have the highest mean SAP and only 7% with ratings below 40. As reported above, dwellings using room and portable heaters have among the lowest SAP ratings, along with storage radiator systems and the small number of other systems used for a dwelling's primary heating.

Type of Heating System	Less than 40	More than 65	Mean SAP
Boiler system with radiators	15%	20%	53.7
Storage radiators	52%	10%	39.3
Warm air system	22%	23%	51.6
Room heater	65%	4%	32.1
Other systems	73%	0%	27.1
Communal	7%	70%	73.0
Portable heaters only	97%	0%	10.8
Total	20%	20%	51.8

Table 1: Comparison of SAP ratings among heating systems

Fuel Use

As with the heating system, the SAP rating of a dwelling depends strongly on the primary fuel used for its heating.

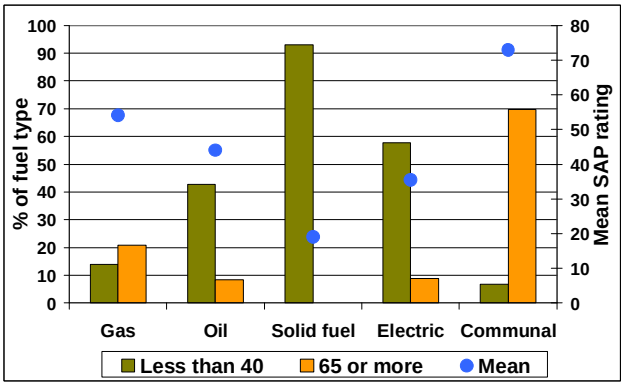

Figure 8: Comparison of SAP ratings by primary heating fuel

In Figure 8, communal heating has been categorised by itself to leave the known fuels that directly supply a dwelling. Of these, gas is the predominant fuel and it also has the highest mean SAP and is also the only fuel with a higher proportion of stock rating at above 65 than below 40. Dwellings with oil, electric and solid fuel systems all have means below the stock average, with no dwellings heated by solid fuel achieving a SAP rating of above 65.

Thermal Insulation

A further key driver of the SAP rating system is thermal insulation measures within a dwelling, therefore a strong correlation between high SAP ratings and effective insulation measures is expected and this is supported by the 2004 data.

Figure 9 shows that dwellings with cavity walls have a higher average SAP rating than non-cavity walled stock, with insulated cavity walls out-performing those without insulation. On average homes with insulated cavity walls have a SAP rating of 61.5, 10 points higher than those with empty cavities, which in turn have a mean SAP 8 points higher than non-cavity walled stock.

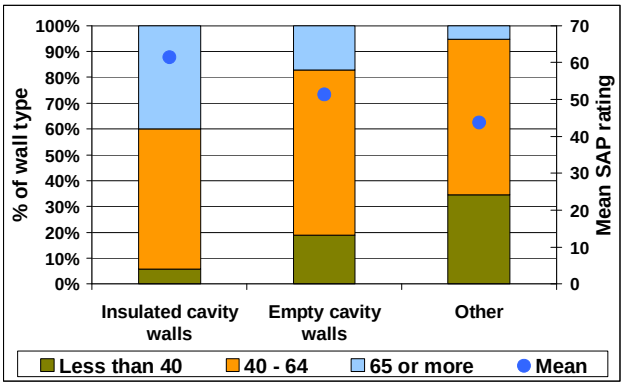

Figure 9: Comparison of SAP distribution by wall type

Those with filled cavities are predominantly newer dwellings with insulation fitted at the time of construction, while solid walls are found more commonly in older stock. Retrospectively fitting insulation to a solid wall can significantly improve the SAP rating, but is often prohibitively expensive.

In Figure 10 we also see a pattern of higher SAP ratings with thicker levels of loft insulation. The mean increases from 36.5 where no insulation is present to over 58 where insulation is greater than 150mm. The 101 – 150mm band is where we first see more dwellings with ratings of over 65 than below 40.

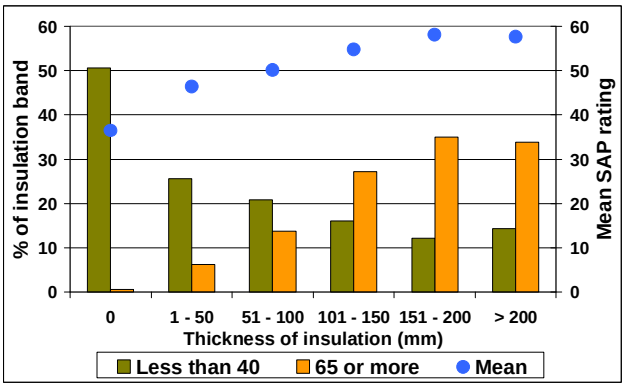

Figure 10: Comparison of highest and lowest SAP ratings by depth of loft insulation

The slight decline in mean SAP where insulation levels are above 200mm can be attributed to the retrospective fitting of this very deep insulation in older stock, which fails to achieve a high level of energy efficiency due to other factors such as solid walls, non-gas fuelled systems or non-central heating.

Another construction element affecting thermal insulation is the extent of double-glazing used in a dwelling. Stock which uses double-glazing in all windows has an average SAP rating of 56, whilst dwellings with little or no double-glazing typically have a SAP rating of 45. We should note, however, that this 11 point difference is only partly due to the extent of double glazing. Other energy efficiency measures are more likely to be found in stock with a lot of double glazing, which will also contribute to a high SAP rating. For example, although dwellings with full double glazing make up just less than 60% of the stock, they account for 71% of homes with insulated cavity walls and just 41% of those with non-cavity walls.

We also find that entirely double-glazed dwellings comprise over 81% of the 'SAP greater than 65' category and only 38% of the 'SAP less than 40' category.

Household Analysis

Tenure

As demonstrated in the accompanying Energy Update 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. Figure 11 compares SAP ratings to quantify the effects of energy efficiency measures within the tenures.

It shows that private rented dwellings have the lowest average SAP rating at 48.5 with 27% of these homes falling into the 'SAP less than 40' category and just over 17% having a SAP greater than 65. This is significantly lower than the most energy efficient tenure, the RSL sector, which averages 61, with only 10.5% of its stock in the lowest SAP band and over 43% above 65. Local authority dwellings reach an average SAP rating of just over 56, while owner occupied homes, which make up the majority of the stock, average 50.5 and have slightly more dwellings with ratings below 40 than above 65.

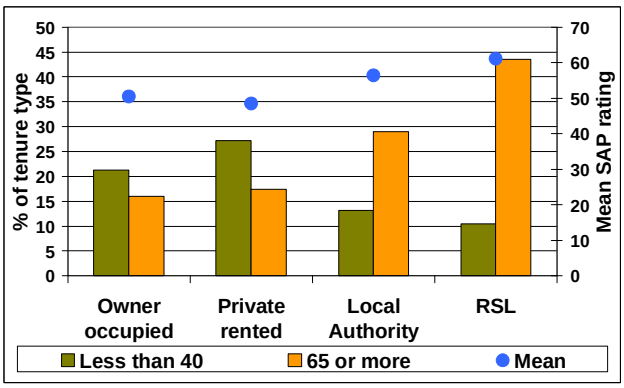

Figure 11: Comparison of SAP distribution by tenure

Comparing the tenure categories to physical features discussed earlier we see that a higher than average proportion of private rented dwellings use non-central heating for their primary space and water heating systems. In particular they rely on electricity as a primary fuel source. This tenure also has the lowest incidence of insulated cavity walls and contains the highest proportion of solid walls as well as having a higher proportion of uninsulated lofts than other tenures. These are all contributory factors to the low energy efficiency performance in this sector.

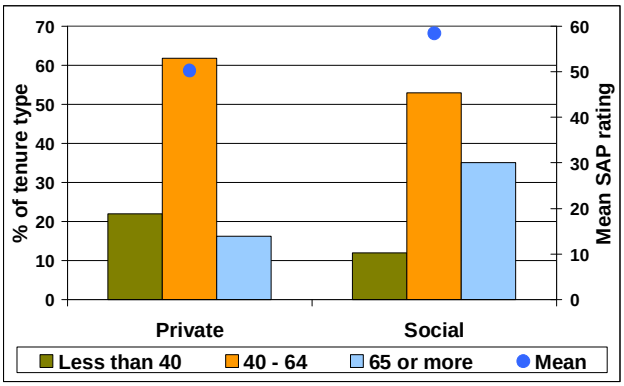

Figure 12: Comparison of SAP distribution by tenure type

Figure 12 further demonstrates the variation in SAP ratings between the tenures by grouping private (owner occupied and private rented) and social (LA and RSL) tenures together. We see that the social sector has 35% of dwellings with a SAP rating greater than 65, more than twice the proportion of private sector stock. The private sector's mean SAP rating is around 8 points below social stock.

Occupancy

Another group that have a typical SAP lower than the overall mean are vacant dwellings as shown in Figure 13. There is a difference of 4 SAP points between these, which comprise just less than 4% of dwellings in 2004.

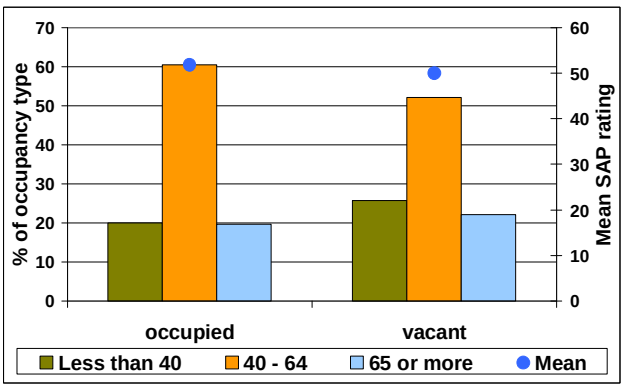

Figure 13: Comparison of SAP distribution by occupancy type

Vacant stock includes 26% with ratings below 40 and we find a large proportion of private rented dwellings here; however there are also a slightly higher proportion of SAP ratings more than 65 within the vacant stock. This is due to a relatively large number of vacant purpose built flats. Again, we find that a high proportion of vacant stock is overly reliant on non-central heating and is poorly insulated when compared to occupied dwellings.

Neighbourhood

A further set of comparisons can be drawn by looking at the nature neighbourhood surrounding a dwelling, shown in Figure 14.

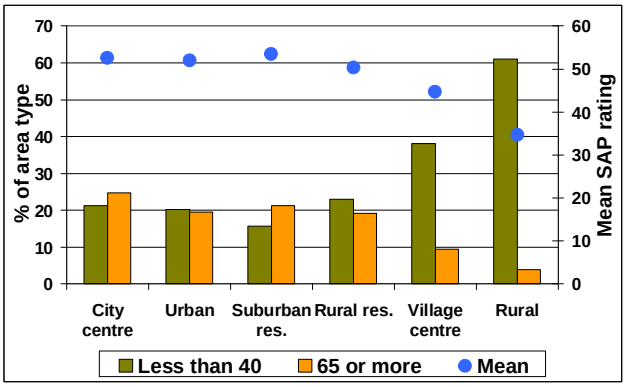

Figure 14: Comparison of SAP distribution by area category

Dwellings in city centre[4], urban[5] or suburban[6] locations achieve above average SAP ratings with 52.6, 52 and 53.5 respectively, whilst village[7] based dwellings average 44.7 and rural[8] stock only 34.7. We find that 61% of rural dwellings have SAP ratings below 40, compared with only 16% of suburban residential stock.

Central heating is predominant in both rural and suburban dwellings; however the high proportion of detached dwellings found in rural stock relies on oil or solid fuels to a far greater extent than the gas powered city and suburban homes. They also have a lower incidence of the more efficient combination boilers; all effects which lead to the lower observed mean SAP rating

Household Type

Table 5 of the appendix of detailed tables compares SAP ratings for seven categories of household composition. These vary according to the type of household, but Figure

[4] The area immediately surrounding the core of large cities.
[5] The area around the core of towns and small cities.
[6] The outer area of a town or city.
[7] Traditional villages or the heart of old villages.
[8] Isolated dwellings, small hamlets.

15 groups the categories into those with similar mean SAP scores.

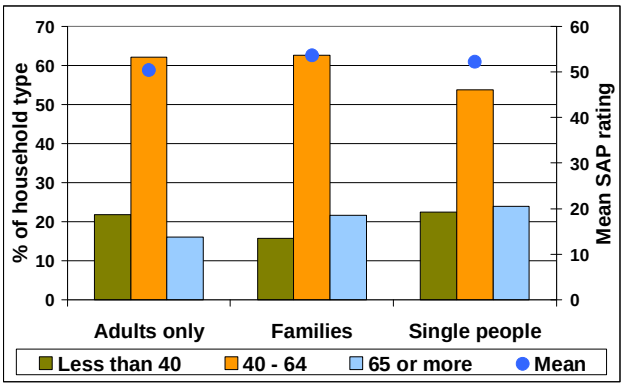

Figure 15: Comparison of SAP distribution by household type

The highest average ratings occur in dwellings containing families with dependent children and either one or both parents; 54.9 and 53.2 respectively. These compare favourably with the typical mean SAP for all single person households of just over 52 and for other household types, (couples and other multi-person households), with a mean of 50.3. Single people have the highest proportion in the 'SAP more than 65' band, reflecting the high incidence of this category residing in purpose built flats.

Families are the most likely to use gas central heating systems, as well as the most likely to have a boiler and to centrally heat their water – both beneficial energy efficiency measures. Over 20% of lone parents with dependent children live in RSL dwellings, which have the highest SAP ratings.

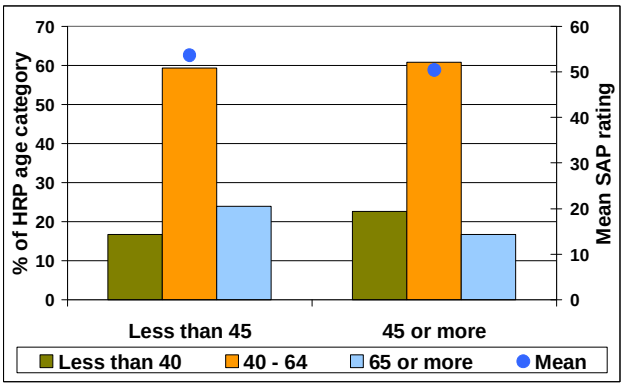

Figure 16: Comparison of SAP distribution by age of household response person

Table 5 of the appendix also suggests a difference in SAP ratings between older and younger households and Figure 16 shows this more clearly. Here we see older households having a lower average SAP than younger households. Households in which the Household Reference Person (HRP) is 45 or older have an average SAP of 50.5, compared to 53.6 where the HRP is below 45. This is partly due to a relatively high proportion of older households living in detached or semi-detached dwellings. A slightly higher proportion also lives in the South West, which has the lowest regional mean SAP.

Income

Examining the mean energy efficiency ratings against income we see very little difference between dwellings containing low and high incomes. Separating the net income of all households into quintiles and looking at the SAP distribution within each quintile, we see only one SAP point between the highest and lowest means, as indicated in Figure 17.

However, examining incomes more closely we find that the lowest income quintile contains more households in dwellings with SAP above 65 than below 40. This pattern gradually inverts as we move into the highest income quintile, where nearly 200,000 more dwellings have ratings in the lower band than the higher band.

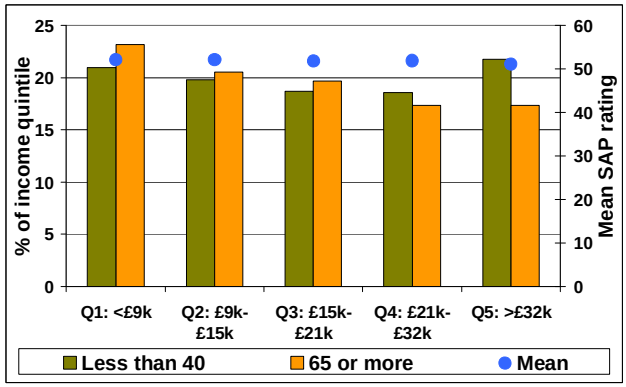

Figure 17: Comparison of highest and lowest SAP ratings by income quintile

One reason for this can be found in the types of dwelling that high and low income households typically live in. We find that 38% of detached houses are occupied by households in the 5th income quintile, while 40% of purpose built flats occur in the 1st income quintile. The high income households in large detached dwellings will be able to afford energy efficiency measures, but the size of the dwelling will restrict its ability to attain a very high SAP rating. Conversely the low income households will benefit from the high average SAP rating achieved by purpose built flats and terraced dwellings, but the poorest may have dwellings in poor repair, reducing their energy efficiency and hence their SAP ratings.

Comparison over time

The average SAP rating of the housing stock has increased by almost 14 points between 1991 and 2004,

gaining a little over a point per year until 2001 since when the increase has slowed slightly. The proportion of dwellings achieving scores above 65 has risen from just 3% in 1991 to 20% in 2004, an increase from 0.6 million dwellings to 4.25 million. The proportion of stock rated at less than 40 has fallen from 48% (9.35 million dwellings) in 1991 to around 20% (4.35 million dwellings) in 2004. This left a central proportion with ratings between 40 and 65 of just below 50% in 1991, rising to 60% in 1996, where it has remained. These figures are illustrated in Figure 18.

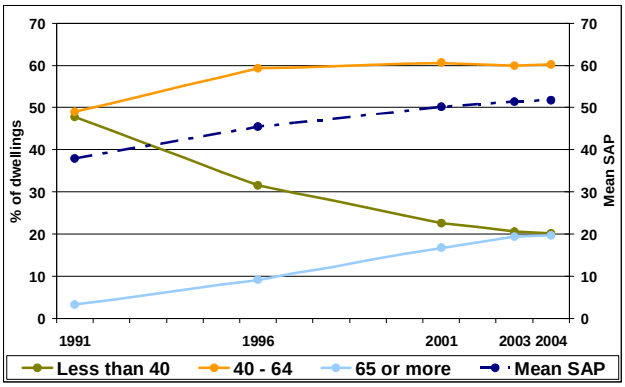

Figure 18: Timeline of SAP ratings for the total stock

Dwelling Type

All categories of dwelling type have seen a steady rise in mean SAP ratings between 1991 and 2004 (Figure 19), with the exception of converted flats which shows a fluctuating pattern, partially explained by the significant decrease in the numbers of this dwelling type over time. Purpose built flats show the largest total mean SAP increase, a rise of 21 points, making this the dwelling type with the highest mean in each survey since 1996.

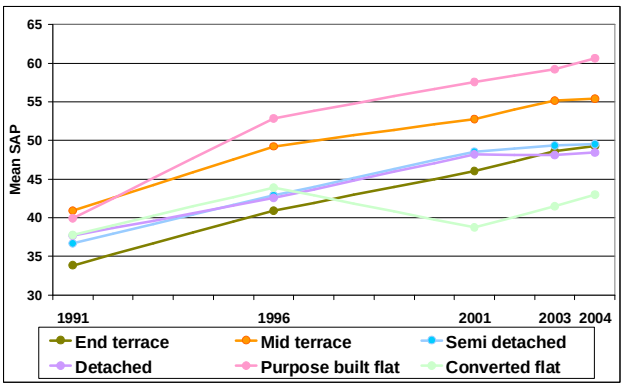

Figure 19: Timeline of mean SAP ratings by dwelling type

Mid-terraced houses come the closest to matching the performance of purpose built flats, whilst end terraces have only recently ceased to be the house profile with the lowest mean. No change in typical ratings of detached houses since 2001 has seen this group this below other house types.

Table 2 gives an alternative view of the relative improvements in energy efficiency. The numbers below each year give the difference in proportion of each dwelling type with ratings above 65 to those below 40. As we see the total figure move towards 0 in 2004, (with 20% of the stock falling in both the highest and lowest SAP bands), we see the purpose built flats indicator rapidly become positive, followed by mid-terraces in 2001.

Type	1991	1996	2001	2003	2004
End terrace	-56	-38	-19	-10	-8
Mid-terrace	-35	-10	2	11	11
Semi-detached	-46	-28	-9	-7	-8
Detached	-52	-38	-15	-14	-13
Purpose built flat	-35	4	19	25	31
Converted flat	-43	-22	-37	-32	-27
Total	-44	-22	-6	-1	0

Table 2: Timeline of spread of SAP distributions by dwelling type

Converted flats are still some way behind, with other house types edging towards parity.

Dwelling Age

Examining the construction date bands by mean SAP rating we see a similar trend for each category, with the order of the age bands unchanged in each survey year (Figure 20). Between 1991 and 2004 we see each mean rising by between 10 and 12 SAP points.

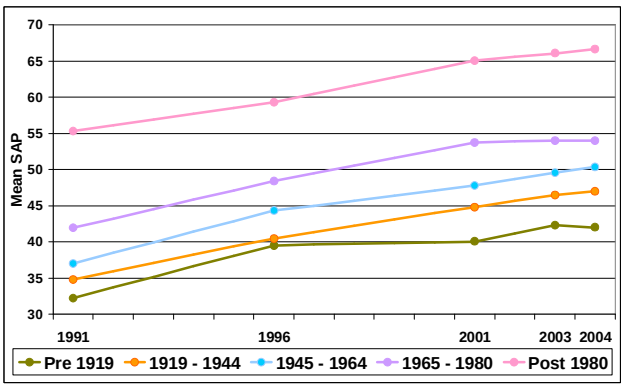

Figure 20: Timeline of mean SAP ratings by dwelling age

After 1996 the smallest increase has come in the oldest stock, suggesting a high level of stock in this category that cannot easily have its energy efficiency measures improved. This is dealt with in more detail in the Hard to Treat Homes focus report. The proportion of post 1980 dwellings with SAP values greater than 65 has increased steeply from 23% in 1991 to 59% in 2004, reflecting the

standards to which new build stock has adhered to during that time.

Government Office Region

Where, in Figure 5, we looked at SAP ratings in groups of GORs, Table 3 displays a league table of each individual region by mean SAP, across each survey year. Here we see the Northern and South Eastern regions towards the top in each year, with the North East in particular improving since 1991. The South West has in general remained below the other regions due to its lower access to mains gas and low levels of cavity wall insulation.

Region	1991	1996	2001	2003	2004
North East	4	2	1	1	1
London	3	1	2	3	2
South East	1	3	3	2	3
North West	5	4	5	4	4
Eastern	2	5	4	7	5
Yorks and Humber	8	6	6	5	6
East Midlands	6	7	7	6	7
West Midlands	7	9	9	8	8
South West	9	8	8	9	9

Table 3: Ranking of region by mean SAP since 1991

Tenure

Figure 21 demonstrates the rise of the social tenures in terms of energy efficiency since 1991. We can clearly see the increase in the RSL and LA sectors overtaking the predominant owner occupied category. The latter has gone from having the highest mean rating in 1991 to the third highest in 2004. RSL stock, in particular, have seen the largest increase in the proportion of dwellings achieving the highest SAP ratings, with the mean rising by nearly 23 points, compared with just 10 points in the owner occupied sector.

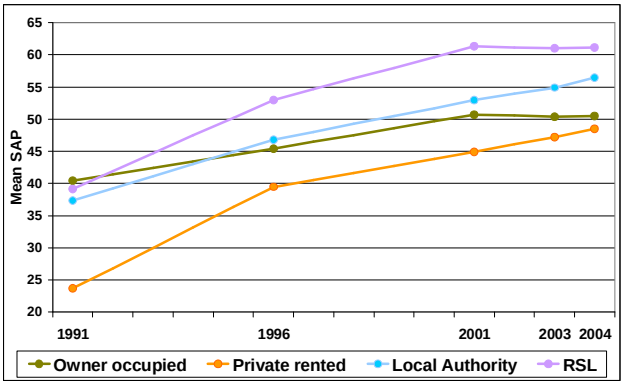

Figure 21: Timeline of mean SAP ratings by tenure

Private rented stock has had the largest overall increase in mean SAP since 1991, up 25 points, partly reflecting the large potential for improvements in this tenure. Table 4 shows the decrease in the difference between the high and low SAP bands in the private sector, now down to a 5% gap in owner occupied dwellings and 10% in private rented. In social stock the proportion gaining SAP ratings of above 65 now significantly outweigh those with ratings below 40.

Tenure	1991	1996	2001	2003	2004
Owner occupied	-40	-24	-8	-5	-5
Private rented	-74	-37	-24	-13	-10
Local Authority	-44	-15	1	11	16
RSL	-36	6	31	33	33
Total	-44	-22	-6	-1	0

Table 4: Timeline of spread of SAP distributions by tenure type

The order of the tenures in terms of average SAP rating is unchanged since 1996, with RSL dwellings showing the greatest rise in the proportion of stock with very high SAP ratings; likely to be due to the increasing amount of better insulated new build stock that is found in this sector. The overall amount of RSL housing has risen from 0.6 million in 1991 to 1.65 million in 2004, more than doubling the share of the total housing stock within this tenure category.

Household Type

The differences between the mean SAP scores among different categories of household are not large, although changes relating to tenure, dwelling type and age of household were discussed earlier.

Type	1991	1996	2001	2003	2004
Couple under 60	-33	-19	-5	-4	-2
Couple, 60 or over	-43	-29	-14	-10	-12
2 parent family	-32	-19	-1	5	4
1 parent family	-39	-16	5	8	12
Other multi person household	-43	-29	-13	-4	-3
One person under 60	-45	-22	-4	4	6
One person, 60 or over	-48	-23	-6	-4	-2
Total	-39	-22	-6	-1	0

Table 5: Timeline of spread of SAP distributions by household category

However, a comparison of the proportions of each household type achieving high and low SAP scores, in Table 5, shows single parent families reach a point at which SAP ratings above 65 outweigh those below 40 in 2001. Older couples without children are still some way behind this point, with the remaining categories close to having no difference between proportions in high and low SAP bands. Although single person households still have relatively low SAP ratings they have seen some of the highest rises since 1991. This reflects the scope for improvement in their dwellings, which are often privately rented, with lower insulation levels and inefficient heating systems.

Income

In 1991 there is a clear pattern of higher mean SAP ratings in dwellings containing higher earning households. In 1996 the pattern is similar but the differences between the income groups has narrowed, whilst since 2001 the gap has decreased further and we now find the highest SAP ratings more typical of low income households, as shown in Figure 22.

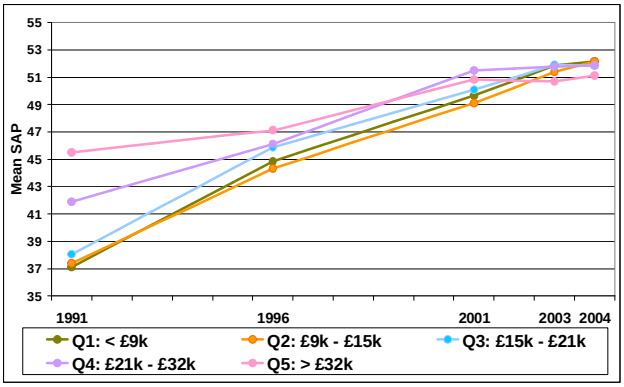

Figure 22: Timeline of mean SAP ratings by income quintile

This suggests that ongoing efforts to target low income households in improving the energy efficiency of their housing since 1991 have been successful and will continue to be so, with the lowest quintiles showing strong recent increases. 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, whilst higher earners are still in the private sector – an area which has seen the smallest increase in SAP ratings.

Household Satisfaction with Heating

A relatively recent development in the EHCS interview survey allows us to look at householders' attitudes to their energy efficiency systems, in particular their satisfaction with water and space heating systems, their insulation effectiveness and whether they are able to keep comfortably warm in winter. Figure 23 shows the satisfaction with space heating, categorised into very, fairly, not very and not at all effective. In each survey there is a clear pattern of greater satisfaction with higher mean SAP ratings.

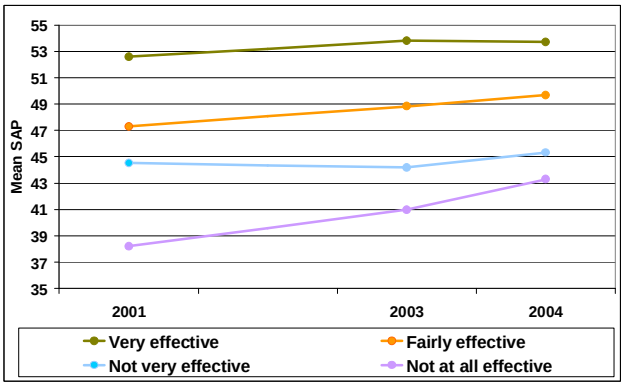

Figure 23: Timeline of mean SAP ratings by household satisfaction with space heating

The trend is similar in attitudes to water heating and insulation, whilst SAP ratings for those households who can keep warm more easily are, unsurprisingly, higher than those who can't. Looking at energy characteristics discussed earlier, we see a higher than average proportion of room and portable heaters being used by those responding 'not very effective' or 'not at all effective', with solid fuel or electricity also featuring strongly in these categories. Comparing the responses over time, the larger increase in mean SAP has been in the least satisfied category. A large proportion of these have come from the private rented sector, which has itself seen a high increase in SAP ratings whilst remaining below the total stock mean.

Conclusions and Future Issues

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 also confirmed categories in which we now expect high levels of energy efficiency, for example the RSL tenure and purpose built flats.

As further combined EHCS datasets are available we can more closely monitor the change in mean SAP rating, to establish whether the slower headline rate of increase seen recently will continue. Future updates will focus analysis of trends on the dwelling types and household groups with the lowest energy efficiency ratings.

Energy Efficiency Update Tables 2004

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 2004.

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Table 1.1 Analysis of SAP - total stock

count(000s), (column%)

SAP Band	Dwellings
Up to 40	4,360
	(20.2)
40 - 64	12,996
	(60.1)
65 or more	4,257
	(19.7)
Total	21,613
	(100.0)
Mean SAP	51.8

Base: All Dwellings

Table 1.2 Analysis of SAP - by dwelling type

	count(000s), (row%), (column%)				
	Up to 40	45 - 64	65 or More	Total	Mean SAP
End terrace	523	1,217	352	2,093	49.3
	(25.0)	(58.2)	(16.8)	(100.0)	
	(12.0)	(9.4)	(8.3)	(9.7)	
Mid terrace	535	2,751	1,013	4,299	55.4
	(12.4)	(64.0)	(23.6)	(100.0)	
	(12.3)	(21.2)	(23.8)	(19.9)	
Semi detached	1,322	4,609	807	6,738	49.5
	(19.6)	(68.4)	(12.0)	(100.0)	
	(30.3)	(35.5)	(19.0)	(31.2)	
Detached	1,401	2,659	764	4,824	48.4
	(29.0)	(55.1)	(15.8)	(100.0)	
	(32.1)	(20.5)	(18.0)	(22.3)	
Purpose built flat	378	1,330	1,297	3,005	60.6
	(12.6)	(44.3)	(43.1)	(100.0)	
	(8.7)	(10.2)	(30.5)	(13.9)	
Converted flat	201	429	24	654	43.0
	(30.8)	(65.6)	(3.6)	(100.0)	
	(4.6)	(3.3)	(0.6)	(3.0)	
Total	4,360	12,996	4,257	21,613	51.8
	(20.2)	(60.1)	(19.7)	(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%)

	Up to 40	45 - 64	65 or More	Total	Mean SAP
Pre 1919	1,821	2,630	133	4,584	42.0
	(39.7)	(57.4)	(2.9)	(100.0)	
	(41.8)	(20.2)	(3.1)	(21.2)	
1919 - 1944	919	2,708	229	3,856	47.0
	(23.8)	(70.2)	(5.9)	(100.0)	
	(21.1)	(20.8)	(5.4)	(17.8)	
1945 - 1964	789	3,194	507	4,489	50.3
	(17.6)	(71.1)	(11.3)	(100.0)	
	(18.1)	(24.6)	(11.9)	(20.8)	
1965 - 1980	706	2,959	1,072	4,738	54.0
	(14.9)	(62.5)	(22.6)	(100.0)	
	(16.2)	(22.8)	(25.2)	(21.9)	
1981 - 1990	101	1,113	718	1,931	61.4
	(5.2)	(57.6)	(37.2)	(100.0)	
	(2.3)	(8.6)	(16.9)	(8.9)	
Post 1990	25	393	1,598	2,015	71.7
	(1.2)	(19.5)	(79.3)	(100.0)	
	(0.6)	(3.0)	(37.5)	(9.3)	
Total	4,360	12,996	4,257	21,613	51.8
	(20.2)	(60.1)	(19.7)	(100.0)	
	(100.0)	(100.0)	(100.0)	(100.0)	

Base: All Dwellings

Table 1.4 Analysis of SAP - by tenure type

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

	Up to 40	45 - 64	65 or More	Total	Mean SAP
Owner occupied	3,242	9,587	2,450	15,279	50.5
	(21.2)	(62.7)	(16.0)	(100.0)	
	(74.4)	(73.8)	(57.6)	(70.7)	
Private rented	636	1,293	405	2,334	48.5
	(27.2)	(55.4)	(17.4)	(100.0)	
	(14.6)	(10.0)	(9.5)	(10.8)	
Local Authority	307	1,351	677	2,335	56.4
	(13.1)	(57.9)	(29.0)	(100.0)	
	(7.0)	(10.4)	(15.9)	(10.8)	
RSL	175	765	725	1,665	61.2
	(10.5)	(45.9)	(43.6)	(100.0)	
	(4.0)	(5.9)	(17.0)	(7.7)	
Total	4,360	12,996	4,257	21,613	51.8
	(20.2)	(60.1)	(19.7)	(100.0)	
	(100.0)	(100.0)	(100.0)	(100.0)	

Base: All Dwellings

Table 1.5 Analysis of SAP - by household type

	count(000s), (row%), (column%)				
	Up to 40	45 - 64	65 or More	Total	Mean SAP
Couple under 60	833	2,615	732	4,179	51.3
	(19.9)	(62.6)	(17.5)	(100.0)	
	(20.0)	(20.8)	(17.9)	(20.1)	
Couple 60 or over	802	2,133	414	3,349	49.1
	(23.9)	(63.7)	(12.4)	(100.0)	
	(19.3)	(17.0)	(10.1)	(16.1)	
Couple with children	778	3,148	981	4,906	53.2
	(15.9)	(64.2)	(20.0)	(100.0)	
	(18.7)	(25.0)	(24.0)	(23.6)	
Lone parent with children	227	849	401	1,476	54.9
	(15.3)	(57.5)	(27.2)	(100.0)	
	(5.5)	(6.7)	(9.8)	(7.1)	
Large adult household	289	890	247	1,426	50.8
	(20.3)	(62.4)	(17.3)	(100.0)	
	(7.0)	(7.1)	(6.0)	(6.9)	
One person under 60	510	1,342	658	2,511	53.1
	(20.3)	(53.5)	(26.2)	(100.0)	
	(12.3)	(10.7)	(16.1)	(12.1)	
One person 60 or over	716	1,603	648	2,966	51.4
	(24.1)	(54.0)	(21.8)	(100.0)	
	(17.2)	(12.7)	(15.9)	(14.3)	
Total	4,154	12,580	4,081	20,814	51.8
	(20.0)	(60.4)	(19.6)	(100.0)	
	(100.0)	(100.0)	(100.0)	(100.0)	

Base: All Dwellings

Table 1.6 Analysis of SAP - by floor area

	count(000s), (row%), (column%)				
	Up to 40	45 - 64	65 or More	Total	Mean SAP
Quintile 1: < 63m^2	758	2,225	1,340	4,323	55.3
	(17.5)	(51.5)	(31.0)	(100.0)	
	(17.4)	(17.1)	(31.5)	(20.0)	
Quintile 2: 63m² - 78m²	816	2,589	915	4,320	52.5
	(18.9)	(59.9)	(21.2)	(100.0)	
	(18.7)	(19.9)	(21.5)	(20.0)	
Quintile 3: 78m² - 90m²	737	2,849	739	4,325	51.7
	(17.0)	(65.9)	(17.1)	(100.0)	
	(16.9)	(21.9)	(17.4)	(20.0)	
Quintile 4: 90m² - 114m²	838	2,844	640	4,322	50.6
	(19.4)	(65.8)	(14.8)	(100.0)	
	(19.2)	(21.9)	(15.0)	(20.0)	
Quintile 5: > 114m²	1,210	2,489	623	4,322	48.7
	(28.0)	(57.6)	(14.4)	(100.0)	
	(27.8)	(19.2)	(14.6)	(20.0)	
Total	4,360	12,996	4,257	21,613	51.8
	(20.2)	(60.1)	(19.7)	(100.0)	
	(100.0)	(100.0)	(100.0)	(100.0)	

Base: All Dwellings

Table 1.7 Analysis of SAP - by household income

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

	Up to 40	45 - 64	65 or More	Total	Mean SAP
Quintile 1: < £9k	871	2,316	961	4,149	52.1
	(21.0)	(55.8)	(23.2)	(100.0)	
	(21.0)	(18.4)	(23.6)	(19.9)	
Quintile 2: £9k - £15k	822	2,482	854	4,158	52.2
	(19.8)	(59.7)	(20.5)	(100.0)	
	(19.8)	(19.7)	(20.9)	(20.0)	
Quintile 3: £15k - £21k	777	2,560	816	4,153	51.8
	(18.7)	(61.6)	(19.7)	(100.0)	
	(18.7)	(20.3)	(20.0)	(20.0)	
Quintile 4: £21k - £32k	775	2,677	725	4,177	51.9
	(18.6)	(64.1)	(17.3)	(100.0)	
	(18.7)	(21.3)	(17.8)	(20.1)	
Quintile 5: > £32k	908	2,544	724	4,177	51.1
	(21.7)	(60.9)	(17.3)	(100.0)	
	(21.9)	(20.2)	(17.8)	(20.1)	
Total	4,154	12,580	4,081	20,814	51.8
	(20.0)	(60.4)	(19.6)	(100.0)	
	(100.0)	(100.0)	(100.0)	(100.0)	

Base: All Households