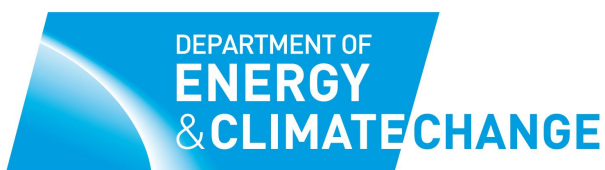


Energy Use in Homes 2007

**A series of reports on domestic energy use in
England**

Space and Water Heating



Energy Use in Homes 2007

A series of reports on domestic energy use in England

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

The 2007 EHCS Energy Analysis has been prepared by BRE Housing with the funding and support of the Department of Energy and Climate Change (DECC) through a contract managed by the Energy Saving Trust. This publication is Crown Copyright. For any further information please contact nowakt@bre.co.uk

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Energy Use in Homes 2007: Space and Water Heating

Executive Summary

In 2007, conventional central heating (boiler driven system with radiators) is the predominant form of space heating found in the English housing stock. This type of heating system is present in 87% of dwellings (19.3 million dwellings), which is a rise of 0.4 million since 2006 and 5.4 million since 1991. Over the same period, the numbers of dwellings with room heaters have decreased significantly. Although the percentage of dwellings heated by storage radiators may have increased since 1991, since 2005 it has begun to decline. The proportion of dwellings heated by communal heating systems has risen since 1991; this type of heating system is most common in purpose built flats.

Most conventional central heating systems are fuelled by gas, resulting in 84% of the housing stock using this fuel in 2007. This is an increase from 78% in 1991. Oil fired heating systems have also increased, due to the installation of oil fired central heating in rural areas where access to mains gas is less common. The proportions of electric and solid fuelled heating systems have decreased since 1991.

Several different types of boiler power conventional central heating and water heating systems in the stock. The standard boiler is the most common type of boiler found in English dwellings. It is present in 39.6% of the stock, but it has seen a decline in numbers since 1991. The back boiler and dwellings with no boiler at all have seen a decrease during this period. Combination boilers have seen a significant increase in use since 1991, rising from a proportion of 1.2% in 1991 to 28.3% in 2007, although this is a slight decrease from the peak of 28.7% in 2005. Since 2004, the proportion of condensing boilers has increased dramatically, rising from 3% to 12% in 2007. This is due to the introduction of new building regulations in 2005, stating that all new and replacement boilers should be condensing. The condensing combination boiler has proved more popular than the standard condensing boiler. Due to the convenience of not requiring a water tank or hot water cylinder, combination boilers (both non-condensing and condensing) have grown in popularity in recent years. They are easier to install as they require less space, and so are appropriate for smaller dwellings that would not be suitable for other boiler driven systems.

Most dwellings have some form of secondary heating to act as a back up to the main heating system and the most common secondary systems are room heaters, found in 70.2% of English dwellings. The proportion of dwellings using these for secondary heating has increased since 1991, as the proportion of dwellings with no secondary heating has decreased. This either suggests the installation of room heaters in rooms not covered by central or storage heating, or an existing set of room heaters becoming secondary when central heating has been installed. The most common types of room heaters used for secondary space heating are mains gas open or balanced flue heaters; electric panel, convector or radiant heaters; solid fuel open fires; and mains gas live effect and decorative fires. Despite this, a significant proportion of the stock has no secondary heating system (27.2%).

In 87% of dwellings the main system for provision of hot water is the same system that runs the central heating. Since 1991 the percentage of dwellings with this type of water heating has risen (from 73%), whilst the percentage of dwellings with electric immersion heaters as the main system for provision of hot water has decreased. Roughly half of all dwellings still have an electric immersion heater, however in many cases it is used as a back up system to the hot water provided by the central heating system.

Space and Water Heating Update Report 2007

Summary

- Since 2006, the proportion of conventional systems has continued to rise; along with gas fired heating systems and water heated using the same system as the central heating.
- Along with the rise in conventional heating systems, and due to the recent change in building regulations, the proportion of condensing boilers has increased since 2006.
- Flats and other small dwellings use the most diverse range of space and water heating systems and fuels in the stock. Larger dwellings almost entirely rely on conventional heating systems.

Introduction

This report looks at the space and water heating systems found in the English housing stock in 2007. The heating systems and the fuels used are looked at and compared to different dwelling and household characteristics such as dwelling type, age, and household income. They are also looked at in relation to time, using data from previous English House Condition Surveys.

Since 2002 the EHCS has run in a continuous format, providing annual data which is then analysed in two year datasets. This report analyses data from 2006-2007¹ dataset and compares this to data from the previous continuous surveys and to surveys carried out in 1991, 1996 and 2001.

Primary Heating Systems

This section of the report looks at the primary space heating systems present within dwellings in England. The most predominant system in dwellings in England is a boiler system with radiators (see Table 1). In these systems, water is heated by a boiler and distributed to radiators throughout the dwelling.

Figure 1 shows the change in the percentage of English housing stock with boiler systems with radiators against all other heating systems over time. Between 1991 and 2007 the proportion of the boiler systems with radiators has increased by roughly 16% (5.4 million dwellings) to 87% (19.3 million dwellings). Between 2006 and 2007, the number of dwellings with these conventional central heating systems has risen by 0.4 million. 0.2 million new dwellings were built over this period, the majority of which

would have been fitted with a boiler system with radiators. The use of non-boiler space heating systems has declined since 2006.

Primary heating system	Percentage of total stock (%)
Boiler system with radiators	86.8
Storage radiators	7.0
Warm air system	1.1
Room heater	3.3
Other systems	0.1
Communal	1.5
Portable heaters only	0.2
Total	100.0

Table 1: Distribution of Primary Heating Systems.

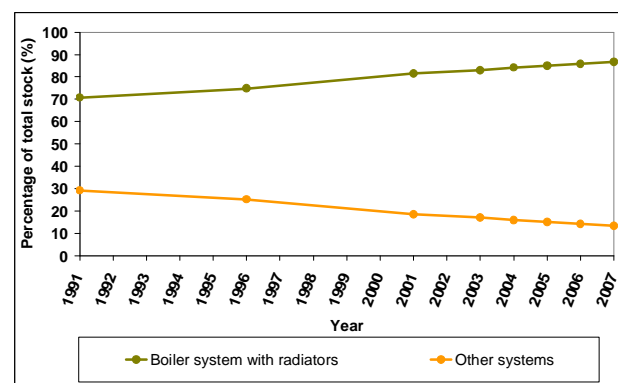


Figure 1: Timeline of boiler systems with radiators against other systems.

After conventional heating systems, storage radiators the second most predominant type of heating system are storage radiators. Storage radiators use off-peak electricity to store heat (in high density bricks), which is released throughout the course of the day.

Figure 2 shows the changes in the percentages of primary heating systems, other than those with boilers and radiators, in the English housing stock since 1991. In 1991 storage radiators were the third most common type of primary heating system. The percentage of these systems increased from 6% in 1991 to 8% in 1996, then levelled out between 2001 and 2005, but decreased slightly to 7% in 2006 where it remains for 2007.

The use of fixed room heaters such as mains gas fires, electric panel heaters and solid fuel open fires, as the primary heating source, has decreased from 18% in 1991, when they were the second most common form of primary heating system, to 3% of the stock in 2007. The use of less common heating systems such as warm air systems and portable heaters has also decreased over this period.

¹ The 2006-2007 combined dataset contains data collected between April 2006 and March 2008.

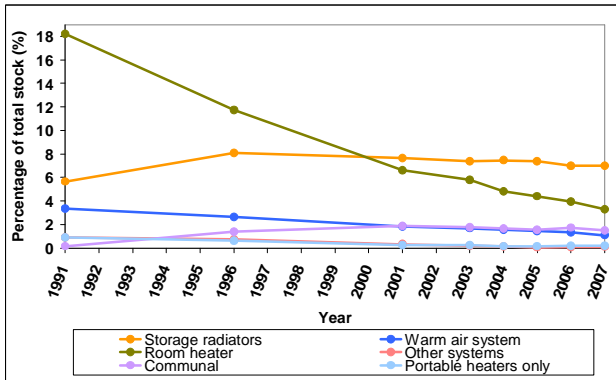


Figure 2: Timeline of other primary heating systems.

Communal heating systems are those that serve more than one dwelling. Although these systems are still rare they have become more common since 1991. Having risen to 2% of the English housing stock by 2001 proportions remained fairly constant, dipping only slightly to 1.5% in 2007. The proportion of other systems such as electric under floor or ceiling heating has declined since 1991.

A comparison of the primary heating system types with the household satisfaction rating for the heating system is shown in Figure 3. The satisfaction ratings range from very effective to not at all effective. 93% of households that have conventional central heating rate the heating system as being either very or fairly effective. The perceived effectiveness of this type of system has probably been a factor in the increasing proportions of this type of heating system, as new or replacement heating systems are installed. No households with portable heaters as their primary heating system view them as very effective, with more than half feeling that they are not very, or not at all effective as a primary heating system.

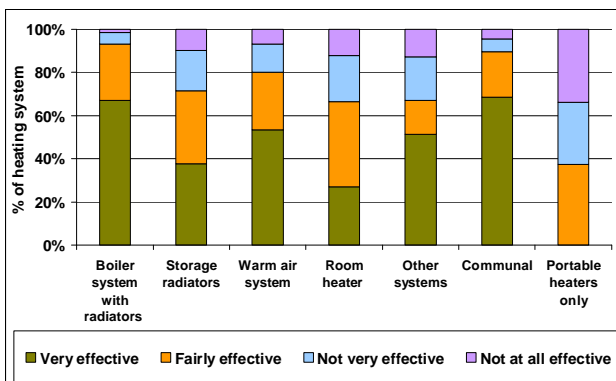


Figure 3: Comparison of space heating systems by household satisfaction rating for heating.

Dwelling Type

Figure 4 shows that houses are much more likely to have conventional heating systems than flats. Quite a large proportion of flats have either storage radiators or a communal system as their primary heating system. In

fact, over 90% of communal systems present in the English housing stock are installed in flats (both purpose built and converted).

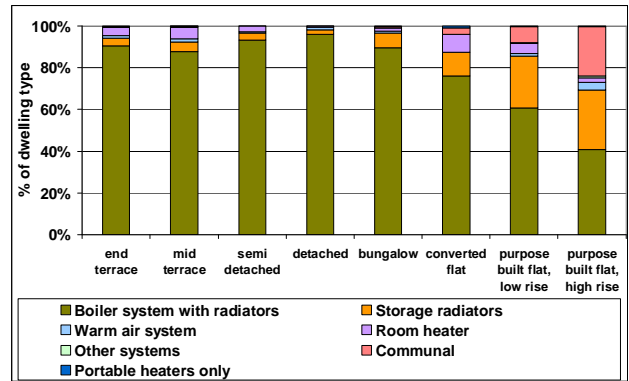


Figure 4: Comparison of space heating systems by dwelling type.

Figure 5 compares primary heating systems with the construction date of the dwelling. Conventional central heating is the most common form of primary heating in dwellings of all ages. Alternative methods of heating dwellings are most popular in houses built between 1965 and 1990. Storage heaters are more common in dwellings built post 1980 (15% of dwellings built between 1980 and 1990, and 9% of dwellings built post 1990); this can be credited to the larger proportion of flats built during this time period (as shown in Figure 4, storage radiators are most popular in flats).

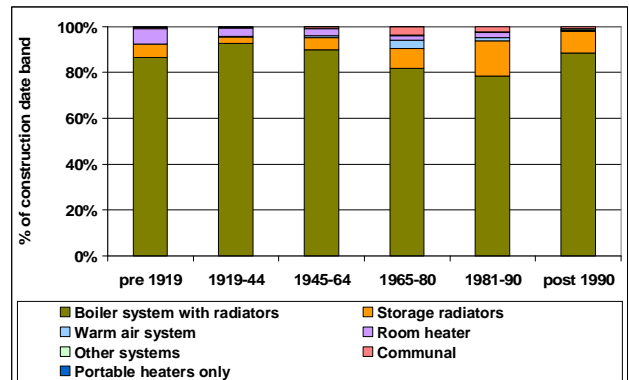


Figure 5: Comparison of space heating systems by dwelling construction date.

The use of room heaters as the primary heating source for a dwelling is less common in dwellings built post 1965. Warm air systems are most common in dwellings built between 1965 and 1980 because these systems were typically installed in the 1960's and 1970's, as were other systems such as electric underfloor or ceiling heating. 65% of communal systems are present in houses constructed between 1965 and 1990.

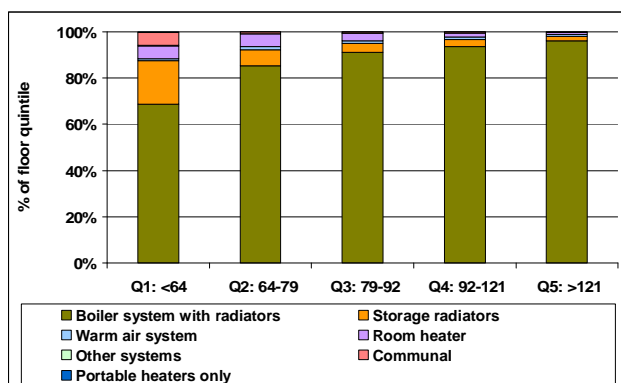


Figure 6: Comparison of space heating systems by floor area quintiles.

Figure 6 shows that there is strong correlation between the total floor area of dwellings and the type of primary space heating system installed in the dwelling. Conventional central heating is the predominant type of space heating for all floor area quintiles (floor areas are split into five equal groups). However, the smaller the floor area (in terms of quintiles), the more alternative types of primary heating system are used. Only 69% of dwellings with a floor area of less than 64 m² (Q1) have a conventional central heating system, compared with 96% of dwellings with a floor area greater than 121 m² (Q5).

Dwelling Location

Government office Region	% Boiler system with radiators	% Storage radiators	% Room heater
East Midlands	91.2	4.5	2.4
North East	89.7	4.8	2.4
North West	89.1	4.3	5
Yorks & Humber	89	3.8	5
West Midlands	86.4	7.5	3.6
East England	85.6	9.7	2.1
London	85	7.4	2.4
South East	84.9	8.6	2.7
South West	83.5	10.4	4.2
All	86.8	7.0	3.3

Table 2: Comparison of the key space heating systems by region.

The area with the largest proportion of conventional central heating systems is the East Midlands (91.2%), followed closely by the North East, North West and Yorks & Humber areas (all around 90%, see Table 2). The area with the lowest proportion of boiler systems with radiators as the primary heating system is the South West, with only 83.5% of homes having a conventional central heating system. The proportion of these conventional central heating systems has increased in both the East Midlands

(from 89.2%) and the South West (from 83.1%) amongst others since 2006. The percentage of storage radiators has increased in the 3 regions with the lowest proportion of conventional heating systems since 2006 while overall the proportion of storage radiators has remained constant at 7%.

Tenure

Figure 7 shows a comparison of primary space heating systems with tenure. Private rented accommodation has the lowest proportion of conventional central heating, with 76% compared to 90% in owner occupied dwellings. The proportion of boiler systems with radiators is also below 80% in RSL dwellings. Private rented dwellings also have the highest proportion of dwelling heated by storage radiators (13%) and room heaters (7%). Communal heating is most common in local authority dwelling and RSL dwellings (6% of dwellings in each tenure group) whereas it is almost non-existent in owner occupied dwellings (0.2%).

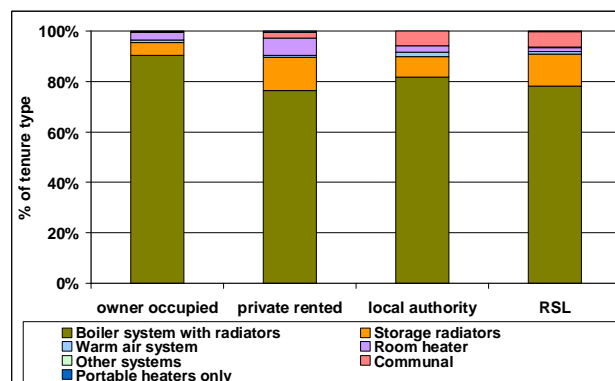


Figure 7: Comparison of space heating system by tenure.

Owner occupied dwellings have the highest proportion of conventional central heating. This can be partially attributed to the fact that this tenure group has the highest proportion of detached and semi-detached houses (55% of owner occupied dwellings), which have a high proportion of boiler systems (see Figure 4). As owner occupiers have a greater degree of certainty and control with regards to their home, systems which are perceived as more effective such as boiler systems with radiators, are more common.

Due to the high proportion of purpose built flats associated with Local Authority and RSL housing (39% and 35% respectively), this tenure group has a relatively high proportion of communal heating (around 6% of the social sector compared to less than 1% of owner occupied stock).

94% of owner occupiers perceive their primary space heating system to be either very or fairly effective; this correlates well with the high percentage of boiler systems

with radiators found in this sector. It also follows that an owner occupier with a relatively large amount of control over what is used within their home would want a system that they perceive to be effective. Conversely only 79% of those in private rented accommodation consider their primary heating system to be either very or fairly effective. Less than half (49%) of householders in the private rented sector would perceive their primary heating as very effective. This correlates well with the high percentage of less energy efficient room heaters and storage radiators in this sector. Local Authority and RSL housing fairs better than private rented accommodation, with 83% and 86% of householders respectively considering their heating to be either very or fairly effective. This may be due to the higher percentage of communal and boiler systems with radiators than in private rented dwellings.

Household Type

A comparison of the primary space heating types within household groups is shown in Figure 8. Single person households (one person under 60 and one person 60 or over) have the lowest proportion of conventional heating systems (under 70%) and hence have the highest incidence of non conventional heating systems such as storage radiators and room heaters, as well as communal heating. The reason for this is that single people tend to live in smaller dwellings such as flats or bungalows, as oppose to larger households which require more space and hence larger dwellings. As can be seen from Figure 6, smaller dwellings have a higher proportion of non conventional heating systems than larger dwellings, and Figure 4 shows that flats and bungalows (traditionally smaller dwellings) also tend to have a higher proportion of non conventional heating systems such as storage radiators.

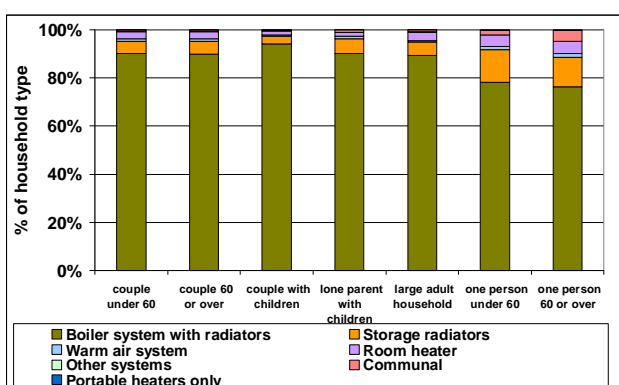


Figure 8: Comparison of space heating system by household group.

The net income of a household also affects the type of primary space heating system (see Figure 9). The higher the income of the household, the higher the proportion of conventional central heating systems. 95% of households with an income above £35,000 have a boiler system with radiators for space heating, compared with only 80% of households with an income of less than £11,000. The

percentage of storage radiator systems gradually declines as income decreases (from 11% in Q1 to 3% in Q5).

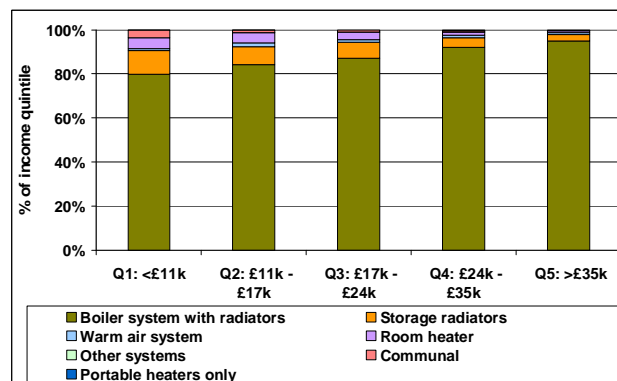


Figure 9: Comparison of space heating system by household income.

Almost 70% of households with an income in the highest quintile live in a detached or semi-detached house compared to just over a quarter of households in the lowest income quintile. Contrast this with the fact that only 8% of households in the highest income quintile live in flats and 30% of households with income less than £11,000 live in flats and it is clear that households with higher incomes tend to live in dwellings that tend to have a higher proportion of boiler systems with radiators (i.e. detached and semi-detached houses, see Figure 9). On the other side of the coin more households with low incomes live in dwellings that have a higher proportion of non conventional heating systems (such as flats, see Figure 4).

Space Heating Fuels

This section of the report considers the fuels used to run the primary space heating systems. The most common fuel used for space heating is gas (including mains gas, LPG and bottled gas), 84% of the English housing stock have gas fired heating systems (see Table 3). Most conventional central heating systems run on mains gas, whilst warm air systems and fixed room heaters are also likely to be fuelled by gas.

Primary heating fuel	Percentage of total stock (%)
Gas fired system	84.4
Oil fired system	4.3
Solid fuel fired system	1.4
Electrical system	8.4
Communal system	1.5
Total	100.0

Table 3: Distribution of Space Heating Fuels.

The predominance of gas fired heating systems has grown since 1991 (see Figure 11) from 78% of the total

stock (15.3 million dwellings), to the current level or 84% (18.7 million dwellings). The overall proportion of other fuels has decreased over this time period.

Focus on: Solid fuels.

Solid fuels used within the English housing stock as a main heating fuel consisted of house coal, smokeless fuel, anthracite nuts and wood. Of these four fuels house coal and smokeless fuel are the most commonly used, constituting 76% of all solid fuel fired systems. More than a fifth of dwellings using solid fuels as their main heating fuel are in Yorkshire and The Humber, whereas only 2% of dwellings heated by solid fuel are found in London. For the most part, solid fuel is utilised by rural dwellings, with 57% of dwellings using solid fuel as their main heat source located in a rural area. Solid fuel does not tend to be used as the main heating fuel in particularly large or small dwellings.

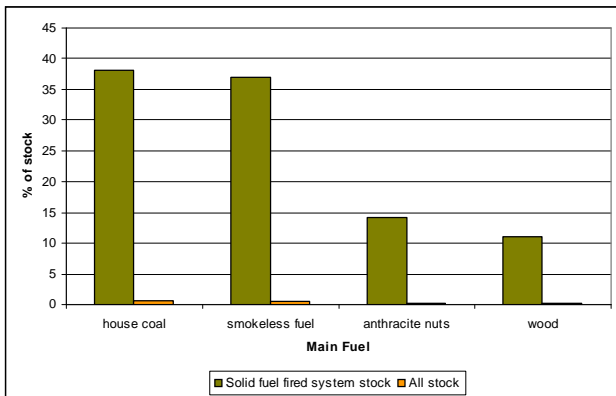


Figure 10: Main fuel used in solid fuel fired and all stock

Dwellings with solid fuel fired systems are either boiler systems with radiators (73%, compared with 87% of all dwellings using these systems), or room heaters (27%). They also tend to be much older systems, with 72% of solid fuel fired systems aged 12 years or older. That is more than double the proportion of old heating systems for the total stock. Only 9% of solid fuel fired systems are less than 3 years old, indicating that unless they are forced to, people generally choose non solid fuel fired systems. The use of solid fuel tends to be more prevalent with low income households, again suggesting that given the choice, and the capability, people would not opt for solid fuel fired systems. Only 9% of solid fuel fired systems are found in dwellings occupied by households in the highest income quintile.

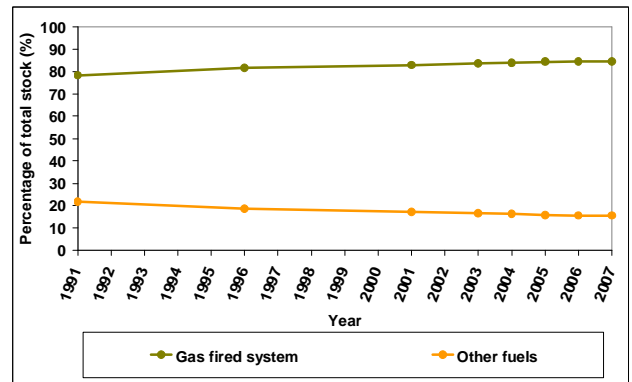


Figure 11: Timeline of gas fired heating systems against other fuel types.

Figure 12 shows a timeline from 1991 to 2007 for all non-gas heating fuels. The decrease in the proportions of electric and solid fuel fired systems can be attributed to the decline in the use of room heaters and portable heaters since 1991.

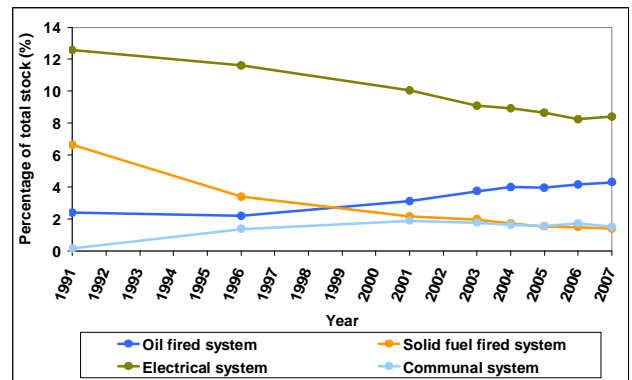


Figure 12: Timeline of other heating fuels.

There has been an increase in oil fired heating systems since 1991 from 2% to 4% of the housing stock. This increase is mainly due to a rise in oil fired conventional central heating in areas that do not have access to mains gas.

Dwelling Type

Figure 13 shows a comparison of space heating fuels with dwelling type. Unsurprisingly flats have the largest proportion of electrical fired systems. This fits in with the fact that flats have the largest proportion of storage radiators (which are fuelled by electricity), as well as a high number of room heaters as a primary heating system, as shown in Figure 4.

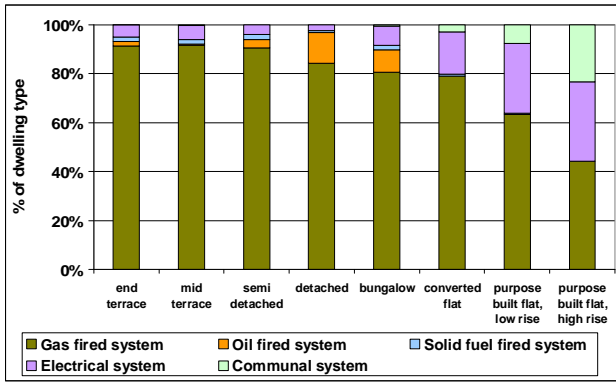


Figure 13: Comparison of space heating fuels by dwelling type.

Gas is the most common heating fuel for all dwelling types, because of the prevalence of conventional central heating in England. In five of the eight dwelling types looked at over 80% of the heating systems are gas fired. Flats are the only dwelling types that have a significant proportion of their heating fired by communal systems (between 3% and 24%).

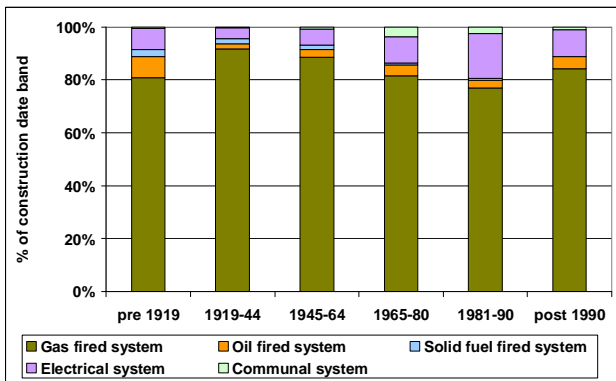


Figure 14: Comparison of space heating fuels by dwelling construction date.

Figure 14 shows a comparison between heating fuels and the construction date of the dwelling. Solid fuel fired systems are most common in pre 1919 dwellings but still only make up 3% of the dwellings in that age band. Post 1965 dwellings with heating systems fired by solid fuel are almost non-existent, making up only a nominal proportion of the dwellings built in those periods. On the other hand, communal systems become more common post 1965. Oil fired systems are also most common in dwellings built pre 1919. One reason for this is the relatively high proportion of rural dwellings in this age bracket. A third of all rural dwellings are off the gas network and so have to use alternative fuels such as oil for heating. Over a quarter of all rural dwelling were built pre 1919. A fifth of all rural dwellings were built between 1965 and 1980, which may also account for the high proportion of oil fired systems in the construction date band.

With reference to Figure 15, we can see that a large proportion of homes with small floor areas have electrical systems for their space heating, and this proportion

declines as floor area increases. 22% of dwellings with a floor area less than 64m² have electrical systems as oppose to only 3% of dwellings with a floor area larger than 121m². This is due to the use of storage radiators, which are fuelled by electricity, in smaller dwellings such as flats. Dwellings with floor areas less than 64m² have the highest proportion of communal systems (73% of all communal systems are found in dwellings with floor areas less than 64m²) which can again be attributed to the use of communal systems in flats (see Figure 4).

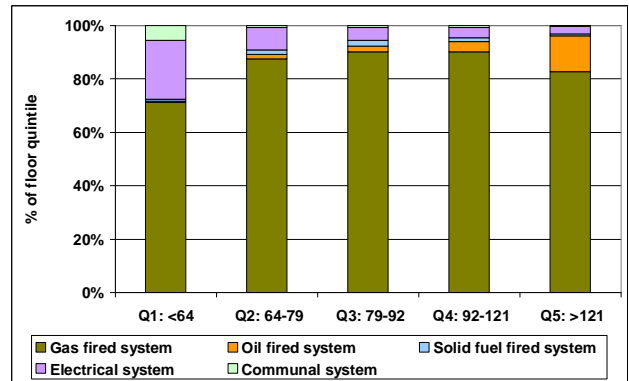


Figure 15: Comparison of space heating fuels by floor area quintile.

Oil fired systems are most common in dwellings with floor areas over 121m² because a number of dwellings in this floor area quintile are located in rural areas (35% of Q5 dwellings are rural) and as has been discussed previously a number of rural dwellings do not have access to the gas network and so need alternative fuels. This is the reason that dwellings with the largest floor areas have the second lowest incidence of gas fired (conventional) systems, behind dwellings with the smallest floor areas, although it is still 83%.

Dwelling Location

The fuels used within each region can depend on the nature of the area that the region covers, for example, whether the region has more rural or urban locations. The three regions with the highest proportion of rural dwellings also have the lowest proportion of gas fired heating systems. As can be seen from Table 4, these are the South East, East of England and South West. This is because rural locations have a lower level of access to mains gas than urban and suburban areas.

London has the lowest percentage of dwellings in a rural location and accordingly a very small minority of oil fuelled systems. However, the proportion of gas fired systems is not as high as in other regions as there are a large number of flats in London containing storage radiators, amongst other heating systems. This explains the relatively high level of electrical systems in London.

Region	% Gas system	% Oil system	% Electrical system
North West	90.1	2.4	5.6
Yorks & Humber	89.2	1.4	5.1
North East	87.8	2.8	5.8
East Midlands	87.3	4.5	5.0
London	86.6	0.1	8.9
West Midlands	84.8	4.5	8.3
South East	81.3	5.7	10.6
East of England	78.2	8.4	11.2
South West	76.0	8.8	12.4
Total	84.4	4.3	8.4

Table 4: Comparison of key space heating fuels by region

Tenure

A comparison of space heating fuels by tenure is shown in Figure 16. The private rented sector has the highest proportion of electric heating (17% of private rented dwellings) due to the relatively high proportion of storage heaters and room heaters found in these dwellings. Owner occupied dwellings have the highest incidence of oil fired systems. Over 80% of all rural dwellings are owner occupied, so this could explain the fact that 86% of all oil fired systems are present in owner occupied homes, as many rural homes use oil as a heating fuel. As is the general trend, gas fires systems are the most common form of heating system in all tenure groups.

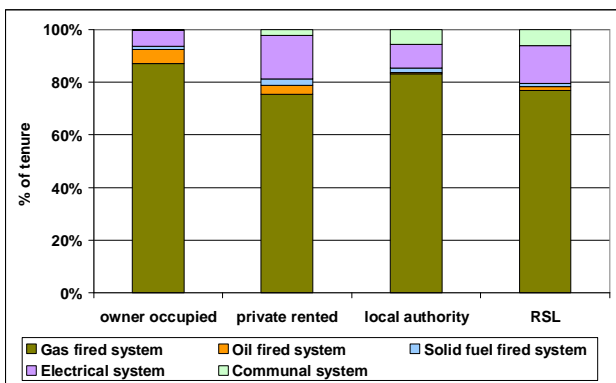


Figure 16: Comparison of space heating fuels by tenure.

Household Type

Figure 17 shows the distribution of space heating fuels over different household groups. Gas fired space heating systems are least common in single person households who more commonly live in dwellings that have electric heating, such as storage radiators. Around 15% of

households containing only one person live in dwellings heated by an electrical system. Single person households are also most likely to be heated by a communal system. This is because a significant proportion of single people live in flats, and 90.8% of communal systems are present in flats.

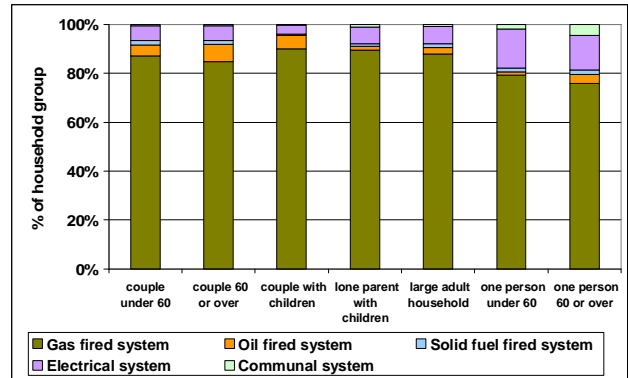


Figure 17: Comparison of space heating fuels by household group.

Oil fired space heating systems are most commonly found in dwellings occupied by couples over the age of 60 (7% of the household group). This is because a relatively large proportion (26.6%) of couples over 60 live in rural locations compared with 19% of all households.

The distribution of space heating fuels by income is shown in Figure 18. Oil fired systems are most common in houses within the highest income group. This is because 27% of households in rural areas have an income over £35,000 compared with only 14% of households in the lowest income group. Lower income households have a higher proportion of electrical systems than higher income households. This could be because of the tendency for lower income households to live in flats, which have a high proportion of storage radiators (see Figure 4). 31% of households in the lowest income group live in flats, whereas only 8% of households with incomes greater than £35,000 live in flats.

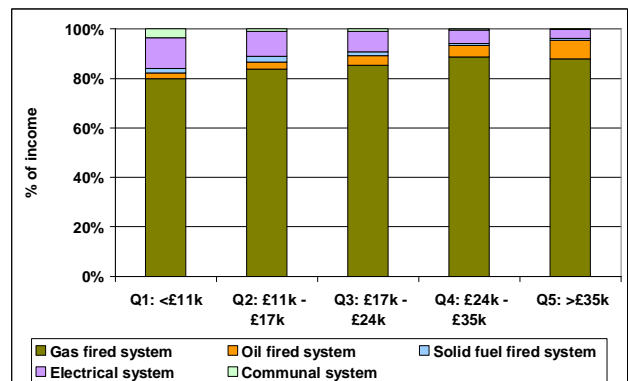


Figure 18: Comparison of space heating fuels by income.

Focus on: Households with older Household Reference Persons (HRPs).

In England we have an aging population. Using the EHCS datasets we can see that since 2001 the average age of HRPs has increased from 50 to 52. The proportion of HRPs over 65 has also increased, moving from 25% to 27%. The indications are that this trend will continue, and therefore it is of importance to look at the dwellings that older people are living in, and how they are heating their dwellings. Most HRPs over 65 are owner occupiers (74%), with very few private renters (4%). Almost a quarter of the oldest HRP group live in rural areas, and a large proportion of HRPs over 65 live in bungalows (over a fifth of all HRPs over 65, much higher than the 10% of all stock). Although a large percentage of HRPs over 65 have the conventional boiler system with radiators heating their dwellings (82%), this is lower than the proportion for the total stock. Almost 10% use storage radiators as their main heating system, 2% more than the proportion for the total stock. The age of the heating system in dwellings with HRPs over 65 is also significantly different. Heating systems over 12 years old are the most common type of heating system found in dwellings where the HRP is over 65. They are roughly twice as common as systems less than 3 years old, and are present in around 200,000 more dwellings than systems aged between 3 and 12 years.

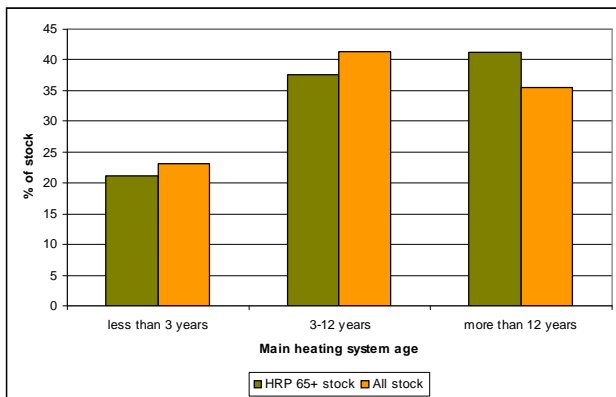


Figure 19: Age of main heating system

Dwellings where the HRP is over 65 are also much more likely to have a secondary heating system present. Only 18% of these households are without a secondary heating system with room heaters present in almost 80% of homes where the HRP is over 65.

Boiler Categories

This section looks at the type of boilers used in dwellings that use conventional central heating systems and Figure 20 shows the proportions of these different types. The standard boiler is most common (40% of the housing stock), followed by combination boilers (37% of the

housing stock including condensing combination boilers). Combination boilers supply heat for both space heating and water. They heat water on demand, as opposed to standard boilers which heat water which is stored in a cylinder until use. 12% of the stock does not have a boiler, and 3% of the stock has a standard condensing boiler.

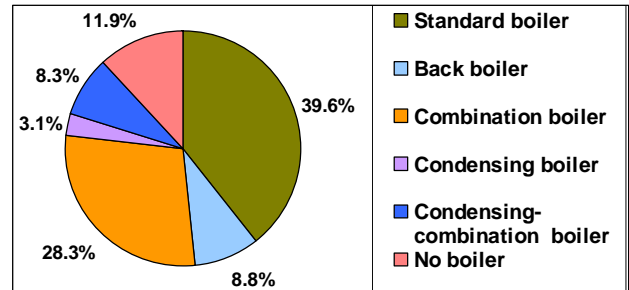


Figure 20: Proportions of boiler types.

The proportions of boiler types has changed over time as building regulations have changed and more efficient boiler types have been installed. Figure 21 shows the percentages of different boiler types between 1991 and 2007.

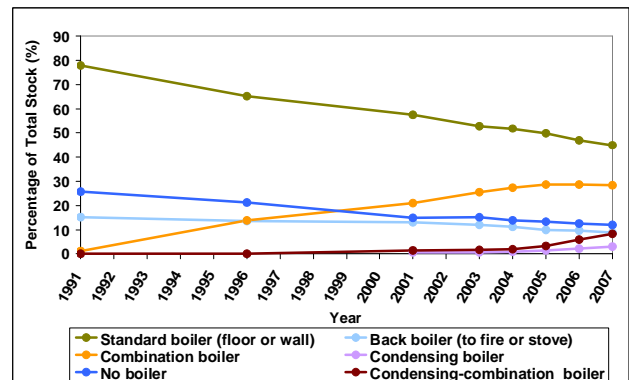


Figure 21: Timeline of boiler types.

The share of dwellings without boilers has fallen from 26% of the stock in 1991 to 12% in 2007, as the number of dwellings with central heating has risen. The percentage of dwellings with back boilers and standard boilers has also fallen over this period, whereas combination boilers have risen significantly from 1% of the total stock in 1991 to 37% in 2007. Combination boilers can be either condensing combination or non-condensing combination and make up 8% and 28% of the stock respectively. There has been a recent rise in the numbers of both condensing boilers and condensing combination boilers in use. New building regulations, introduced in April 2005, specify that condensing boilers must be used when installing new or replacement boilers, or upgrading from a non-central heating system which explains the rise in the total proportion of condensing and condensing combination boilers from 3% of the total stock in 2004 to 12% of the total stock in 2007. The new regulations have led to a slight drop in the proportion of non-condensing combination boilers since 2005 (29% to 28%).

Figure 22 shows a comparison of the different boiler types with the household's satisfaction rating for the heating system. Satisfaction with condensing boilers is highest, with 76% of households that live in dwellings with standard condensing boilers and condensing combination boilers judging the heating system to be "very effective". Disregarding heating systems without boilers, back boilers appear to be the least effective boiler type. 11% of households with back boilers rate their heating system as not very effective or not at all effective. The percentage of back boilers in the housing stock has steadily decreased since 1991 to be replaced with boilers that are perceived to be more effective.

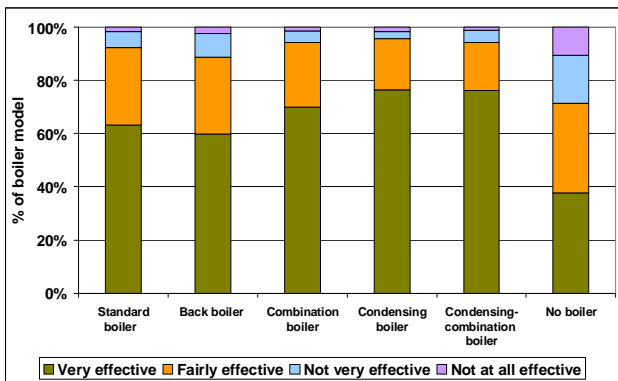


Figure 22: Comparison of boiler type by household satisfaction rating for heating.

Dwelling Type

A comparison of boiler types with dwelling type is shown in Figure 23. Flats have the highest proportion of dwellings without boilers; this is due to the relatively low proportion of conventional central heating systems in these dwellings. Detached dwellings have the highest proportion of standard boilers (67% of the dwelling type). Non-condensing combination boilers are most common in converted flats (46% of the dwelling type), although they also make up a significant proportion of the boiler types in smaller dwellings such as terraced houses. Combination boilers are most suitable for small dwellings, because they require less room than for a standard or back boiler due to the absence of a water tank and hot water cylinder and this is why condensing combination boilers are most popular compared to standard condensing boilers in converted flats.

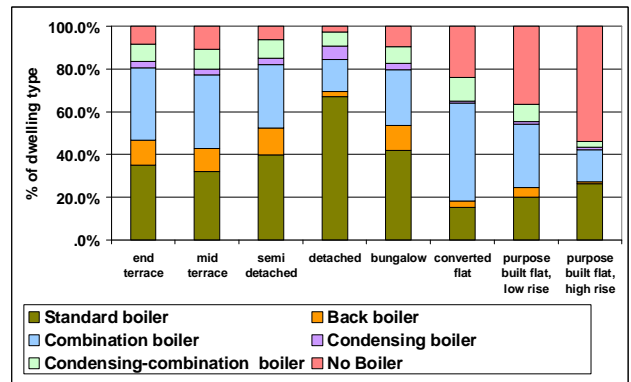


Figure 23: Comparison of boiler types by dwelling type.

As can be seen from Figure 21 the total percentage of combination (both condensing and non-condensing) boilers has grown significantly since 1991. The condensing combination boiler has also proved more popular than the standard condensing boiler). Figure 24 shows a timeline of the percentage of all combination boilers (including condensing combination boilers) by general dwelling types. The percentage of combination boilers has increased for all dwelling types since 1991. They are most prevalent in converted flats. Most houses that are converted into flats probably have a gas supply and therefore when conversion to flats takes place, it is sensible to install gas central heating. The combination boiler is often the boiler of choice, because it is suited to smaller dwelling types due to the lack of need for water tanks and cylinders.

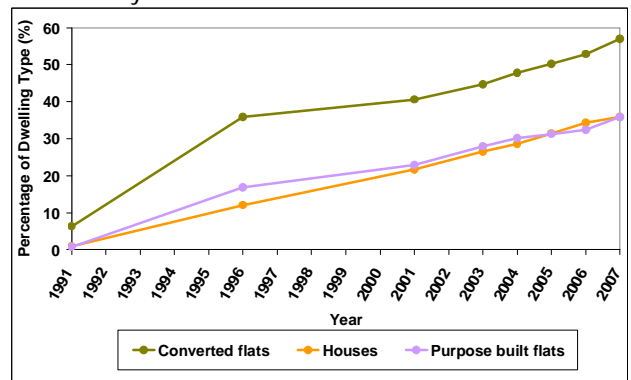


Figure 24: Timeline of all combination boilers, including condensing combination boilers, by dwelling type.

A comparison of boiler types with the dwelling construction date is shown in Figure 25. Although one may expect post 1990 dwellings to have a higher proportion of standard condensing or condensing combination boilers than dwellings from other age groups, the proportions within each group are very similar (around 11% or 12% of dwellings in each age group have condensing boilers). In fact, dwellings constructed between 1919 and 1944 have a slightly higher proportion of condensing (standard plus combination) boilers than post 1990 dwellings. This is because when boilers are replaced they must be replaced by condensing boilers. Dwellings built between 1981 and

1990 are least likely to have a standard condensing or condensing combination boiler (only 9% of dwellings in this construction date band have a condensing boiler), in fact dwellings in this construction band are least likely to have a boiler at all, with a fifth of all dwellings from this band having no boiler. This is due to the large number of flats built in this period. With reference to Figure 4, we can see a large proportion of flats use storage radiators rather than boiler systems.

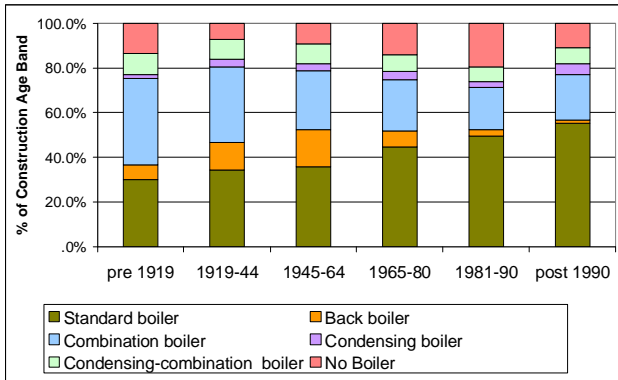


Figure 25: Comparison of boiler types by dwelling construction date.

Standard boilers are most common in the largest dwellings (61% of dwellings in the top fifth of floor areas) and least common (23%) in the smallest fifth of the stock as seen in Figure 25. It is also more likely in smaller dwellings for there to be no boiler present as other forms of heating, such as storage radiators, are used (see Figure 6).

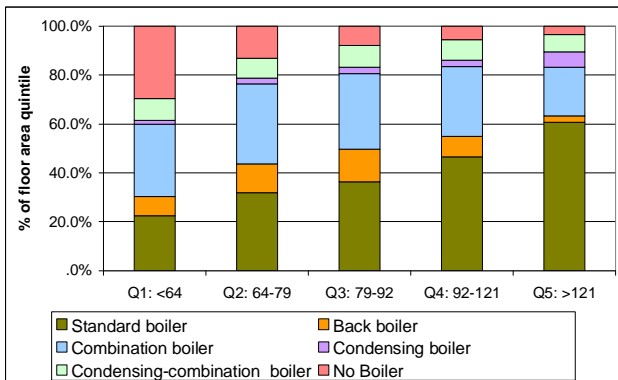


Figure 26: Comparison of boiler types by floor area (m²) quintiles.

Dwelling Location

Rural areas have the highest proportion of standard boilers (50%) because rural dwellings tend to be larger properties and therefore have more space for a standard boiler system which requires a water tank. Dwellings in city and urban areas tend to be smaller, and these areas contain a large proportion of flats which explains why they have the lowest incidence of standard boiler systems. To counteract this, city and urban areas have the highest proportion of combination (condensing and non-

condensing) boilers (37%) and the largest proportion of dwellings with no boilers, as small dwellings like flats or terraces may opt for storage radiators or combination boilers as there is no space for a hot water tank.

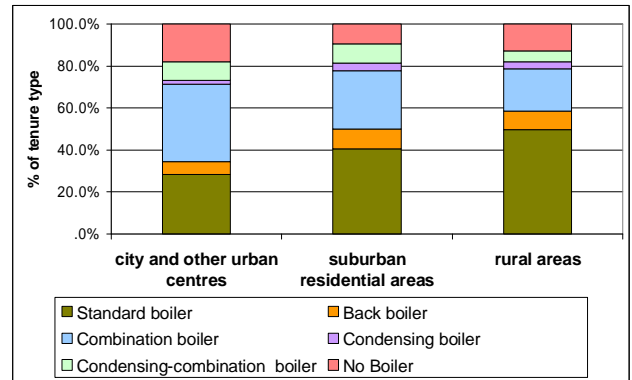


Figure 27: Comparison of boiler types by type of area.

Tenure

Owner occupied stock has the highest proportion of standard boilers (44% of owner occupied stock), as can be seen in Figure 28. This is partly due to the high proportion of detached houses in this tenure group. Private rented accommodation has the highest percentage of combination boilers (35% non-condensing combination and 8% condensing combination), due to the large proportion of converted flats in this sector. Social housing has the highest incidence of less effective (see Figure 22) back boilers.

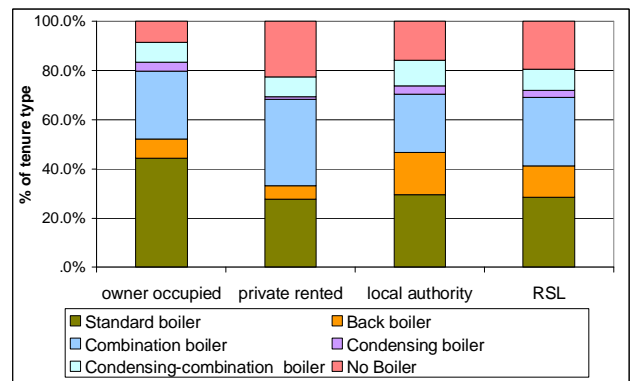


Figure 28: Comparison of boiler types by tenure.

Household Type

The distribution of boiler types with household groups is given in Figure 29. Couples, under and over the age of 60 and couples with children are more likely to live in dwellings with standard boilers (42%, 48% and 44% respectively). These household types are more likely to live in detached houses than other household groups, which correlates with the higher incidence of standard boilers.

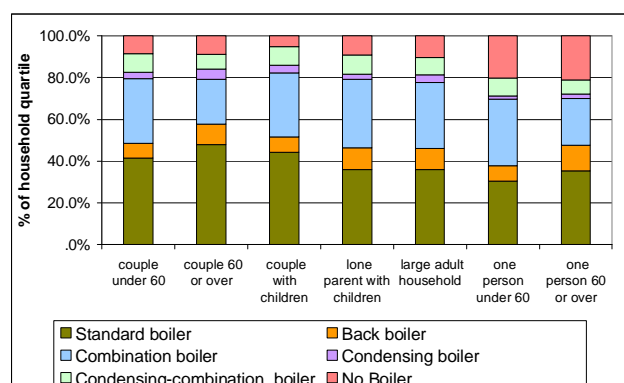


Figure 29: Comparison of boiler type by household group.

Single person households (over or under the age of 60) are least likely to live in dwellings with standard boilers. They commonly live in smaller dwellings and so there is not enough room for the standard boiler system. The greater tendency of single people to live in flats also explains the fact that the single person household groups are least likely to have any form of boiler. This is because a significant number of flats use non conventional heating systems such as storage radiators.

In dwellings where the age of the household representative person (HRP) is between 16 and 29, non-condensing combination boilers are more common than for other age groups (38% of households within this age group compared to 21% of households aged over 65). These households more commonly live in flats (in particular converted flats) and older dwellings which have relatively large proportions of combination boilers.

Figure 30 shows a comparison between boiler type and household income. It can be seen that the lower the income, the lower the proportion of standard boiler systems and the higher the proportion of dwellings with no boiler at all. This is because households with higher incomes tend live in larger dwellings such as detached houses (69% of households living in detached houses are from the highest two income groups compared to only 16% from the lowest two income groups). Conversely only 8% of households from the top income bracket live in flats, compared with 31% of households in the lowest income group. Therefore households with lower incomes live in flats where combination boilers and non conventional systems such as storage radiators are more common.

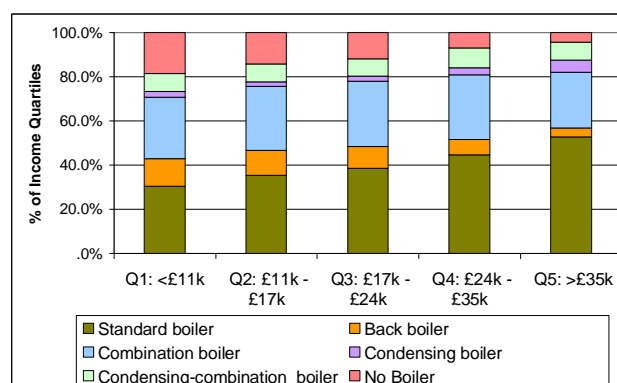


Figure 30: Comparison of boiler type by household income.

Secondary Heating Systems

This section of the report considers types of secondary heating in the English housing stock. These are mainly used as a back-up to the primary heating system. The EHCS collects information on the predominant form of secondary heating in a dwelling, although there could be others omitted from this analysis. The data is drawn from the SAP methodology, which assumes that no secondary system is present in communally heated dwellings. It also gives homes with storage heaters as their primary system some form of portable back-up system. These assumptions are included in the analysis.

Table 5 shows the distribution of secondary heating systems in 2007. The most common collective group of secondary systems are room heaters (present in 15.6 million dwellings, 70% of the stock), however more than a quarter of the stock does not have a secondary heating system. Other less common types of secondary heating are storage heaters (which could be individual or only present in a few rooms) and portable heaters.

Secondary heating system	Percentage of total stock (%)
No secondary heating	27.2
Storage radiators	0.4
Room heater	70.2
Portable heaters only	2.1
Total	100.0

Table 5: Distribution of Secondary Space Heating Systems.

The changes in the proportions of the types of secondary space heating systems since 1991 are shown in Figure 31. As can be seen, both storage radiators and portable heaters have remained at low levels of use for the

duration, although the proportion of portable heaters has increased slightly. The use of room heaters as a secondary heating system increased from 64% of the total stock in 1991 to 72% in 2003. It stayed roughly at this level to 2006 but decreased to 70% in 2007. The percentage of stock without any secondary heating system has practically mirrored the percentage of stock using room heaters, starting at 33% in 1991 and falling to 26% in 2003. As a proportion of total stock it remained roughly level until 2006 but increased to 27% in 2007. This either suggests that where secondary heating systems have been installed in dwellings, these are mainly room heaters or that existing room heaters have become the secondary heating when central heating systems have been installed.

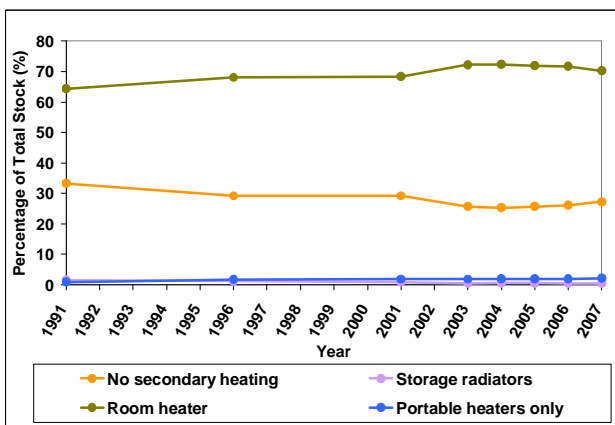


Figure 31: Timeline of secondary space heating systems.

Dwelling Type

The types of primary space heating systems vary greatly with the type of dwelling (see Figure 4) therefore it might be expected that the types of secondary space heating systems are also dependent on the type of dwelling. Figure 32 shows a comparison of secondary heating systems with dwelling type.

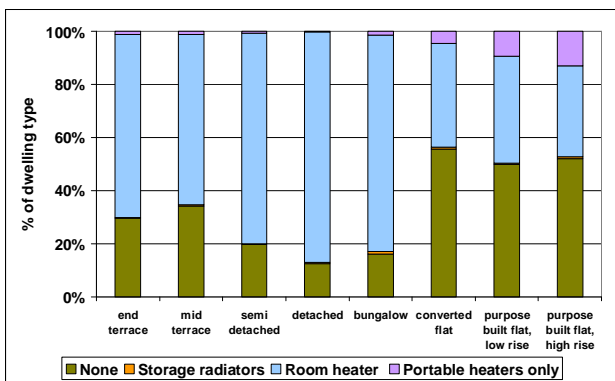


Figure 32: Comparison of secondary space heating systems by dwelling type.

In general, flats are much less likely to have a secondary heating system than houses. 51% of flats have no

Fact Box: Rural homes.

Rural homes tend to be owner occupied dwellings with less than a fifth of dwellings in rural areas belonging to a different tenure group. The vast majority of rural dwellings are detached houses, bungalows and semi detached houses. There is also a higher percentage of older homes in rural areas (27% constructed pre 1919 compared with only 22% of the total housing stock being constructed in the same period). Rural homes are heated by a dramatically lower proportion of gas fired systems than the overall housing stock. Only 60% of rural dwellings are heated using mains gas as their main heating fuel, with another 3% heated by LPG or bottled gas. In contrast, 84.4% of the total English housing stock is heated by gas fired systems. This is largely due to the fact that over a third of rural homes are not on the gas network according to EHCS data whereas only 13% of all dwellings are off the gas network.

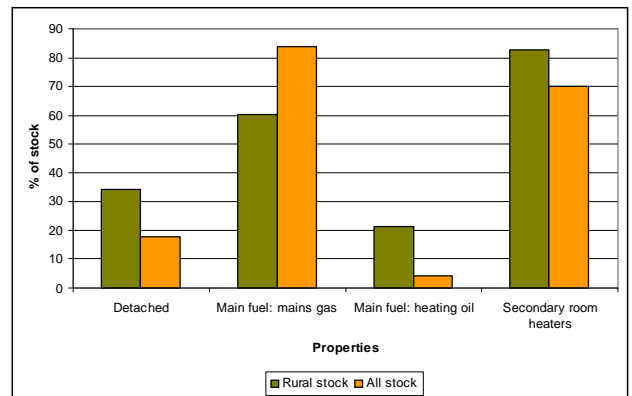


Figure 33: Focus on rural homes

A large proportion (21%) of rural dwellings are heated by oil fired systems instead of gas fired systems. A much higher proportion of rural dwellings have secondary heating systems than the total stock, with room heaters present in more than 80% of rural dwellings. A significant number of secondary heating systems in rural homes are also heated by solid fuel (over 30% compared to just 12% of the total stock).

secondary heating system whereas only 22% of houses are without some form of secondary heating. This may be because houses tend to be larger than flats and so a secondary heating system is required. 41% of dwellings in the smallest floor area quintile have no secondary heating system whereas only 15% of dwellings with a floor area over 121m² go without secondary heating. However, flats are more likely to have a portable heater(s) as a secondary heating system than houses are.

More modern dwellings have a lower proportion of secondary heating with 33% of post 1965 dwellings having no secondary heating compared to only 23% of pre-1965

dwelling. This trend may be due to more efficient primary heating systems being fitted in more modern dwellings at the point of construction, negating the need for secondary heating. Also a larger proportion of flats have been built in more recent years.

Dwelling Location

Dwellings in rural areas are more likely to have a secondary heating system than dwellings in urban or suburban areas. 41% of houses in urban areas go without secondary heating systems whereas only 15% of houses in rural areas have no secondary heating system. A relatively high proportion of older stock and stock with large floor areas are found in rural locations, as well as the greater use of less efficient heating systems. London has the highest percentage of dwellings with no secondary heating, as can be seen in Table 6. This might be expected from the urban nature of London and the large proportion of flats in this region.

Region	% with None	% with Room heater	% with Portable heaters only
Yorks & Humber	16.3	82.3	1.2
East Midlands	17.8	80.6	1.0
North East	18.1	80.5	1.1
North West	18.4	79.8	1.3
West Midlands	18.7	79.5	1.5
South West	22.4	74.6	2.2
East of England	29.3	67.6	2.5
South East	32.2	64.3	3.0
London	54.3	41.8	3.7
Total	27.2	70.2	2.1

Table 6: Comparison of key secondary space heating systems with region.

We also see that dwellings in northern regions are more likely to have some kind of secondary heating than more southerly regions, possibly because of a slightly colder climate in the north. Also higher proportions of flats and newer buildings in southern regions help account for the lower proportion of secondary heating systems.

Tenure

Owner occupied dwellings have a higher proportion of secondary space heating systems than privately rented, local authority or RSL dwellings, (see Figure 34). Only 21% of owner occupied dwellings have no secondary heating, compared with roughly 40% of dwellings in each of the other type of tenure groups. Owner occupied dwellings are more likely to be large detached or semi-

detached houses, which have a higher percentage of secondary heating systems, whereas the other tenure group dwellings are likely to be smaller homes such as flats.

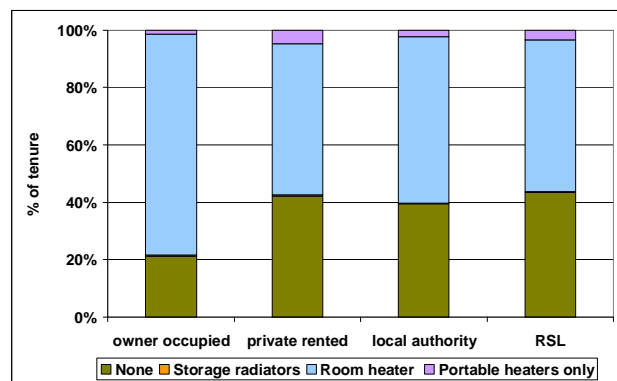


Figure 34: Comparison of secondary space heating systems by tenure.

Household Type

Figure 35 shows a comparison of secondary space heating systems with household groups.

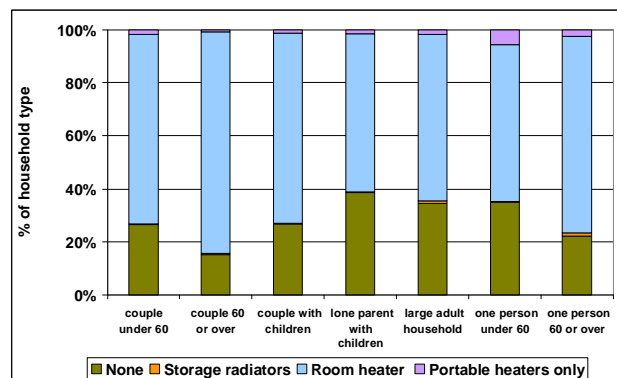


Figure 35: Comparison of secondary space heating systems by household group.

Elderly household groups are most likely to have some form of secondary heating with only 15% of couples over 60, and 22% of single people over 60 living without a secondary heating system in their home. The difference in age and the effect this has on the presence of a secondary heating system is confirmed by Figure 36, which shows that the older the age group, the lower the% of dwellings without a secondary heating system. 46% of homes where the HRP is between 16 and 29 have no secondary heating whereas only 18% of dwellings where the HRP is 65 or over are without a secondary heating system.

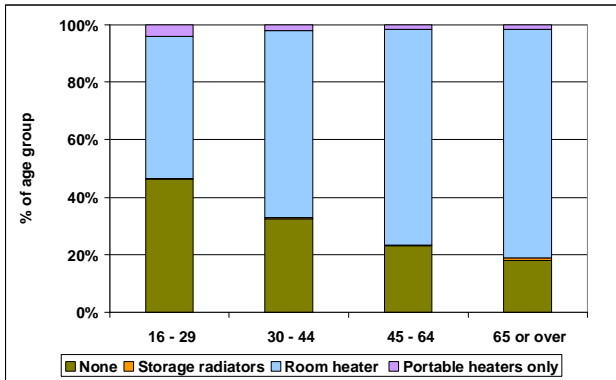


Figure 36: Comparison of secondary space heating systems by age of the household reference person.

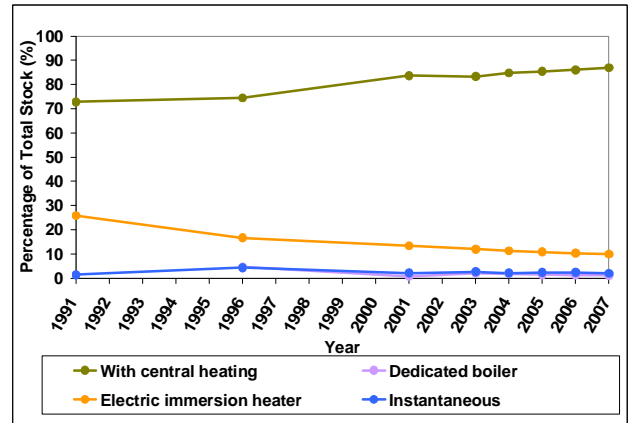


Figure 37: Timeline of water heating systems.

Water Heating Systems

The most common method of heating water in the English housing stock is through the same system as the space heating (see Table 7). This is as expected given the dominance of conventional central heating in the housing stock, where the boiler is used to heat water for both direct use and for circulating to radiators in order to provide space heating.

Water Heating System	Percentage of Total Stock (%)
With central heating	86.9
Dedicated boiler	1.2
Electric immersion heater	9.9
Instantaneous	2.0
Total	100.0

Table 7: Distribution of Water Heating Systems.

The second most common water heating system is electric immersion heaters. It can be seen from Figure 37 that since 1991 the proportion of water heating systems that work with the central heating has risen (from 73% to 87%), whilst the proportion of dedicated boilers and instantaneous heaters have fluctuated mildly at low levels. Electric immersion heaters have fallen as a proportion of the total stock, from 26% in 1991 to 10% in 2007. In total, around 49% of English dwellings have an electric immersion heater, however many do not feature in this analysis since they are commonly used as a back up to the primary water heating system. When water is heated by a standard boiler, back boiler or condensing boiler (non-combination), the hot water is stored in a cylinder which may also be fitted with an immersion heater. This immersion heater can then be used if there is a large demand for hot water.

Figure 388 shows a comparison between the water heating system and the household satisfaction rating. At least 89% of households rate their water heating system as either very or fairly effective, for each water heating system. Households with electric immersion heaters are the least satisfied, with 11% finding their water heating system either not very, or not at all effective. Those whose water heating is with their central heating are the most satisfied, with 94% saying their water heating system is either very or fairly effective. Households with instantaneous water heating are the most 'indifferent' with 39% finding their water heating system fairly or not very effective.

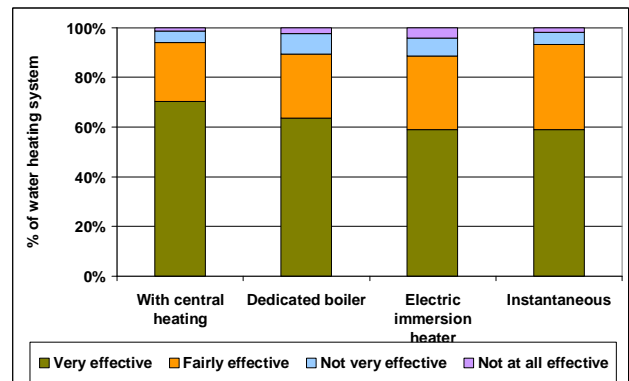


Figure 38: Comparison of water heating system by household rating for water heating.

Dwelling Type

A comparison of water heating systems with dwelling type is shown in Figure 40. The proportion of water heating systems that work with the central heating system is lowest in flats, which would be expected as flats have a lower proportion of conventional central heating systems than other dwelling types (see Figure 4). Detached houses have the highest proportion of water heating systems working with the central heating (95%) which correlates with the fact that detached houses have the highest incidence of conventional central heating.

Fact Box: Off gas.

Gas fired systems are the most common method of heating the English housing stock. However, it is of increasing interest to look at the properties of dwellings that are 'off' the gas network. i.e. have no access to mains gas. This tends to occur in rural areas (over half of all 'off gas network' dwellings are in rural areas) but this situation also occurs in cities and suburban areas.

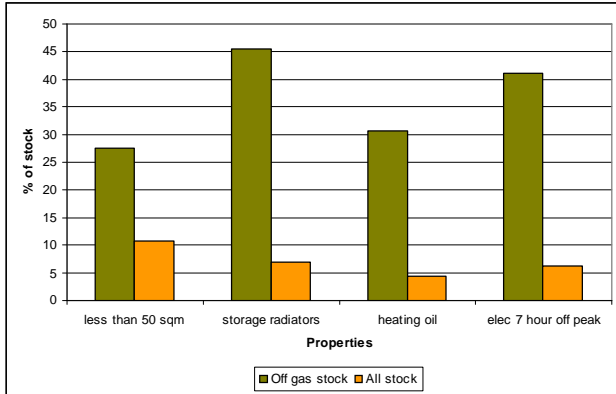


Figure 39: Properties of off gas and all stock

As 'off the gas network' dwellings cannot use mains gas to fuel their heating systems, they must find an alternative. Gas in other forms (such as LPG or bottled propane gas) is still a viable heating fuel but electrical and oil fired systems tend to be the preferred option. Over two fifths of homes off the gas network use 7 hour off peak electricity to fuel the main heating system, and 31% use heating oil. This is in contrast with the low overall proportions of the English housing stock which use 7 hour off peak electricity and heating oil.

A large proportion of dwellings classed as 'off the gas network' are purpose built low rise flats. These account for nearly 30% of all off network dwellings and explain the fact that a large proportion of off network dwellings lie in the smallest floor area group (less than 50 m²), as well as the high proportion of storage radiators. Another key property of homes off the gas network is the age of their main heating system. Over half of all off network dwellings have a main heating system that is at least 12 years old.

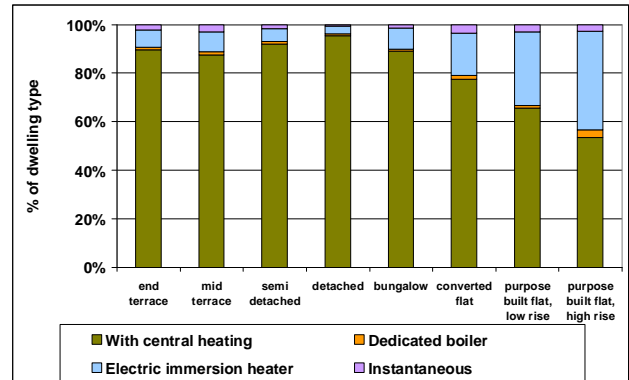


Figure 40: Comparison of water heating systems by dwelling type.

Figure 41 shows a comparison of water heating systems with dwelling construction date. The lowest incidence of centrally heated water systems is in dwellings built between 1981 and 1990 (only 80% of dwellings built in this period). This is because of the large proportion of flats built during this period (almost a quarter of all dwellings built between 1981 and 1990 were flats), which have lower proportions of conventional central heating (see Figure 4) and therefore water heating systems that work with the central heating.

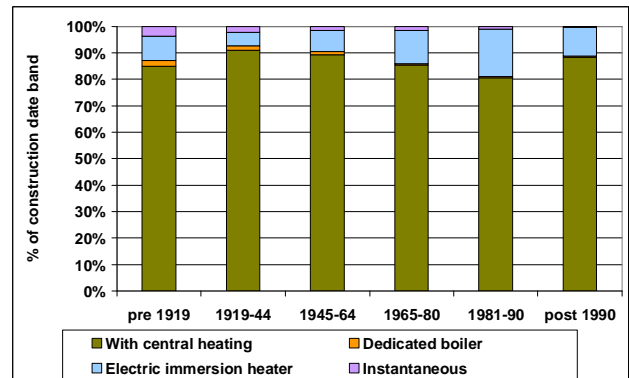


Figure 41: Comparison of water heating systems by dwelling age.

Pre 1919 dwellings have the highest percentage of instantaneous water heaters (4% of pre 1919 dwellings). 14% of pre 1919 dwellings are converted flats (compared with a stock proportion of only 3%), which have a high incidence of instantaneous water heaters (see Figure 40).

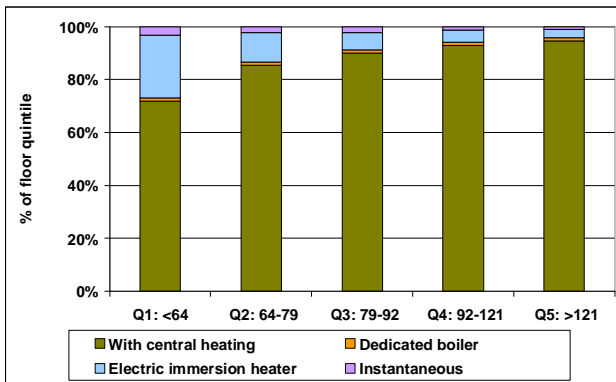


Figure 42: Comparison of water heating system by floor area quintiles.

From Figure 42 we see that the proportion of water heated by the central heating system increases with dwelling floor area (72% in Q1 up to 95% in Q5). 79% of dwellings in the largest floor area quintile are detached or semi detached whereas over half of all dwellings in the lowest floor area quintile are flats. With reference to Figure 40, we can see that these larger dwelling types have a higher proportion of water heating with central heating than flats, which explains the pattern in Figure 42.

Dwelling Location

The South West has the lowest incidence of water heating systems that are combined with the central heating system (83% of dwellings in the South West have water heating with their central heating, compared to 92% of dwellings in the East Midlands). This is due to the lower proportion of conventional central heating found in the South West (see Table 2).

Dwellings in suburban residential areas are the most likely to have centrally heated water (89% compared to 82% in city and other urban areas). Suburban areas contain a lower proportion of flats than city and urban areas and are more likely to have connection to mains gas than rural areas, which accounts for this relatively high proportion.

Tenure

Figure 43 shows a comparison between the water heating system and the tenure of a dwelling. Owner occupied dwellings have the highest proportion of water heating with the central heating system (89% of owner occupied dwellings) due to the large proportion of owner occupied dwellings that have a conventional central heating system (see Figure 7). Private rented dwellings have the lowest incidence of water heating with the central heating system, due to the high proportion of flats in this tenure group. As Figure 40 shows, flats have the lowest proportion of water heating systems with the central heating. Non-centrally heated water in the social sector is almost exclusively provided by an immersion heater, whilst private stock

includes a greater range of dedicated boilers and instantaneous systems.

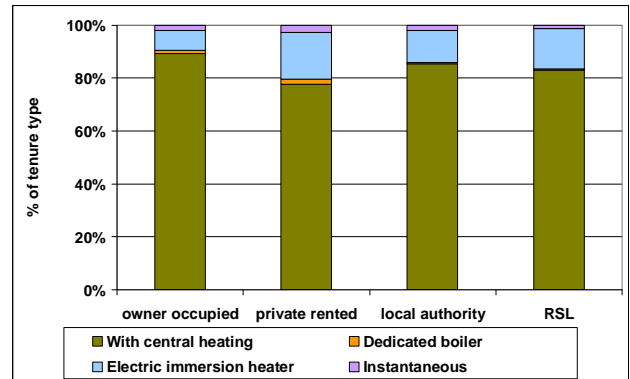


Figure 43: Comparison of water heating system by tenure.

Household Type

Single person households (with occupants over or under 60) are the most likely to live in dwellings where the water is not centrally heated, because a high proportion of this household type live in flats. 94% of all couples with children live in a dwelling where the water heating is with the central heating system.

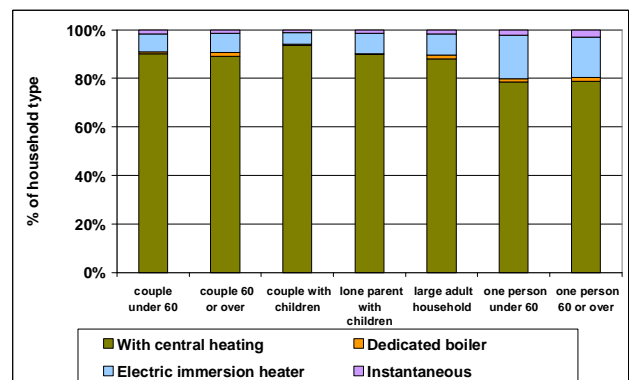


Figure 44: Comparison of water heating system by household group.

Figure 45 shows a comparison of water heating systems with the age of the household reference person. Households with the youngest and oldest HRP's live in dwellings with the lowest proportion of water that is heated by the central heating system. These groups are more likely to live in flats and bungalows where the percentage of centrally heated water is smaller than in other dwelling types.

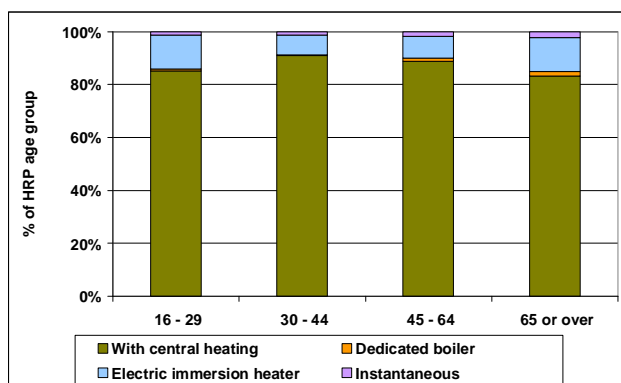


Figure 45: Comparison of water heating system with age of the household reference person.

Conclusions and Future Issues

The efficiency of space and water heating systems in the English housing stock continues to increase with further increases in conventional central heating; gas fired heating systems and centrally heated water. A significant increase in the proportion of condensing boilers is seen from 2006. The increase in condensing boilers is due to building regulations introduced in 2005, stating that all new and replacement boilers must be condensing.

The proportion of all combination boilers has increased significantly since 1991 and this has continued since the introduction of the new building regulations with the more significant take up of condensing-combination boilers compared to standard condensing boilers. Combination boilers are easier to install than standard boilers and are more suitable for use in dwellings with small floor areas, as they do not require a water tank or hot water cylinder.

In the future it may be possible to track the increase in alternative water heating systems and other renewable energy sources due to changes in the data collected by the EHCS.

Space and Water Heating Update Tables 2007

These tables give detailed breakdowns of four main aspects of domestic heating (primary space heating type and fuel, water heating type and boiler type) against key variables, as an appendix to the Space and Water Heating Update Report 2007.

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Table 1.8 Primary space heating system - Proportion of space heating type by household income

Table 2.1 Primary space heating fuel - Proportion of space heating fuel
Table 2.2 Primary space heating fuel - Proportion of space heating fuel by dwelling type
Table 2.3 Primary space heating fuel - Proportion of space heating fuel by dwelling age
Table 2.4 Primary space heating fuel - Proportion of space heating fuel by floor area
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Table 2.7 Primary space heating fuel - Proportion of space heating fuel by the age of the household representative
Table 2.8 Primary space heating fuel - Proportion of space heating fuel by household income

Table 3.1 Water heating system - Proportion of water heating system
Table 3.2 Water heating system - Proportion of water heating system by dwelling type
Table 3.3 Water heating system - Proportion of water heating system by dwelling age
Table 3.4 Water heating system - Proportion of water heating system by floor area
Table 3.5 Water heating system - Proportion of water heating system by dwelling tenure
Table 3.6 Water heating system - Proportion of water heating system by household composition
Table 3.7 Water heating system - Proportion of water heating system by the age of the household representative
Table 3.8 Water heating system - Proportion of water heating system by household income

Table 4.1 Type of boiler - Proportion of boiler type
Table 4.2 Type of boiler - Proportion of boiler type by dwelling type
Table 4.3 Type of boiler - Proportion of boiler type by dwelling age
Table 4.4 Type of boiler - Proportion of boiler type by floor area
Table 4.5 Type of boiler - Proportion of boiler type by dwelling tenure
Table 4.6 Type of boiler - Proportion of boiler type by household composition
Table 4.7 Type of boiler - Proportion of boiler type by the household representative
Table 4.8 Type of boiler - Proportion of boiler type by household income

Table 1.1 Primary space heating system - Proportion of space heating type

	count(000s), (column%)
Primary space heating system	Dwellings
Boiler system with radiators	19,258 (86.8)
Storage radiators	1,552 (7.0)
Warm air system	241 (1.1)
Room heater	740 (3.3)
Other Systems	31 (0.1)
Communal	332 (1.5)
Portable heaters only	36 (0.2)
Total	22,189 (100.0)

Base: All Dwellings

Table 1.2 Primary space heating system - Proportion of space heating type by dwelling type

	count(000s), (row%), (column%)							
	Boiler system with radiators	Storage radiators	Warm air system	Room heater	Other systems	Communal	Portable heaters only	Total
end terrace	1,886 (90.6) (9.8)	75 (3.6) (4.9)	23 (1.1) (9.7)	85 (4.1) (11.5)	4 (0.2) (12.5)	5 (0.2) (1.4)	4 (0.2) (10.3)	2,082 (100.0) (9.4)
mid terrace	3,653 (87.9) (19.0)	188 (4.5) (12.1)	60 (1.5) (25.1)	235 (5.7) (31.8)	6 (0.1) (19.3)	11 (0.3) (3.2)	4 (0.1) (11.5)	4,158 (100.0) (18.7)
semi detached	5,681 (93.1) (29.5)	209 (3.4) (13.5)	37 (0.6) (15.5)	167 (2.7) (22.6)	2 (0.0) (5.8)	2 (0.0) (0.6)	5 (0.1) (15.0)	6,103 (100.0) (27.5)
detached	3,817 (96.1) (19.8)	83 (2.1) (5.3)	47 (1.2) (19.7)	20 (0.5) (2.7)	5 (0.1) (16.5)	0 (0.0) (0.0)	1 (0.0) (2.0)	3,973 (100.0) (17.9)
bungalow	1,881 (89.5) (9.8)	149 (7.1) (9.6)	20 (0.9) (8.2)	33 (1.6) (4.4)	2 (0.1) (6.4)	14 (0.6) (4.1)	4 (0.2) (10.3)	2,102 (100.0) (9.5)
converted flat	575 (76.0) (3.0)	88 (11.6) (5.7)	0 (0.0) (0.0)	64 (8.5) (8.7)	0 (0.0) (0.0)	23 (3.0) (6.9)	7 (0.9) (19.8)	757 (100.0) (3.4)
purpose built flat, low rise	1,635 (60.7) (8.5)	669 (24.8) (43.1)	41 (1.5) (16.9)	128 (4.7) (17.3)	9 (0.3) (29.6)	204 (7.6) (61.4)	10 (0.4) (27.4)	2,696 (100.0) (12.1)
purpose built flat, high rise	130 (40.8) (0.7)	90 (28.5) (5.8)	12 (3.7) (4.9)	7 (2.2) (0.9)	3 (1.0) (9.9)	75 (23.5) (22.5)	1 (0.4) (3.7)	318 (100.0) (1.4)
Total	19,258 (86.8) (100.0)	1,552 (7.0) (100.0)	241 (1.1) (100.0)	740 (3.3) (100.0)	31 (0.1) (100.0)	332 (1.5) (100.0)	36 (0.2) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 1.3 Primary space heating system - Proportion of space heating type by dwelling age

	count(000s), (row%), (column%)							
	Boiler system with radiators	Storage radiators	Warm air system	Room heater	Other systems	Communal	Portable heaters only	Total
pre 1919	4,119 (86.4) (21.4)	279 (5.8) (17.9)	2 (0.0) (1.0)	316 (6.6) (42.7)	(0.0) (0.0)	34 (0.7) (10.2)	15 (0.3) (43.3)	4,766 (100.0) (21.5)
1919-44	3,585 (92.8) (18.6)	108 (2.8) (7.0)	2 (0.1) (0.8)	140 (3.6) (18.9)	(0.0) (0.0)	19 (0.5) (5.7)	11 (0.3) (29.6)	3,864 (100.0) (17.4)
1945-64	3,910 (90.0) (20.3)	229 (5.3) (14.8)	30 (0.7) (12.6)	137 (3.2) (18.5)	1 (0.0) (1.7)	35 (0.8) (10.4)	3 (0.1) (8.7)	4,345 (100.0) (19.6)
1965-80	3,930 (81.8) (20.4)	412 (8.6) (26.5)	175 (3.6) (72.6)	95 (2.0) (12.8)	15 (0.3) (47.8)	173 (3.6) (52.0)	7 (0.1) (18.4)	4,806 (100.0) (21.7)
1981-90	1,472 (78.4) (7.6)	287 (15.3) (18.5)	27 (1.4) (11.1)	42 (2.2) (5.7)	3 (0.2) (11.0)	47 (2.5) (14.1)	(0.0) (0.0)	1,878 (100.0) (8.5)
post 1990	2,242 (88.6) (11.6)	237 (9.4) (15.3)	5 (0.2) (2.0)	10 (0.4) (1.3)	12 (0.5) (39.4)	25 (1.0) (7.6)	(0.0) (0.0)	2,531 (100.0) (11.4)
Total	19,258 (86.8) (100.0)	1,552 (7.0) (100.0)	241 (1.1) (100.0)	740 (3.3) (100.0)	31 (0.1) (100.0)	332 (1.5) (100.0)	36 (0.2) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 1.4 Primary space heating system - Proportion of space heating type by floor area

	count(000s), (row%), (column%)							
	Boiler system with radiators	Storage radiators	Warm air system	Room heater	Other systems	Communal	Portable heaters only	Total
Quintile 1: < 64m ²	3,042 (68.5) (15.8)	835 (18.8) (53.8)	44 (1.0) (18.5)	245 (5.5) (33.1)	13 (0.3) (42.9)	241 (5.4) (72.7)	18 (0.4) (49.1)	4,438 (100.0) (20.0)
Quintile 2: 64m ² - 78m ²	3,781 (85.2) (19.6)	305 (6.9) (19.7)	69 (1.5) (28.6)	241 (5.4) (32.5)	5 (0.1) (16.8)	30 (0.7) (8.9)	7 (0.2) (20.7)	4,438 (100.0) (20.0)
Quintile 3: 79m ² - 92m ²	4,023 (90.9) (20.9)	178 (4.0) (11.5)	55 (1.2) (22.9)	137 (3.1) (18.5)	4 (0.1) (11.6)	26 (0.6) (7.9)	5 (0.1) (13.7)	4,428 (100.0) (20.0)
Quintile 4: 93m ² - 121m ²	4,150 (93.4) (21.5)	143 (3.2) (9.2)	43 (1.0) (17.8)	77 (1.7) (10.5)	2 (0.0) (6.4)	25 (0.6) (7.4)	4 (0.1) (11.3)	4,444 (100.0) (20.0)
Quintile 5: > 121m ²	4,261 (96.0) (22.1)	91 (2.0) (5.9)	30 (0.7) (12.3)	40 (0.9) (5.4)	7 (0.2) (22.3)	10 (0.2) (3.1)	2 (0.0) (5.2)	4,440 (100.0) (20.0)
Total	19,258 (86.8) (100.0)	1,552 (7.0) (100.0)	241 (1.1) (100.0)	740 (3.3) (100.0)	31 (0.1) (100.0)	332 (1.5) (100.0)	36 (0.2) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 1.5 Primary space heating system - Proportion of space heating type by dwelling tenure

	count(000s), (row%), (column%)							
	Boiler system with radiators	Storage radiators	Warm air system	Room heater	Other systems	Communal	Portable heaters only	Total
owner occupied	14,053 (90.3)	786 (5.0)	167 (1.1)	470 (3.0)	28 (0.2)	36 (0.2)	19 (0.1)	15,560 (100.0)
private rented	2,091 (76.4)	362 (13.2)	21 (0.8)	187 (6.8)	1 (0.0)	62 (2.3)	14 (0.5)	2,738 (100.0)
local authority	1,625 (81.8)	160 (8.1)	34 (1.7)	53 (2.6)		115 (5.8)	1 (0.0)	1,987 (100.0)
RSL	1,489 (78.2)	244 (12.8)	18 (1.0)	30 (1.6)	1 (0.1)	119 (6.3)	2 (0.1)	1,904 (100.0)
Total	19,258 (86.8)	1,552 (7.0)	241 (1.1)	740 (3.3)	31 (0.1)	332 (1.5)	36 (0.2)	22,189 (100.0)
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

Base: All Dwellings

Table 1.6 Primary space heating system - Proportion of space heating type by household composition

	count(000s), (row%), (column%)							
	Boiler system with radiators	Storage radiators	Warm air system	Room heater	Other systems	Communal	Portable heaters only	Total
couple under 60	3,585	200	43	107	6	27	5	3,973
	(90.2)	(5.0)	(1.1)	(2.7)	(0.2)	(0.7)	(0.1)	(100.0)
	(19.3)	(14.0)	(18.1)	(16.6)	(22.8)	(9.7)	(16.2)	(18.7)
couple 60 or over	3,363	198	50	105	8	22	4	3,749
	(89.7)	(5.3)	(1.3)	(2.8)	(0.2)	(0.6)	(0.1)	(100.0)
	(18.1)	(13.9)	(21.0)	(16.3)	(29.7)	(7.8)	(11.9)	(17.6)
couple with children	4,737	151	42	77	9	13	3	5,033
	(94.1)	(3.0)	(0.8)	(1.5)	(0.2)	(0.3)	(0.1)	(100.0)
	(25.5)	(10.6)	(17.7)	(12.0)	(34.2)	(4.7)	(9.2)	(23.7)
lone parent with children	1,310	90	12	25		16	1	1,454
	(90.1)	(6.2)	(0.9)	(1.7)	(0.0)	(1.1)	(0.1)	(100.0)
	(7.0)	(6.3)	(5.3)	(3.9)	(0.0)	(5.7)	(4.3)	(6.8)
large adult household	1,342	83	8	52	4	13	3	1,505
	(89.2)	(5.5)	(0.5)	(3.5)	(0.2)	(0.8)	(0.2)	(100.0)
	(7.2)	(5.8)	(3.4)	(8.1)	(13.3)	(4.6)	(10.6)	(7.1)
one person under 60	1,853	320	33	117		45	7	2,375
	(78.0)	(13.5)	(1.4)	(4.9)	(0.0)	(1.9)	(0.3)	(100.0)
	(10.0)	(22.4)	(14.0)	(18.2)	(0.0)	(16.3)	(21.7)	(11.2)
one person 60 or over	2,409	384	49	161		141	8	3,153
	(76.4)	(12.2)	(1.5)	(5.1)	(0.0)	(4.5)	(0.3)	(100.0)
	(13.0)	(26.9)	(20.5)	(25.0)	(0.0)	(51.1)	(26.1)	(14.8)
Total	18,599	1,426	236	645	27	276	32	21,242
	(87.6)	(6.7)	(1.1)	(3.0)	(0.1)	(1.3)	(0.2)	(100.0)
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

Base: All Dwellings

Table 1.7 Primary space heating system - Proportion of space heating type by age of the household representative

	count(000s), (row%), (column%)							
	Boiler system with radiators	Storage radiators	Warm air system	Room heater	Other systems	Communal	Portable heaters only	Total
16 - 29	1,492 (84.4)	178 (10.1)	11 (0.6)	50 (2.8)	1 (0.1)	31 (1.8)	5 (0.3)	1,767 (100.0)
	(8.0)	(12.5)	(4.6)	(7.7)	(4.4)	(11.3)	(14.5)	(8.3)
30 - 44	5,462 (91.2)	305 (5.1)	40 (0.7)	121 (2.0)	9 (0.2)	45 (0.7)	9 (0.1)	5,991 (100.0)
	(29.4)	(21.4)	(16.9)	(18.7)	(34.1)	(16.2)	(27.7)	(28.2)
45 - 64	7,095 (89.2)	426 (5.4)	113 (1.4)	245 (3.1)	11 (0.1)	56 (0.7)	12 (0.1)	7,957 (100.0)
	(38.1)	(29.8)	(47.8)	(38.0)	(40.5)	(20.3)	(36.5)	(37.5)
65 or over	4,550 (82.3)	518 (9.4)	73 (1.3)	229 (4.1)	6 (0.1)	144 (2.6)	7 (0.1)	5,527 (100.0)
	(24.5)	(36.3)	(30.8)	(35.5)	(20.9)	(52.2)	(21.3)	(26.0)
Total	18,599 (87.6)	1,426 (6.7)	236 (1.1)	645 (3.0)	27 (0.1)	276 (1.3)	32 (0.2)	21,242 (100.0)
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

Base: All Dwellings

Table 1.8 Primary space heating system - Proportion of space heating type by household income

	count(000s), (row%), (column%)							
	Boiler system with radiators	Storage radiators	Warm air system	Room heater	Other systems	Communal	Portable heaters only	Total
Q1: <£10k	3,375 (79.8) (18.1)	455 (10.8) (31.9)	44 (1.0) (18.5)	201 (4.7) (31.1)	(0.0) (0.0)	150 (3.5) (54.3)	8 (0.2) (23.4)	4,232 (100.0) (19.9)
Q2: £10k-£16k	3,567 (84.1) (19.2)	348 (8.2) (24.4)	66 (1.6) (28.1)	196 (4.6) (30.4)	5 (0.1) (17.7)	48 (1.1) (17.2)	10 (0.2) (29.9)	4,239 (100.0) (20.0)
Q3: £17k-£23k	3,694 (87.0) (19.9)	310 (7.3) (21.7)	45 (1.0) (18.8)	152 (3.6) (23.6)	5 (0.1) (18.7)	39 (0.9) (14.2)	1 (0.0) (4.5)	4,246 (100.0) (20.0)
Q4: £24k-£35k	3,920 (92.1) (21.1)	188 (4.4) (13.2)	44 (1.0) (18.7)	64 (1.5) (9.9)	5 (0.1) (19.7)	25 (0.6) (9.0)	12 (0.3) (36.6)	4,258 (100.0) (20.0)
Q5: >£35k	4,043 (94.8) (21.7)	126 (2.9) (8.8)	38 (0.9) (15.9)	32 (0.7) (5.0)	12 (0.3) (43.9)	15 (0.3) (5.3)	2 (0.0) (5.7)	4,267 (100.0) (20.1)
Total	18,599 (87.6) (100.0)	1,426 (6.7) (100.0)	236 (1.1) (100.0)	645 (3.0) (100.0)	27 (0.1) (100.0)	276 (1.3) (100.0)	32 (0.2) (100.0)	21,242 (100.0) (100.0)

Base: All Households

Table 2.1 Primary space heating fuel - Proportion of space heating fuel

	count(000s), (column%)
Primary space heating fuel	Dwellings
Gas fired system	18,728 (84.4)
Oil fired system	946 (4.3)
Solid fuel fired system	322 (1.4)
Electrical system	1,862 (8.4)
Communal system	332 (1.5)
Total	22,189 (100.0)

Base: All Dwellings

Table 2.2 Primary space heating fuel - Proportion of space heating fuel by dwelling type

	count(000s), (row%), (column%)					
	Gas fired system	Oil fired system	Solid fuel fired system	Electrical system	Communal system	Total
end terrace	1,899 (91.2) (10.1)	38 (1.8) (4.0)	40 (1.9) (12.4)	102 (4.9) (5.5)	5 (0.2) (1.4)	2,082 (100.0) (9.4)
mid terrace	3,810 (91.6) (20.3)	25 (0.6) (2.7)	73 (1.8) (22.8)	240 (5.8) (12.9)	11 (0.3) (3.2)	4,158 (100.0) (18.7)
semi detached	5,533 (90.7) (29.5)	193 (3.2) (20.4)	126 (2.1) (39.1)	250 (4.1) (13.4)	2 (0.0) (0.6)	6,103 (100.0) (27.5)
detached	3,349 (84.3) (17.9)	496 (12.5) (52.5)	28 (0.7) (8.6)	100 (2.5) (5.4)	(0.0) (0.0)	3,973 (100.0) (17.9)
bungalow	1,689 (80.4) (9.0)	193 (9.2) (20.5)	40 (1.9) (12.4)	166 (7.9) (8.9)	14 (0.6) (4.1)	2,102 (100.0) (9.5)
converted flat	598 (78.9) (3.2)	(0.0) (0.0)	6 (0.8) (1.8)	131 (17.3) (7.0)	23 (3.0) (6.9)	757 (100.0) (3.4)
purpose built flat, low rise	1,709 (63.4) (9.1)	1 (0.0) (0.1)	9 (0.4) (3.0)	772 (28.6) (41.5)	204 (7.6) (61.4)	2,696 (100.0) (12.1)
purpose built flat, high rise	140 (44.2) (0.7)	(0.0) (0.0)	(0.0) (0.0)	103 (32.3) (5.5)	75 (23.5) (22.5)	318 (100.0) (1.4)
Total	18,728 (84.4) (100.0)	946 (4.3) (100.0)	322 (1.4) (100.0)	1,862 (8.4) (100.0)	332 (1.5) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 2.3 Primary space heating fuel - Proportion of space heating fuel by dwelling age

	count(000s), (row%), (column%)					
	Gas fired system	Oil fired system	Solid fuel fired system	Electrical system	Communal system	Total
pre 1919	3,849 (80.8) (20.6)	378 (7.9) (39.9)	128 (2.7) (39.9)	377 (7.9) (20.2)	34 (0.7) (10.2)	4,766 (100.0) (21.5)
1919-44	3,544 (91.7) (18.9)	78 (2.0) (8.2)	72 (1.9) (22.4)	151 (3.9) (8.1)	19 (0.5) (5.7)	3,864 (100.0) (17.4)
1945-64	3,848 (88.6) (20.5)	121 (2.8) (12.8)	76 (1.7) (23.6)	265 (6.1) (14.2)	35 (0.8) (10.4)	4,345 (100.0) (19.6)
1965-80	3,914 (81.5) (20.9)	196 (4.1) (20.7)	35 (0.7) (10.8)	488 (10.1) (26.2)	173 (3.6) (52.0)	4,806 (100.0) (21.7)
1981-90	1,444 (76.9) (7.7)	57 (3.0) (6.0)	11 (0.6) (3.3)	320 (17.0) (17.2)	47 (2.5) (14.1)	1,878 (100.0) (8.5)
post 1990	2,128 (84.1) (11.4)	117 (4.6) (12.3)		261 (10.3) (14.0)	25 (1.0) (7.6)	2,531 (100.0) (11.4)
Total	18,728 (84.4) (100.0)	946 (4.3) (100.0)	322 (1.4) (100.0)	1,862 (8.4) (100.0)	332 (1.5) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 2.4 Primary space heating fuel - Proportion of space heating fuel by floor area

	count(000s), (row%), (column%)					
	Gas fired system	Oil fired system	Solid fuel fired system	Electrical system	Communal system	Total
Quintile 1: < 64m ²	3,155 (71.1) (16.8)	24 (0.5) (2.5)	36 (0.8) (11.3)	981 (22.1) (52.7)	241 (5.4) (72.7)	4,438 (100.0) (20.0)
Quintile 2: 64m ² - 78m ²	3,891 (87.7) (20.8)	69 (1.6) (7.3)	81 (1.8) (25.1)	367 (8.3) (19.7)	30 (0.7) (8.9)	4,438 (100.0) (20.0)
Quintile 3: 79m ² - 92m ²	3,994 (90.2) (21.3)	91 (2.1) (9.7)	98 (2.2) (30.5)	218 (4.9) (11.7)	26 (0.6) (7.9)	4,428 (100.0) (20.0)
Quintile 4: 93m ² - 121m ²	4,011 (90.2) (21.4)	170 (3.8) (18.0)	70 (1.6) (21.6)	169 (3.8) (9.1)	25 (0.6) (7.4)	4,444 (100.0) (20.0)
Quintile 5: > 121m ²	3,676 (82.8) (19.6)	590 (13.3) (62.4)	37 (0.8) (11.6)	126 (2.8) (6.8)	10 (0.2) (3.1)	4,440 (100.0) (20.0)
Total	18,728 (84.4) (100.0)	946 (4.3) (100.0)	322 (1.4) (100.0)	1,862 (8.4) (100.0)	332 (1.5) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 2.5 Primary space heating fuel - Proportion of space heating fuel by dwelling tenure

	count(000s), (row%), (column%)					
	Gas fired system	Oil fired system	Solid fuel fired system	Electrical system	Communal system	Total
owner occupied	13,546 (87.1) (72.3)	816 (5.2) (86.3)	203 (1.3) (63.0)	959 (6.2) (51.5)	36 (0.2) (11.0)	15,560 (100.0) (70.1)
private rented	2,065 (75.4) (11.0)	95 (3.5) (10.1)	61 (2.2) (18.9)	455 (16.6) (24.4)	62 (2.3) (18.6)	2,738 (100.0) (12.3)
local authority	1,652 (83.1) (8.8)	9 (0.4) (0.9)	32 (1.6) (10.0)	179 (9.0) (9.6)	115 (5.8) (34.6)	1,987 (100.0) (9.0)
RSL	1,464 (76.9) (7.8)	26 (1.3) (2.7)	26 (1.4) (8.1)	269 (14.1) (14.5)	119 (6.3) (35.8)	1,904 (100.0) (8.6)
Total	18,728 (84.4) (100.0)	946 (4.3) (100.0)	322 (1.4) (100.0)	1,862 (8.4) (100.0)	332 (1.5) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 2.6 Primary space heating fuel - Proportion of space heating fuel by household composition

	count(000s), (row%), (column%)					
	Gas fired system	Oil fired system	Solid fuel fired system	Electrical system	Communal system	Total
couple under 60	3,460 (87.1) (19.2)	178 (4.5) (19.2)	66 (1.7) (22.5)	242 (6.1) (14.4)	27 (0.7) (9.7)	3,973 (100.0) (18.7)
couple 60 or over	3,177 (84.7) (17.6)	265 (7.1) (28.7)	58 (1.6) (19.7)	227 (6.1) (13.5)	22 (0.6) (7.8)	3,749 (100.0) (17.6)
couple with children	4,524 (89.9) (25.1)	278 (5.5) (30.0)	36 (0.7) (12.3)	181 (3.6) (10.8)	13 (0.3) (4.7)	5,033 (100.0) (23.7)
lone parent with children	1,302 (89.5) (7.2)	20 (1.4) (2.2)	16 (1.1) (5.4)	100 (6.9) (5.9)	16 (1.1) (5.7)	1,454 (100.0) (6.8)
large adult household	1,319 (87.7) (7.3)	41 (2.7) (4.4)	26 (1.7) (8.8)	106 (7.1) (6.3)	13 (0.8) (4.6)	1,505 (100.0) (7.1)
one person under 60	1,880 (79.2) (10.4)	30 (1.3) (3.3)	36 (1.5) (12.4)	383 (16.1) (22.7)	45 (1.9) (16.3)	2,375 (100.0) (11.2)
one person 60 or over	2,396 (76.0) (13.3)	113 (3.6) (12.2)	56 (1.8) (19.0)	447 (14.2) (26.5)	141 (4.5) (51.1)	3,153 (100.0) (14.8)
Total	18,058 (85.0) (100.0)	926 (4.4) (100.0)	295 (1.4) (100.0)	1,686 (7.9) (100.0)	276 (1.3) (100.0)	21,242 (100.0) (100.0)

Base: All Dwellings

Table 2.7 Primary space heating fuel - Proportion of space heating fuel by the age of the household representative

	count(000s), (row%), (column%)					
	Gas fired system	Oil fired system	Solid fuel fired system	Electrical system	Communal system	Total
16 - 29	1,496 (84.6) (8.3)	10 (0.6) (1.1)	15 (0.9) (5.1)	215 (12.2) (12.7)	31 (1.8) (11.3)	1,767 (100.0) (8.3)
30 - 44	5,306 (88.6) (29.4)	225 (3.8) (24.3)	53 (0.9) (17.8)	363 (6.1) (21.5)	45 (0.7) (16.2)	5,991 (100.0) (28.2)
45 - 64	6,869 (86.3) (38.0)	405 (5.1) (43.7)	117 (1.5) (39.5)	511 (6.4) (30.3)	56 (0.7) (20.3)	7,957 (100.0) (37.5)
65 or over	4,387 (79.4) (24.3)	286 (5.2) (30.9)	111 (2.0) (37.5)	598 (10.8) (35.5)	144 (2.6) (52.2)	5,527 (100.0) (26.0)
Total	18,058 (85.0) (100.0)	926 (4.4) (100.0)	295 (1.4) (100.0)	1,686 (7.9) (100.0)	276 (1.3) (100.0)	21,242 (100.0) (100.0)

Base: All Dwellings

Table 2.8 Primary space heating fuel - Proportion of space heating fuel by household income

	count(000s), (row%), (column%)					
	Gas fired system	Oil fired system	Solid fuel fired system	Electrical system	Communal system	Total
Q1: <£10k	3,375 (79.7) (18.7)	102 (2.4) (11.0)	81 (1.9) (27.5)	525 (12.4) (31.1)	150 (3.5) (54.3)	4,232 (100.0) (19.9)
Q2: £10k-£16k	3,548 (83.7) (19.6)	126 (3.0) (13.6)	91 (2.2) (31.0)	426 (10.0) (25.2)	48 (1.1) (17.2)	4,239 (100.0) (20.0)
Q3: £17k-£23k	3,620 (85.3) (20.0)	171 (4.0) (18.5)	59 (1.4) (20.0)	356 (8.4) (21.1)	39 (0.9) (14.2)	4,246 (100.0) (20.0)
Q4: £24k-£35k	3,769 (88.5) (20.9)	202 (4.7) (21.8)	34 (0.8) (11.5)	229 (5.4) (13.6)	25 (0.6) (9.0)	4,258 (100.0) (20.0)
Q5: >£35k	3,747 (87.8) (20.7)	325 (7.6) (35.1)	30 (0.7) (10.1)	151 (3.5) (8.9)	15 (0.3) (5.3)	4,267 (100.0) (20.1)
Total	18,058 (85.0) (100.0)	926 (4.4) (100.0)	295 (1.4) (100.0)	1,686 (7.9) (100.0)	276 (1.3) (100.0)	21,242 (100.0) (100.0)

Base: All Households

Table 3.1 Water heating system - Proportion of water heating system

	count(000s), (column%)
Water heating system	Dwellings
With central heating	19,291 (86.9)
Dedicated boiler	257 (1.2)
Electric immersion heater	2,200 (9.9)
Instantaneous (including kettles)	441 (2.0)
Total	22,189 (100.0)

Base: All Dwellings

Table 3.2 Water heating system - Proportion of water heating system by dwelling type

	count(000s), (row%), (column%)				
	With central heating	Dedicated boiler	Electric immersion heater	Instantaneous	Total
end terrace	1,864 (89.5) (9.7)	22 (1.1) (8.7)	151 (7.3) (6.9)	45 (2.1) (10.1)	2,082 (100.0) (9.4)
mid terrace	3,639 (87.5) (18.9)	53 (1.3) (20.4)	343 (8.2) (15.6)	124 (3.0) (28.1)	4,158 (100.0) (18.7)
semi detached	5,607 (91.9) (29.1)	75 (1.2) (29.2)	316 (5.2) (14.4)	105 (1.7) (23.8)	6,103 (100.0) (27.5)
detached	3,787 (95.3) (19.6)	35 (0.9) (13.6)	128 (3.2) (5.8)	22 (0.6) (5.1)	3,973 (100.0) (17.9)
bungalow	1,869 (88.9) (9.7)	20 (0.9) (7.7)	183 (8.7) (8.3)	30 (1.4) (6.8)	2,102 (100.0) (9.5)
converted flat	587 (77.5) (3.0)	12 (1.6) (4.6)	132 (17.4) (6.0)	27 (3.5) (6.1)	757 (100.0) (3.4)
purpose built flat, low rise	1,768 (65.6) (9.2)	31 (1.1) (11.9)	818 (30.3) (37.2)	80 (3.0) (18.1)	2,696 (100.0) (12.1)
purpose built flat, high rise	170 (53.6) (0.9)	10 (3.1) (3.8)	129 (40.7) (5.9)	8 (2.7) (1.9)	318 (100.0) (1.4)
Total	19,291 (86.9) (100.0)	257 (1.2) (100.0)	2,200 (9.9) (100.0)	441 (2.0) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 3.3 Water heating system - Proportion of water heating system by dwelling age

	count(000s), (row%), (column%)				
	With central heating	Dedicated boiler	Electric immersion heater	Instantaneous	Total
pre 1919	4,053 (85.0) (21.0)	97 (2.0) (37.6)	437 (9.2) (19.9)	179 (3.8) (40.7)	4,766 (100.0) (21.5)
1919-44	3,518 (91.0) (18.2)	62 (1.6) (24.0)	199 (5.1) (9.0)	86 (2.2) (19.5)	3,864 (100.0) (17.4)
1945-64	3,879 (89.3) (20.1)	49 (1.1) (18.9)	346 (8.0) (15.7)	71 (1.6) (16.1)	4,345 (100.0) (19.6)
1965-80	4,095 (85.2) (21.2)	31 (0.6) (12.0)	603 (12.5) (27.4)	77 (1.6) (17.5)	4,806 (100.0) (21.7)
1981-90	1,510 (80.4) (7.8)	10 (0.5) (3.9)	336 (17.9) (15.3)	21 (1.1) (4.8)	1,878 (100.0) (8.5)
post 1990	2,236 (88.3) (11.6)	9 (0.4) (3.6)	280 (11.1) (12.7)	6 (0.2) (1.4)	2,531 (100.0) (11.4)
Total	19,291 (86.9) (100.0)	257 (1.2) (100.0)	2,200 (9.9) (100.0)	441 (2.0) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 3.4 Water heating system - Proportion of water heating system by floor area

	count(000s), (row%), (column%)				
	With central heating	Dedicated boiler	Electric immersion heater	Instantaneous	Total
Quintile 1: < 64m ²	3,192 (71.9) (16.5)	45 (1.0) (17.6)	1,059 (23.9) (48.2)	142 (3.2) (32.2)	4,438 (100.0) (20.0)
Quintile 2: 64m ² - 78m ²	3,787 (85.3) (19.6)	60 (1.3) (23.3)	487 (11.0) (22.1)	105 (2.4) (23.8)	4,438 (100.0) (20.0)
Quintile 3: 79m ² - 92m ²	3,984 (90.0) (20.7)	54 (1.2) (21.0)	295 (6.7) (13.4)	95 (2.2) (21.6)	4,428 (100.0) (20.0)
Quintile 4: 93m ² - 121m ²	4,129 (92.9) (21.4)	48 (1.1) (18.6)	215 (4.8) (9.8)	52 (1.2) (11.8)	4,444 (100.0) (20.0)
Quintile 5: > 121m ²	4,199 (94.6) (21.8)	50 (1.1) (19.5)	144 (3.3) (6.6)	47 (1.0) (10.6)	4,440 (100.0) (20.0)
Total	19,291 (86.9) (100.0)	257 (1.2) (100.0)	2,200 (9.9) (100.0)	441 (2.0) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 3.5 Water heating system - Proportion of water heating system by dwelling tenure

	count(000s), (row%), (column%)				
	With central heating	Dedicated boiler	Electric immersion heater	Instantaneous	Total
owner occupied	13,893 (89.3) (72.0)	176 (1.1) (68.3)	1,193 (7.7) (54.2)	298 (1.9) (67.6)	15,560 (100.0) (70.1)
private rented	2,126 (77.6) (11.0)	55 (2.0) (21.3)	481 (17.6) (21.8)	77 (2.8) (17.4)	2,738 (100.0) (12.3)
local authority	1,693 (85.2) (8.8)	15 (0.7) (5.8)	237 (11.9) (10.8)	42 (2.1) (9.4)	1,987 (100.0) (9.0)
RSL	1,578 (82.9) (8.2)	12 (0.6) (4.6)	289 (15.2) (13.1)	25 (1.3) (5.6)	1,904 (100.0) (8.6)
Total	19,291 (86.9) (100.0)	257 (1.2) (100.0)	2,200 (9.9) (100.0)	441 (2.0) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 3.6 Water heating system - Proportion of water heating system by household composition

	count(000s), (row%), (column%)				
	With central heating	Dedicated boiler	Electric immersion heater	Instantaneous	Total
couple under 60	3,575 (90.0) (19.2)	34 (0.9) (14.7)	300 (7.5) (14.7)	64 (1.6) (17.4)	3,973 (100.0) (18.7)
couple 60 or over	3,336 (89.0) (17.9)	59 (1.6) (25.1)	297 (7.9) (14.6)	57 (1.5) (15.5)	3,749 (100.0) (17.6)
couple with children	4,704 (93.5) (25.3)	35 (0.7) (14.9)	237 (4.7) (11.6)	57 (1.1) (15.5)	5,033 (100.0) (23.7)
lone parent with children	1,307 (89.9) (7.0)	5 (0.3) (2.2)	121 (8.3) (5.9)	21 (1.5) (5.8)	1,454 (100.0) (6.8)
large adult household	1,325 (88.0) (7.1)	25 (1.6) (10.6)	131 (8.7) (6.4)	24 (1.6) (6.5)	1,505 (100.0) (7.1)
one person under 60	1,868 (78.6) (10.0)	27 (1.1) (11.5)	428 (18.0) (21.0)	53 (2.2) (14.4)	2,375 (100.0) (11.2)
one person 60 or over	2,486 (78.8) (13.4)	49 (1.6) (21.1)	527 (16.7) (25.8)	91 (2.9) (24.8)	3,153 (100.0) (14.8)
Total	18,602 (87.6) (100.0)	233 (1.1) (100.0)	2,040 (9.6) (100.0)	367 (1.7) (100.0)	21,242 (100.0) (100.0)

Base: All Dwellings

Table 3.7 Water heating system - Proportion of water heating system by the age of the household representative

	count(000s), (row%), (column%)				
	With central heating	Dedicated boiler	Electric immersion heater	Instantaneous	Total
16 - 29	1,505 (85.1) (8.1)	16 (0.9) (6.9)	224 (12.7) (11.0)	23 (1.3) (6.2)	1,767 (100.0) (8.3)
30 - 44	5,440 (90.8) (29.2)	30 (0.5) (12.9)	442 (7.4) (21.7)	78 (1.3) (21.3)	5,991 (100.0) (28.2)
45 - 64	7,063 (88.8) (38.0)	97 (1.2) (41.7)	656 (8.2) (32.1)	142 (1.8) (38.6)	7,957 (100.0) (37.5)
65 or over	4,594 (83.1) (24.7)	90 (1.6) (38.6)	718 (13.0) (35.2)	124 (2.2) (33.9)	5,527 (100.0) (26.0)
Total	18,602 (87.6) (100.0)	233 (1.1) (100.0)	2,040 (9.6) (100.0)	367 (1.7) (100.0)	21,242 (100.0) (100.0)

Base: All Dwellings

Table 3.8 Water heating system - Proportion of water heating system by household income

	count(000s), (row%), (column%)				
	With central heating	Dedicated boiler	Electric immersion heater	Instantaneous	Total
Q1: <£10k	3,445 (81.4) (18.5)	61 (1.5) (26.3)	616 (14.5) (30.2)	110 (2.6) (30.0)	4,232 (100.0) (19.9)
Q2: £10k-£16k	3,561 (84.0) (19.1)	62 (1.5) (26.7)	531 (12.5) (26.0)	85 (2.0) (23.1)	4,239 (100.0) (20.0)
Q3: £17k-£23k	3,693 (87.0) (19.9)	42 (1.0) (18.0)	432 (10.2) (21.2)	79 (1.9) (21.7)	4,246 (100.0) (20.0)
Q4: £24k-£35k	3,891 (91.4) (20.9)	46 (1.1) (19.5)	267 (6.3) (13.1)	55 (1.3) (15.0)	4,258 (100.0) (20.0)
Q5: >£35k	4,013 (94.0) (21.6)	22 (0.5) (9.5)	194 (4.6) (9.5)	38 (0.9) (10.2)	4,267 (100.0) (20.1)
Total	18,602 (87.6) (100.0)	233 (1.1) (100.0)	2,040 (9.6) (100.0)	367 (1.7) (100.0)	21,242 (100.0) (100.0)

Base: All Households

Table 4.1 Type of boiler - Proportion of boiler type

Type of boiler	count(000s), (column%) Dwellings
Standard boiler	8,782 (39.6)
Back boiler	1,944 (8.8)
Non condensing combination boiler	6,287 (28.3)
Condensing boiler	698 (3.1)
Condensing-combination boiler	1,837 (8.3)
No boiler	2,642 (11.9)
Total	22,189 (100.0)

Base: All Dwellings

Table 4.2 Type of boiler - Proportion of boiler type by dwelling type

	count(000s), (row%), (column%)						
	Standard boiler (floor or wall)	Back boiler (to fire or stove)	Non condensing combination boiler	Condensing boiler	Condensing- combination boiler	No boiler	Total
end terrace	731 (35.1) (8.3)	239 (11.5) (12.3)	707 (34.0) (11.2)	62 (3.0) (8.9)	170 (8.2) (9.3)	173 (8.3) (6.5)	2,082 (100.0) (9.4)
mid terrace	1,327 (31.9) (15.1)	452 (10.9) (23.3)	1,438 (34.6) (22.9)	106 (2.6) (15.2)	392 (9.4) (21.4)	442 (10.6) (16.7)	4,158 (100.0) (18.7)
semi detached	2,435 (39.9) (27.7)	762 (12.5) (39.2)	1,803 (29.5) (28.7)	183 (3.0) (26.2)	534 (8.7) (29.1)	385 (6.3) (14.6)	6,103 (100.0) (27.5)
detached	2,666 (67.1) (30.4)	98 (2.5) (5.0)	592 (14.9) (9.4)	252 (6.3) (36.1)	257 (6.5) (14.0)	109 (2.7) (4.1)	3,973 (100.0) (17.9)
bungalow	883 (42.0) (10.1)	242 (11.5) (12.5)	551 (26.2) (8.8)	58 (2.7) (8.3)	169 (8.0) (9.2)	199 (9.5) (7.5)	2,102 (100.0) (9.5)
converted flat	116 (15.3) (1.3)	23 (3.1) (1.2)	347 (45.8) (5.5)	5 (0.7) (0.8)	85 (11.2) (4.6)	181 (23.9) (6.8)	757 (100.0) (3.4)
purpose built flat, low rise	538 (20.0) (6.1)	124 (4.6) (6.4)	801 (29.7) (12.7)	28 (1.0) (4.0)	221 (8.2) (12.1)	983 (36.5) (37.2)	2,696 (100.0) (12.1)
purpose built flat, high rise	84 (26.4) (1.0)	3 (1.0) (0.2)	48 (15.0) (0.8)	4 (1.3) (0.6)	8 (2.7) (0.5)	170 (53.6) (6.4)	318 (100.0) (1.4)
Total	8,782 (39.6) (100.0)	1,944 (8.8) (100.0)	6,287 (28.3) (100.0)	698 (3.1) (100.0)	1,837 (8.3) (100.0)	2,642 (11.9) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 4.3 Type of boiler - Proportion of boiler type by dwelling age

	count(000s), (row%), (column%)						
	Standard boiler (floor or wall)	Back boiler (to fire or stove)	Non condensing combination boiler	Condensing boiler	Condensing- combination boiler	No boiler	Total
pre 1919	1,433 (30.1) (16.3)	308 (6.5) (15.9)	1,847 (38.8) (29.4)	89 (1.9) (12.7)	449 (9.4) (24.4)	639 (13.4) (24.2)	4,766 (100.0) (21.5)
1919-44	1,331 (34.4) (15.2)	468 (12.1) (24.1)	1,317 (34.1) (21.0)	123 (3.2) (17.7)	351 (9.1) (19.1)	274 (7.1) (10.4)	3,864 (100.0) (17.4)
1945-64	1,551 (35.7) (17.7)	728 (16.8) (37.4)	1,145 (26.3) (18.2)	133 (3.1) (19.1)	385 (8.9) (21.0)	402 (9.3) (15.2)	4,345 (100.0) (19.6)
1965-80	2,141 (44.6) (24.4)	353 (7.3) (18.2)	1,102 (22.9) (17.5)	176 (3.7) (25.2)	351 (7.3) (19.1)	681 (14.2) (25.8)	4,806 (100.0) (21.7)
1981-90	927 (49.4) (10.6)	55 (2.9) (2.8)	356 (18.9) (5.7)	51 (2.7) (7.4)	121 (6.5) (6.6)	367 (19.6) (13.9)	1,878 (100.0) (8.5)
post 1990	1,398 (55.2) (15.9)	31 (1.2) (1.6)	520 (20.5) (8.3)	125 (4.9) (17.9)	179 (7.1) (9.7)	278 (11.0) (10.5)	2,531 (100.0) (11.4)
Total	8,782 (39.6) (100.0)	1,944 (8.8) (100.0)	6,287 (28.3) (100.0)	698 (3.1) (100.0)	1,837 (8.3) (100.0)	2,642 (11.9) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 4.4 Type of boiler - Proportion of boiler type by floor area

	count(000s), (row%), (column%)						
	Standard boiler (floor or wall)	Back boiler (to fire or stove)	Non condensing combination boiler	Condensing boiler	Condensing- combination boiler	No boiler	Total
Quintile 1: < 64m ²	998 (22.5) (11.4)	349 (7.9) (17.9)	1,312 (29.6) (20.9)	74 (1.7) (10.6)	395 (8.9) (21.5)	1,311 (29.5) (49.6)	4,438 (100.0) (20.0)
Quintile 2: 64m ² - 78m ²	1,413 (31.8) (16.1)	521 (11.7) (26.8)	1,454 (32.8) (23.1)	101 (2.3) (14.5)	365 (8.2) (19.9)	584 (13.2) (22.1)	4,438 (100.0) (20.0)
Quintile 3: 79m ² - 92m ²	1,611 (36.4) (18.3)	588 (13.3) (30.2)	1,368 (30.9) (21.8)	118 (2.7) (16.9)	394 (8.9) (21.5)	349 (7.9) (13.2)	4,428 (100.0) (20.0)
Quintile 4: 93m ² - 121m ²	2,064 (46.4) (23.5)	376 (8.5) (19.3)	1,269 (28.6) (20.2)	123 (2.8) (17.6)	362 (8.2) (19.7)	250 (5.6) (9.5)	4,444 (100.0) (20.0)
Quintile 5: > 121m ²	2,696 (60.7) (30.7)	111 (2.5) (5.7)	884 (19.9) (14.1)	282 (6.3) (40.4)	320 (7.2) (17.4)	148 (3.3) (5.6)	4,440 (100.0) (20.0)
Total	8,782 (39.6) (100.0)	1,944 (8.8) (100.0)	6,287 (28.3) (100.0)	698 (3.1) (100.0)	1,837 (8.3) (100.0)	2,642 (11.9) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 4.5 Type of boiler - Proportion of boiler type by dwelling tenure

	count(000s), (row%), (column%)						
	Standard boiler (floor or wall)	Back boiler (to fire or stove)	Non condensing combination boiler	Condensing boiler	Condensing- combination boiler	No boiler	Total
owner occupied	6,900 (44.3) (78.6)	1,208 (7.8) (62.1)	4,317 (27.7) (68.7)	545 (3.5) (78.0)	1,255 (8.1) (68.4)	1,335 (8.6) (50.5)	15,560 (100.0) (70.1)
private rented	758 (27.7) (8.6)	152 (5.6) (7.8)	961 (35.1) (15.3)	31 (1.1) (4.4)	219 (8.0) (11.9)	617 (22.5) (23.4)	2,738 (100.0) (12.3)
local authority	584 (29.4) (6.7)	341 (17.2) (17.5)	476 (23.9) (7.6)	71 (3.6) (10.2)	200 (10.1) (10.9)	315 (15.8) (11.9)	1,987 (100.0) (9.0)
RSL	539 (28.3) (6.1)	243 (12.8) (12.5)	532 (28.0) (8.5)	52 (2.7) (7.5)	162 (8.5) (8.8)	375 (19.7) (14.2)	1,904 (100.0) (8.6)
Total	8,782 (39.6) (100.0)	1,944 (8.8) (100.0)	6,287 (28.3) (100.0)	698 (3.1) (100.0)	1,837 (8.3) (100.0)	2,642 (11.9) (100.0)	22,189 (100.0) (100.0)

Base: All Dwellings

Table 4.6 Type of boiler - Proportion of boiler type by household composition

	count(000s), (row%), (column%)						
	Standard boiler (floor or wall)	Back boiler (to fire or stove)	Non condensing combination boiler	Condensing boiler	Condensing- combination boiler	No boiler	Total
couple under 60	1,650 (41.5) (19.2)	279 (7.0) (14.8)	1,232 (31.0) (20.5)	115 (2.9) (17.0)	357 (9.0) (20.5)	341 (8.6) (14.4)	3,973 (100.0) (18.7)
couple 60 or over	1,795 (47.9) (20.9)	372 (9.9) (19.8)	804 (21.4) (13.4)	180 (4.8) (26.7)	263 (7.0) (15.1)	335 (8.9) (14.2)	3,749 (100.0) (17.6)
couple with children	2,235 (44.4) (26.0)	366 (7.3) (19.4)	1,542 (30.6) (25.7)	187 (3.7) (27.7)	450 (8.9) (25.8)	253 (5.0) (10.7)	5,033 (100.0) (23.7)
lone parent with children	523 (36.0) (6.1)	152 (10.5) (8.1)	477 (32.8) (7.9)	35 (2.4) (5.2)	135 (9.3) (7.8)	132 (9.0) (5.6)	1,454 (100.0) (6.8)
large adult household	540 (35.9) (6.3)	154 (10.2) (8.2)	476 (31.6) (7.9)	54 (3.6) (8.0)	127 (8.4) (7.3)	155 (10.3) (6.6)	1,505 (100.0) (7.1)
one person under 60	727 (30.6) (8.5)	169 (7.1) (9.0)	763 (32.1) (12.7)	37 (1.6) (5.5)	199 (8.4) (11.4)	481 (20.3) (20.4)	2,375 (100.0) (11.2)
one person 60 or over	1,111 (35.2) (12.9)	392 (12.4) (20.8)	704 (22.3) (11.7)	67 (2.1) (10.0)	212 (6.7) (12.2)	666 (21.1) (28.2)	3,153 (100.0) (14.8)
Total	8,580 (40.4) (100.0)	1,884 (8.9) (100.0)	5,997 (28.2) (100.0)	675 (3.2) (100.0)	1,744 (8.2) (100.0)	2,362 (11.1) (100.0)	21,242 (100.0) (100.0)

Base: All Dwellings

Table 4.7 Type of boiler - Proportion of boiler type by the age of the household representative

	count(000s), (row%), (column%)						
	Standard boiler (floor or wall)	Back boiler (to fire or stove)	Non condensing combination boiler	Condensing boiler	Condensing- combination boiler	No boiler	Total
16 - 29	477 (27.0) (5.6)	124 (7.0) (6.6)	677 (38.3) (11.3)	28 (1.6) (4.2)	201 (11.4) (11.6)	259 (14.7) (11.0)	1,767 (100.0) (8.3)
30 - 44	2,316 (38.7) (27.0)	431 (7.2) (22.9)	2,024 (33.8) (33.7)	176 (2.9) (26.1)	560 (9.3) (32.1)	483 (8.1) (20.5)	5,991 (100.0) (28.2)
45 - 64	3,521 (44.3) (41.0)	664 (8.3) (35.2)	2,137 (26.9) (35.6)	291 (3.7) (43.2)	602 (7.6) (34.5)	741 (9.3) (31.4)	7,957 (100.0) (37.5)
65 or over	2,265 (41.0) (26.4)	665 (12.0) (35.3)	1,160 (21.0) (19.3)	179 (3.2) (26.5)	380 (6.9) (21.8)	879 (15.9) (37.2)	5,527 (100.0) (26.0)
Total	8,580 (40.4) (100.0)	1,884 (8.9) (100.0)	5,997 (28.2) (100.0)	675 (3.2) (100.0)	1,744 (8.2) (100.0)	2,362 (11.1) (100.0)	21,242 (100.0) (100.0)

Base: All Dwellings

Table 4.8 Type of boiler - Proportion of boiler type by household income

	count(000s), (row%), (column%)						
	Standard boiler (floor or wall)	Back boiler (to fire or stove)	Non condensing combination boiler	Condensing boiler	Condensing- combination boiler	No boiler	Total
Q1: <£10k	1,284 (30.4) (15.0)	532 (12.6) (28.2)	1,178 (27.8) (19.6)	110 (2.6) (16.3)	342 (8.1) (19.6)	785 (18.6) (33.2)	4,232 (100.0) (19.9)
Q2: £10k-£16k	1,504 (35.5) (17.5)	477 (11.2) (25.3)	1,223 (28.9) (20.4)	89 (2.1) (13.2)	346 (8.2) (19.8)	601 (14.2) (25.4)	4,239 (100.0) (20.0)
Q3: £17k-£23k	1,633 (38.5) (19.0)	417 (9.8) (22.2)	1,266 (29.8) (21.1)	92 (2.2) (13.6)	335 (7.9) (19.2)	503 (11.8) (21.3)	4,246 (100.0) (20.0)
Q4: £24k-£35k	1,903 (44.7) (22.2)	290 (6.8) (15.4)	1,254 (29.5) (20.9)	140 (3.3) (20.7)	380 (8.9) (21.8)	292 (6.8) (12.3)	4,258 (100.0) (20.0)
Q5: >£35k	2,256 (52.9) (26.3)	168 (3.9) (8.9)	1,076 (25.2) (17.9)	245 (5.7) (36.3)	341 (8.0) (19.5)	182 (4.3) (7.7)	4,267 (100.0) (20.1)
Total	8,580 (40.4) (100.0)	1,884 (8.9) (100.0)	5,997 (28.2) (100.0)	675 (3.2) (100.0)	1,744 (8.2) (100.0)	2,362 (11.1) (100.0)	21,242 (100.0) (100.0)

Base: All Households