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# Chapter 4

## Heating

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- 4.1. This chapter provides an overview of the distribution and types of primary and secondary heating systems in English homes in 2013 and how these varied by dwelling characteristics. It also looks at whether some form of secondary heating was available to certain household groups who may be considered more vulnerable owing to, for example, their age or health, and how this varied according to tenure.
- 4.2. As part of the analysis on secondary heating, the chapter examines whether secondary heating was available for dwellings and households where the primary heating system was, or was not, central heating. Finally the chapter looks at the prevalence of secondary heating over time and how this varied by tenure.
- 4.3. Where the heating system has a gas boiler it is especially important that these are both fitted correctly and are well-maintained. This is because harmful carbon monoxide is produced when gas appliances are not fully burning their fuel, or if vents, chimneys or flues become blocked. Any form of heater, fire or boiler burning solid or liquid fuel (such as coal, wood, paraffin) could also produce carbon monoxide due to, for example, inadequacy or disrepair of ventilation or flues. As carbon monoxide is colourless, tasteless and has no smell, it is difficult to recognise, but fitting a carbon monoxide detector helps to detect its presence<sup>1</sup>.

### Primary heating systems

- 4.4. For the EHS a heating system is referred to as the primary heating system if:
  - there is a heating distribution system sufficient to provide heat to two or more rooms, for example, through radiators or warm air vents, or
  - there are storage radiators in two or more rooms, or

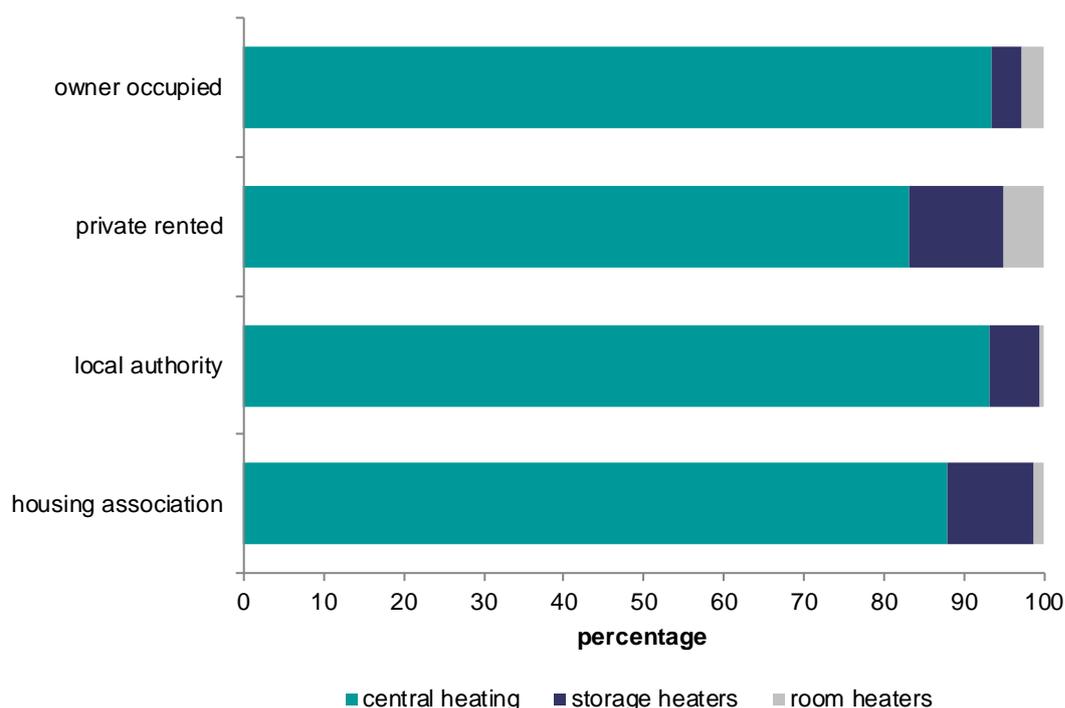
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<sup>1</sup> Since October 2010 Part J of building regulations in England has required a carbon monoxide alarm to be fitted in any new property where a solid fuel heating system is first installed. The Energy Act 2013 enables the Secretary of State to use secondary legislation to require private landlords to install smoke alarms and carbon monoxide detectors where there is considered to be a clear need and where the benefits of installation clearly outweigh the costs.

- there are other fixed<sup>2</sup> types of heaters that use the same fuel in two or more rooms

4.5. The great majority of homes (91%) were centrally heated in 2013, whilst 6% had storage heaters and the remaining 3% had individual room heaters. Although central heating was the most common type of heating across all tenures, it was more prevalent in owner occupied and local authority homes (94% and 93% respectively), Figure 4.1.

**Figure 4.1: Heating systems by tenure, 2013**



**Base: all dwellings**

**Note: underlying data are presented in Annex Table 4.1**

**Source: English Housing Survey, dwelling sample**

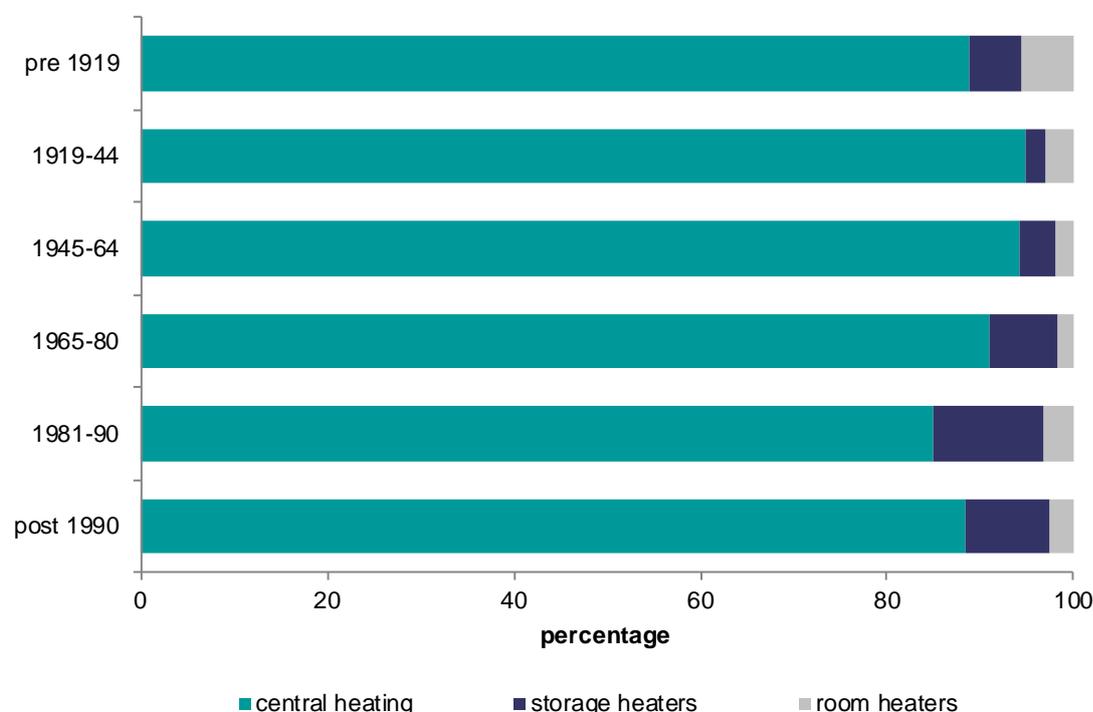
4.6. The vast majority of houses (95%) had central heating, compared with only three-quarters of flats (75%). Less than a fifth (19%) of flats had storage heaters, and the remaining 7% used individual room heaters, which are generally the least energy efficient and most expensive form of heating, Annex Table 4.1.

4.7. All types of rented homes were more likely to have storage heating as the primary heating source than owner occupied homes, reflecting the higher proportion of flats among these dwellings. This type of heating was, however, more common in private rented and housing association homes than the local authority tenure. This is likely to be due to the low numbers of local authority dwellings built since 1980 (see Chapter 1 of the profile of English Housing

<sup>2</sup> portable heaters are not considered as part of the fabric of the home and are not classed as primary heating

Report, Annex Table 1.1). Homes built after 1980 had a higher proportion of dwellings using storage heaters, Figure 4.2.

**Figure 4.2: Heating systems by dwelling age, 2013**



**Base: all dwellings**

**Note: underlying data are presented in Annex Table 4.1**

**Source: English Housing Survey, dwelling sample**

4.8. As part of the EHS physical survey, households in occupied homes were asked whether the primary heating system was the main heat source in winter. Some 98% of respondents indicated that the primary heating system was their main source of winter heating, though this proportion reduced to 94% where the primary system consisted of storage or room heaters rather than central heating, Annex Table 4.2.

## Secondary heating systems

4.9. Where more than one distinct heating system is found in a home, the EHS records information about the secondary heating system, which is typically found in one room only. These systems may originally have been installed alongside the primary system, particularly in larger homes. Alternatively they may have been the only source of heating (such as gas or solid fuel fires) when the property was built, before being superseded by a new system, typically a form of central heating.

4.10. It is useful to examine the number and types of homes that contain secondary heating, as it may point to groups for whom the primary heating is insufficient.

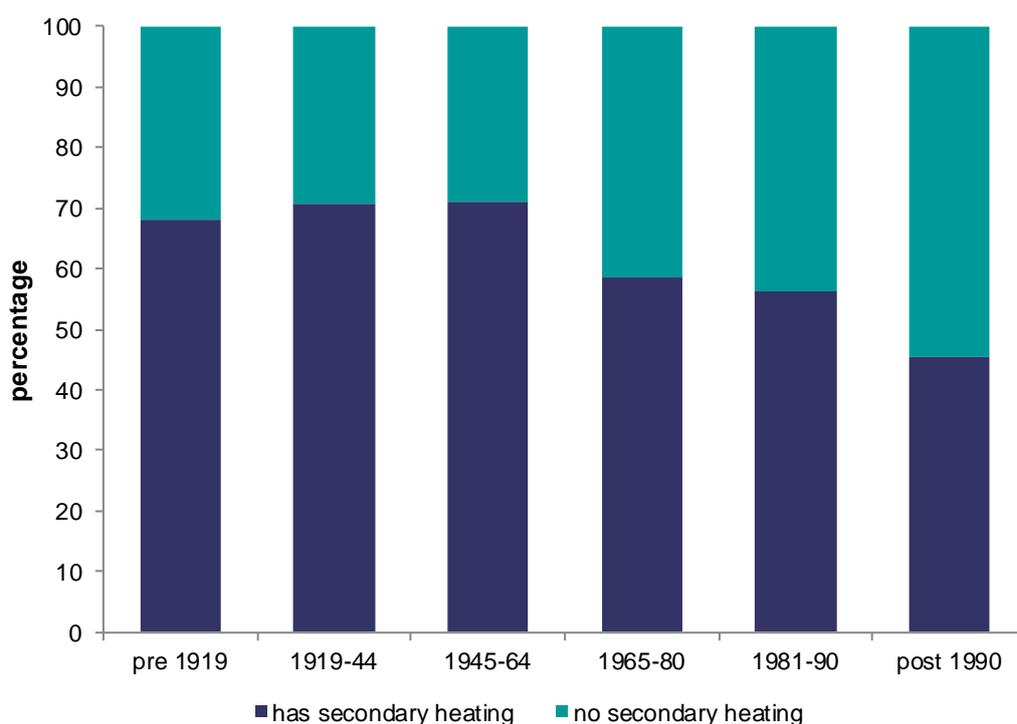
However it should be recognised that some types of secondary heating, such as wood burning stoves, may have been installed as a decorative home feature, rather than a heating necessity.

### Prevalence of secondary heating systems by type of dwelling

4.11. In 2013, around 14.6 million homes (63% of dwellings) had some form of secondary heating. This varied greatly by tenure and dwelling characteristics. Owner occupied homes were much more likely to have secondary heating (72%) compared with both private rented (45%) and social rented homes (47%). Houses were far more likely to have secondary heating (71%) than flats (32%), with particularly high proportions for detached houses (82%), bungalows (75%) and semi-detached houses (74%), Annex Table 4.3.

4.12. The age of a home was also a good indicator as to whether secondary heating was available. The proportion of homes with secondary heating ranged from 68% in those built before 1919, to 71%, for homes built from 1944 to 1965. In contrast, the prevalence of secondary heating was lower for newer homes, and only 46% of those constructed after 1990 had such heating, Figure 4.3.

**Figure 4.3: Secondary heating systems by dwelling age, 2013**



Base: all dwellings

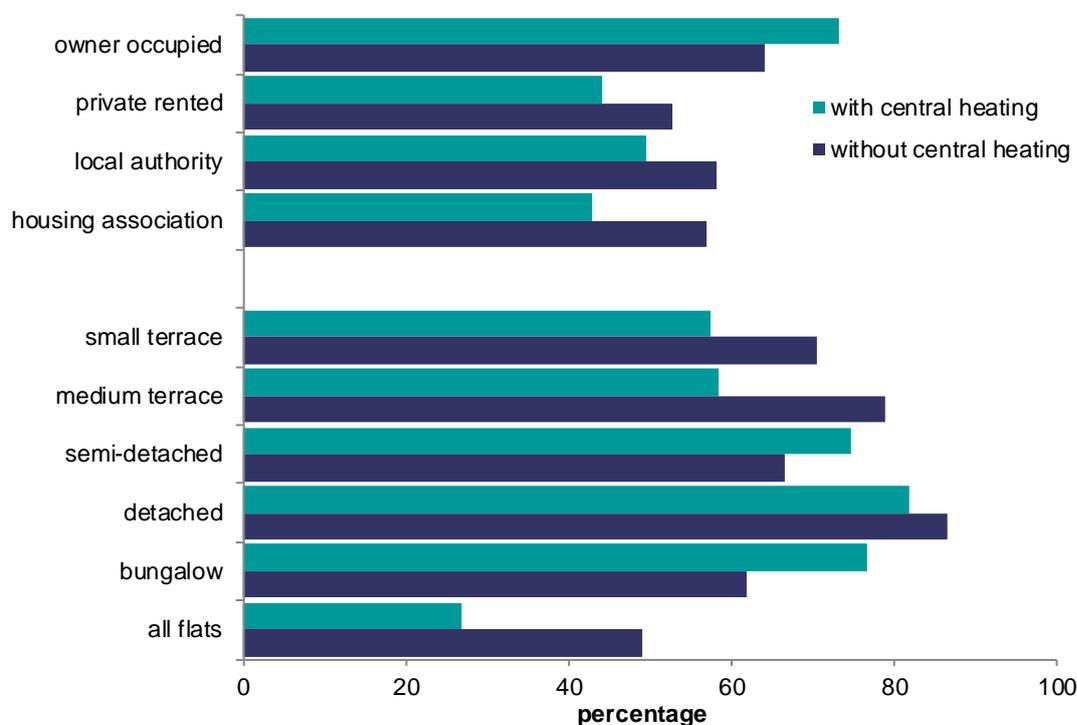
Note: underlying data are presented in Annex Table 4.3

Source: English Housing Survey, dwelling sample

## Prevalence of secondary heating systems by whether primary system is central heating

- 4.13. Secondary heating was slightly more common in homes with a primary central heating system (63%) compared with homes with other primary heating systems (59%), Annex Table 4.3.
- 4.14. Owner occupied centrally heated homes were more likely to have secondary heating (73%) compared with other owner occupied homes (64%). Conversely all types of rented dwellings were more likely to have secondary heating if they did not have central heating, Figure 4.4.
- 4.15. The type of primary heating system also affected whether secondary heating was present, and this varied by the type of dwelling; for example 79% of medium sized terraces without central heating had secondary heating compared with 58% of those with central heating. In contrast, semi-detached houses were more likely to have secondary heating if the home was centrally heated (75% compared with 66%), Figure 4.4.
- 4.16. Irrespective of their age, the proportion of dwellings with secondary heating was similar irrespective of whether the home had central heating or other types of primary heating, Annex Table 4.3.

**Figure 4.4: Characteristics of homes with secondary heating by type of primary heating system, 2013**



Base: all dwellings with/without central heating as primary heating system

Note: underlying data are presented in Annex Table 4.3

Source: English Housing Survey, dwelling sample

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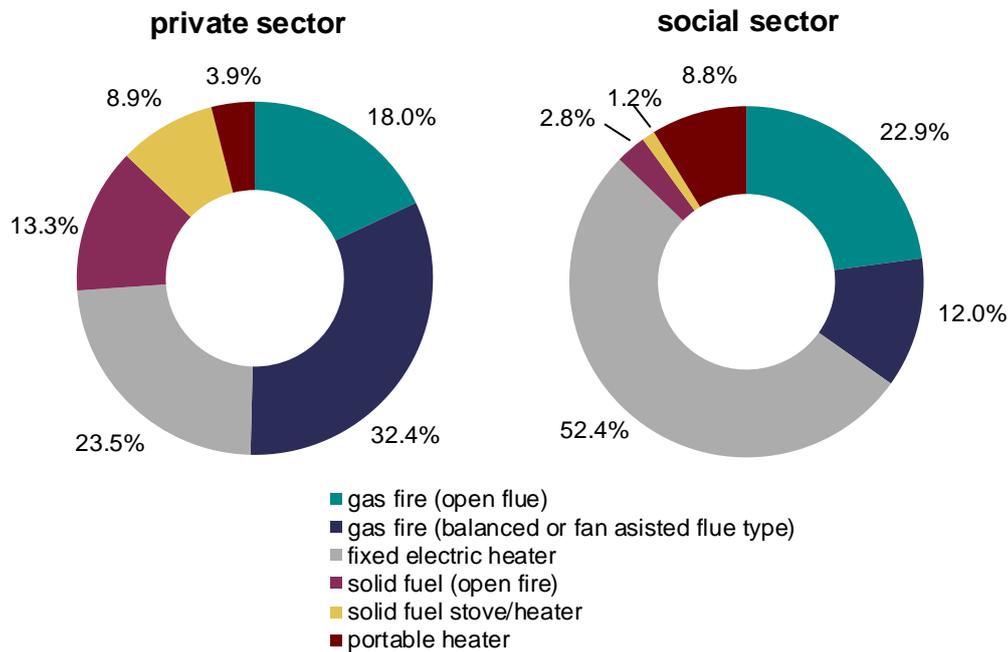
## Types of secondary heating

- 4.17. The categories of heating systems in this analysis are those used in the EHS survey to provide the most appropriate information for use in calculating the energy efficiencies of heating systems, and in turn, the energy efficiency rating of the dwelling. Further information on these heating types can be found in Appendix 1 of this chapter.
- 4.18. These secondary heating types are:
- mains gas fires (less efficient open flue)
  - mains gas fires (more efficient balanced or fan-assisted flue types)
  - fixed electric heaters (or panel heaters wired to the mains supply)
  - solid fuel systems<sup>3</sup> - open fires
  - solid fuel systems - stoves and space heaters (which include a range of appliances from kitchen stoves to modern biomass room heaters)
  - portable heaters
- 4.19. For homes with secondary heating, the most common forms were gas fires with balanced or fan-assisted flues (30%) and fixed electric heaters (27%); the least common form was portable heaters (5%). Some form of solid fuel secondary heating was present in 20% of homes: 12% of homes had solid fuel open fires and 8% had a solid fuel stove or heater, Annex Table 4.4.
- 4.20. Fixed electric heaters were a far more common source of secondary heating in the social sector (52%) compared with the private sector (24%). Within the private sector fixed electric heaters were also more common in private rented homes (33%) compared with owner occupied homes (22%) Figure 4.5 and Annex Table 4.4. This is partly due to the higher proportion of flats and relatively newer homes in the social sector; both newer homes and flats are less likely to have main gas (see Annex Table 2.4 of the Profile of English Housing Report). Also landlords may prefer to fit electric room heaters because they are relatively inexpensive to install and maintain compared with gas secondary heating systems.
- 4.21. Solid fuel in some form was used more commonly for secondary heating in private sector homes (22%) compared with those in the social sector (4%). This partly reflects the greater proportions of older homes and houses in the private sector; the latter are also more likely to have decorative fires such as wood-burning stoves, Figure 4.5.

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<sup>3</sup> solid fuel includes coal, smokeless fuel, wood and anthracite (a compact variety of coal with a high carbon content)

**Figure 4.5 Types of secondary heating systems by tenure, 2013**

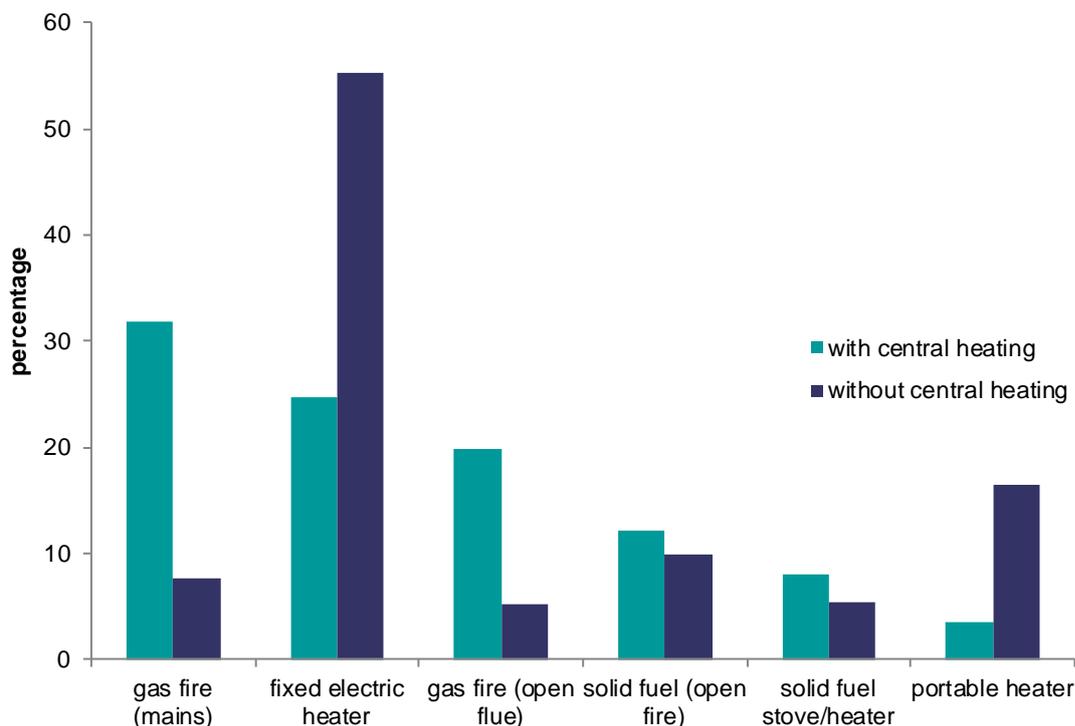


**Base:** all dwellings with secondary heating systems  
**Note:** underlying data are presented in Annex Table 4.4  
**Source:** English Housing Survey, dwelling sample

### Type of secondary heating by whether primary system is central heating

- 4.22. The type of secondary heating system also varied according to whether the home was centrally heated. Given that most central heating systems are fuelled by gas, this is often a natural choice of fuel for secondary heating systems and using mains gas is likely to be the cheapest way to fuel the secondary heating. Over half (52%) of the secondary heating systems in centrally heated homes were also fuelled by gas. In contrast just 13% of non-centrally heated homes had a gas fire (mains or open flue) for secondary heating, Figure 4.6
- 4.23. For homes without central heating (55%), fixed electric heaters were the most common form of secondary heating. This proportion is notably higher than for centrally heated homes with this type of secondary heating (25%). The use of portable heaters for secondary heating was also far more common for homes without central heating; 17% compared with just 3% of centrally heated homes, Figure 4.6.
- 4.24. Although the use of solid fuel open fires was similar irrespective of whether the home was centrally heated, the use of solid fuel stoves was slightly higher for centrally heated homes (8% compared to 6%), Figure 4.6.

**Figure 4.6: Types of secondary heating in dwellings with and without primary central heating, 2013**



**Base:** all dwellings with secondary heating systems  
**Note:** underlying data are presented in Annex Table 4.5  
**Source:** English Housing Survey, dwelling sample

### Prevalence of secondary heating systems by household type

4.25. Earlier analysis in this chapter showed that some form of secondary heating was more common in owner occupied homes. As owner occupation is the predominant form of tenure, this is one of the main reasons why, for all household groups (including those who may be more vulnerable), those living in the private sector were more likely to have a form of secondary heating than social renters, Figure 4.7.

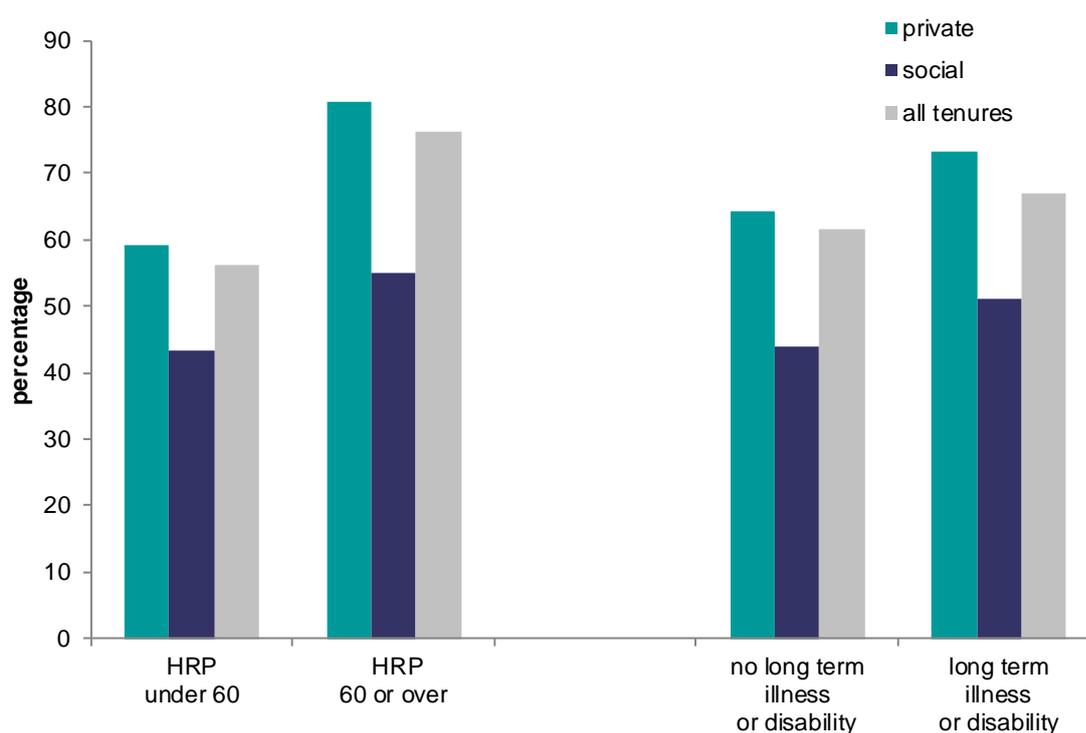
4.26. Households where the HRP was aged 60 years or over were more likely to have some form of secondary heating (76%), compared with households where the HRP was under 60 years (56%). This disparity was found in both the private and social sectors, Figure 4.7. The reasons for this disparity cannot easily be identified given that, for example, older people were no more likely to live in the oldest (and least energy efficient) homes (those built before 1919). Furthermore, the distribution of older people among different types of homes was fairly similar to younger households. Consequently, it is difficult to determine the extent to which the greater prevalence of secondary heating among older households could reflect:

- inadequacy of the primary heating system to heat the home to the preferred temperature

- the need to reduce fuel bills by using secondary heating to heat occupied rooms only

4.27. Around two-thirds (67%) of households containing a person with a long term illness or disability had secondary heating compared with 62% of households without these health difficulties. This disparity was found in both the private and social sector. As older people are more likely to have a long term illness or disability, this may be related to the finding above for the age of the HRP, Figure 4.7.

**Figure 4.7: Secondary heating systems by household type and tenure, 2013**



**Base: all households**

**Note: underlying data are presented in Annex Table 4.6**

**Source: English Housing Survey, dwelling sample**

4.28. Just over half of households where the youngest person was under 5 years (51%) had a secondary heating system compared with 65% of households where the youngest person was older. This disparity was evident across all tenures. Secondary heating was less prevalent in social sector households where the youngest person was under five years (40%), compared with those who lived in the private sector (53%), Annex Table 4.6.

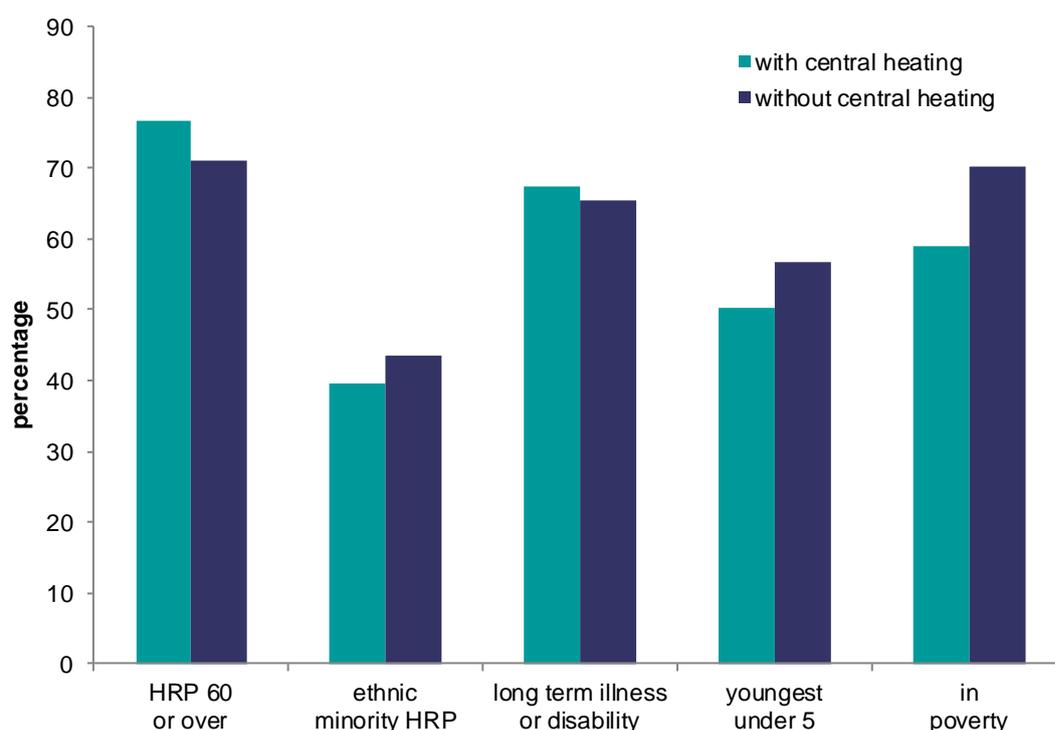
4.29. Households with an ethnic minority HRP were less likely to have secondary heating (40%) compared with white HRP households (66%). This disparity was found in both private and social sectors. Secondary heating was notably less prevalent among ethnic minority HRP households who lived in social sector homes (26%) compared with those who lived in the private sector (44%), Annex Table 4.6.

4.30. Overall, secondary heating was slightly less prevalent among households in poverty (61%) compared with households not in poverty (64%). This difference was evident in the private sector, but the prevalence of secondary heating was similar among social renters irrespective of whether the household was classified as being in poverty, Annex Table 4.6.

### Prevalence of secondary heating systems for households by type of primary heating system

4.31. For some types of households, such as those with a long term illness or disability, the proportion with secondary heating was fairly similar irrespective of whether central heating was present or not. The most marked difference related to households who were in poverty: some 70% of such households without central heating had secondary heating, compared with 59% of those who lived in centrally heated homes, Figure 4.8.

**Figure 4.8: Key household groups in homes with secondary heating by primary heating system, 2013**



Base: households with secondary heating

Note: underlying data are presented in Annex Table 4.7

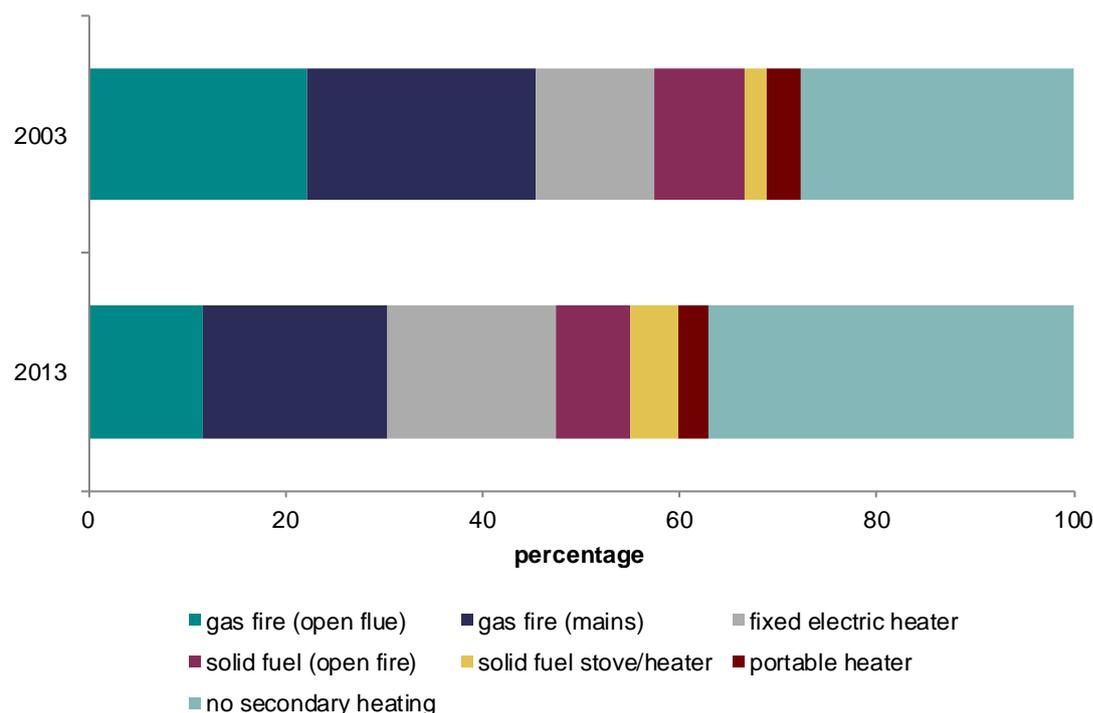
Source: English Housing Survey, household sub-sample

### Secondary heating over time

4.32. As the proportion of homes using central heating increased from 2003 (from 87% to 91%, (Annex Table 4.8), the use of secondary heating systems declined somewhat, with the percentage of homes having secondary heating falling from 72% to 63% in 2013, Annex Table 4.9.

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- 4.33. It is very likely that most new homes built during this period would have had only central heating installed at the time of construction. At the same time some older homes would have undertaken some energy improvements such as the installation of new boiler systems to replace less efficient heating systems.
- 4.34. The most significant change was a fall in the proportion of the total housing stock which had gas fires with open flues as a form of secondary heating; a fall from 22% in 2003 to 12% in 2013. Over the same period the proportion of the total housing stock using fixed electric heaters as a secondary system increased from 12% to 17%, Figure 4.9.
- 4.35. The reason for this increase in electric secondary heating is unknown, but possible explanations include that this additional source of heating is being increasingly valued by households (such heaters are available at relatively low cost, and are able to provide rapid additional heat into a room). In addition, in the rented sector these heaters are often preferred to gas systems due to ease of installation and less stringent maintenance and safety requirements. It may also be that homes where electric fixed heaters were formerly used for primary heating are being upgraded to other types of primary system while retaining their former fixed electric heaters for secondary heating.

**Figure 4.9: Type of secondary heating, 2003 and 2013**



**Base: all dwellings**

**Note: underlying data are presented in Annex Table 4.9**

**Sources:**

- 1) 2003: English House Condition Survey, dwelling sample;
- 2) 2013: English Housing Survey, dwelling sample

- 4.36. The decrease in the total number of homes with secondary systems was similar for both the private and social sectors. The rise in fixed electric heaters was particularly notable in the social sector stock overall (25% in 2013 compared to 14% in 2003), Annex Table 4.9.
- 4.37. In 2013, some 3% of respondents in homes with secondary heating said they used these secondary heating systems as the main heating source in winter, rather than the primary system. This proportion had decreased from 8% in 2003<sup>4</sup>, perhaps driven by an increase in central heating use, Annex Table 4.10.

<sup>4</sup> these findings need to be treated with caution due to non-response (around 6% of raw and weighted cases) in 2003

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## Appendix 1 Types of secondary heating

4.38. These categories of heating systems are used in the EHS survey to provide the most appropriate information that can be used to calculate the energy efficiencies of heating systems, and in turn, the energy efficiency rating of the dwelling.

- **mains gas fires (open flue)**

These take air for combustion from within the room and are therefore quite inefficient. As a result these fires will always be 'open fronted' which means the fuel bed and combustion gases are not 'sealed' from the room in which the fire is fitted.

- **mains gas fires (balanced or fan-assisted flue types)**

Balanced flue gas fires are room-sealed (closed fronted). The flue uses natural convection to draw the air from outside the building for combustion and expels it back to the outside through a separate compartment of the flue. The fire can only be on an external wall and the flue will be roughly 175 mm in diameter.

Fan assisted gas fires work like a balanced flue but with a fan, which means that they can use a smaller diameter flue pipe (about 125mm) which makes them more efficient. The fire can be on an inside wall and the fan will need an electricity supply.

This category of secondary heating system includes condensing gas fires

- **fixed electric heaters (or panel heaters wired to the mains supply)**
- **solid fuel systems - open fires**
- **solid fuel systems - stoves and space heaters**

Examples include modern biomass room heaters (wood burning stoves) and solid fuel range cookers

- **portable heaters**

An electric heater that is not fixed to the wall or wired in directly to a fused spur and is possible for a single person to carry easily from room to room.