

Homes Fit for Study 2017 | Evidence review

This report provides a summary for each of the 16 sources reviewed as part of the Homes Fit for Study research. The sources were identified through key terms searches using online search engines including Google, Google Scholar, Web of Knowledge. The main focus of the search was for literature specifically focused on students and their experiences of fuel poverty, however limited resources were identified with this relatively narrow focus. As a result, the search was widened to consider research that focuses on young people in general, or on broader experiences of fuel poverty for individuals living in the private rented sector. The tables below highlight the key findings from each source that are relevant to the student population, given their characteristics as being more likely to be young people, and to also be living in the private rented sector. The findings from this review fed in to the development of a national online survey of students living in the private rented sector, and also focus group research with the same audience. Full details of this research can be found online at:

The evidence

ID	Reference	Summary	Research population
1	HM Government, (2013), Modelling the likelihood of being fuel poor, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/266469/likelihood_of_being_fuel_poor.pdf	<p>The research aims to develop a model of influential characteristics using data from published sources to identify probability that a household is living in fuel poverty, however recognizing that this will not be a definitive measure. Factors assessed include household size and composition, employment status, benefits status, method of payment, dwelling type and age, tenure, energy efficiency performance and fuel type. Key findings include:</p> <ul style="list-style-type: none"> • Single person households have higher odds of being fuel poor compared to larger households with more occupants (with the odds being are four times that compared with households with five or more occupants). • Pension aged households have almost half the odds of being fuel poor compared to younger households (likely to be due to reduced housing costs so higher disposable income compared to younger households). • Odds of being fuel poor more than double for households in which the main household reference for national surveys person is unemployed or inactive (economically inactive people include those who are in full time education) compared to where the main reference person is employed. 	<ul style="list-style-type: none"> • UK wide • General population

		<ul style="list-style-type: none"> Households in older properties have increased odds of being fuel poor compared to more recently built properties. Households living in privately rented accommodation have over twice the off of being in fuel poverty compared to households in social housing. <p>The research also recognised the difficulty of identifying individuals living in fuel poverty within large households in the private rented sector due to the potential for varying levels of income amongst individuals living in the same household.</p>	
2	<p>HM Government, (2014), Understanding the behaviours of households in fuel poverty, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332122/understanding_behaviours_households_fuel_poverty_review_of_research_evidence.pdf</p>	<p>A large scale evidence review focused on behaviours and attitudes of fuel poor and those at risk of fuel poverty, which identified 152 pieces of evidence which met the requirements for relevance and methodological robustness. The 57 highest scoring pieces of evidence were reviewed in depth. The review was triggered as a result of the difficulty of identifying fuel poor households using the Low Income High Costs methodology and the need to identify proxy indicators that can be gathered more easily. Key findings include:</p> <ul style="list-style-type: none"> Research on behaviours and attitudes has tended to focus on 'at risk' groups (e.g. elderly) or use the proxy of low-income. Similarly, research tends to be qualitative in nature, and as a result, relatively small-scale. Research in 2013 by the Department for Energy and Climate Change found 22% of young adults aged 16-24 to be in fuel poverty. Younger adults tend to be at higher risk of fuel poverty partly due to their lower average earnings and the fact that the majority of this age group live in private rented accommodation, which tends to be less energy efficient and thus have higher fuel costs. Across the evidence reviewed, comfort and cost were found to be the key drivers of awareness and understanding of energy efficiency and that action was mainly focused on cutting back on energy use to achieve immediate cost savings rather than addressing the energy efficiency of properties. Evidence suggests that those living in fuel poverty are highly engaged with their energy use and bills, however those in the private rented sector tended to be less engaged with energy efficiency as this is more commonly a responsibility of the landlord rather than the tenant. The evidence review suggests a lack of knowledge over some actions which may influence spending on energy, for example the operation of heating systems and small energy efficiency improvements. Similarly, another barrier was found around the lack of knowledge about the potential benefit of switching energy supplier with individuals/households often seeing this process as too complex and uncertain in terms of the financial rewards. 	
3	<p>Marchand, R. (2015), Study 2a: Developing a Social Practice Theory Picture of Fuel Poverty,</p>	<p>PhD research which examines the household practices involving energy more widely, arguing that behaviours involving heating cannot be considered isolation of other uses of energy in the home, but also energy practices need to be considered in relation to broader household practices which are influenced by financial considerations and social norms. The aim of the research was to start to</p>	

	http://etheses.whiterose.ac.uk/11509/	<p>develop a model of fuel poverty from a social practice theory perspective. Focus group research was conducted to explore experiences of fuel poverty and how this is lived in terms of day to day experiences.</p> <ul style="list-style-type: none"> • Participants reported adapting their energy use across a range of behaviours/actions including heating, cooking, eating, personal hygiene and lighting behaviours with the aim of reducing energy spend. Examples include batch cooking at weekends and ensuring all oven shelves were used at a time to ensure maximum effectiveness. Other behaviours include leaving the house to avoid needing to turn on the heating, reduced frequency of washing clothes, using extra clothing or going to bed earlier in the evening to benefit from the warmth of duvets. • The research also considered how households managed their budgets overall, in order to meet their energy bill payments, finding that food purchasing behaviour was effected in terms of where participants did their shopping, to what time of day (often linked to the availability of price reductions/offers). Participants in the research also reported prioritising food purchasing over energy, in some cases missing bill payments to ensure food purchases were possible. • The research also highlighted a social dimension to behaviours associated with fuel poverty with participants reporting adjusting their energy use when visitors were in the home to give the impression of being able to keep their home warmer than reality, for example turning the heating up and not using blankets to stay warm. 	
4	<p>Chard, R, (2016), <i>The struggle to afford adequate energy: different ways of knowing fuel poverty</i>, http://eprints.lancs.ac.uk/80040/</p>	<p>This PhD thesis looked at fuel poverty from three perspectives – those directly experiencing fuel poverty, those involved in delivering interventions to support households in fuel poverty, and finally from the perspective of the statistics used to define fuel poverty. The research found each perspective to be based on distinctly different knowledge, and processes of developing knowledge. Key findings from those experiencing fuel poverty include:</p> <ul style="list-style-type: none"> • Daily practices involve continual assessments between energy use and cost with research participants acutely aware of the impact of various in home practices (cooking, heating, hot water) on their budgets. • A variety of techniques were reported in order to manage warmth in their accommodation, including the use of portable heaters over central heating, wearing additional clothing or using additional layers, limiting the number of rooms that are heated and 'underheating' through limited use of heating systems. • This 'underheating' of homes has traditionally been associated with older householders due to an expectation that they are more likely to be at home more frequently than working, younger households for example, however the extent to which homes were occupied during the day, whatever the occupants' age, has been found to be a stronger influence on the rationing of energy use. • Younger households have been found to show less aversion towards debt and are more likely to go into debt due to higher energy costs. 	UK – General population

		<ul style="list-style-type: none"> • Many research participants revealed an awareness of social norms around the temperature of homes with the need to offer warmth to visitors, however the resulting action varied with some not feeling able to change the temperature due to personal preference or limitations, to others changing the temperature considerably from usual. • Most actions reported by research participants to alleviate their experiences of fuel poverty were limited to individual behavioural changes rather than changes to the fabric of accommodation. • The research revealed that the lack of significant action to improve their situation may be explained by participants lack of perception that they are experiencing anything problematic, believing that they are coping as they are managing to pay their energy bills thanks to the adaptations they have made. 	
5	<p>Simcock, N., Walker, G. and Day, R, (2016), Fuel Poverty in the UK: beyond heating?, <i>People, Place and Policy</i>, 10 (1), pp.25-41</p>	<p>This research investigates the range of energy uses and services which should be included in conceptualisations of fuel poverty, beyond the framing of the issue around heating which has predominantly been used by both the government and organisations seeking to reduce fuel poverty.</p> <ul style="list-style-type: none"> • Reporting on DECC research published in 2015, the article reveals that the private rented sector is the sector with the highest estimated rates of fuel poverty in the UK. • Space heating, and affordable warmth have been the main focus for most fuel poverty research in the UK, however research has considered fuel poverty as an inability to attain sufficient levels of energy services - which may include space heating but also other non-heating energy uses which are seen as necessities in everyday life. • As a result, research aimed at understanding the negative impacts on physical and mental health of fuel poverty has potentially missed understanding the full impact of fuel poverty as wider energy-use has not been considered. • The research that does exist has suggested that older and less efficient technologies are concentrated in low-income households, putting greater pressure on energy bills. Issues have also been identified in this area in the private rented sector because purchasing is most often controlled by landlords. This latter finding has implications for young adults and students commonly resident in the private rented sector. 	UK – General population
6	<p>Cauvain, J. and Bouzarovski, S, (2016), Energy vulnerability in mutiple occupancy housing: a problem that policy forgot, <i>People, Place and Policy</i>, 10 (1), pp.88-106</p>	<p>This study argues that houses of multiple occupation (HMOs), are absent from UK policy on energy efficiency and fuel poverty, and proposes a typology of HMOs to improve recognition and inclusion in policy making. The typical residents of which include students and young people, and university towns are also associated with a prevalence of HMOs.</p> <ul style="list-style-type: none"> • The study notes that the way official fuel poverty statistics are calculated may not be applicable to HMOs, for example if energy payments are included in rent or if payments are shared between different 'households' within the same building. 	UK – Residents in houses of multiple occupation

		<ul style="list-style-type: none"> The study reports that residents in HMOs are likely to experience reduced control over their energy either through access to controls, or through the need to negotiate with other 'households'. 	
7	<p>McCarthy, L., Ambrose, A. & Pinder, J., (2016), Energy (In)Efficiency: Exploring what tenants expect and endure in the private rented sector in England - An evidence review, https://www4.shu.ac.uk/research/cresr/sites/shu.ac.uk/files/energy-inefficiency-private-rented-housing-final-report.pdf</p>	<p>This report is based on a systematic evidence review of 130 sources to uncover the extent to which tenant experiences in the private rented sector (PRS) regarding energy efficiency and thermal performance are understood. Key findings include:</p> <ul style="list-style-type: none"> Association of Conservation of Energy reported that in 2011, nearly half of households living in PRS properties with an Energy Performance Certificate (EPC) rating of F and G were in fuel poverty. Similarly, Liddell & Gray (2014) found that one in two PRS renters in Northern Ireland are likely to be in fuel poverty. Experiences of fuel poverty in the PRS were found to be triggered by a combination of low incomes, high fuel costs and the poor energy performance of the housing stock. For example, the PRS was found to represent the worst performing tenure type with only 8% obtaining a rating from A-C on the EPC scale. PRS properties were also found to be less likely to have cavity wall insulation, central heating, loft insulation or double glazing. Similarly, more than 15% are deemed to constitute category 1 excess cold hazard under health and safety standards. The research highlighted a lack of awareness amongst tenants in the PRS of their rights to raise issues linked to energy efficiency, cold and repair with landlords. A lack of awareness and understanding of EPCs was also uncovered in the evidence. Evidence reviewed also found that young people were more profoundly affected by landlord relationships more profoundly, for example describing landlords as unapproachable and afraid to contact them, and to cause arguments. Research sources showed that short length of tenancies can also disempower tenants to negotiate for improvements in energy performance, however in some cases it tenant turnover was found to drive improvements with new tenants demanding higher standards. The impacts of fuel poverty were found to be multi-dimensional, including impacts on physical health and mental wellbeing as a direct result of thermal discomfort but also linked to social isolation and anxiety. 	UK – General population
8	<p>Waddams Price, C., Brazier, K. & Wang, W., (2012), Objective and subjective measures of fuel poverty, <i>Energy Policy</i> 49, p.33–39</p>	<p>A report that explores the link between a subjective measure of fuel poverty and previous government statistics that categorised the condition according to income with a cut off of 10% of household income required for spending on energy to keep homes satisfactorily warm.</p> <ul style="list-style-type: none"> A key finding of the research was that fewer people reporting themselves as unable to afford energy than have been categorised as being fuel poor under government classification using the 10% definition. The research also noted that many households who spend more than 10% of their income on energy don't feel fuel poor, and vice versa. This latter category were classified as 'feel fuel poor'. 	UK - Low income households on prepayment meters

		<ul style="list-style-type: none"> The article categorises two groups as a result – the economically fuel poor and the ‘feel fuel poor’. The ‘feel fuel poor’ are likely to have higher incomes and lower energy spend than the economically fuel poor. The ‘feel fuel poor’ are also more likely to use pre-payment meters or standard payments over direct debits. 	
9	<p>Bruner, K-M., Spitzer, M. & Christanell, A., (2012), Experiencing fuel poverty. Coping strategies of low-income households in Vienna/Austria, <i>Energy Policy</i> 49, p.53–59</p>	<p>Research based on qualitative interviews with low income households experiencing fuel poverty to investigate the factors causing fuel poverty and behavioural strategies of those experiencing it.</p> <ul style="list-style-type: none"> The research identified a category called the ‘modest fuel poor’ which were found to be younger than average. This category have no choice but to adopt energy efficiency strategies in order to achieve even rudimental thermal comfort due to limited financial resources. The research found that this category see their situation as temporary, perceiving higher incomes in the future, and are likely to be students. Strategies adopted by this group included adjusting the proportion of rooms that are heated, limiting other energy uses such as lighting and using additional layers. Exceptions were found if visitors were in their homes. Differences were identified in prioritisation of finances, with some prioritising energy and rent above everything and adjusting their spending elsewhere. For others there was less attention to monthly planning and things are more reactive. There was a preference for bills/payment slips over direct debits as these are less flexible, and there are potential knock on effects of missing an automated direct debit payment through bank charges. 	<p>Vienna, Austria – Low income households</p>
10	<p>Middlemiss, L & Gillard, R., (2015), Fuel poverty from the bottom-up: Characterising household energy vulnerability through the lived experience of the fuel poor, <i>Energy Research & Social Science</i> 6, p.146–154</p>	<p>This article draws on the literature on vulnerability and on recent qualitative interviews with fuel poor households to characterise the experience of energy vulnerability in the UK. The research identifies six challenges to energy vulnerability for the fuel poor: quality of dwelling fabric, energy costs and supply issues, stability of household income, tenancy relations, social relations within the household and outside, and ill health.</p> <ul style="list-style-type: none"> The paper defined energy vulnerability as being the likelihood of a household being subject to fuel poverty, the sensitivity of that household to fuel poverty, and the capacity that household has to adapt to changes in fuel poverty. Referencing research by Hartington et al., four main responses to fuel poverty were described: a) keeping warm by depriving themselves in other ways, b) economizing on fuel as a result of extreme poverty, c) economising on fuel in order to afford other activities, and d) those with high heating inefficiency in their homes. <i>Quality of dwelling</i>: Energy vulnerability is experienced as a result of poor energy efficiency, with reports of residents making attempts to improve things but most acknowledging that without sufficient funds, technical information and control over their dwelling they could not make any significant or lasting improvement. 	<p>UK – General population</p>

		<ul style="list-style-type: none"> • <i>Energy costs and supply</i>: Switching suppliers is seen as a difficult process with minimal reward. Some in energy vulnerability showed a preference for pre-payment meters as they result in more visible and controllable energy use. • <i>Social relations</i>: The research found evidence of changing energy consumption practices to reduce costs. Evidence was also uncovered of receiving financial support from outside households in order to cope with bill payments. Understanding energy vulnerability will require a better understanding of the networks households can draw on to reduce the effects. • Young adults participating in the research were frequently found to not perceive themselves as experiencing any form of energy vulnerability. 	
11	<p>Gibbons, D. & Singler, R., (2008), Cold Comfort: A Review of Coping Strategies Employed by Households in Fuel Poverty, http://www.infohub.monevadvicetrust.org/content_files/files/cesi_cold_comfort_report.pdf</p>	<p>This report examines the level and quality of research evidence currently available concerning the coping strategies used to deal with fuel poverty that are employed by households deemed vulnerable by the government's UK Fuel Poverty Strategy.</p> <ul style="list-style-type: none"> • The report identifies groups beyond the elderly as being under-researched in terms of their coping strategies for living in fuel poverty. • The coping strategies that have been identified can be categorised as reducing/rationing energy use (including as far as self-disconnection), using financial measures (such as reducing expenditure in other areas e.g. food) or getting into debt. The latter strategy was found to be more prevalent amongst young people. • The research suggested that lower income households were constantly juggling their finances, with actions including cutting back on treats (such as social activities) in the first instance, followed by amending spending on more flexible areas of their budget such as food and clothing. 	UK – General population
12	<p>Anderson, W., White, V. & Finney, A., (2010), "You just have to get by": Coping with low incomes and cold homes, https://www.cse.org.uk/downloads/reports-and-publications/fuel-poverty/you_just_have_to_get_by.pdf</p>	<p>This study focuses on the coping strategies of low-income households in Great Britain using survey and interview methodologies. Rather than using government definitions of fuel poverty, a range of indicators of fuel-related hardship (for example extent to which householders struggled to keep up with bill payments) were used to examine the links between cold homes and other forms of deprivation.</p> <ul style="list-style-type: none"> • The research found that cost-cutting was extremely common amongst low-income households, with 'discretionary items' being cut in the first instance but also in 'essentials'. • The primary means for saving on energy was not to look for better prices but to cut back on usage either through turning heating off or down, restricting heating to certain rooms in the house, coupled with the use of other strategies such as layering. • 'Coping' was found to be accepted differently by research participants, with some expressing pride in their ability to cope with their low-income, however for others the burden of coping was almost too difficult to bear and caused significant mental distress. 	UK – General population (low-income)

		<ul style="list-style-type: none"> Switching supplier was rare amongst research participants, with some reporting to not know how to compare prices. Others were worried that if they did switch, things would go wrong. Many households were doubtful that the deals being offered would deliver real savings in practice. The low-income households who experienced cold homes reported adverse impacts on their mental health, physical health and social lives with nearly half (47 per cent) saying the cold had made them feel anxious or depressed, 30 per cent saying an existing health problem had got worse, and 17 per cent did not feel able to invite friends or family to their house. Some strategies employed served to increase the sense of isolation that had grown from not being able to invite guests to their homes, and cutting back on spending on social activities, for example staying in bed to stay warm. 	
13	Butler, D., (2016), An Interpretative Phenomenological Analysis of the Perceptions, Attitudes and Experiences of Energy Vulnerability among Urban Young Adults, http://usir.salford.ac.uk/38007/	<p>This research adopted a qualitative methodological approach (six interviews) to explore how urban young adults, not in education, use energy within their households. Key findings include:</p> <ul style="list-style-type: none"> 'Young adult households' – those where the oldest member is younger than twenty-five – are disproportionately more likely to be fuel poor than any other age group. The research also revealed that energy use within young adult households is often a result of compromise and reconciliation to accommodate the needs of other household members. The author noted the importance of understanding the level of support young adults received and the impact this has on their experiences of managing their home and energy use. Among young adult households there may be a failure to recognise or acknowledge that they are living in fuel poverty, despite substantial evidence that participants were living in such conditions. This may be linked to a "widespread cultural expectation that it is acceptable for individuals to live in poorly heated and low quality housing at the entry point of their housing career". 	UK – Young adults not in education
14	Butler, D. and Sherriff, G., (2017), 'It's normal to have damp': Using a qualitative psychological approach to analyse the lived experience of energy vulnerability among young adult households, <i>Indoor and Built Environment</i> 26(7), p.954-979	<p>This research adopted a qualitative methodological approach (six interviews) to explore how urban young adults living in Salford (UK), not in education, make sense of energy-use within their households. Key findings include:</p> <ul style="list-style-type: none"> Fuel poverty should be understood as an experience that is shaped by multiple factors including costs, income, housing and personal and social circumstances. Factors relating specifically to young adult households include: the energy inefficiency of PRS properties typically rented by this age group, exploitation by and poor relationships with landlords, combining of rent and utility costs, and a lack of awareness regarding energy efficiency or fuel poverty assistance. In addition, this age group is likely to fail to recognise or acknowledge conditions symptomatic of fuel poverty in part due to a lack of awareness of energy efficiency but also 	UK – young adults not in education

		<p>as a result of a widespread cultural expectation that it is acceptable for young adults to live in low quality housing at the start of their 'housing careers'. This also links to a reduced likelihood of seeking support to address their experiences.</p> <ul style="list-style-type: none"> • Interviewees overwhelmingly focused on widespread experiences of damp and mould in their homes, however only one reported negative health effects associated with these experiences. • Dealing with mould was provided as an example of the relationship between tenant and landlord, with interviewees revealing that solutions offered by the housing owner were often unrealistic or unhelpful given the financial resources implicated. • Laundry practices were revealed as a task with a number of implications related to energy, for example washing of clothes was prioritised due to the required social norm of having clean clothes, however this caused necessary compromises in using energy for other purposes, or resulted in using increased levels of energy to dry clothing. • Instability in relation to household income has previously been cited as a key influence on fuel poverty, however interviewees focused more on the instability of outgoings in particular in relation to energy bills which were more variable and unpredictable when compared to other outgoings such as rent payments. • Interviewees noted that despite living in the PRS for a number of years, energy management still posed an issue as previous experiences included renting properties with 'all bills included' meaning they lacked preparedness for dealing with bills on an individual basis. • The research confirmed the widespread use of blankets as coping mechanism for living in a cold home, as well as focusing home life (and heating) on one room. • Psychological mechanisms for coping were also used, such as seeing their current living situation as temporary. This was particularly found to be the case amongst interviewees who were graduates who also concurred with the stereotypical images of 'student squalor'. Despite this view, both graduate interviewees remained living in similar circumstances to whilst they studied. 	
15	<p>Petrova, S., (2017), Encountering energy precarity: geographies of fuel poverty among young adults in the UK, Transactions of the Institute of British Geographers, http://onlinelibrary.wiley.com/doi/10.1111/tran.12196/epdf</p>	<p>This research uses the concept of 'energy precarity' to unpack the experiences of young adults living in the private rented sector. The author considers a broader range of energy uses than is traditionally associated with fuel poverty research e.g. information technology as well as heating through analysis of survey data with 75 households in Selly Oak, Birmingham.</p> <ul style="list-style-type: none"> • Energy should be considered in relation to broader precariousness of income, housing and food rather than in isolation. • Energy should also be considered in a broader sense than the historic focus on heating, in particular for young adults as research elsewhere has highlighted prioritization of access to the internet over hot water and thermal comfort. • Young adults – especially students – are often seen as lacking sufficient awareness of energy issues, in particular efficiencies that can be achieved in their homes. However, research has shown that young people are more likely to be willing to engage with new 	UK – young adults

		<p>energy technologies and that age has less influence than gender and educational background.</p> <ul style="list-style-type: none"> • There is a persistent image of 'student squalor' associated with dampness, poor electrical safety, overcrowding and inadequate facilities. • In many cases, survey respondents did not report feeling affected by fuel poverty despite in-depth interviews revealing under-consumption of energy. None of the student participants reported feeling ashamed of not having a warm home, which can be attributed to cultural expectations of poor housing at this stage in their lives. • Complexities of household relationships were highlighted as causing precarity, for example different members of the household had vary financial situations and frequently energy use was brought down to the level the least well off person could afford. • Students in the research highlighted ways dealing with cold homes such as going to university buildings or congregating in houses that were warmer, or could afford warmth. • Student respondents held a perception that their poor housing situation was only temporary and that things would improve in the future, however this wasn't borne out by graduate respondents. The perception of temporariness influenced respondents' beliefs on the effectiveness and worth of attempting to take wider political action on the issues they face in relation to fuel poverty and housing. 	
16	<p>Bouzarovski, S. and Cauvain, J., (2016), Spaces of exception: governing fuel poverty in England's multiple occupancy housing sector, <i>Space and Polity</i> 20(3), p.310-329</p>	<p>This paper considers the specific experiences of fuel poverty within housing in multiple occupation through a policy and literature review as well as interviews with professionals working in the private rented sector. Findings include:</p> <ul style="list-style-type: none"> • There is evidence that households that are vulnerable to fuel poverty are more likely to reside in housing in multiple occupation (HMOs), driven by the low incomes of tenants as well as poor housing conditions/low levels of energy efficiency. • Students are described as the HMO demographic that has some economic freedom compared to other types of resident, option for house-shares for reasons other than reducing living costs. • Outside London, HMOs are most typically found in university and coastal towns. Census data shows that there is clustering of student shared households within these towns. • HMOs and their residents have increasingly received negative media and political attention. • There are loopholes in legislation designed to improve the energy efficiency of homes in the private rented sector, for example the requirement to provide an Energy Performance Certificate (EPC) is not applied to homes let as a single property rather than cases where individual rooms or bedsits are rented. There are also issues with applying the methodology for an EPC to HMO properties. 	<p>UK – residents in housing in multiple occupation</p>

		<ul style="list-style-type: none">• HMO properties also present complexities in addressing their energy performance due to the factors such as age, and therefore costs involved in retrofit improvements.• The ability to control the heating system and therefore levels of thermal comfort is reduced in HMO properties when compared with standard self-contained housing.	
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