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What are the key challenges and solutions to increasing the Energy Efficiency through insulation of existing post-1930s blocks of flats in the private housing sector to contribute towards UK carbon reduction targets?

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Abstract

With the UK housing sector accounting for a quarter of carbon emissions, there is increasing pressure to contribute towards the UK's ambitious carbon reduction targets by improving the efficiency of the existing housing stock. Within this stock, 20% are flats of social and private tenure and whilst much literature has commented on the poor design and neglected state of these buildings, little focus has been put on the many significant challenges to upgrading them when they are in private leasehold ownership. By analysing published case studies from across Europe, carrying out an online survey aimed at leaseholders and tenants and conducting interviews with professionals working in the field, this study starts to investigate the challenges in private sector housing, specifically looking at insulation measures for post-1930s blocks.

This study explores the issues of collective ownership of leasehold flats and how the 'common' structure of blocks dictates the interdependent nature of the flats which would benefit from whole-block insulation measures. Coordinating leaseholders, tenants, managers and freeholder in a block, payback calculation disparities between top and bottom floor flats, access costs and leasehold agreements were all shown to be significant challenges or barriers to leasehold and co-owned flats being improved. Little enthusiasm was found for Green Deal finance proposals, but wider issues regarding paying for basic maintenance and investing in blocks in general may start to explain this. The research investigates solutions that could be applied in parts of blocks where 100% commitment can't be gained and also finds the potential in using abseil access for high-rise blocks. The study also reveals where further research needs to be carried out in order to ensure blocks of flats are treated fairly and catered for adequately under the new Energy Bill.

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Contents

List of Abbreviations

CERT	Carbon Emissions Reduction Target
DECC	Department of Energy and Climate Change
ECO	Energy Company Obligation
EEPH	Energy Efficiency Partnership for Homes
EPC	Energy Performance Certificate
EST	Energy Saving Trust
EUROACE	European Association for Conservation of Energy
FPRA	Federation of Private Residents Association
LEASE	The Leasehold Advisory Service
LVT	Leasehold Valuation Tribunal
RDSAP	Reduced Data Standard Assessment Procedure
RMC	Residential Management Company
RSL	Registered Social Landlord
RTA	Recognised Tenants Association
RTM	Right to Manage (Company)
SAP	Standard Assessment Procedure

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1. Introduction

1.1. Setting the Scene & Background

The UK has set an ambitious target for 2050 to reduce carbon emissions by 80%, with households accounting for over a quarter of these emissions, there lies a significant challenge ahead (EST, 2010 cited Saville, 2010: 1). Legislation to reduce carbon in new buildings is now starting to play a role in the carbon reduction challenge, however given that two thirds of existing homes will still be in use in 2050, one of the most difficult challenges lies in the existing housing stock (SDC, 2006).

Within the housing sector, 20% of dwellings are flats, a number of which are owned and/or managed by a number of different interested parties whose ability to install energy efficiency improvements are often restricted by the terms on their lease (EST, 2008). 'Common parts' are a familiar feature of such buildings, making improvements to the 'common parts' is however not straightforward, and can cause friction between those with an interest in the building (Roberts, 2010). Unfortunately, despite significant differences to other housing types, little research addresses improving blocks of flats or explores the specific challenges faced in these buildings; guidelines on renovating existing buildings are mainly on a limited range of standard house types.

1.2 Aims and Framework for Research

The refurbishment of the UK housing stock will require a number of carbon reduction measures to be applied in every home to meet the Government's carbon reduction targets, however this is a vast area of study. As wasted energy from a building is most effectively dealt with by reducing heat loss through the building fabric and ideally should be addressed before heating, glazing and low to zero carbon technologies are considered (SDC, 2006), this piece of research will be limited to addressing the installation of insulation as a way of improving energy efficiency.

This research will investigate the key challenges and solutions found specifically in blocks of flats. The way blocks of flats are managed, maintained and owned is generally quite different to houses, hence a different approach to carrying out maintenance or improvement works is required (Guertler & Smith, 2006). Although it is assumed that some structural/physical techniques for insulating blocks of flats will generally be learned from demonstration projects carried out on social housing blocks, it will be investigated to what extent this is true and what the additional barriers are in blocks of flats in the private sector, which makes these buildings significantly more complicated to upgrade.

Cavity wall construction started to become common in the UK from the late 1920s, including in the construction of some blocks of flats, although increased availability of prefabricated concrete structures influenced the flats sector most (EST, 2008). This era saw a widespread transformation in the way homes were built, in particular moving away from traditional solid brick construction methods. Due to experiments with the use of concrete and steel in large structures, not all blocks of flats were built with cavities, nor in fact using the same construction techniques (EST, 2006), as a result there will not be a 'one size fits all' solution to upgrading these buildings. Although certain methods of solid wall construction have continued, mainly involving concrete, many of the blocks built before this time have a number of additional issues (Changeworks, 2004), which are beyond the scope of this work; this research will be limited to blocks of flats built post 1930.

The purpose of the research thesis is to provide guidance for politicians, local authorities, developers, environmental consultants or other interested parties on how to address carbon reduction/energy efficiency improvement in blocks of flats through insulation.

This research will specifically aim to address the following questions:

1. Whilst structural/physical techniques for insulating blocks of flats can in theory be learned from social housing projects, what problems lie solely with private sector blocks and how can they be resolved?

2. What impact would changing legislation make to resolving problems with leases and energy efficiency improvements?

3. Are the Government's proposed mechanisms for refurbishing the UK housing stock and reducing carbon appropriate to blocks of flats? If not, where do the problems lie in the mechanisms and what are the solutions?

4. What other changes or strategies are required to address the challenges to improving insulation in privately owned blocks of flats?

2. Literature Review

2.1. Carbon Reduction Targets and the Refurbishment of Housing

It is now widely accepted around the world that to avoid dangerous climate change, global temperatures must not increase above 2°C atmospheric; to achieve this, greenhouse gas gases in particular carbon dioxide (CO_2), need to be stabilised (Moore, 2008). The UK Government have committed to a legally binding target of at least an 80% reduction in carbon emissions on 1990 baseline by 2050 (EST, 2010a). In the short term, the UK has also set an ambitious target of 20% cuts on 1990 baseline by 2020 (E²APT, 2010). Similar targets have been set by other developed countries around the world and will only be met if significant changes are made in energy generation, supply and demand across all sectors.

Housing has a key role to play in the UK meeting such challenging carbon reduction targets. Buildings generally contribute to approximately 50% of the UK's current CO_2 emissions, around half of which is from UK homes and despite initial efforts, this figure has continued to rise (SDC, 2006). To help meet UK carbon targets, the DECC have suggested emissions in homes and communities need to be cut by 29% by 2022 on 2008 levels (DECC, 2010). These figures have been recalculated recently against 2008 levels because targets set for earlier years were not met. In fact between 1990 and 2005 there was only a 5% cut in carbon emitted from the residential sector in comparison with the UK's 15% target set for that period (Boardman, 2007).

In general the UK housing stock is energy inefficient, many existing UK houses and flats need to reduce the rate of heat loss by at least half by 2050, indeed in 2007, British Gas stated that as a result of poor insulation, as much as £1 in every £3 spent on heating homes is wasted (Boardman, 2007). But there are strong arguments from many sectors for improving existing homes rather than encouraging widespread demolition and re-build (Patalia & Rushton, 2007). Some of the carbon reductions are expected to come from increased uptake of renewable heat and power, but significant reduction of heat energy loss from energy efficiency improvements will be vital if carbon targets are to be met. With a very low turnover of housing stock and over three quarters of existing homes expected to be in still use in 50 years time (SDC,2006), this emphases the huge amount of effort that will need to go into refurbishing the existing homes.

2.2. Approaches to Refurbishment of Existing Housing

The Sustainable Development Commission's energy hierarchy confirms that the approach to reducing carbon in the residential sector first starts with maximising energy efficiency in order to minimise the amount of energy needed to provide a reasonable level of service (SDC, 2006). It is estimated that around 75% of energy used in homes is for heating space and water, however if every home were adequately insulated, only a fraction of that heat energy would be required. In fact if a property was highly insulated using passive house principles, just solar gains and the heat from occupants and appliances would suffice to keep the internal space warm most of the year, only in the coldest weather should a small space heating system be required (Roberts, 2008). Whilst Passive House principles will not be practical for all, best practice carbon reduction guidance progressing through the stages of the hierarchy are applicable to an extent for all buildings. Only once energy loss has been addressed, should carbon reduction, such as using renewable energy technologies for heat and power be considered. Anecdotal evidence suggests however that contrary to this, this hierarchy does not seem to be understood by the general public, who are more interested in installing 'trendy' renewable energy systems than 'boring' energy efficiency measures such as insulation.

2.3. Condition and Proportion of Flats within the Existing Housing Stock

From their research Guertler & Smith (2006) have suggested that high-rises residences are the most neglected section of the building stock, let alone the housing stock, but these buildings hold significant opportunities for refurbishment, improving comfort, energy efficiency, CO_2 emissions and the general environment. In the UK, most residential high-rise buildings (more than five storeys) were built in a short space of time between 1959 and 1967 and were originally commissioned by local authorities for social renting in response to an acute housing shortage. A proportion were built as private residences though and further blocks have also been sold off to private landlords over the years. Nevertheless, regardless of tenure, the structures were still built in a similar way; fuel costs or energy efficiency were not really considered important at the time and there were no minimum standards prior to the 1965 building regulations (Gorgolewski et al, 1996). When building regulations were finally introduced, at first they enforced a maximum wall u-value of 1.7W/m²/K, but Gorgolewski et al (1996) argue this still only led to minimal insulation requirements so until standards were raised further in subsequent years, it made little thermal difference.

Patalia and Rushton (2007) note that despite the need for refurbishment, high rise blocks of flats have a number of benefits that are often overlooked. They have great potential to leave a much smaller footprint that traditional low rise houses; their low surface area to volume ratio means they can be made more energy efficient and they are great space saving resources that with increasing housing shortages, the UK cannot afford to lose (Patalia & Rushton, 2007).

The literature suggests that it is not just high-rise blocks of flats in need of refurbishment though, across the European Union it is reported that over 17.6 million privately owned block of flats of varying heights that stand today were built before the first oil crisis in 1973 and with many of these unimproved, they are very inefficient (E^2APT, 2010). EST estimates that in the UK, of the 25 million dwellings, 5 million are flats of different size and structure (EST, 2008). Due to the widespread selling off of the social housing stock to private landlords and Registered Social Landlord (RSLs) in recent years and the 'right to buy', up to half of these blocks could contain leaseholders and private residents. However the true proportion is not known because exact figures simply do not exist.

The widespread adoption of cavity walls construction around 1930 marked a key change in building methods in general; this trend can be seen in some of blocks of flats with standard block and brick, 'column and beam and 'box frame' constructions (EST, 2006a). The cavity was originally built as an empty space and used to counteract damp, however with modern techniques and insulation products, it is now understood that there is significant potential for improving the thermal performance of walls if cavity walls are filled with insulation. It is reported to be one of the least obtrusive, cost effective ways to insulate buildings however a installation can be compromised for a number of reasons; common construction detail defects such as a dirty wall, mortar 'snot', narrow or variable width cavity, blockage by pipes or cables but also simply poor installation (Roberts, 2008). To reduce the risk of increased cold bridging and damp problems it is of upmost importance that a survey of the building is carried out to effectively check for such defects before any work commences.

Other popular construction methods for blocks of flats include 'no fines' concrete and precast concrete 'large panel systems' (LPS). For these blocks or for blocks where the cavity shouldn't or can't be filled, there are a number of external and internal wall insulation solutions (EST, 2010a). EST (2010) suggest that heat loss through an uninsulated solid wall is typically 50% greater than through an uninsulated cavity, so insulating a solid wall would make a significantly bigger impact on the occupants. Solid wall insulation is either applied inside or out. Internal wall solutions marginally reduce room sizes and can be very disruptive to occupants as fixtures, fittings and decorations have to be moved or changed. On the other hand external wall solutions

need to be installed on the entire building as a continuous layer so require multiple flats to be treated simultaneously (SDC, 2006). Whilst this is a less intrusive measure, it is very time consuming and may be limited by planning constraints and access to the facade of the block. EST argue that although external wall insulation is more expensive than internal solutions, one of the advantages is because the insulation layer is continuous there is less thermal bridging where internal walls and floors meet, thermal bridging can lead to damp spots so avoiding this is better for the health and longevity of the building (EST, 2010a).

Many buildings, including flats still only have a small amount of insulation in the loft which if less than 150mm would be cost effective to top up to the current building regulation level of 270mm (BRE, 2005 cited Roberts, 2008: 4483). Not all blocks will have a loft space though, many have flat roofs with no buffer space that need would be treated in quite a different way.

It has been suggested that privately owned blocks of flats are not easy buildings to manage or improve and that one of the major barriers to upgrading these buildings is that many are owned under co-ownership arrangements. Chi-wing Ho et al (2005) suggests it requires a high level of co-operation and co-ordination amongst the owners to manage and maintain the whole building but the largest difficulty is the management of 'common parts'. Roberts (2010) goes further to say that in fact little attention has been paid to the complicated legal matrix relating to the physical structure of a block of flats nor the widespread inadequate legislation and procedures governing collective ownership of building and as a result how difficult it is for people living in long leasehold flats to upgrade energy efficiency. Chi-wing Ho et al (2005) suggests it is the physical interdependence of the flats on different levels both in structure and shelter that is a significant contributing factor to this. The complicated nature of ownership arrangements in private apartment buildings suggests that the management of multi storey, co-owned buildings is quite different from that of an average house, however this fact seems little recognised by the Government in policies and strategies.

2.4. Existing Barriers to Improvements for Block of Flats

It is reported that there is a sound understanding in the building and construction sector that the public sector leads the way and the private sector will follow shortly thereafter (E²APT, 2010). A significant difference in upgrading a private flat compared to a house or block wholly owned by an RSL is that a house owner may choose to carry out maintenance and energy efficiency upgrades at their convenience, however a flat owner must seek consent from the other owners to carry out any works in the common parts (Chi-wing Ho et al, 2005). Evidence of flats

refurbishment projects can be seen with a handful of RSL owned high-rise blocks, but even the amount of RSL blocks improved so far is only a small number.

Killip (2008) suggests that the reason there is still little demand for energy efficiency improvements may be because most householders in the UK have actually little or no direct experience of what a truly energy efficient home is like to live in and many simply do not understand how much difference energy efficiency measures could make. EEPH (2010) reported that many people's knowledge actually appears to be out of date; they noted there is still much concern that installing cavity wall insulation causes damp, regardless of the condition of the structure, but also have noted widespread views that just two inches of loft insulation is sufficient. Further to this, DECC (2010b) has recently revealed through their own customer research that the main barriers they found to installing measures in all homes, but not specifically flats were upfront cost, payback times and the 'hassle' to plan and carry out work. Also noted, similar to Killip was a widespread lack of awareness of the benefits of improving the energy efficiency of buildings and what was already installed, let alone what the options for improvements may be (DECC, Green Deal summary, 2010b). These barriers will be fed into the Government's future energy policies, but unfortunately do not address some of the more specific barriers that are starting to be identified for more complicated buildings such as co-owned blocks of flats.

Gorgolewski et al (1996) report that an intrinsic feature of medium to high-rise housing is that due to the variation in height of the individual dwellings from the ground, the performance of flats at different levels will not be identical. When modelling the performance of flats taking into account wind speeds at varying heights, they noted that the difference in heating load between the 1st and 10th floor can be 25% or 3000kWh/yr in an unimproved building (Gorgolewski et al, 1996). Further height modelling by the Energy Saving Trust also shows that for basic improvements such as cavity wall and loft insulation, low energy lighting and draughtproofing, improvements up to 22 SAP points can be gained in top floor flats, but the same measures would only increase the SAP of ground floor flats by 1-2 SAP points. With added heating upgrades and solid wall insulation, the difference is smaller but still noticeable (EST, 2008). Given these findings, it may be necessary to approach the renovation of higher floors in high-rise buildings differently to those close to the ground or at least advertise the difference in potential savings depending on the location in the block.

Bailey et al (1997) report that the legal arrangements for flat ownership in Britain have evolved piecemeal over time and are not always best suited to the 21st century; they claim one negative outcome of this is that Britain is the only developed country to have no statutory system for the

regulation of flat ownership. ARMA goes so far as to say that the management of blocks of flats is actually "becoming increasingly complex and hazardous" (ARMA, 2003: 3). Property law in England and Wales requires all flats to be leasehold (LEASE, 2011), but it is becoming increasingly popular to find flats sold with a share of the freehold through a Residents Management Company (RMC). Alternatively since the Right to Manage (RTM) was introduced in 2002, lessees are able to apply to "manage the building as if they were the landlord" without owning the freehold (LEASE, 2011). LEASE report that a major motivation behind RTM is to save money on maintenance but they have to remain responsible and cannot let the building deteriorate (LEASE, 2010). In addition to this, various tenants association are also found; to be truly effective they must be legally recognised if they are to be used by the freeholder, or management company to consult with on matters for the block (RPTS, 2009). Where this has not been set up, every tenant would have to be consulted individually.

Roberts (2010), as a representative for the FPRA has recently been working with Westminster Council to investigate into legal aspects of making energy efficiency improvements to blocks of flats. Roberts states that in a leasehold block of flats:

> "The extent of the demise to each leaseholder will generally end at the inner surface of the exterior walls. So the cavity between the two skins of brickwork will not belong to him, instead it will form part of the 'common parts' and belong to the landlord. The demise of the typical top floor flat usually ends at the ceiling and so will not include the attic space above it…It would technically be an act of trespass against the landlord for a leaseholder to install insulation material in a wall cavity or attic space that did not belong to him" (Roberts, 2010: 897).

> "It is well established that a landlord or RMC (Residential Management Company) is able to incur expenditure and pass on to the service charge account only if there is clear authority under the lease to do so…for the majority, the lease will make no reference to incurring expenditure on energy saving measures: these will therefore count as "improvements" which go beyond what is authorized by the lease (Roberts, 2010: 897-898).

It seems from Roberts' research that the insulation of flats could therefore only be undertaken if the landlord will authorise the work and a sufficient number of leaseholders are willing to contribute to the cost, subject to the terms of the lease. On this issue, Bailey et al (1997) discuss that whilst majority voting is the basic system they have seen for flat ownership, it is not appropriate to allow all decisions to be taken by a simple majority, particularly where a large

expenditure would result. Unfortunately if 100% agreement is required, just one lessee refusing proposed changes effectively blocks the entire alteration under current legislation. It is generally understood that if a lessee does not agree, they could not then be required to pay for neither the immediate nor any ongoing costs of the change (City of Westminster, 2010).

Roberts (2010) suggests that one solution to this problem would be to change secondary legislation. He reports that at present, section 35 of the Landlord and Tenant Act 1987 provides for long leases of flats to be varied by the Leasehold Valuation Tribunal (LVT) if defective in certain ways. Roberts' proposal is that section 35 should be amended so that the failure of a lease to make adequate provision for the reasonable insulation of a property should be a ground for its variation (Roberts, 2010). Because section 35(2) (g) of the same act currently makes provision for additional grounds for variation to be added by Regulation, this could be dealt with by the Secretary of State and would not need to be treated as primary legislation (Smytherman, 2011). He also mentions that by expressly stating that the lease should provide only for "reasonable" insulation, in the event of any dispute as to whether the measures were 'reasonable', a further application could be made to the LVT to resolve the issue (Roberts, 2010). Unfortunately there is little cases based evidence to support the proposals, it is mainly anecdotal. Furthermore, representatives from the FPRA have however noted that whilst they recognise that a change to the legislation will not solve all the problems with upgrading leasehold blocks of flats, nor impact the "steadfastly uninterested", it will at least allow willing and enthusiastic leaseholders to carry out works without the terms of their lease standing in their way (Warren, 2010: 1)

2.5. The Private Rental Sector and Flats

Many leasehold flats in the private sector are reported to be sub-let through private landlords or letting agencies which complicates the nature of managing these buildings further. A growing number of organisations have been studying the private rental sector and so far concluded that there is little incentive for the landlord to choose to invest as it would mainly be for the benefit of the tenant with little personal gain. As a result, research has concluded that the majority of landlords will not be interested in heavily improving a property without significant incentives for themselves (SDC, 2006).

EEPH reported that in 2005, a study was carried out with private sector landlords to explore their views on energy efficiency. The research revealed these landlords did not see energy efficiency as their concern and were more focussed on maximising profits or the value of their

investment (EEPH, 2009). In 2008, a further two studies with landlords and private rental tenants were commissioned. The tenants revealed that the cost of energy bills and feeling warm fell only mid-way in their priorities when choosing a rental property so had some influence but was not highly important. The landlord report stated that most of the measures that landlords had installed were double glazing, heating controls, loft insulation, low energy lighting and energy efficient replacement boilers, but there were little reports of wall insulation. Not surprisingly, EEPH noted that most landlords said the main reason they were still holding back on items such as insulation was the installation cost. But interestingly over 50% of landlords and influencers in the study actually thought the Government should do more to encourage landlords to make their properties more efficient (EEPH, 2009), implying they acknowledge they may need a push to make them carry out works.

2.6. Future Government Policies to Refurbish the UK Existing Housing Stock

A new Energy Bill to target the refurbishment of the UK housing stock is currently progressing through Parliament. The intention of the Bill is to create the Green Deal finance scheme and a new obligation on energy companies to supersede the current obligation, CERT, which ends December 2012 (DECC, 2010a). The Green Deal will be a 40 year programme that will allow residents to take out finance to cover the upfront cost of installing energy efficiency measures, recovered through the energy meter at the property where the measures are installed for a period of up to 20 years. Under current proposals, to qualify for the Green Deal, the 'golden rule' will have to be met; "that the expected savings in typical properties consuming a normal amount of energy must be equal to or greater than the cost of the measure" (DECC, 2010b: 6). The intention of the golden rule is to ensure only cost effective measures are installed at no upfront cost and that repayments are less than expected savings. But as the calculated savings will be based on RDSAP, the same software used for EPCs, they are only theoretical and do not take into account user behaviour.

DECC's new Energy Company Obligation (ECO) is intended to underpin the Green Deal, focussing on the circumstances of the householder and certain properties that will not see sensible payback periods from measures. The complicated nature of blocks of flats may lead to some requiring ECO financial assistance, but with the full details not drawn up yet, it is unclear what will be possible. The Government claim they want to see the demand for energy efficiency measures to be maintained until the entire UK housing stock has been improved (DECC, 2010b). This implies that they intend to target every part of the housing stock at some point, but if past trends continue it is likely that the most difficult buildings will be left until last.

To protect Green Deal financial providers, DECC have stated in their proposal that repayments will be charged to the energy meter at the property where measures are installed. Customers who default on Green Deal payments will be treated the same way as customers who default on their energy bills, which can lead to disconnection (DECC, 2010a). It has been recognised by DECC that the Green Deal should particularly appeal to the private rental sector, as the removal of the upfront cost should appeal to both commercial and domestic landlords (DECC, 2010b), although this could be to the detriment of the tenant who normally pays the energy bills. So it will be important that in a co-owned building, every single occupier, not just each landlord is required to give consent for work if a charge is going to be applied to their meter. In blocks of flats with common areas and a presumably a common energy meter, it does raise the question how Green Deal charges might be made to the freeholder should he chose to reclaim costs through the service charge. In addition, DECC have recently announced that the EPC will form the basis of a policy for minimum standards in the private rental sector, making it illegal to rent out F or G rated properties after 2018. Unfortunately at this stage as the details are yet to be decided, it is difficult to establish whether this will complement the Green Deal and/or ECO or not.

2.7. Conclusions from Literature

In summary, it can be seen from existing literature that when it comes to refurbishment there are some academics and professionals starting to investigate the specific issues with co-owned blocks of flats, however there is still little experience based research on private sector flats and the Government's focus appears to remain on improving individual homes.

Although it seems it is not known exactly how many of the 5 million blocks of flats in the UK lie in the private sector, estimates suggest it could be as many as 2.5million. With a large proportion of these built in an era when fuel costs and energy efficiency were simply not considered, many are in serious need of energy efficient refurbishment. Blocks of flats have not only been built in an assortment of heights and shapes, but also using several different construction methods, from cavity walls to prefabricated solid concrete systems. This array of structures poses further challenges when considering insulation solutions; these may be external, cavity fill or internal. Internal appears to pose most risk to the overall health of the blocks with interdependent walls though increased risk of thermal bridging where floors and walls meet.

Existing market research shows there is still widespread lack of awareness for the benefits of insulation; moreover that many people's knowledge about the subject is out of date. It is also suggested that there is little demand for insulation measures because most householders have no idea experience of what a truly energy efficient home could be like so have no vision to work towards. This suggests greater education and myth-busting is required if take-up of measures is to be increased.

Recent research looking at legal aspects of leasehold blocks of flats is also proposed as a key barrier for owner-occupier leaseholders and private rental leasehold landlords of flats. The weakness however in Roberts' argument for suggesting changes to leasehold legislation lies with a lack of widespread supporting evidence from leaseholders who have struggled to make improvements due to the terms of their lease. In fact in general, whilst a handful of academics have reviewed the complicated nature of managing co-owned buildings, little work has been done to investigate the full extent of the challenges or propose solutions. Research has revealed that specifically within the private rental sector, a sector found in high proportions in flats, cost is considered the main reason holding landlords back from investing.

The Government's Energy Bill, is being designed to provide long-term financial mechanisms to aid widespread refurbishment of the UK building stock. The potential issues raised using modelling software with regards to discrepancies between high and low floors in a block could have substantial implications for the Green Deal. However the existing evidence fails to consider any real life examples; this matter should be investigated further to ensure that the Government's Green Deal offers a fair deal to all residents of flats, regardless of which storey in the block they reside on.

With little reference made to co-owned buildings by the Government and the details of the Energy Bill not yet through Parliament, there is now an opportunity to influence policies and guidelines to ensure provision is made for co-owned blocks to ensure they can join in with the widespread refurbishment of homes that is needed in the UK to meet ambitious carbon targets. But unfortunately at this stage in the Energy Bill, not enough detail has been released to reassure leaseholders that sufficient provision will be made for blocks of flats. The research in this study is intended to provide further evidence to support the arguments made for the specific difficulties of improving energy efficiency in co-owned blocks of flats. Any other evidence of issues that don't appear to have been brought to people's attention will also be explored, especially where solutions to problems have already been found.

3. Research Methods

In order to meet the aims of this study, as set out in the introduction, several different approaches to research have been used. By using a combination of the following methods, it should be possible to establish a balanced view of the challenges, barriers and any solutions already found.

The following three methods of research have been used:

a) Content analysis of case studies of refurbishment projects involving insulation in both social and private sector blocks of flats.

b) Qualitative interviews and conversations with professionals working on domestic (private sector) insulation projects.

c) Survey questions to existing tenants, leaseholders, landlords and freeholders of blocks of flats.

3.1. Methodology

3.1.1. Case Study Analysis

A case study approach was chosen to examine and learn from published material that has already explored themes similar to those considered in this study. Case studies on refurbishment projects in the last 20 years involving insulation were searched for using a number of online and academic search engines. Following the initial search, the case studies to be analysed were picked out using selection criteria such as whether they reveal experiences and findings from projects including reasons for carrying out the work, issues identified during project on installing the insulation itself, co-ordination and funding. Some also suggest or imply recommendations and/or lessons that can be transferred and used in future projects of a similar nature. After further assessing the chosen documents for authenticity, credibility, representativeness and meaning (Scott, 1990: 6 cited Bryman, 2001: 370-371), 20 were deemed suitable for this study; figure 3.1 lists all the studies analysed. A content analysis approach was taken to analyse the case studies to help quantify the content and seek for recurring themes, challenges and solutions (Bryman, 2001). The coding schedule and

corresponding coding manual that was developed for this task can be found in appendices 6 and 7.

Case study no.	Reference
1	EuroACE, 2005a
2	EuroACE, 2005b
3	Barabanova, 2009
4	EuroACE, 2005c
5	EuroACE, 2005d
6 (a & b)	Davies, 1995
7 (a & b)	BRE, 2004
8	EST, 2006b
9	Wetherby Building Systems, 2010
10	EST, 2003
11	EuroACE, 2005e
12	D & B Facades, 2008
13	Ham & Schamhart, 2006
14	EST, 2010b
15	City of Westminster Council, 2010.
16	Patalia & Rushton, 2007
17	EST, 2008
18	Sustain, 2010

Figure 3.1: List of case studies chosen for examination by content analysis

It should be noted that although some of the case studies refer to “apartments” rather than “flats”; it is understood by the author that in Europe these are in fact the same thing.

3.1.2. Interviews and Surveys

The author chose to also conduct qualitative and quantitative interviews and surveys in addition to the case study analysis to provide further data which could fill in any knowledge gaps found in published reports. It was not possible to investigate into every insulation project in the UK, but it was assumed there would be particular benefit from some interviews with people involved with insulation projects involving flats who can share their experiences and hopefully reveal unpublished case studies.

Semi-structured interviews were designed based around anticipated problems and solutions as identified in the literature review and the author’s own experience. The author has been employed in local government working on energy efficiency for three years and has been able to use existing contacts in the insulation industry and reflect on her own experience from being involved with the West Sussex Flats Insulation Project since 2009.

Using the author's contacts, networks and knowledge of the sector, key managers from the insulation industry were identified. This included the major energy companies who have to fulfil the Government's CERT obligation and project managers of insulation schemes including known flats projects. While the author experienced a number of short conversations with people in the sector, unfortunately only small numbers of full interviews were able to be carried out as a number of the companies contacted either did not respond or the contact claimed they were not in a position to comment at length and were unable to identify anyone else who might have any experience or knowledge on the subject.

A list of questions was prepared for interviewees but due to the variety of interviewee's positions and experiences on the subject, some questions had to be tailored to suit their situation. Pilot interviews were carried out to check all questions were clear and as unambiguous as possible and items that clearly would not yield any useable data were removed (Bell, 1999). The identified participants were initially contacted by telephone or e-mail to ask for their availability to participate in the research and where possible an appointment was booked for a interview at their convenience. The questions were followed in sequence as much as possible and due to the unavailability of recording equipment, detailed notes were taken by the author. Whilst full transcripts of each interview have not been provided, a summary of the main responses from the interviews can be found in appendix 5.

Further to the interviews, the author decided to also conduct an online survey to obtain sample evidence of the views and experiences of a range of people who live in, own or manage a flat or block with regards to energy efficiency and insulation. The survey was designed to investigate any measures that have been installed and if there are any relationships in this to other answers. Also it was asked if and why people in blocks of flats are interested in installing energy efficiency measures and what, if any, they perceive to be the barriers to installing them. The simple survey will provide mostly quantitative answers, but with opportunities for respondents to comment further with more qualitative answers if they chose.

For the purposes of this part of the research the author worked in partnership with the FPRA to contact networks linked to people in this sector. The link to the online survey was sent to as many people as possible by including it on e-news circulation lists, tweets, Linked-in events and website news for the FPRA, the Great British Refurb campaign, News on the Block, DECC's Green Deal Forum, Low Carbon Best Practice Exchange, Leasehold Life, Flat Living and the EEPH Green Deal forum. Unfortunately as a result of this method, the author was unable to find out exactly how many people were invited to the survey, but the a representative from the FPRA

has suggested it would have been seen by a quite a large number of people who live in, own or manage flats.

3.2. Merits of Research Methods, Limitations & Implications

3.2.1. Case Study Analysis

The method of content analysis was chosen to help to clearly and systematically examine, compare and contrast the case studies; however this method of analysis has a number of limitations. For this particular subject matter, the initial search to find case studies itself was restricted by the limited availability of material that has been published in the English language on the subject and great variation in the quality and suitability of those published case studies.

Caution was taken when developing the subsequent coding schedule and manual to ensure that all the dimensions were discrete, mutually exclusive and exhaustive (Bryman, 2001). Due to the exhaustive schedule, it was expected that some dimensions of the scheme would contain little data but it is important to note that revealing the data which is repeatedly missing is important for identifying where further research may be necessary (May, 1993). Missing information may be due to data protection, but they may be other reasons for omissions so it must also be questioned to what extent the published content is a truly accurate description of events (May, 1993). Furthermore, it is possible that for every successful published case study there are failed projects that have never even been written down as case studies, let alone published. If this is the case, it is unfortunate nothing is published on this matter as it is important to learn from mistakes as well as successes.

3.2.2. Interviews and Surveys

Because of time restrictions and challenges finding the right person to speak to, the data may not provide a full representation of the issues across the whole length of the UK but it will provide first hand experiences on the issues considered, which will give an indication of the wider situation across the country. It is acknowledged that there are probably more people who are successfully working with blocks of flats or have strong opinions on how to approach such buildings but locating further contacts with this knowledge has not been possible for this study. It is assumed that speaking to people with no experience of working with block of flats at all may have revealed general perceptions of insulating flats in the industry, but without firsthand experience, such interviews are unlikely to have helped find any true barriers or solutions.

Further studies on these matters should examine a significantly larger sample of people working in the industry with experience of blocks of flats.

The author worked with the FPRA to contact tenants and leaseholders of flats as it was found to be very difficult to gain direct contact details for residents and leaseholders of a wide range of flats. This may partly be as there is no central data on the location of such tenancies arrangements due to the lack of regulation for leasehold buildings. Even within local authority housing records there is little data on the specific whereabouts of privately owned blocks of flats or contact details for leaseholder of flats that do not occupy them. It is recognised that the method used to contact survey respondents has limitations as the sampling method used is unlikely to have contacted a truly fair representation of co-owners and dwellers of flats across the UK. However provided this fact is kept in mind, the information gained from this survey is still expected to provide important evidence that is useful to compare to the views of installers, the Government and academics, offering a more balanced view on the overall situation.

4. Case Studies

4.1. General Summary of Findings from Case Studies

Research revealed there are not large numbers of detailed case studies of flatted buildings in the UK and those in existence were mostly on grant-funded social housing projects, on regeneration projects that required decanting tenants while the work was done or mere models of how work might be carried out. The aim of this exercise was to try and learn from case studies to confirm or refute whether physically insulating flatted buildings is the same with social and private sector blocks but also to learn of any further challenges identified from projects in co-owned buildings, so a wider search was deemed necessary. It was considered worth evaluating further case studies from other parts of Europe where buildings are of a similar construction to those in the UK.

In total 20 case studies from 18 publications were analysed; the findings from which are discussed below. The coded data from all the studies and corresponding coding manual can be found in appendices 6 and 7.

4.2. Structural Findings

From the data we can see there is great variation between the levels of detail given on the original structure and the specific products applied to the study buildings. An overview of the insulation solutions described in the case studies is summarised in table 4.1 below. There were 15% of cases where cavity walls had been insulated but unfortunately little detail is provided on any challenges to this process.

The preferred solution for the other construction types, regardless of tenure, appears to be upgrading the whole block with an external rather than internal solutions, but as table 4.1 shows that with similar wall u-value results (where published) there doesn't appear to be a 'winning' solution; a wide range of types of external insulation have been used. Five case studies also improve thermal efficiency of the flats further by enclosing individual balconies with single glazing to make small conservatories.

Case study no	Type of building (structure)	Age of original building	description of wall insulation	U-value of insulated wall
				W/m²/K
9	Art Deco brick build	1930s	WBS external wall insulation system; 130mm phenolic insulation adhesively and mechanically fixed to structure. Plus in the internal courtyard an EPSITEC rail system with infill panels was applied.	0.15
1	Prefab concrete panels	1980s	30-60mm extruded polystyrene foam glued to existing rendered 200mm concrete panel, followed by thin layer of plaster, reinforced fibreglass grid, an external coat of plaster including lime and a coat of finishing plaster	0.52
2	Prefab concrete panels	1980s	80mm polystyrene insulation, glued, plastic coated then coloured to plan.	0.3
7a	Prefab concrete panels	1960s	Insulated panels fitted onto frame which is bolted directly onto concrete walls. Insulated rain screen panels have micaceous textured coating factory fixed to them, terracotta tiles fixed to additional layer over insulated panels.	0.3
6b	Prefab concrete panels	1950s	Rain screen cladding with smoke detectors in the fabric.	Not specified
11	Prefab concrete panels - with cavity wall	1960s	Type or width of cavity not specified, cavity wall insulated. Single glazed balcony areas to create buffer to flat in winter.	Not specified
4	Lightweight prefab concrete panels	1990s	Outer walls covered with 80mm slabs of thermal insulation fixed using support screen technology and covered with decorative plaster.	Not specified
13	Lightweight prefab panels	1960s	Removal of existing facade and a portal structure and new pre-fabricated, multifunctional facade elements placed directly in front of existing deck access. Includes 300mm layer of super insulation.	Not specified
16	Reinforced concrete frame	1960s	Existing masonry walls insulated and over clad, balconies enclosed with full height rain screen cladding.	Not specified
7b	Reinforced concrete frame	Not specified	As above but due to structural integrity of walls, cladding is fixed to a further steel frame using concrete pads on top of party walls.	Not specified
5	unspecified block of flats	1950s	80mm mineral wool attached to the external wall, then rendered with exterior 10mm coat of plaster.	0.28
10	unspecified block of flats	Not specified	100mm polystyrene insulation fixed to external wall and covered with dry dash render.	0.3
12	unspecified block of flats	Not specified	D&B facades' aluminium rain screen (fixing free).	Not specified

Figure 4.1: Different wall insulation solutions as described in a selection of the case studies

Half of the studies specifically commented on the poor state of repair as a reason for undergoing the improvements but difficulties in heating flats adequately and keeping away cold and damp were also noted in almost half the case blocks.

Figure 4.2: Before and after images of large scale high-rise refurbishment in the UK (D & B Facades, 2008)

4.3. Non-Structural Findings

Figure 4.3 reveals the most frequently reported challenges to insulating blocks. From this data it can be seen that aside from structural issues with the block as mentioned above, finding finance or resident contributions from all leaseholders, communicating with or coordinating tenants are most significant. 25% of the studies didn't report any challenges or barriers though.

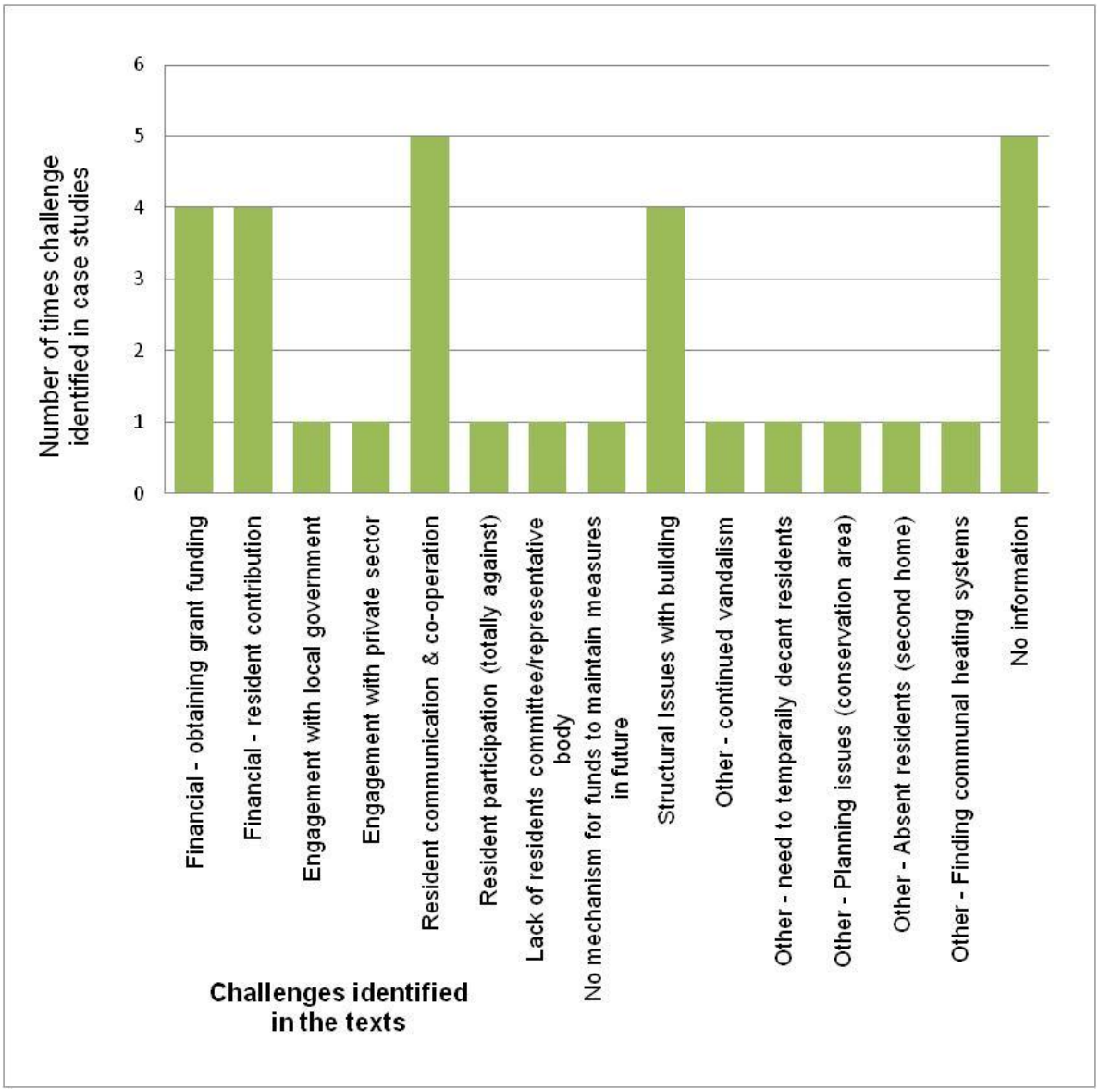


Figure 4.3: Challenges to insulating blocks of flats, as identified in case studies

The majority of case studies analysed at were instigated by a social landlord, local government, central Government or private regeneration companies. Interestingly, none of the case studies reported being initiated by the residents or a private landlord.

Unlike many of the case studies, the Westminster study identifies a number of specific barriers to improving insulation in certain types of private sector flats, including listed buildings and ones in conservation areas. Issues were also identified with the perceived hassle of carry out works, unappealing long payback periods and leases that make it quite complicated to make changes. Because of the planning restrictions in the area, the study considers internal wall insulation

solutions, however because this is only phase 1 of a larger project, only estimated costs and methods are given for the proposed improvements.

The rate in which investments might be recovered through energy savings or income with energy efficiency measures was not reported in 65% of cases. Some case studies do not specify costs but refer to adding value to projects by adding new flats or 'hidden homes' to the block in the attic or replacing deck access, figure 4.4 shows visually how these improvements have enhanced the look of the block.

Figure 4.4: Addition of new attic flats for a block of flats in Russia (EuroACE, 2005d)

Not only was payback missing from many studies, 55% of the studies provided no indication of how much the works cost at all. Improvements costs that were quoted for the remaining case studies varied so widely and cover such a wide timescale, that they are of little use for this study. Where it was reported loans had been offered to residents in European case studies such as case study 3 in Hungary, the study reveals this was through special loans set up through the World Bank and partners to provide help to low income residents who wouldn't normally get a bank loan. Also the repayment mechanisms used were different to those proposed for the UK Green Deal finance loans; using the block's service charge not individual energy meters.

4.4. How useful is this to Help Future Projects in Private Sector Flats?

The review of case studies confirms that most of the structural physical techniques for insulating and improving blocks of flats can be learned from social housing projects where the residents have remained in situ, but if decanting is required, it is unlikely to be viable. The problems identified in the private sector studies show two main areas; finance and coordinating people (tenants, leaseholders, freeholders and residential management companies). The case studies revealed clear leads taking forward flats projects, this was however not the residents or

freeholders of the blocks. In the UK the Government may need to consider and encourage whoever would be best suited to lead the refurbishment of privately owned blocks and co-ordinate leaseholders and other interested parties if they are unlikely to lead themselves.

4.5. What Information is Missing or yet to be Obtained?

In light of the lack of published case studies in the UK for privately owned flats, it is important to find out to what extent the challenge of flats in the private sector are really being addressed. Also where work has been done, it needs to be established how the challenges have been addressed and what the most difficult barriers are that are stopping flats improve their energy efficiency.

The solutions reported in the case studies all rely on the whole building being done as one. Further research should investigate what alternatives are there to external wall insulation for blocks of flats, for example internal lining solutions. Further information also needs to be sought on costs such as current estimates for carrying out insulation work on typical blocks of flats in the UK and how energy company obligation schemes in the UK that are available to private residents can work in a block of flats.

5. Results from Survey and Interviews

5.1. Results from Surveys

The online survey was designed to obtain a sample of opinions, experiences and attitudes to improving energy efficiency in blocks of flats from people who live in, own or manage flats or whole blocks. 88 responses were received; for practical reasons, rather than the full dataset, a summary of the most significant results are included in appendices 2 and 3. The respondents consisted of 50% leaseholders and the other 50%, a combination of private rental tenants, social housing tenants, Residential Management Company Directors and freeholders. Respondents reported being in a wide range of situations involving different heights and sizes of blocks so results should provide insight into the overall picture rather than just for a specific type or storey of flat or a single region. The locations of respondents' flats are fairly evenly distributed all around the UK with the one exception of London where 35% of responses came from.

Figure 5.1 shows positively that most respondents have desire to improved energy efficiency. Only a small proportion, mainly in recently built flats, felt their block was already efficient enough. Other reasons for disinterest can be seen in the legend below, the responses regarding leases were both freeholders.

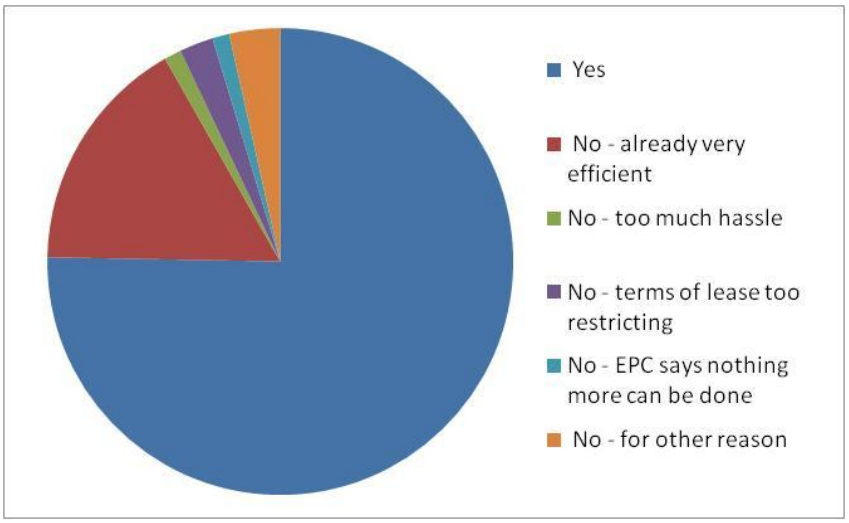


Figure 5.1: Survey responses revealing whether respondents would like to improve the energy efficiency of their flat or block.

The main reasons respondents gave for wanting to improve the energy efficiency is shown in figure 5.2. It must be noted though that respondents were able to give multiple answers to this question, in hindsight it probably would have been more revealing to restrict respondents to just

one answer making them choose. The length of payback periods was highlighted as issue on this topic though, especially regarding older residents who want lower bills, but are of the view they will simply not live long enough to see any worthwhile return on their investment.

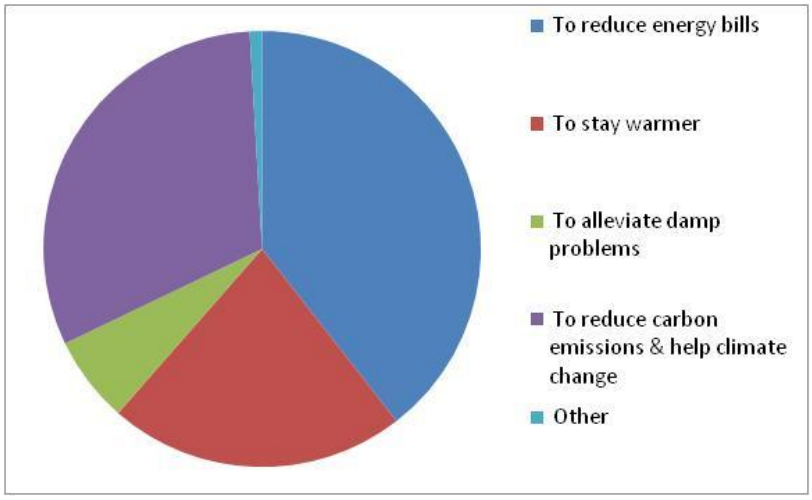


Figure 5.2: Survey results of the main reasons for improving energy efficiency of flat(s)/block

Responses revealing any measures that have already been installed in flats and blocks can be seen in figures 5.4.and 5.5. Figure 5.3 clearly shows low energy lighting, glazing upgrades and heating improvements are the most commonly installed measures whereas comparatively little insulation has been carried out. Loft and cavity wall insulation is shown to be more common than other forms such as external wall but this is very likely to be due to access to grant funding in recent years where it has been available for the former two, but not the latter. It should also be noted that a quarter of respondents reported that they knew of nothing that had been done to improve the efficiency of their flat or block.

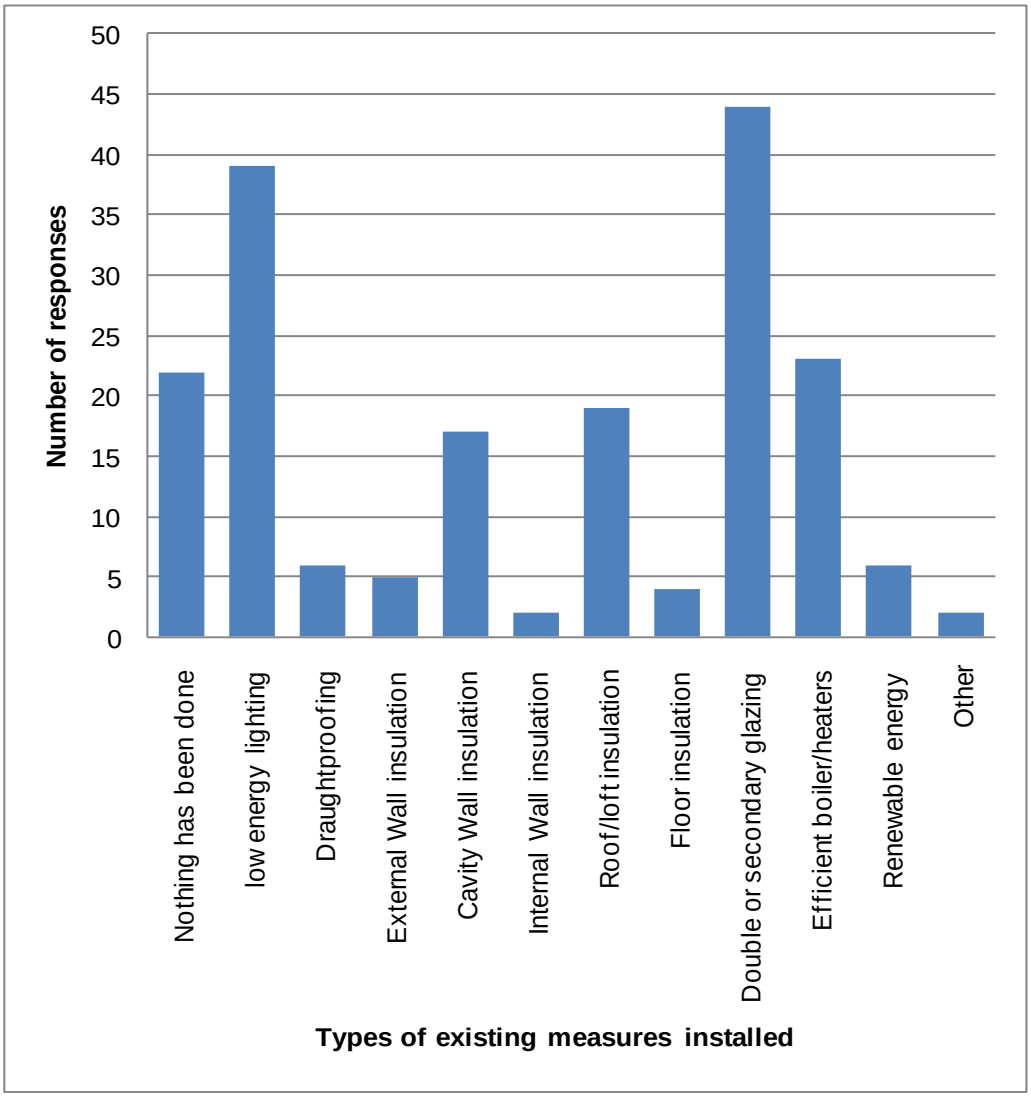


Figure 5.3: Measures reported to have already been installed to improve the energy efficiency of the respondent's flat or block

Figure 5.4a and 5.4b have been produced in addition to 5.3 to show any relationships between the type of residential management set up in a block and what has already been installed. Whilst at first it appears there are greater instances of measures being installed where there is an RMC present in a block, but it must be considered that RMCs were reported in over 40% of responses. Figure 5.4b tests this and shows that the number of measures correlates well with the number of responses and therefore no relationship is immediately evident between the measures and management system. In fact similar numbers and types of measures appear to have been installed in blocks with no recognised residential group, suggesting the type of residential management does not seem to make a big difference to whether measures are installed in blocks of flats or not.

Type of Residential Management in Block (if any)	% of total responses	Nothing has been done	low energy lighting	Draught-proofing	External Wall insulation	Cavity Wall insulation	Internal Wall insulation	Roof/loft insulation	Floor insulation	Double or secondary glazing	Efficient boiler/ heaters	Renewable energy	Other	Total
Right to Manage Co. (RTM)	8%	1	6	0	2	1	0	4	1	6	2	0	0	**23**
Residential Management Co. (RMC)	42%	9	16	2	2	7	2	5	0	15	10	3	1	**72**
Residents Association (RA) or Recognised Tenants Association (RTA)	15%	3	5	1	1	3	0	3	2	7	4	2	1	**32**
RMC and RA or RTA	7%	1	4	1	0	3	0	1	0	4	2	0	0	**16**
Other type (not specified)	5%	0	2	0	0	2	0	1	0	3	1	0	0	**9**
No residents group, company or asso.	24%	7	6	2	0	1	0	5	1	9	4	1	0	**36**

Figure 5.4a: Measures reported to have already been installed to improve the energy efficiency of the respondent's flat or block and the relationship to type of residential management set up.

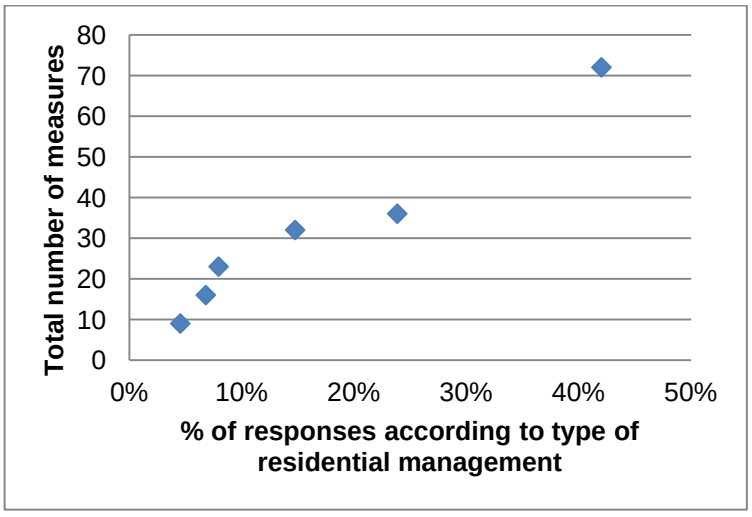


Figure 5.4b: Correlation between total number of energy efficiency measures already installed and the type of residential management in the block

The different energy efficiency measures respondents would like to have installed in future can be seen in table 5.5 below. Whilst only third of respondents have reported they would like to see some form of wall insulation installed, many would also like double glazing, efficient heating and renewable energy systems. Of those stating they want renewable energy only 55% have also stated they do not have not wall insulation at present, but would like some.

	Insulation measures						Other measures				
	External Wall insulation	Internal Wall insulation	Cavity Wall insulation	Draught-proofing	Floor insulation	Roof/loft insulation	Low energy lights	Double or sec. glazing	Renewable energy	Efficient boiler/ heaters	Not sure which measures can installed
number of responses	13	13	19	16	13	20	17	21	22	24	2
% of total 88 respondents	15%	15%	22%	18%	15%	23%	19%	24%	25%	27%	2%
% of total respondents who want some form of insulation measure											49%
% of total respondents who want at least one wall insulation measure											33%
% of 22 respondents who want renewable energy who also want wall insulation											55%
% of 22 respondents who want renewable energy but don't have or want wall insulation											31%

Figure 5.5: Measures which respondents would like to have installed in their flat or block

Figure 5.6 reveals the respondent's views of specific barriers to installing energy efficiency measures; it is clear that high upfront costs and the complication of sorting out all the flats in the block are two key issues. Appendix 4 also contains this data broken down by their tenure in the block but it shows no significant relationship has been observed. In addition to these responses, further comments included a freeholder specifically citing an example of loft insulation works being refused by the other residents as 100% agreement could not be reached with leaseholders; the top flats wanted it paid from the service charge but the ground and lower flats were not interested. Other comments included several leaseholder owner-occupiers stating they don't know what can be done to improve their flat of block or didn't know who to approach for genuine, reliable, impartial advice.

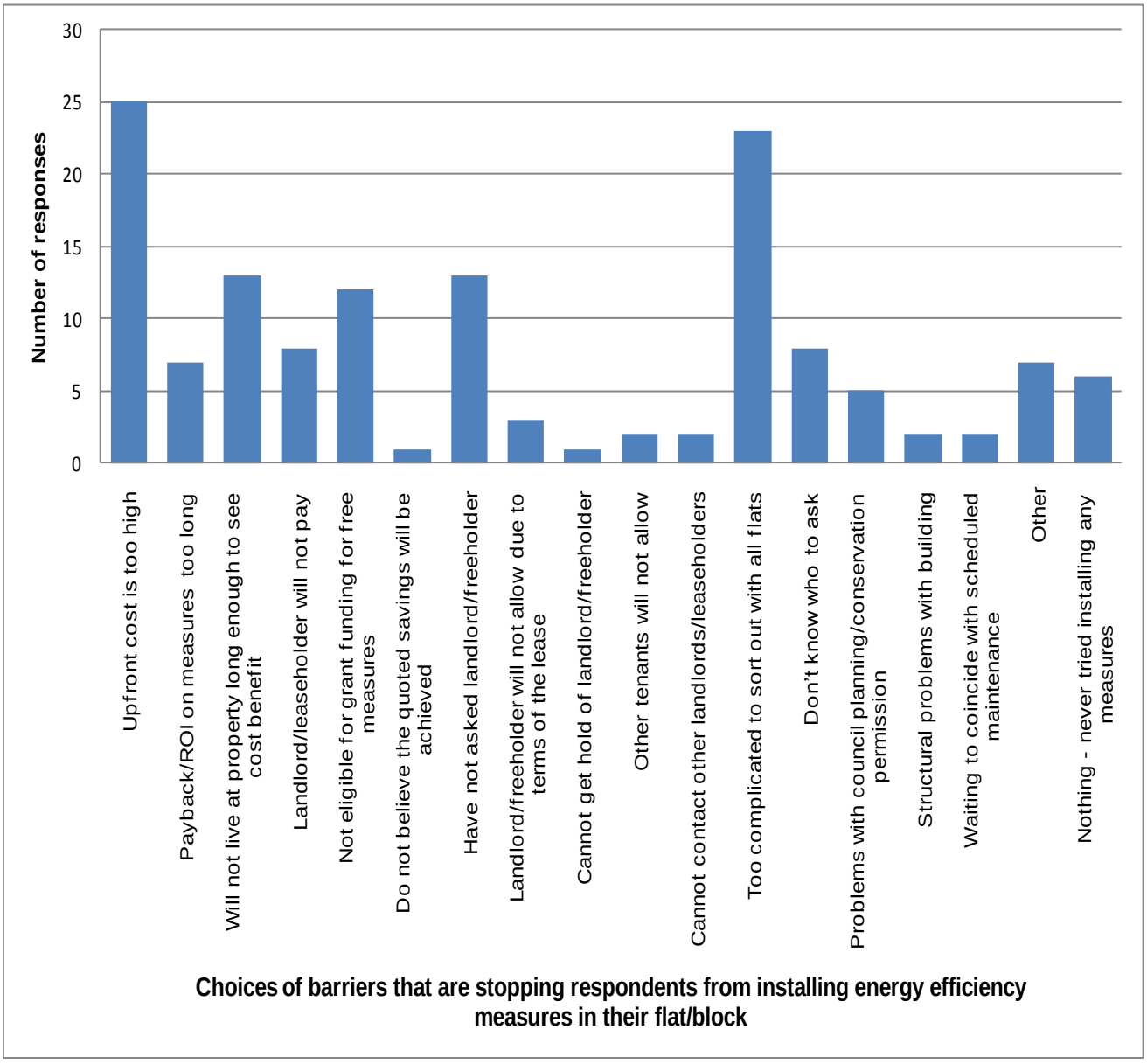
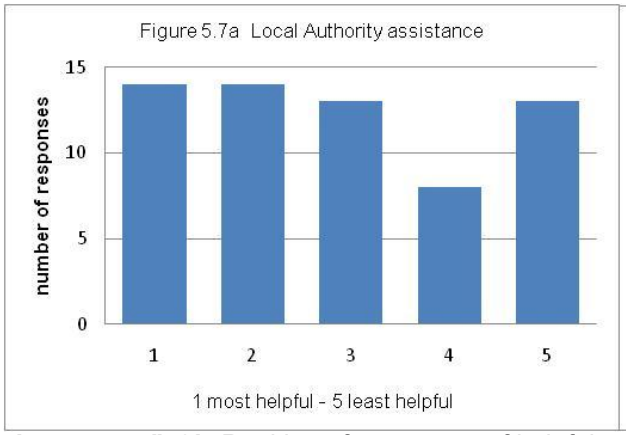


Figure 5.6: Views on the main barriers to installing energy efficiency measures in blocks of flats (further data showing breakdown of responses by tenure can be seen in appendix 4)

The survey also addressed which solutions respondents thought might help make it easier to install measures. The results, illustrated in figures 5.7a-e, which rank the solutions in order of priority, reveal mixed messages with regards to local authority assistance and Government legislation. It is clear that relatively speaking, Green Deal loans are considered the least helpful measure for flats and that additional grant funding is evidently wanted instead. Changing leasehold legislation also appears to be relatively low down in most respondents' priorities, in fact there was concern raised for the position of the leaseholder. One respondent mentioned that leasehold properties are often bought because the upfront cost is cheaper and more often than not, those leaseholders do not have extra finance to pay for energy efficiency projects.

There was concern expressed that bringing in policies such as minimum standards without clear specification could encourage cowboys to take over the energy efficiency market.



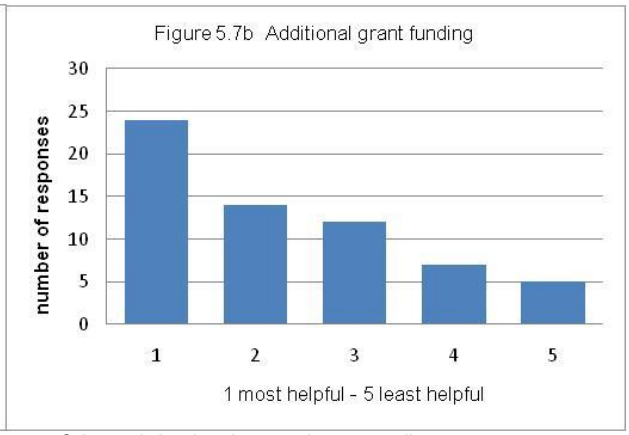
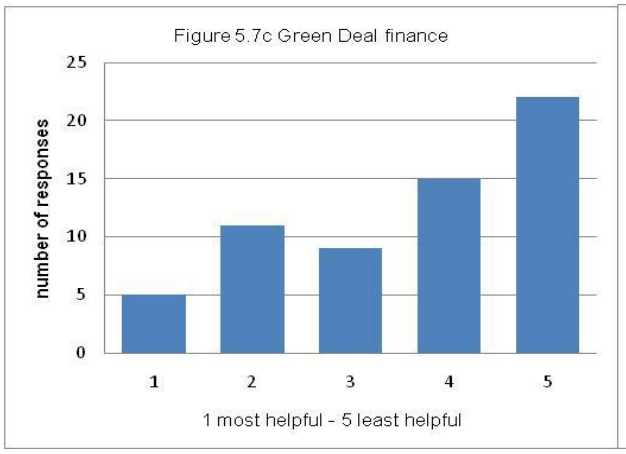


Figure 5.7a (left): Ranking of responses of helpfulness of 'Local Authority assistance (i.e. co-ordination and impartial information)'
Figure 5.7b (right): Ranking of responses of helpfulness of 'Additional grant funding to reduce resident contribution'



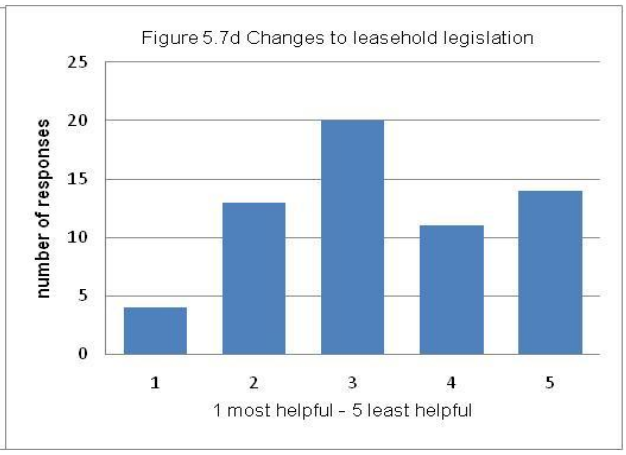


Figure 5.7c (left): Ranking of responses of helpfulness of 'Green Deal finance (long term loans charged to energy meter in house)'
Figure 5.7d (right): Ranking of responses of helpfulness of 'Changes to leasehold landlord & tenant legislation'

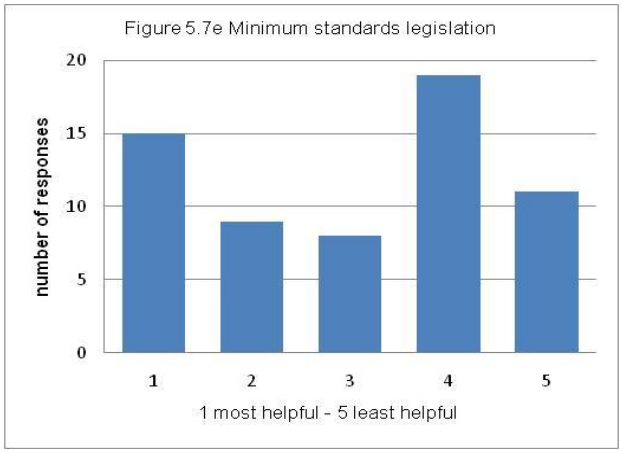


Figure 5.7e: Ranking of responses of helpfulness of 'Legislation from Government to make landlords and home owners improve insulation'

5.2. Results from Interviews

Findings from seven qualitative interviews indicate that some work is being done in privately owned flats, but two clearly different approaches can be seen; specific flats projects carried out in partnership with local authorities and insulation project managers who have learned to work with co-owned blocks of flats as and when the opportunity arises. It was however reported that due to recent funding cuts, many of the Council supported schemes have lost their funding and despite great success have had to end already or will be ending soon. A summary of the authors' notes from interviews can be found in appendix 5.

5.2.1. Leases and Leasehold flats

Despite having insulated many leasehold blocks, half the interviewees said they had not experienced any problems with leases; it was noted that in most of the buildings they have worked, resident contributions were often paid out of the service charge with no questions asked. However the issue of co-ordination and gaining 80-100% consent from co-owners/managers was recognised by all interviewees as a challenge. Interviewee 1 even mentioned that their first step is to gauge initial commitment from the block, if not a decent proportion they are unlikely to proceed. Interviewee 4 reported flats in the West Sussex Project taking on average 6 months from start to finish despite a project manager coordinating it and 100% funding; the installation of the insulation itself would generally take less than 1 week of that time though.

One of the reasons reported for needing to contact all residents and not just leaseholders is to obtain details about tenants to claim grant funding. Whilst most insulation project managers alleged to be happy to chase this information to an extent, a number of blocks of flats were reportedly dropped because even after chasing, tenants did not return forms. Interviewee 7 explained that ground landlords of buildings are unlikely to spend too much time coordinating residents as they exist as a business not a tenant and as time is money it may not be worth it. It is clearly not always about funding though, as even where 100% funding was offered regardless of grants, interviewees reported residents, landlords and managing agents refusing works because they were adamant the insulation would cause problems with the building.

Interviewee 6 suggested that the introduction of RMC legislation has helped where freeholders have been doing a bad job. However on the other hand Interviewee 7 thought that a common problem seen in blocks that have RMCs is that too many leaseholders on RMC committees are

now financially struggling and contrary to best practice advice, don't want to pay the service charge or in fact spend any money maintaining the building and are not interested in investing in the block.

5.2.2. Common Parts and the Whole Block Approach

A number of the interviewees commented that if you can't get agreement to do the whole external facade, pepper-potted internal insulation solutions for each flat could be evaluated. It was suggested that cavity brushes could be inserted into the common walls dividing them up allowing just sections of the wall to be completed. However whilst Interviewee 1 stated only vertical brushes could be inserted, stopping flats above and below having insulation, Interviewee 5 suggested that horizontal divisions could also be made where there are already horizontal crossbeams built into the frame.

Poor maintenance such as pointing, windows, and leaking gutting is a issue raised by all interviewees as a big problem with blocks of flats that can stop energy efficiency improvement works going ahead. All interviewees concurred that poorly maintained buildings should not be insulated at all until fixed as the combination will most likely lead to hazardous or damp related issues; the latter of which the new insulation is often blamed for, rather than the existing maintenance issue.

5.2.3. Access

Most interviewees considered access to blocks of flats a significant problem; confirming that above 3 storeys a cherry picker would be required, but above 6 storeys a block would need scaffolding. Further issues were raised that scaffolding can not only cause problems if not correctly located for the required drill pattern (for cavity walls) but these extra access costs are expensive. Interviewees 3 and 4 noted that cherry pickers only cost around £350-450 for an average sized block but scaffolding a high-rise to install insulation could cost £40-50,000, plus a further £10-15,000 to install the insulation itself. Figure 5.8 below shows a block of flats in West Sussex that was recently insulated using a combination of access methods.

Figure 5.8: A 3 storey blocks of flats in West Sussex having cavity wall insulation installed using a combination of ladder and a cherry picker (images by author, 2010).

There were mixed responses with regards to the type of products that are offered to blocks of flats. Interviewee 2 claimed his company are the only system provider that can offer cavity wall, external and/or internal solutions as a hybrid package for complicated buildings; most companies can do cavity but then can only offer internal or external, not both.

One newly identified problem with installing cavity wall insulation in medium to high rise blocks is that standard pumping kit can only reach between 100-120m from the machine which can be an issue with large awkward to access buildings or anything above 5-6 storeys. Interviewee 1 reported once wheeling a pump into the residents lift and going to an upper floor to enable the top storeys to be filled, whereas Interviewee 5 once had to arrange an entire road closure to gain access to certain walls

With regards to access, there was a general consensus that abseil access to medium to high buildings is a very appealing option over scaffolding. Interviewee 3 confirmed that abseil access for a high rise building can cost just £10-15,000; around 40-60% less than scaffolding and take half as long as having scaffold up. Abseiling is also significantly more flexible than scaffolding allowing flexibility for the correct drill pattern to be followed and also any required maintenance can be carried out on ropes before installation starts, also any snags can easily be attended to, whereas if scaffolding had been there but already taken down, there would then be a problem. Furthermore, this method is less disruptive to tenants and the work itself has a smaller carbon footprint as there are no vehicles transporting scaffolding, the abseilers can cycle to work and only a lorry for bead is needed (and bead is almost as light as air). During the process of this research the author was offered the opportunity to carry out some additional action research into this method of installing insulation. Figure 5.9 shows the author abseiling off the top of a local 13 storey high-rise block that was being insulated. A copy of the subsequent article

published in the local paper to publicise this innovative method of installing insulation is included in appendix 8.

Figure 5.9: Avalon's abseiling team insulating a high-rise block in Littlehampton, West Sussex and the author being accompanied as she abseils down the building to investigate how it all works (Left image taken by author, 2011, right image ©Peter Savage, 2011).

Interviewees noted how Avalon have a niche in the market at present as they are the only company able to offer BBA approved cavity wall insulation using abseiling. It was discussed with interviewee 3 that any future competitors wishing to compete would most likely be maintenance abseilers diversifying to insulation much like they did, rather than vice versa as it would take several years of experience to train installers to the point where they could commercially abseil. Avalon is currently experimenting with an external wall insulation product that could be installed on ropes; if successful it has great potential in the future for bringing down the cost of this measure too.

Whilst the approach to lofts in blocks of flats was recognised as different to that of a house as some are communal common parts but some are divided up amongst the top flats, this was not really considered an issue. Interviewee 1 noted how he they had adopted a method of dividing the loft space by the number of top flats to apply for CERT funding, whereas Interviewee 4 commented on the problem that some of the lofts are so large they exceed grant maximum areas and require a significant extra contribution. Problems were noted with household items stored in lofts, even in communal loft spaces that have to be removed before installation; but with this is a problem experienced in all types of the housing, not just flats.

5.2.4. Policies, Finance and Extra Assistance

The overall consensus of opinion from the interviewees that had been involved in flats insulation projects was that the Government will not learn everything that needs to been known from evaluating social housing flats projects as there is a much ignorance in the private sector about the need for renovation at all and the issues are different. Interviewee 2 also added that there is no overall right or wrong answer to refurbishment, each project very much depends on the structure itself, the living patterns of the tenants and the needs of the customer.

Unsurprisingly, the interviewees who had been working on projects with local authorities were very clear that local authority backing has been key to the success of the project, although not just for the funds, as they thought it is the endorsement that has been important. The insulation project managers who had not been running a specific project were however not so bothered about the need for local authority endorsement. Nevertheless, there was concern from Interviewee 2 for the supposed impartial advice that might be offered with regards to complicated buildings where the assessors are unlikely to fully understand how systems work together.

There was mixed enthusiasm towards the Green Deal, some claiming it will not work and others stating it will. In particular interviewees commented how pessimistic they were that the majority of people would be interested in the Green Deal, especially if the flat is rented or the resident is not very ‘green’. Interviewee 7 also commented on the common areas in a building and the lack of provision so far in the Green Deal to allow for the ground landlord to charge any works to his common electricity meter. Interviewee 5 was not happy that grants were being replaced with loans and suggested it would be better to widen the net for 100% grants so over time, everyone gets a chance to apply.

With regards to minimum standards, most interviewees welcomed the concept, however Interviewee 6 expressed his concern for leaseholders and private rental tenants when the Green Deal and minimum standards are combined and noted on behalf of the FPRA and alongside Friends of the Earth he is currently lobbying the Government to ensure the right protection is put in place.

6. Analysis, Discussion and Recommendations

6.1. Analysis and Discussion of Findings

The research in this study was intended to provide further evidence to existing knowledge to support the arguments made for the specific difficulties of improving energy efficiency in co-owned blocks of flats. The following analysis of findings and discussion explores the evidence for this and reveals further evidence of issues that generally have not yet been brought to people's attention.

6.1.1. Structural Issues Learned from Social Housing Projects

The evidence from the reviewed case studies appears to generally support the proposed theory that the structural techniques used for insulating social blocks of flats are replicable in similar privately owned buildings. This is with the exception of any measures which require the decanting of tenants on the assumed basis that this it would be impractical and unfeasible. Even the enclosed small balconies described in the case studies could be replicable in privately owned blocks if the right permission and funding could be sought. Whilst in general the small amount of literature produced for RSLs offering guidance on improving blocks of flats to an extent does apply to co-owned buildings, the findings in this study further support the idea that a number of additional structural and non-structural challenges and barriers are found only in co-owned buildings. These are not necessarily just privately owned buildings though, some of these challenges will arise wherever there are leaseholders in block, even if the building is owned and managed by an RSL.

It was thought that the case studies and interviews would reveal the most appropriate types of insulation that should be installed on blocks of flats, instead they revealed there are numerous different products, applied in different ways with different effects and outcomes. As the case studies have been gathered from projects carried out over the last 20 years and with insulation products rapidly being developed this may just reflect progress in this field rather than just emphasising the wide range of choices available for blocks of flats.

With existing evidence showing widespread knowledge for the neglected state of blocks of flats, in particular high rise blocks and increasing pressure to refurbish poorly performing buildings, one might think that more attention would be paid to the energy efficient refurbishment of flats; but this does not seem to be the case. Evidence from interviews imply that there are a number of privately owned blocks in poor condition that would require additional investment before measures such as insulation can be installed. Furthermore, it is interesting but also concerning to find evidence of leaseholders showing little ambition or finances to attend to these issues, even where the Right to Manage (RTM) has given lessees responsibility for such works. From the authors' own experience there is often misconception that RSL owned flats are in poorer condition than privately owned ones. In recent years though RSLs have been seen to upgrade their stock under 'decent homes' schemes and in response to the Government's Carbon Reduction Commitment (CRC) whilst at the same time no pressure or min standards have been applied to the private sector. Combined with the current financial climate, it is not surprising the private sector is being left behind.

The 'common' interdependent nature of the walls and the difficulties in gaining commitment from all leaseholders appears to be the reason for some alternative insulation solutions being offered to flats in the private sector. The case studies generally showed instances where the whole block was insulated using cavity wall or external wall measures which correlates with EST (2010a) best practice guidance as discussed in the literature review. However the suggestions of offering pepper-pot insulation work for just sections of a building or in individual flats rather than adopting a whole-block approach is contrary to this guidance and raises concern. Whilst this approach may not cause thermal bridging if done professionally, there is a much wider issue as to whether this piecemeal approach should be encouraged in 'common' walled buildings. Nevertheless, if the block is subject to planning conservation restrictions, internal and hybrid solutions are likely to prove to be invaluable where whole block approaches are unlikely to be allowed. Further practical research should be done to investigate this before it becomes a widespread problem.

Access has been frequently noted as one of the biggest problems with blocks of flats of all tenures and can potentially cost more than the insulation work itself in buildings of 6 storeys or more, however where the responsibility for cost is put on the leaseholders rather than an RSL this becomes a more noteworthy issue as it can be higher than the cost of the insulation work itself. Abseil access is a relatively new, but very appealing option for maintaining and improving medium to high rise blocks, coming in as a cheaper, more flexible and quicker option than the alternative; which is normally scaffolding. It seems there is still ignorance though in the wider insulation sector on the use of abseiling as a means to install cavity wall insulation, with the first

block outside of London only being completed in May 2011 despite the company starting insulation work back in 2009. Even so it must also be considered with only one small company at present offering this rope access, unless they can expand rapidly to meet any increased demand there is a risk there could be problems reacting to increased uptake of this method.

Overall the research revealed that there does not appear to be a right way to approach insulating lofts in flatted buildings; this challenge is partly due to the non-standard layout of and responsibility for loft spaces from block to block. Contrary to Roberts' (2010) description highlighted in the literature review referring to loft as a common space owned by the freeholder, the research has shown that whilst this is true in some blocks it is not in others. Often loft spaces have been divided up and allocated to each top floor flat but even then it is not always a given that responsibility for that space is included in the leasehold agreement. Based on the findings regarding loft spaces and models showing that top floor flats are likely to see the most significant benefit from this measure, the suggestion to approach co-owned blocks by dividing the loft space by the number of flats on the top floor or just charging top floor flats would seem a very sensible idea. Although there is some evidence that freeholders may be happy to pay for insulation and claim it back from the service charge, there is also counter evidence that shows this approach has led to residents from lower floors blocking the work from going ahead; it would be better if the extra charge could just be allocated to the top floor flats. Some general guidance for flats could help tackle this issue.

Where a block has a flat roof with no loft space, regardless of tenure, although little evidence has been found it is assumed work would most likely be carried out if external wall insulation was applied as in some case studies, or additional insulation would most likely be required as part of the building regulations anyway as and when the roof is due for replacement or routine maintenance. It is interesting to note the case studies that revealed that finance for refurbishment can be raised by adding extra flats to the attic or top of the block. Unfortunately it would probably be incredibly difficult in a co-owned block to get co-operation from all the leaseholders carry out such major, disruptive works.

6.1.2. Other Challenges to Improving Insulation in Blocks of Flats

Existing research by EEPH discussed in the literature review revealed cost is considered the main reason holding landlords back from investing in energy efficiency measures. But evidence suggests there actually appears to be a greater lack of understanding and foresight from leaseholders on the importance of funding basic maintenance in leasehold buildings, let alone

energy efficiency improvements. This would explain the lack of enthusiasm for re-payable loans over grants; people may just simply not want to pay for it themselves, no matter how well loan schemes are tailored to suit flats. As discussed from the literature, private landlords do not experience improved living conditions and cheaper bills, so have little incentive to invest at present, but it needs to be noted for flats that this also applies to decision makers who do not reside in blocks. It is possible that people do not even think their property needs upgrading and feel they are being forced to comply with carbon reduction targets set by the Government that they do not agree are required. Arguments to reduce carbon to meet targets may be overbearing issues closer to home such as residents simply being able to afford to heat and light homes, taking into account the rapidly rising cost of energy.

The disparity in figures for savings and payback between the top and bottom floor flats identified in the literature was not recognized in most of the case studies or interviews. Also contrary to expectations, no obvious relationship could be seen in the survey results between the measures already installed or desired and the floor the respondent's flat was in the block. Although it is not really considered much of an issue at the moment, it may become significantly more problematic when the Green Deal begins as repayments will be closely linked to estimated savings and payback. The results of surveys did show that people are mostly interested in how much money they could save on energy bills. This suggests that payback projections for flats need to at least be modelled correctly, even if user behaviour means that savings may not be realized for some.

It appears from the research that as suspected, the desires of the respondents do not necessarily follow the energy hierarchy discussed in the literature review with survey results revealing much enthusiasm for renewable energy when simple energy efficiency measures have still not been installed. With neither measure actually installed yet, it is possible that in practice leaseholders might insulate first but it must be noted that a third of the respondents who said they wanted renewable energy suggested they did not already have any and had no desire to install any wall insulation either.

Contrary to findings from the literature regarding a widespread lack of awareness for the benefits of insulation and that many people's knowledge about the subject is out of date; the research generally did not support this. However this result may be explained by the sampling methods used in the research. It is probable that leaseholders, freeholders and tenants with no awareness or enthusiasm for improving energy efficiency would be unlikely to respond to a survey on the subject, nor respond to any publicity or letters regarding insulation of their building. Even so, the interviewees confirmed that they still find much ignorance in the private

sector with regards to the need to install energy efficiency measures, indicating that in many cases the former theory may well be true. Therefore, increased education campaigns on the benefits of insulation combined with the production of best practice guidance that has specific reference to private sector flats may be beneficial.

One of the most interesting findings was that coordinating all the flats in a block to reach a common decision is not just a small problem, but considered one of the most difficult challenges for blocks of flats, more so than funding. Because of this finding, the lack of comments about this in some case studies is almost suspicious, hinting at the fact they may be hiding how challenging it really was to complete the projects described in the reports. One solution the author investigated was whether people thought assistance from local government would help with this but the research revealed mixed responses and no clear cut answer for who else would be best placed to address this. Whilst some evidence suggested the freeholder might be a point of contact, because this position is usually held as a business, rather than as a resident it's unlikely they would spend much time chasing leaseholders unless there was a financial reward for them in the process. All things considered though, it leads the author to conclude that whilst local government involvement specifically may not needed, a strong project manager who could step in to lead and co-ordinate everyone in the block is required. For whomever that might be, it would be imperative they have the time, patience and understanding required to see projects through to the end.

6.1.3. Proposals to Change Leaseholder Legislation

Overall the research revealed slightly confused reactions to whether the Roberts' (2010) proposed changes to leaseholder legislation might help energy efficiency improvements to be carried out in blocks of flats. Most of the interviews with insulation project managers commented that they had not really experienced problems with leases. However, on the other hand they also all confirmed that obtaining permission is a lengthy process and they had all experienced insulation not being installed because of non-agreement from all leaseholders. Therefore it can only be assumed that interviewees were just unable to see that they had in fact experienced issues with leases as it is the inability to get 100% agreement that is at the core of Roberts' (2010) proposals to change leasehold legislation.

The survey results provided a slightly different insight into the issue. Specific comments were made with regards to problems with leases restricting 'improvements' to the block and half the respondents said they thought changing the legislation would probably help them go ahead with

energy efficiency improvements. Nevertheless, when they ranked the need for the change in legislation against other solutions, it generally ranked midway to low. Whilst this result may be explained by a misunderstanding of the question, it could also be the case that although respondents think the changes could be helpful, compared to other issues such as coordinating the blocks it is relatively low in their priorities.

Taking all this into account, it appears the research does provide an amount of much needed evidence to support Roberts' (2010) proposals to change leasehold legislation but more extensive research still needs to be carried out. Furthermore, bearing in mind the issue of access costs for blocks, noted to sometimes exceed installation costs, the Government will need to also ensure that guidance is provided as to what 'reasonable' measures might be alongside any changes to legislation. If the cost and inconvenience of scaffolding for blocks of 6 storeys or more could be substituted with abseiling at a substantially lower cost, there is a risk that even some quite reasonable measures, could be classed as unreasonable in a LVT as it can be proved it is not necessarily the best value solution. Findings also confirmed that the proposed changes to leaseholder legislation is only one part of the wider picture and some sort of regulation and minimum standards will also be vital to encourage the more reluctant as well as the disinterested.

6.1.4. Government Proposals for Refurbishing the UK Housing Stock

Overall, the research has revealed little enthusiasm for the proposed Green Deal long-term loans that will be the basis of the Government's new Energy Bill. The evidence from the interviews reveals concern that in the UK there will be particularly low take up from flats and that non-green leaseholders will be unenthused by the opportunity. In fact the evidence from the surveys and interviews, not surprisingly suggests that in general people would like continued or increased grant funding, not loans to help finance energy efficiency measures.
Nevertheless, reflecting on the current financial situation of the UK Government and the country in general and also the high cost of the more expensive insulation measures such as external wall insulation, it is clear why grant funding is unlikely to be possible in future on the large scale it would be required.

It was highlighted in the literature review that in a co-owned block, the freeholder technically 'owns' the common parts i.e. a cavity wall, but under the Green Deal proposals the Government don't seem to acknowledge this in any way and so far only include proposals to charge refurbishment costs to individual energy meters and put the financial risk on each resident.

Although the evidence shows reports in Hungary of the successful take-up of long term loans for leaseholders of flats, the fundamental difference in the case study is the loan was paid back through increased common costs, not individual energy meters. With potential fear of disconnection if Green Deal repayments are missed, people with low incomes in the UK could be put off agreeing to works. Should the leasehold legislation in the UK be changed, the opportunity would arise to allow the freeholder to receive Green Deal charges on their meter in the common areas and re-charge residents through the service charge in a similar manner to the case seen in Hungary. This many not be suitable to all blocks but with the amended legislation they would no longer need 100% agreement from the block for 'reasonable measures', provided charges were made in accordance with the terms of the lease this could be very valuable in some blocks of flats.

The suggestion made by interviewees to insulate sections of blocks also raises concern with regards to government policies for the minimum standards in the private rental sector. This option may be desirable in blocks where internal insulation could be installed by individual flats in addition to cavity or external insulation works. But a concerning implication of this is the possibility that in mixed tenure buildings, landlords could be forced to consider this disjointed approach if they cannot get the other leaseholders on board for whole block works but are made to improve the thermal efficiency of their walls in line with regulations or risk being banned for renting the flat. If many blocks for instance start getting cavity wall insulation installed in random parts of the building, one would assume it could quickly become difficult in those blocks to monitor what had been done and what hadn't. Based on EST guidance, this could be bad for the health and longevity of the building as a whole and could leave some inefficient flats out in the cold.

The fact that DECC have said that the new ECO will support the Green Deal and provide additional funding where measures are just too expensive or don't meet the 'golden rule' provides some hope that extra provision might be made for some blocks (DECC, 2010). But with details of the ECO yet to be worked out, it is still difficult to speculate exactly what overall impact the Green Deal will have for flats.

6.2. Recommendations

Refurbishment of housing in the private sector flats needs to be addressed to a greater extent but plans to enforce on just the private rental sector may hinder flats more than help, for blocks of flats the entire leasehold sector needs to be targeted with minimum standards. This alongside increased education on the benefits of insulation and best practice guidance with including issues found in private sector flats should make a big difference. Such guidance would hopefully boost interest and ensure work is done in the right order as well as the most appropriate way. Further practical research should be done to investigate the effects of using internal and hybrid solutions in buildings where there are common, interdependent walls but not just for conservation properties but also co-owned blocks as discussed in this study.

Further research in real flats rather than modelling needs to be commissioned to highlight the disparities between carbon and energy savings depending on the storey the flat is on in the block. This may prove to be invaluable in persuading flat leaseholders and tenants to accept measures to be installed under the Green Deal. It is recommended that some general guidance for flats on type of loft spaces and dividing the loft space by the number of flats on the top floor or just charging top floor flats should be created.

This research has shown initial evidence for changing leaseholder legislation but further research may need to be carried out to support the FPRA's case before the Government would be prepared to make changes to secondary legislation. Government will need to also ensure that guidance is provided as to what 'reasonable' measures might be alongside any changes to legislation, including the issue of access costs.

The experiences gained from successful projects involving loan schemes elsewhere in Europe could be of great benefit to those planning to launch Green Deal finance schemes aimed at flats. For example, DECC could allow freeholders or block management organisations to replicate proven European finance models and receive Green Deal charges on the common area meter with the intention to re-charge residents through the service charge. This model could work in the UK should the proposed leasehold legislation changes be made, but also other successful European finance models used in flats may be relevant.

7. Conclusion

The purpose of the research thesis was to provide guidance for politicians, local authorities, developers, environmental consultants or other interested parties on how to address carbon reduction/energy efficiency improvement in blocks of flats through insulation. To achieve this, the research has confirmed which physical techniques for insulating blocks of flats can generally be learned from RSL owned blocks, but it has also revealed some additional barriers found only in the private sector or blocks containing leaseholders, which make these buildings significantly more complicated to upgrade.

The amount of neglected privately owned blocks requiring additional investment before measures such as insulation can be installed are probably in greater numbers than is generally thought. With evidence of leaseholders in many of these blocks showing little ambition or finances to attend to these basic issues, it highlights the extent of the challenge of persuading them to all to upgrade the energy efficiency of their block. Furthermore, with no pressure or minimum standards having been applied to the private sector to upgrade buildings, but much having been seen in RSL owned blocks it seems the private sector is being left behind. The issue of minimum standards and guidance need to be addressed, for the entire leasehold sector not just for the private rental sector.

The observed lack of enthusiasm for re-payable loans rather than grants has indicated that people do not want to pay for energy efficiency improvements themselves. Although the reasons for this are not entirely clear, it is possible that there is a lack of understanding of how much more comfortable their home could be, but also arguments to reduce carbon may be overbearing issues closer to home such as residents simply being able to afford to heat and light their homes if projected energy costs in the future are taken into account. The Government hold great hope for the success of Green Deal finance in helping refurbish all homes, but with details of the ECO yet to be worked out, it is difficult to speculate exactly what impact the Green Deal will have for flats. It is most likely that the details and experiences gained from successful European projects which have used long-term loans for residents in blocks could be of great benefit to those planning to launch Green Deal finance schemes aimed at flats.

It can be seen that coordinating all the flats in a block is considered one of the most difficult challenges for flats and contrary to popular belief, is more of an issue than funding. Whilst local government may be appropriate to step into this role, evidence suggests any project manager

would be able to fulfil this role, provided they have a relevant understanding of flats and have the time and patience to see the project through to the end.

Whilst access is noted as a further challenge for blocks of flats of all tenures, where the cost is put on the leaseholders this is a far more significant issue. It seems there is ignorance in the wider insulation sector on the benefits and availability of using of abseiling as a means to install cavity wall insulation but with only one small company at present offering this rope access, if demand increased rapidly they would needs to respond and expand very swiftly. Also the access, layout and responsibility for loft spaces clearly varies greatly from block to block and can be challenging to approach. But as top floor flats are likely to benefit most from this measure, guidance could be introduced to link this measure to just top floor flats.
This goes further than just loft insulation though, the potential disparities between carbon and energy savings depending floor level in a block are not often considered at the moment But once the Green Deal begins the need for accurate modelling taking account of these issues is likely to come to light. This issue would benefit from further research being carried out, but in real flats not just more modelled studies.

The piecemeal approach discovered to insulating blocks, which is contrary to best practice guidance raises a number of concerns for the widespread improvement of blocks of flats and raises the broader issue as to whether it is appropriate to encourage this approach in 'common' walled buildings unless the block is subject to planning conservation restrictions; further research into the potential consequences of this needs to be explored.

The research provided some evidence that changing leasehold legislation would help break down some barriers to improving energy efficiency in leasehold blocks. But due to the financial implications of this, further research may need to be carried out before the Government would be prepared to make changes to secondary legislation. Furthermore, if changes are made to leaseholder legislation the Government will need to also ensure that guidance is provided as to what 'reasonable' measures might be, including access methods so that should a case end up in a LVT as it can be proved it is the best value solution.

This research has been limited by the availability of published case studies with sufficient detail to learn from for future projects and difficulties finding and contacting not only people who live in or own private flats, but also people in the industry who have been working to improve these properties. It has been difficult to draw conclusions from some of the evidence collected, where the evidence collected has just highlighted the need for more substantial research to be carried out on the issue. However based on the responses received in the survey and the discussions

the author was able to have with people in the industry certain conclusions have been able to be drawn. Overall this study has revealed there is great interest and support for investigating the issues and solutions for these knowingly complicated buildings; it seems that there are people with some knowledge and experiences of many of the issues raised in this study but little of this is published or widely available. This study has only considered the issues found in post 1930s blocks due to differences in structures before this time; some of the issues identified in this study will also apply to older blocks but there are likely to be additional even more difficult challenges in pre-1930s blocks.

More pressure needs to be put on the Government to raise their awareness of the issues identified for co-owned and leasehold blocks and the need for real life rather than modelled research. DECC need to ensure that the financial mechanisms proposed for refurbishing the UK housing stock from 2012 onwards will not just work in blocks of flats but will also be appealing to residents and leaseholders. Best practice guidance needs to be available for these buildings to ensure they are improved in the most appropriate and cost effective way to benefit residents and the UKs ambitious carbon reduction targets.

Energy Efficiency and Blocks of Flats Survey

Introduction

This survey is being undertaken as part of the research for a postgraduate MSc Thesis into insulation and blocks of flats. For the purposes of this survey, Jo Brooks, the MSc student has partnered up with the Federation of Private Resident Association (FPRA) who have already identified some barriers to improving energy efficiency in blocks of flats but need further evidence to continue the talks they have started with the Government.

Please respond honestly so that we can gain a better understanding of the real issues with blocks of flats. There are extra spaces provided under most questions should you wish to elaborate on any points raised or explain your answer in detail.

All responses to this survey will be stored anonymously and will only be used for a) the purposes of Jo Brooks' thesis research and may be referred to in any subsequent papers on the topic and b) the purpose of being processed and analysed to support the FPRA's discussions with CLG and DECC on future energy efficiency polices. Your details will not be shared with any third parties.

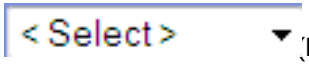
A little bit about you and your block of flats

These first questions are just so we understand a little bit more about how you fit into your block of flats and what sort of block/flat it is.

1. With regards to your block of flats which of the following are you?

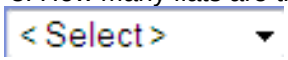
- ☐ Private rental tenant (Assured Short hold Tenancy)
- ☐ Private rental landlord (long- leasehold owner)
- ☐ Private rental landlord (freeholder)
- ☐ Owner-occupier (leasehold)
- ☐ Owner-occupier (freehold)
- ☐ Residential Management Company / Right to Manage Co. Director
- ☐ Other (please state below)

*2. Where in the UK is the block of flats located?

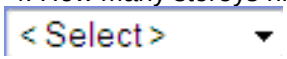


(Listed by UK counties)

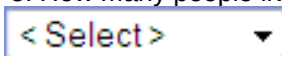
*3. How many flats are there in the whole block?



*4. How many storeys high is the block?



*5. How many people live in just your flat?



*6. How long have you been involved with or lived in the block?

< Select >

7. What floor do you live on in the block? *Please state if this is the lowest, middle or top level

floor no. and level

*8. Is there a Residential Management Company (RMC) / Right to Manage Company (RTM) or Recognised Tenants Association (RTA) / Residents Association in your block?

- [ ] Residential Management Company (RMC)
- [ ] Right to Manage Company (RTM)
- [ ] Recognised Tenants Association (RTA)
- [ ] Residents Association
- [ ] None of the above

Other comments

*9. Are you a member of the above organisation?

< Select >

Energy Efficiency in your block so far
These next questions will look at any energy efficiency measures you have already installed in your flat or block

*10. If you have an Energy Performance Certificate (EPC) for your flat, please state the rating (between A-G)

A	B	C	D	E	F	G	Do not have an EPC	Do not wish to reveal rating
○	○	○	○	○	○	○	◉	○

Other comments

*11. Are you aware if anything been done to improve the energy efficiency of your flat(s) or the whole block?

- [ ] Nothing has been done
- [ ] low energy lighting
- [ ] Draughtproofing
- [ ] External Wall insulation
- [ ] Cavity Wall insulation
- [ ] Internal Wall insulation
- [ ] Roof/loft insulation
- [ ] Floor insulation
- [ ] Double or secondary glazing
- [ ] Efficient boiler/heaters
- [ ] Renewable energy (please provide more details below)
- [ ] Other (please state below)

other details

*12. Were the majority of these installed before or since you have been living in or been involved with the block?

- Before moved in/involved with block
- N/a - nothing installed
- Since moved in/involved with block
- Can't remember
- Some before, some since

*13. Would you like to increase the energy efficiency of your flat(s)/block in any way?

- Yes
- No - because it is already very efficient
- No - for other reason (please provide reason below)

other details

The next few questions will look at which energy efficiency measures you would like to see installed and explore if there are any barriers stopping you from installing them.

*14. What is your main reason for wanting to improve the energy efficiency of the flat(s)/block?

- To reduce energy bills
- To stay warmer
- To alleviate damp problems
- To reduce carbon emissions & help climate change
- Other (please state below)

other details

*15. What measures would you like to see installed in your flat(s)/block? *(tick all that apply)*

- Low energy lights
- Draughtproofing
- Cavity Wall insulation
- Roof/loft insulation
- Renewable energy (please provide more details below)
- Other (please state below)
- External Wall insulation
- Internal Wall insulation
- Floor insulation
- Double or secondary glazing
- Efficient boiler/heaters

other details

16. Please state what is stopping you from installing these measures in your flat(s)/block?(tick all that apply)*

- ☐ Upfront cost is too high
- ☐ Payback/ROI on measures too long
- ☐ Will not live at property long enough to see cost benefit
- ☐ Landlord/leaseholder will not pay
- ☐ Not eligible for grant funding for free measures
- ☐ Do not believe the quoted savings will be achieved
- ☐ Have not asked landlord/freeholder
- ☐ Landlord/freeholder will not allow due to terms of the lease
- ☐ Cannot get hold of landlord/freeholder
- ☐ Other tenants will not allow
- ☐ Cannot contact other landlords/leaseholders
- ☐ Too complicated to sort out with all flats
- ☐ Don't know who to ask
- ☐ Problems with council planning/conservation permission
- ☐ Structural problems with building
- ☐ Waiting to coincide with scheduled maintenance
- ☐ Other (please state below)
- ☐ Nothing - never tried installing any measures

other details

Energy Efficiency – Delivery

The next few questions will suggest some mechanisms that could help you upgrade the energy efficiency of your flat(s) or block in the future. We would love to know if you think any of these suggestions would help you. *If you can't remember the energy efficiency options from the previous page, they were: Low energy lights, External Wall insulation, Draughtproofing, Internal Wall insulation, Cavity Wall insulation, Floor insulation, Roof/loft insulation, Double or secondary glazing, Renewable energy and Efficient boiler/heaters.*

*17. Would you install any of the energy efficiency measures mentioned on the previous page if you were offered a low or zero interest loan that was paid back in small repayments over the long-term?

< Select >

*18. Would you install any of the energy efficiency measures mentioned on the previous page if you were offered non repayable grant funding so measures were very cheap or free?

< Select >

*19. Would you install any of the energy efficiency measures mentioned on the previous page if the Local Authority or an outside company offered to help co-ordinate all the flats to enable measures to be carried out?

< Select >

*20. Would you install any of the energy efficiency measures mentioned on the previous page if the legislation was changed so all leasehold agreements specifically allowed reasonable energy efficiency improvements to be carried out in a similar way that essential maintenance is dealt with?

< Select >

The next few questions ask YOUR OPINION on upgrading the energy efficiency of blocks of flats in general.

*21. In your experience/opinion, can you rank in order of difficulty/significance, the major challenges to improving the energy efficiency of block of flats?

(1= most significant/difficult barrier, 6= least significant/difficult barrier)

	1	2	3	4	5	6
Resident(s) against the idea who think installing insulation will cause problems	○	○	○	○	○	○
Time and effort involved in getting 100% permission from everyone	○	○	○	○	○	○
Legalities/terms of lease	○	○	○	○	○	○
Funding (obtaining grants or contributions to top up grant funding)	○	○	○	○	○	○
Funding extra costs incurred for blocks of flats (i.e. access equipment)	○	○	○	○	○	○
Communication between leaseholders and freeholder	○	○	○	○	○	○

Other comments

*22. In your experience/opinion, can you rank in order, the most helpful measures that you think would allow more blocks of flats to be insulated and made more energy efficient?

(1= most helpful, 5= least helpful)

	1	2	3	4	5
Local Authority assistance (i.e. co-ordination and impartial information)	○	○	○	○	○
Additional grant funding to reduce resident contribution	○	○	○	○	○
Green Deal finance (long term loans charged to energy meter in house)	○	○	○	○	○
Changes to leasehold landlord & tenant legislation to make it easier for 100% agreement to be reached.	○	○	○	○	○
Legislation from Government to make landlords and home owners improve insulation in poorly rated buildings.	○	○	○	○	○

Other comments

23. Please use this optional space if you have any other comments or experiences you wish to contribute to this survey.

Other comments (optional)

Appendix 2: Survey results data (selected questions)

Ques	1	2	3	4	7	8	10	11	11	11	11	11	11	11	11	11	11	11	11	13	14	14	14	14	14	15	15	15	15	15	15	15	15	15	15	15	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	17	18	19	20	21	21	21	21	21	21	22	22	22	22	22
Ref no.	Tenancy	location	no. flats in the whole block	no. storeys high	level	RMC/ RTM/ RTA/ Residents Asso. in block?	EPC rating (bet A-G)	What energy measures already been done?												like to increase the efficency of your flat(s)/ block?	main reason to improve efficiency					desired measures (tick all that apply)											barriers stopping installing these measures																		Would you install any measures earlier if:				rank major challenges to improving efficiency of block of flats? (1= most sig./difficult, 6= least)						rank most helpful measures to allow more blocks of flats to be insulated (1= most helpful, 5= least)				
	Private Rental, Owner Occupier (leasehold /freehold), RSL Tenant, Freeholder, RMC Director							Nothing has been done	low energy lighting	Draughtproofing	External Wall insulation	Cavity Wall insulation	Internal Wall insulation	Roof/loft insulation	Floor insulation	Double or secondary glazing	Efficient boiler/heaters	Renewable energy	Other		To reduce energy bills	To stay warmer	To alleviate damp problems	To reduce carbon emissions & help climate change	Other	Low energy lights	External Wall insulation	Draughtproofing	Internal Wall insulation	Cavity Wall insulation	Floor insulation	Roof/loft insulation	Double or secondary glazing	Renewable energy	Efficient boiler/heaters	Other	Upfront cost is too high	Payback/ROI on measures too long	will move before seeing cost benefit	Landlord/leaseholder will not pay	Not eligible for grant funding for free measures	Do not believe the quoted savings will be achieved	Have not asked landlord/freeholder	Landlord/will not allow due to terms of the lease	Cannot get hold of landlord/freeholder	Other tenants will not allow	Cannot contact other landlords/leaseholders	Too complicated to sort out with all flats	Don't know who to ask	Problems with council planning/conservation permission	Structural problems with building	Waiting to coincide with scheduled maintenance	Other	Nothing - never tried installing any measures	you were offered a low or zero interest loan that was paid back long-term?	you were offered non repayable grant funding so cheap or free?	the Local Authority or co. offered to help co-ordinate all the flats	leasehold legislation was changed to include energy efficiency	Resident(s) against the idea who think installing insulation will cause problems	Time and effort involved in getting 100% permission from everyone	Legalities/terms of lease	Funding (obtaining grants or contributions)	Funding extra costs (i.e. access equip)	Communication between leaseholders and freeholder	Local Authority assistance (i.e. co-ordination and impartial information)	Additional grant funding to reduce resident contribution	Green Deal finance (long term loans charged to energy meter in house)	Changes to leasehold landlord & tenant legislation to make it easier for 100% agreement to be	Legislation to make landlords and home owners improve insulation
1	PR	London	21-30	6	middle	RMC	no EPC				1	1								No - already v efficient																																							5	4	1	2	3	6	1	3	4	5	2
2	partner has f'hold.	London	21-30	3	Top	RMC	no EPC									1				No - other reason																																																	
3	PR	Devon	31-40	4	midle	Res. Asso.	no answer													no answer																																			Maybe	Yes	Yes	Maybe	6	1	3	5	4	2	1	4	5	2	3
4	O/O (l'hold)	London	100+	12	middle	None	no EPC	1												Yes	1			1		1								1									1		1		1	1	1						Maybe	Maybe	Yes	Maybe	2	3	1	5	6	4	2	3	5	4	1
5	PR	East Sussex	6-10	4	Lowest	None	E	1												Yes	1			1			1						1		1				1				1					1																					
6	O/O (l'hold)	Cardiff	6-10	4	Middle	RMC	C					1								Yes	1	1										1					1											1							Maybe	Yes	Yes	Yes	5	6	4	3	2	1	4	3	5	2	1
7	PR	East Sussex	1-5	2	lowest	None	no EPC											1		Yes	1		1	1		1		1				1			1				1	1			1												Yes	Yes	Yes	Yes	1	2	3	4	5	6	2	3	5	4	1
8	O/O (l'hold)	Ceredigion	6-10	7	middle	Other	no EPC					1								Yes	1	1		1									1								1														Yes	Yes	Maybe	Maybe	6	1	4	5	3	2	4	3	5	2	1
9	PR	London	11-20	3	middle	RMC & Res. Asso.	no EPC	1												Yes	1	1		1		1	1			1	1	1		1																			1																
10	PR	London	71-80	7	Middle	RMC	no EPC		1	1	1	1	1			1	1			No - already v efficient																																			No	No	No	No	1	3	4	5	6	2	1	3	4	5	2
11	PR	London	1-5	3	top	None	not revealed	1												Yes	1							1				1	1							1																													
12	PR	Lancashire	6-10	4	top	None	F	1												Yes																																																	
13	RSL-T	London	71-80	6	top	Res. Asso.	no answer																																																No	Maybe	Maybe	Maybe	6	4	3	5	2	1	2	1	5	3	4
14	RSL-T	Edinburgh City	11-20	4	Top level.	Res. Asso.	no EPC		1								1			Yes	1	1		1		1	1	1	1	1	1	1	1		1								1												Yes	Yes	Yes	Yes	6	3	5	2	1	4	2	3	4	5	1
15	O/O (f'hold)	London	6-10	3	top	RTA	E		1			1		1		1	1	1	1	Yes				1	1	1				1		1	1	1	1		1				1							1		1		1																	
16	Treasurer 20 blocks	Bristol and Bath	6-10	5	n/a	RMC	no EPC	1												No - other reason																																			Maybe	Yes	Yes	Yes	4	3	2	1	6	5	2	4	5	3	1
17	PR	London	1-5	3	Middle & top	None	no EPC		1							1				Yes				1				1	1			1		1	1				1				1								1																		
18	O/O (l'hold)	Devon	21-30	3	Middle	RTM	no EPC		1							1				No - already v efficient																																			No	Maybe	Maybe	Maybe	6	3	4	2	1	5	5	2	4	3	1
19	PR	Edinburgh City	6-10	4	middle	None	no EPC	1												Yes				1				1					1		1		1		1																Yes	Yes	No	Yes	5	1	4	2	3	6	5	1	2	3	4
20	F'holder, M'ging Agent & L'lord	Northants Cardiff, Leics & Ealing	31-40	3	3	None	C		1	1				1		1				Yes	1											1		1			1	1																	Yes	Yes	Maybe	Maybe	6	3	4	1	2	5	3	1	2	5	4
21	O/O (l'hold)	London	100+	5	top level	Res. Asso.	no EPC		1							1				Yes				1			1	1	1	1	1	1	1	1	1														1						Yes	Yes	Yes	Yes	2	1	6	4	3	5	2	1	5	3	4
22	O/O (l'hold)	London	1-5	3	middle	RMC	no EPC		1							1	1			Yes	1	1	1							1							1				1												1																
23	O/O (l'hold)	Hampshire	51-60	4	middle	RMC	no answer																																																Maybe	Yes	Maybe	Maybe	4	3	6	2	1	5	2	1	3	5	4
24	Mgr of Res. Asso.	Surrey	11-20	3	n/a	Res. Asso.	no EPC		1							1	1			Yes	1	1		1						1		1		1																				1	Yes	Yes	Maybe	Yes	5	1	4	3	6	2	2	1	5	4	3
25	O/O (l'hold)	West Sussex	41-50	2	top level	Res. Asso.	no EPC	1												Yes	1		1	1							1	1		1			1			1	1					1		1							Yes	Yes	Yes	Yes	1	3	5	2	6	4	3	1	2	5	4
26	PR	Hertford-shire	51-60	3	Middle	None	no EPC		1			1			1	1	1			Yes	1													1			1		1	1			1					1							No	Yes	Maybe	Yes	6	5	2	3	4	1	4	3	5	2	1
27	PR	Mersey-side	11-20	5	Middle	None	no EPC									1				Yes	1	1	1	1				1					1		1					1				1											Yes	Yes	Yes	Yes											
28	PR	Essex	11-20	4	top	RMC	no EPC	1												Yes	1			1		1	1						1				1																																
29	O/O (l'hold)	Bristol	21-30	3	Lowest-garages below	RMC	no EPC	1	1											Yes		1									1																												3	2	1	4	5	6	1	2	4	3	5
30	PR l'lord (f'holder)	W. Midlands	1-5	3	n/a	None	no EPC									1				No -other reason																																							4	5	3	2	1	6	5	1	4	2	3
31	PR l'lord (f'holder)	Cambs	1-5	2	Top level	RTA	D					1		1		1				No - already v efficient																																			Yes	Yes	Maybe	Yes	1	2	6	5	4	3	5	4	2	3	1
32	PR l'lord (f'holder)	Kent	11-20	4	top level	RMC	B		1			1				1	1	1		Yes	1			1												1																	1																
33	O/O (f'hold)	London	11-20	4	lowest	RMC	not revealed													No - other reason																																			Yes	Maybe	Yes	Yes	6	1	4	5	3	2	1	5	3	2	4
34	O/O (l'hold)	West Sussex	41-50	3	lowest	RMC & Res. Asso.	no EPC		1			1				1				Yes	1			1							1	1		1							1		1	1				1							No	Yes	Maybe	Yes											
35	O/O (l'hold)	London	11-20	2	Top	RMC	no EPC							1						Yes	1	1						1					1				1											1						1	Yes	Yes	Yes	Yes	6	2	1	5	4	3	1	4	5	3	2
36	O/O (l'hold)	W. Sussex	1-5	2	Top	RMC	no EPC	1												Yes		1		1			1																						1						Maybe	Yes	No	No	4	1	2	3	5	6	5	1	2	3	4
37	O/O (l'hold)	London	100+	6	middle	RMC	no EPC	1												Yes	1														1		1	1	1																														
38	O/O (l'hold)	London	11-20	3	Top	RMC	no EPC	1												Yes																																			No	Yes	No	No	4	2	1	3	5	6	4	3	5	1	2
39	O/O (l'hold)	Bath & NE Somerset	1-5	4	top	None	no EPC							1			1			Yes				1		1		1	1				1	1			1	1	1		1									1					Maybe	Yes	Maybe	Yes	5	4	1	3	2	6	5	3	4	2	1
40	O/O (l'hold)	London	100+	5	Top	None	D	1												Yes	1					1								1									1																										
41	O/O (l'hold)	London	21-30	5	middle	Res. Asso.	B	1												Yes																																			Yes	Yes	Yes	Yes	5	6	3	1	2	4	1	2	5	3	4
42	O/O (l'hold)	London	1-5	4	lowest	None	D										1			Yes	1	1		1		1			1		1			1			1											1							Yes	Yes	Yes	Yes	2	1	4	5	3	6	1	2	5	3	4
43	O/O (l'hold)	West Sussex	6-10	1	Top	RTM	no EPC		1					1		1				Yes	1	1		1				1		1				1									1					1							No	Maybe	Maybe	Maybe	4	1	2	3	5	6	3	1	4	2	5

ques	1	2	3	4	7	8	10	11	11	11	11	11	11	11	11	11	11	11	11	13
Ref no.	Tenancy	location	no. flats in the whole block	no. storeys high	level	RMC/ RTM/ RTA/ Residents Asso. in block?	EPC rating (bet A-G)	What energy measures already been done?												like to increase the efficency of your flat(s)/ block?
	Private Rental, Owner Occupier (leasehold /freehold), RSL Tenant, Freeholder, RMC Director							Nothing has been done	low energy lighting	Draughtproofing	External Wall insulation	Cavity Wall insulation	Internal Wall insulation	Roof/loft insulation	Floor insulation	Double or secondary glazing	Efficient boiler/heaters	Renewable energy	Other	
44	O/O (l'hold)	Cambs	11-20	3	top	RMC	no EPC							1			1			Yes
45	O/O (l'hold)	London	100+	9	Top of wing	Res. Asso.	E		1	1	1	1		1	1	1	1	1		No - other reason
46	O/O (l'hold)	London	1-5	3	top	RMC	no EPC		1					1		1	1			No - already v efficient
47	O/O (l'hold)	Renfrew-shire	11-20	4	first floor (middle)	RMC	not revealed		1											Yes
48	O/O (l'hold)	Hants	6-10	5	middle	RMC	D		1							1				Yes
49	O/O (l'hold)	E. Lothian	6-10	3	Middle	None	no EPC									1	1			Yes
50	O/O (l'hold)	Midlothian	11-20	4	middle	None	no EPC		1	1						1				Yes
51	O/O (l'hold)	London	51-60	4	Bottom 2 floors	Other	C									1	1			Yes
52	O/O (l'hold)	London	1-5	3	top	None	no EPC							1		1				No - other reason
53	O/O (l'hold)	London	21-30	5	middle	None	no EPC		1					1						Yes
54	O/O (l'hold)	London	21-30	6	middle	None	no EPC		1							1				Yes
55	O/O (l'hold)	Lancs	100+	14	near top level	RMC & RTA	C		1	1		1				1	1			No - already v efficient
56	O/O (l'hold)	Bristol	21-30	4	middle	Res. Asso.	no EPC									1				Yes
57	O/O (l'hold)	Bristol	21-30	4	Top	RMC	no EPC		1	1								1		Yes
58	O/O (l'hold)	London	100+	10	middle	RMC	no EPC		1							1	1			Yes
59	O/O (l'hold)	London	11-20	3	lowest	RTM	no EPC		1					1		1	1			Yes
60	O/O (l'hold)	W. Sussex	6-10	3	Top	RMC & Res. Asso.	no EPC					1		1		1				No - already v efficient
61	O/O (l'hold)	Surrey	6-10	3	top	RMC	no EPC									1				Yes
62	O/O (l'hold)	Oxford-shire	91-100	4	Middle	RMC & Res. Asso.	C		1							1				Yes
63	O/O (l'hold)	Wiltshire	41-50	3	lowest	RMC	no EPC	1												No - already v efficient
64	O/O (l'hold)	Wiltshire	41-50	4	middle	RTM	B		1		1	1		1	1	1				Yes
65	O/O (l'hold)	London	100+	9	middle	RMC & RTA	no EPC		1								1			No - other reason
66	O/O (l'hold)	Swansea	11-20	4	3rd level up of 4	RMC	no EPC		1							1				Yes
67	O/O (l'hold)	Lancs	6-10	3	Top	None	no EPC	1												No - already efficient
68	O/O (l'hold)	London	21-30	3	top	Other	no EPC		1			1		1		1				Yes
69	O/O (l'hold)	E. Sussex	21-30	4	middle	RMC	no EPC					1		1						Yes
70	O/O (l'hold)	London	100+	9	Lowest	Other	no EPC		1							1				Yes
71	O/O (f'hold)	Aberdeen-shire	1-5	14	n/a	RTM	A	1												No - already v efficient
72	O/O (f'hold)	London	6-10	3	lowest	RMC	no EPC										1			Yes
73	O/O (f'hold)	Edinburgh	11-20	4	lowest	None	no EPC							1						Yes
74	O/O (f'hold)	London	1-5	3	Lowest	Res. Asso.	no EPC								1	1				Yes
75	O/O (f'hold)	Dorset	11-20	3	top	RTM	no EPC		1		1			1		1	1			Yes
76	O/O (f'hold)	Surrey	31-40	16	ground	Res. Asso.	no EPC	1												Yes
77	RTM Director	Bucks	100+	4	middle	RMC	E		1							1				Yes
78	RTM Director	London	1-5	4	Top	RMC	D	1												Yes
79	RTM Director	Herts	31-40	2	middle	RMC	no answer													
80	RTM Director	Other (SE England)	100+	more than 25	n/a	RMC	no EPC												1	Yes
81	RTM Director	Cleveland	21-30	4	Lowest	RMC	no EPC	1												Yes
82	RTM Director	W. Midlands	11-20	3	Top	RMC	no EPC		1			1		1		1		1		No - already vefficient
83	RTM Director	Berks	31-40	3	n/a	RMC	C		1							1				Yes
84	RTM Director	London	100+	13	n/a	RMC	D		1							1	1			Yes
85	RTM Director	Lancs	100+	3	middle	RMC	B		1				1			1	1			No - already v efficient
86	RTM Director	Mancs	41-50	3	Middle	RTM	no EPC		1							1				Yes
87	RTM Director	Norfolk	11-20	3	mid	RMC	no EPC		1			1				1				No - already v efficient
88	RTM Director	London	1-5	4	middle	RMC	no EPC										1			Yes

ques	14	14	14	14	14	15	15	15	15	15	15	15	15	15	15	15
Ref no.	main reason to improve efficiency					desired measures (tick all that apply)										
	To reduce energy bills	To stay warmer	To alleviate damp problems	To reduce carbon emissions & help climate change	Other	Low energy lights	External Wall insulation	Draughtproofing	Internal Wall insulation	Cavity Wall insulation	Floor insulation	Roof/loft insulation	Double or secondary glazing	Renewable energy	Efficient boiler/heaters	Other
44				1						1			1			
45																
46																
47																
48	1	1		1				1	1	1	1	1	1	1	1	
49				1			1		1	1						
50	1			1					1				1	1	1	
51	1	1	1	1		1			1	1	1					
52																
53	1	1		1		1							1	1	1	
54				1		1	1		1	1		1		1	1	
55																
56	1						1								1	
57	1	1										1	1		1	
58																
59	1	1		1			1		1	1						1
60																
61	1		1							1		1			1	
62	1			1		1							1			
63																
64	1			1		1										
65																
66	1						1									
67																
68	1						1					1			1	
69	1			1									1		1	
70	1														1	
71																
72		1	1						1				1			
73		1						1			1					
74	1	1				1								1	1	
75	1	1								1	1					
76	1	1						1		1		1	1	1	1	
77	1									1					1	
78				1				1				1				
79																
80				1		1	1	1	1	1	1	1	1	1	1	
81		1								1						
82																
83	1										1			1	1	
84																
85																
86	1					1										
87																
88	1	1		1				1								

ques	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Ref no.	barriers stopping installing these measures																	
	Upfront cost is too high	Payback/ROI on measures too long	will move before seeing cost benefit	Landlord/leaseholder will not pay	Not eligible for grant funding for free measures	Do not believe the quoted savings will be achieved	Have not asked landlord/freeholder	Landlord/will not allow due to terms of the lease	Cannot get hold of landlord/freeholder	Other tenants will not allow	Cannot contact other landlords/leaseholders	Too complicated to sort out with all flats	Don't know who to ask	Problems with council planning/conservation permission	Structural problems with building	Waiting to coincide with scheduled maintenance	Other	Nothing - never tried installing any measures
44			1				1					1	1					
45																		
46																		
47																		
48	1	1		1	1							1						
49												1						
50	1	1	1		1	1						1		1				
51	1		1									1						
52																		
53				1							1	1	1					
54	1		1									1		1				
55																		
56	1												1					
57	1													1	1			
58																		
59																	1	
60																		
61				1								1						
62																		1
63																		
64							1											
65																		
66												1						1
67																		
68	1				1		1										1	
69		1																
70	1																1	
71																		
72	1	1																
73	1											1						
74	1																	
75					1							1						
76							1						1					
77			1		1								1					
78	1		1							1								
79																		
80	1							1				1						
81																		1
82																		
83					1												1	
84																		
85																		
86																1		
87																		
88												1						1

ques	17	18	19	20	21	21	21	21	21	21	22	22	22	22	22
Ref no.	Would you install any measures earlier if:				rank major challenges to improving efficiency of block of flats? (1= most sig./difficult, 6= least)						rank most helpful measures to allow more blocks of flats to be insulated (1= most helpful, 5= least)				
	you were offered a low or zero interest loan that was paid back long-term?	you were offered non repayable grant funding so cheap or free?	the Local Authority or co. offered to help co-ordinate all the flats	leasehold legislation was changed to include energy efficiency	Resident(s) against the idea who think installing insulation will cause problems	Time and effort involved in getting 100% permission from everyone	Legalities/terms of lease	Funding (obtaining grants or contributions)	Funding extra costs (i.e. access equip)	Communication between leaseholders and freeholder	Local Authority assistance (i.e. co-ordination and impartial information)	Additional grant funding to reduce resident contribution	Green Deal finance (long term loans charged to energy meter in house)	Changes to leasehold landlord & tenant legislation to make it easier for 100% agreement to be	Legislation to make landlords and home owners improve insulation
44					2	1	3	4	5	6	4	2	1	3	5
45															
46															
47	Yes	Yes	Yes	Yes	6	3	5	1	2	4	5	1	4	3	2
48	Yes	Yes	Yes	Yes	5	1	3	2	4	6	5	2	1	3	4
49	No	Yes	Yes	Maybe	4	1	5	2	3	6	3	2	5	4	1
50	Maybe	Yes	Maybe	Yes	3	1	2	4	5	6	3	4	5	2	1
51					6	4	2	1	5	3	3	1	2	4	5
52	Maybe	Maybe	Yes	Maybe	6	1	5	4	3	2	1	5	4	2	3
53															
54					6	2	1	3	4	5	3	2	4	1	5
55	Maybe	Yes	Yes	Maybe	3	1	5	2	4	6	4	1	2	3	5
56	Maybe	Maybe	Maybe	Maybe	2	4	5	1	3	6	3	1	2	5	4
57															
58	Maybe	Yes	Maybe	Maybe	4	3	5	1	2	6	3	1	2	5	4
59					5	4	2	3	1	6	2	1	3	5	4
60	Yes	Yes	Yes	Yes	2	1	5	3	4	6	2	1	5	4	3
61	No	Yes	No	No	6	6	6	6	2	6	2	1	3	5	4
62					1	2	3	6	5	4	3	5	4	2	1
63	Yes	Yes	Yes	Yes	4	3	2	1	5	6	5	2	1	3	4
64					3	2	3	2	2	3	3	1	3	1	2
65															
66					1	2	5	3	4	6	1	2	3	4	5
67	Yes	Yes	Yes	Maybe	6	2	4	5	1	3	2	1	4	3	5
68	No	Yes	Yes	Yes											
69	No	No	No	No	6	6	6	6	6	6	5	5	5	5	5
70															
71	Yes	Yes	Yes	Maybe	4	3	6	2	1	5	2	1	3	4	5
72	Maybe	Yes	Maybe	Maybe	3	1	4	2	5	6	2	1	4	5	3
73	Maybe	Yes	No	No	4	3	5	1	2	6	3	1	2	5	4
74	Maybe	Yes	Yes	Yes	5	4	6	1	2	3	5	1	2	3	4
75	No	Yes	Yes	Yes	4	3	5	1	2	6	1	2	5	3	4
76	Yes	Yes	Yes	Yes	1	2	3	6	5	4	5	2	3	4	1
77	Yes	Yes	Yes	Yes	4	1	6	5	3	2	1	2	5	4	3
78															
79	Maybe	Yes	Yes	Yes	5	4	1	3	2	6	5	4	3	1	2
80															
81					6	2	4	1	3	5	4	2	1	5	3
82	Yes	Yes	Maybe	Maybe	6	4	3	1	2	5	4	3	1	2	5
83															
84					1	2	4	5	6	3	1	3	5	4	2
85															
86					2	5	4	6	3	1	3	4	5	2	1
87	Maybe	Maybe	Maybe	Maybe	3	1	4	6	2	5	1	5	4	3	2
88	Maybe	Yes	Yes	Maybe	5	2	4	3	6	1	2	5	4	3	1

Appendix 3: Significant comments selected from survey answers

Ref no.	
Q. 11:	**Are you aware if anything been done to improve the energy efficiency of your flat(s) or the whole block?**
2	Leaseholders are responsible for their own improvements except for the structure and common areas which we are responsible for. Some of the flats including ours have double glazing.
8	I have done low energy lighting and loft installation
15	- We are replacing lamps with LEDs - LB Camden will eventual fill the cavity walls - We have plan to convert the loft including insulation at rafter level at lower than 0.18 W/m2K - We had installed triple glazing to Passive House standard with integral shading (also noise issue). - LB Camden is scheduled to overhaul the district heating in 2013, probably will mean individual boilers because of the cost of upgrading the district system - We have been assessed by British Gas for solar PVs on large south roof, but leasehold arrangement means not likely - We are investigating MVHR in the loft, also ridge roof-light(s) for ventilation - high risk of overheating in summer.
21	Our residents association have been asking the management company since we moved in (4 years ago) for a solution to internal lights being on 24 hours a day, even in areas that receive natural daylight and do not need electrical lighting. However the management company have not taken action. I think because of the difficulty of such a solution (the lighting is apparently all on one circuit) and other things taking priority.
25	Some others like self have fitted double glazing but not all
30	Some resident installed UPVC windows. Do not think this was to do with energy efficiency, most likely that the timber was old and resident felt it was cheaper to change the oak windows to plastic ones. The property is large Edwardian property so no cavity walls. only single brick walls.
32	Part solar heated hot water in selected flats
33	Low energy lighting in common parts, secondary glazing in some flats
41	The flats were only built in 2009 so are very efficient
43	Only a small amount of insulation in my loft and I have double glazing. might not be case for all flats.
51	The whole block has new double glazing windows, however I installed a new gas boiler as the previous leaseholder did not have hot water.
57	I have installed PV panels on roof for my flat
68	1) Unsure if cavity is insulated. 2) Loft insulation is around 5cm. 3) Boiler is conventional fan-assisted.
70	The construction of the building (c 1930s), which is concrete on a metal frame, makes insulation very difficult. All windows in the common parts have been replaced by double glazed windows, and lessees are encouraged to replace their windows with an approved type.
73	Loft insulation above one of the 4 top floor flats, done by the owner without consultation.
82	Investigating feed in tariff for common area electricity
Q. 13:	**Would you like to increase the energy efficiency of your flat(s)/block in any way?**
2	Not at this stage because of funding issues and the fact that leases don't allow for 'improvements' to the structure and common areas.
30	As a landlord of the block leaseholders may be reluctant to pay for "improvements via the service charge" the lease states the landlord can only maintain. A question was raised by the upper flats regarding loft insulation and this was mention at the last residents meeting, however the ground floor and first floor flats were not interested. We need all residents to agree so work was not done.
43	It would be great to get cavity wall insulation as a minimum.
45	EPC states nothing further can be done to increase the energy efficiency of the property
52	Freeholder is London Borough of Camden. They have given me a bill of £28,000 for roof insulation and windows. this is at least twice what I would have paid if I'd been allowed to arrange the work myself and more than I will pay in utility bills for the rest of my life as I'm now in my 60s
65	Too much hassle

70	Because the fuel bills are very high - but the opportunities are very limited.
Q. 15:	**What measures would you like to see installed in your flat(s)/block?**
4	Photo-voltaic might be possible but accessible roof space could be a problem
15	Would like whole block, whole estate to be done. Have discussed this at TRA meetings
17	Solar thermal hot water heating, and possibly PV panels
20	Solar Panels can be fitted, but are expensive.
22	I think I have done as much as I can in relation to my own flat so the only additional measures would be related to the whole block
32	Not sure what can be done as it is a new block of flats
34	Solar panels on the flat roofs
40	Solar water heating and PV's
43	It would be great to have solar thermal to help with the hot water and perhaps a little solar PV to power the lighting in the hallway.
48	PV panel in the S facing roof and feed in tariff income to all residents
51	I appreciate it can be difficult to retrofit insulation, however some items like low energy lights should be easy to change. grants for efficient central heating would reduce energy bills etc.
53	We have low energy lights in our flat. But the communal lighting is not as efficient as it could be (lights are on all night long). I would love to have solar water heating or solar PV.
54	Such as solar water heating.
59	Don't know if the insulation can be done, either individually or for the whole block. Don't know how expensive / disruptive it would be. Would like to see if we could install solar panels.
64	Change lights to light sensitive so they are not on all day
68	1) Improve Loft Insulation 2) Improve Cavity wall insulation 3) Replace boiler with condensing type
83	Have been turned down for solar PV panels as there is no scheme available for flats, neither for the communal parts or for individual flats. I was told this was due to fact it is "too complicated and costly to amend leases".
89	Renewable energy - ground source heat, maybe wind or solar PV/thermal
Q. 16:	**Please state what is stopping you from installing these measures in your flat(s)/block?**
4	For the PV: There is an impossibly complex set of relationships between sub-leaseholders, leaseholders, freeholder and management company. For the low energy lights: It is a matter of knowing a builder/electrician I could trust.
8	Partially doubled glazed. Couldn't afford to install privately until now but in dispute with RSl over External Cladding
15	Costs are very high, especially one-offs as we are doing, and in central London location. Contractors surprisingly reluctant to quote on council properties. Takes huge amount of time to negotiate permissions with three separate offices (District Housing, Surveyors, Home Ownership) each one claims to be the most important, all are in disarray and being cut, and they mostly pass the information round and round.
21	For me, it is not knowing who to approach for good, genuine advice, both for our individual flat and the building as a whole.
22	Getting other flat owners to get involved, rather than everything being left to me!
32	Don't know what can be done
51	If works are carried out, then they will carry out works on all flats, and it does not become a choice. It is also likely that the cost will be far in excess of the cost benefit over the time that I will be a leaseholder.
53	I have mentioned to the council (who own the building) that we should have more efficient lighting. But they have done nothing. I would love solar hot water. But not being the top floor and only a leaseholder I don't know how this would work or how this would get implemented. Also I don't think the council (who own the building) would give permission for this, it being complicated as the block is a mix of private rented and social housing.
59	Might be too complicated & expensive for all flats, all owners would have to be in agreement. Apart from low energy bulbs (whole block) & more efficient boiler (my flat) haven't investigated other measures.

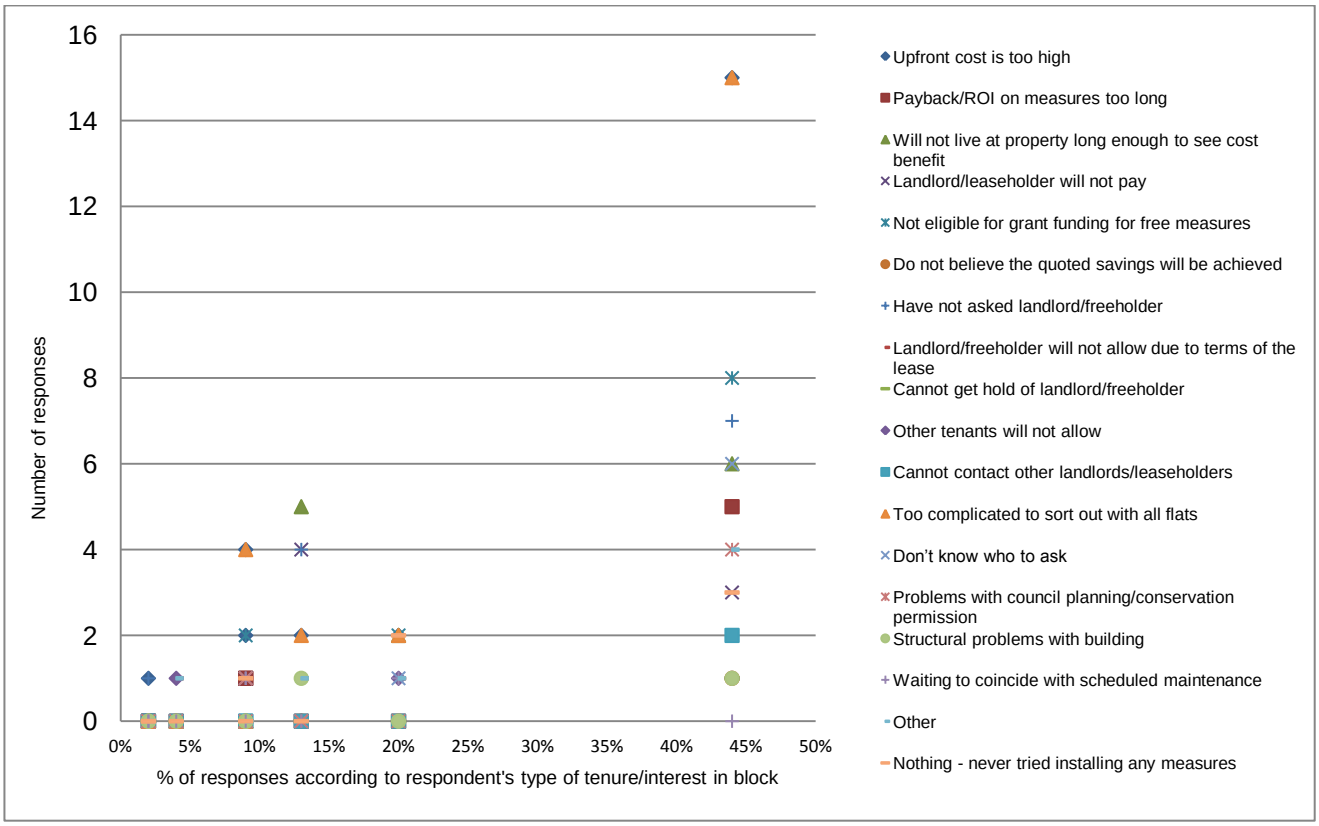
70	Ability to introduce other improvements constrained by size and construction of the block.
83	There appears to be nothing on the market to replace Economy 7 storage heaters, which are costly to run and extremely ugly (designed by men). 'Modern' storage heaters are just as ugly, and do not appear to make any significant savings on electricity, from my research. Even the EPC surveyor had no information!
	If landlord pays for double glazing, he has to pay again when the council does maintenance on the whole block
Q. 21	**In your experience/opinion, can you rank in order of difficulty/significance, the major challenges to improving the energy efficiency of block of flats?**
2	Most of our residents are tenants as the majority of the block is sub-let. However we do have concerns where the Green Deal is inviting tenants to ask their landlords to improve energy efficiency because it may involve work on the structure and common areas which has serious financial implications
8	RSl wants to install external cladding on five blocks of ground floor flats and first floor maisonettes which have cavity wall insulation. Tenants are doubled glazed, most leaseholders double glazed. RSL trying to charge leaseholders £16,000+ plus vat payable in 1 year
15	LB Camden officials seem to be unaware of most the recent means of energy efficiency upgrading; this is strange in a Borough that has voted to do everything to Passive House standard (this was in reference to new-build, refurbishment does not appear to have been in this radar). Officials, tenants and leaseholders are very cynical about anything ever being done; it is easy to be overwhelmed by the numbers (33,000 housing units, 13,00 on district heating which is mostly obsolete) The whole system is changing with the cuts; presumably most officials are concerned first and foremost about their own jobs.
30	Was not aware of funding to the block as a whole. I was aware individuals could apply - but was not aware landlord could apply on behalf of flat - assume this is what the questions are getting at. As a landlord we cannot recover the cost if it is not recoverable in the lease or all leaseholders agree.
34	There is a huge variance in the nature of leaseholder and freeholder relationships including 'tripartite' leases absent freeholders etc.
48	Practicality of carrying out construction work whilst living in the flat.
53	I would be willing to pay (or apply for grants etc) for installation of solar but I don't know if the council would allow as I'm not a top floor flat and am only a leaseholder in a block which is mixed private/social housing.
57	Most significant barrier is structure of building/conservation issues
	Who will lead / manage this process?
Q. 22:	**In your experience/opinion, can you rank in order, the most helpful measures that you think would allow more blocks of flats to be insulated and made more energy efficient?**
8	Energy efficiency government directives should not have to be paid for by leaseholders. Tenants get it for free, freeholders get grants. Leaseholders being discriminated and victimised. Human Rights Act - as Govt decision cannot appeal. unacceptable
15	The estate has tenants, leaseholders and freeholders; most are willing to cooperate, but it is very complicated and cuts means the Council is being reorganised with fewer staff available.
21	Legislation without appropriate information availability and perhaps help on funding would not be helpful in my opinion.
30	We have too much legislation already so I do not think that would be helpful. If this work was for free most leaseholders would agree to having work done. It's the cost that causes the problems.
48	last one is a dangerous as the spec should be very clear to stop cowboys taking control of the market and not resulting good CO2 / money back saving
Q. 23:	**Any other comments or experiences respondents wished to contribute to this survey.**
2	Although I can appreciate the need to ensure that carbon emissions are reduced, I have concerns at the pressure being put onto the housing sector because other areas cannot reduce their own emissions. I also feel that the Green Deal allowing tenants to ask that their landlords make energy improvements is a bit much when anecdotal evidence suggests that environmental issues are not at the top of tenant's priorities. Not only that, many flats are rented out without an EPC so the importance of the environment to landlords themselves (unless they can get a grant)is already

	questionable. Changing leasehold landlord and tenant legislation is also going to potentially make the job of block management even more difficult unless more thought is given as to how the sectors interact and impact on each other. Not only that but how are energy improvements to be enforced and what form should those enforcement measures take?
20	Current assistance is offered in a patchwork approach nationally. Worse still, if there is a group of apartments over commercial units, there is no help. Each funding organisation points to the other. This results in no grant. I recently undertook a £23,000 project to insulate 16 flat roofed apartments (1930's style). No assistance could be gained from our local authority or The Carbon Trust. This needs to be addressed.
21	My main problem with improving the energy efficiency of our building and flat is not knowing of a reliable source for all encompassing expert advice. Funding is also an issue. However if an expert could give impartial, good advice on what could be done in the building a 10 year plan could be implemented, broken down into prioritised individual projects. This is already in place for major repair works within the building.
24	The only problem I have encountered is trying to reduce electricity bills for common parts but this does not seem possible without a bedroom!!!!
30	I am all for energy efficiency measures, however some can detract from the aesthetic of the building such as replacement double glazed units. Also it tends to be the leaseholders of the flat affected by draughts etc that complains or pushes for the work. Those who are not directly affected do not care.
37	The payback time and length of time average o/o lives in a flat are the crucial aspects. Installing insulation is highly disruptive for very little gain. You still have the hot water load to deal with - it's not all about heating.
48	I think we are living in very poorly constructed, designed and insulated houses comparison to the Europe. It is about the time to raise awareness and get people involve.
50	The disparity between predicted savings and actual savings is vast, in nearly every monitoring project carried out. This forms the basis of the Government's Green Deal - their 'Golden Rule' - which means it is inherently flawed. People will not realise the savings that are predicted, meaning they are paying back more than they are saving. This is exacerbated by the more simplistic forms of energy modelling software available, of which EPC software is one of the worst, and this is currently what is proposed for use under the Green Deal. They will also be selling houses with loans attached to them, potentially making them more unattractive. This does not even begin to touch on the issues and complexities involved with retrofitting hard-to-treat houses, which form the majority of UK housing, and the significant additional costs involved which are not grant eligible.
52	I'm very frugal with use of energy, water etc but my freeholder seems to think i have a bottomless purse and that it's alright to help themselves with no regard to costs when it comes to capital works. They've replaced a roof which kept the rain out with a new one with extra insulation. Great-but what about the carbon cost of the new roof? Never mind the financial cost to me.
64	It would be helpful if there were reliable advice or companies to help negotiate these changes
80	Great work so far on a very important issue. I am writing from Crabtree Property, a managing agent who manages approximately 17,000 residential flats who are mainly part of RMC's. I have been researching ways in which we can provide an environmental service including introducing solar and wind technologies to our clients but so far finding the leases to be an obstacle. I have worked on making our company carbon neutral as a basis of leading by example and hope that we will be able to provide our clients with advice on doing the same.
82	In 5 years since block was built, the leaseholders have acquired Right to Manage and subsequently purchased the freehold of the building. Although this puts the shareholder leaseholders and the RMC in a strong position, it also means we do not have big company finance to undertake capital projects. It would be useful to increase roof insulation and the Feed-in Tariff offers a great deal, if we could just afford the capital costs. With a 'retired' profile the leaseholders generally will not see the long term benefits of these schemes, so it is a hard sell!!
83	1) With so many flats relying solely on electricity (i.e. no gas supply), there is a real need for energy efficient heating systems for both space and water heating. 2) Most flats have very large roof areas that are entirely wasted, yet could so easily accommodate solar arrays. 3) Economy 7 electricity tariffs are arguably no longer a saving over regular tariffs. 4) It is extremely difficult to find useful information on energy efficiency that applies to flats. There is clearly no incentive for manufacturers to develop products aimed at flats.

Appendix 4: Main barriers to installing efficiency measures in blocks of flats

Data showing breakdown of responses by tenure and corresponding scatterplot of relationship betwen tenure and responses

Type of tenure of respondent		Upfront cost is too high	Payback/ROI on measures too long	Will not live at property long enough to see cost benefit	Landlord/leaseholder will not pay	Not eligible for grant funding for free measures	Do not believe the quoted savings will be achieved	Have not asked landlord/freeholder	Landlord/freeholder will not allow due to terms of the lease	Cannot get hold of landlord/freeholder	Other tenants will not allow	Cannot contact other landlords/leaseholders	Too complicated to sort out with all flats	Don't know who to ask	Problems with council planning/conservation permission	Structural problems with building	Waiting to coincide with scheduled maintenance	Other (please state below)	Nothing - never tried installing any measures
Private rental tenant (Assured Short hold Tenancy)	13%	2	0	5	4	0	0	4	1	0	0	0	2	0	0	1	0	1	0
Private rental landlord (long- leasehold owner)	2%	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Private rental landlord (freeholder)	4%	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0
Owner-occupier (leasehold)	44%	15	5	6	3	8	1	7	1	1	1	2	15	6	4	1	0	4	3
Owner-occupier (freehold)	9%	4	1	0	1	2	0	1	0	0	0	0	4	1	1	0	1	0	0
Residential Management Company / Right to Manage Co. Director	20%	2	0	2	0	2	0	0	1	0	1	0	2	1	0	0	1	1	2
RSL or Council tenant	2%	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Other	9%	2	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
total		**26**	**7**	**13**	**8**	**12**	**1**	**13**	**5**	**1**	**3**	**2**	**23**	**8**	**5**	**2**	**2**	**7**	**6**



Appendix 5: Summary of Notes from Interviews

Interviewees:

1. Bradley Isaacs (BI), Operations Manager. Instafibre
2. Craig O'Donnell (CO), Business Development Manager. Knauf Insulation
3. Darren Peacock (DP), Director. Avalon Abseiling
4. Lesley Friskney (LF), Managing Director. Forward Energy Solutions
5. Peter Bywater (PB), Senior Project Manager. Dorset Energy Advice Centre
6. Bob Smytherman (BS), FPRA Chairman and flat Leaseholder
7. Roy Scrivener (RS), Director. Elliot Land (Freehold & flats Management)

The following text is a summary of responses and comments noted by the author during interviews. The comments have been divided into common themes.

- Projects already addressing the challenges of flats
- Confirm old, dispel or state new challenges addressing this sector
- How the challenges have been addressed where projects have been carried out?
- What are the most challenging barriers stopping insulation of flats?
- Can we learn from social housing projects to help private blocks?
- What needs to happen to tackle the identified challenges and therefore help more flats to be upgraded?

Projects already addressing the challenges of flats

BI: Not running a specific flat project but has insulated a number of blocks in the social and private sector.

CO: Have undertaken a number of internal and external insulation jobs for blocks of flats, especially low rise buildings. Company can offer hybrid solutions for these complicated buildings.

DP: Around 100 tower blocks in London have been insulated since 2009 and now there is one is Littlehampton, West Sussex too. The London blocks were in the following London Boroughs but were mainly social housing:

- 10 in Camden
- 14 in Islington
- 6 in Suffolk
- 32 in Tower Hamlets
- 30 in Westminster

LF: West Sussex Flats project 2009-11 in partnership with the local authorities used funding from the SE Regional Housing Board: a Government quango that was unfortunately deleted recently by the coalition so the funding has now ceased. The project saw cavity wall and or loft insulation installed in 64 blocks of flats which was about 800 individual flats and bedsits, this is including Kingmere; a 13 storey high rise that we just completed using abseilers for the cavity wall (there was no loft and the flat rood already has some insulation installed).

PB: The advice centre runs a Private Rental Sector Insulation Project subsidised by local authorities. Originally set up with Poole, Southampton, Weymouth and Bournemouth Council's, however recent funding cuts have seen most councils having to back out, only Bournemouth are now continuing to fund throughout 2011-12. Aimed to pay for any rental properties, but charge any owner occupiers. Targeted licensed and unlicensed HMO properties (Houses of Multiple Occupation), houses, houses converted into flats and purpose built flats. Over 100 blocks have probably now been insulated.

BS: It's difficult to know precisely what proportion of the UK housing stock are private flats but there are approximately 4 million long leaseholders. It is likely as much as 2 million flats are in the private sector.

Confirming old, dispelling or stating new challenges in blocks

BI: Flats can be an issue, especially as scaffolding normally needed for over 6 storeys.

LF: Access can be problematic for two reasons;

- The installer would prefer to be as flexible as possible; otherwise they may drill holes in the wrong place.
- If access costs are not funded by council grants it can be a big financial problem even if billed at cost price. From our experience, cherry pickers have cost in the region of £350-£450 per building.

PB: Flats project has involved a wide range of buildings where private rental residents reside. Up to three floors, ladders can be used but after that, it gets more difficult. Cherry pickers can be used to access 4-5 storeys, possibly 6 if a special height machine is used but above 6 scaffolding is required.

PB: Have never encountered any issues with balconies but conservatories can make access very difficult.

BI: The company only offers cavity wall and loft insulation at present, not external insulation at the moment as too expensive. Also the process of internal wall insulation is very disruptive to residents, at present our company only offers it in park homes.

CO: For a block of flats with a solid wall, external wall insulation is the most obvious solution but owner occupiers can be an issue.

PB: Have never come across lease terms as an issue. There has been an even mix of majority rule and 100% agreement properties, but some of the contributions for "able-to-pay" residents in a block have been paid out of the block's maintenance fund with no questions asked.

BS: Even in just a single block, short-hold tenancies may differ and leases differ from building to building too. No lease is identical and there is no such thing as a common lease. But then again there is no benefit to a 'standard' lease as most buildings are different.

BS: The right to manage company (RMC) legislation was brought into the Commonhold and Leaseholder Act in 2002 which enabled leaseholders to get together and take over the management of the building. This has helped where freeholders have been doing a bad job.

RS: You need a reserve fund for a block. The legal wording on the lease normally says the reserve has to be there, however it also says it has to be spent; you can't hold onto it forever. The idea is to spend in 5-7 year cycles. Unfortunately there are a number of leases without a clause at all for a reserve fund and you can't suddenly impose it without gaining 100% agreement from the leaseholders, much as you can't change any part of a lease without 100% agreement.

CO: I have not come across any issue seen with terms of leases in flats so don't really see they need to be changed.

DP: For coastal and exposed locations: Wind off the sea is challenging for abseiling but the wind shadow of the building and external stairwells can be more sheltered on windy days so

work can continue. Birds such as gulls nesting can also be an issue as the equipment is all set up on the roof of the block.

RS: Sea and exposed blocks can pose extra maintenance challenges. The salt ruins reinforced concrete in buildings, electrolysis occurs between the steel rods and the salt. There are special layers that can be coated on the concrete to nullify the situation (Zinc can really help).

LF: Exposure is dealt with by using a bonded bead insulation material; using bead moved the dew point in the wall. One of the blocks that only had the loft done was because one resident was adamant that the insulation would cause damp. One block had to have poorly installed insulation extracted first before any work could be done as cold spots had appeared on the walls of some of the flats.

PB: Sometimes failed insulation has to be extracted first and then the wall can be re-filled properly. It's very expensive (3-5 x cost of install) though. This has been done once on a substantial block but it was social housing and the Council paid for it.

LF: There are regulations on adequate ventilation from CIGA that have to be followed so that the guarantee can be claimed. Most flats have electric, not gas fires and any boilers would normally now have a direct flue so ventilation for carbon monoxide is less of an issue than in some other properties. Should ventilation be required though, the vent would either be fitted or walk away from the job. Random BBA inspections are meant to ensure that vents are installed where needed. Once we installed a core vent from an interior wall into a lobby to help the resident with condensation mould problems because they would not open the outside window.

DP: There is no need to worry most of the time about adequate ventilation following installation of insulation in these kind if buildings as there are no non-condensing boilers or open/gas fires. However any flues that have not been sealed well have to be made good or the insulation will spill out any gap.

How the challenges have been addressed where projects have been carried out?

BI: Blocks of 5-6 storeys are more difficult as the pressure in the pumping equipment can drop and disrupt pumping which could cause uneven filling, even scaffolding doesn't necessarily resolve this. In one instance this was solved by designing a wheeled board for the pump. Then it was wheeled into the internal lift and up to the third floor so that the higher levels could be completed.

PB: There are restrictions with regards to the pumping equipment. Blown fibre hoses can only reach 120m from the machine and bonded bead, only 100m. It doesn't matter which direction (so can be straight up) but can make it difficult where access is complicated.

BI: The approach to flats is different to houses, the one adopted for flats has been to find an enthusiastic resident to gauge how much interest there is in the block – no progress would be made unless there seems to be initial commitment from a decent proportion of the block.

LF: From start to finish It took around 6 months to organise and carry out work on a single block but most of the blocks only took 3-4 days to actually complete installing the insulation (compared to a few hours for a house).

CO: If you can't get 100% agreement you can either ask 80% to pay and cover the cost of the 20% against or offer internal solutions and charge on a flat by flat basis depending where work is done.

BI: It is important to get everyone involved as soon as possible. However if some are really against the work, it can also be evaluated if parts of the property could be insulated using vertical cavity brushes to separate areas off. Unfortunately this would mean any flats above and below couldn't get done.

PB: It is possible in some structures to pepper pot insulate flats if there are concrete crossbeams between dwellings as products can be used to separate the walls and just fill one section. This can be done vertically and horizontally if there are also horizontal beams.

CO: An example I'm working on is Dover House; 6 blocks in Leicester of 2-7 storeys with uninsulated cavity walls. The cavity wall was insulated but we wanted to go further and get the wall U-value to 0.3 and condensation damp problems had not been resolved either. So a trial was started with 35 properties pepper-potted across the blocks to also install further internal wall insulation. It should be interesting but I can't tell you the result yet because the works are still being carried out now.

LF: A bonded bead product has been used for cavities insulated in the West Sussex flats project; if blown fibre was used instead it would be more like 6-7 days as more holes would need to be drilled and the pump can eject bead at a faster speed. Bead also has the advantage of less chance of voids in the wall.

BI: Avalon Abseiling use an Instafibre product. They have a clever niche in the market as scaffolding can be a real problem with high rise buildings.

LF: The cost of abseil access is very appealing compared to the price of scaffolding, it is much quicker and scaffolding can be erected in a way that interferes with the drill pattern; the risk of that is removed with abseil access.

DP: Advantages of using abseiling to install cavity wall insulation in high rise buildings over scaffolding or a cherry picker:

- Cost – it is 40-60% cheaper than using scaffold. Scaffolding a block can cost as much as £40-50k. Abseil access to a 13 storey block can cost around £10-15k. Depending on the width of cavity, the insulation for such a block would cost approximately another £10k.
- Time – A 13 storey block can take around 2 weeks with abseiling. With scaffold it would take 4 weeks just erecting scaffolding (although only 1 week to then to the cavity wall work).
- Access – With cavity wall insulation you have to be very careful where drill pattern needs to go for an even fill. Abseiling not only is more flexible to ensure the drilling can go in the right place but if any snags are noticed after the work is complete, with abseiling you can go back and fix them but you would be stuck if the scaffolding had already been taken down.
- There is also less disruption to tenants and the work itself has a smaller carbon footprint as there are no vehicles transporting scaffolding, the abseilers can cycle to work and only a lorry for bead is needed (and bead is almost as light as air).

PB: Once had to arrange for an entire road closure in the centre of Bournemouth to allow access to 125 dwellings in an area of 3-4 storey 1890s flats with cavity walls. It only took two days to carry out and was very successful but took a long time to arrange.

BI: For lofts, CERT funding is usually calculated by dividing the area of loft by the number of top floor residents; any contributions are easier to sort out when the freeholder offers to pay for the work in full though. Problems lie when there are multiple loft hatches and appointments have to be made to gain access to each part. Even if the loft is communal with a hatch in the common area, stuff is often found stored or dumped up there which has to be removed before any insulation can be added. People don't have much storage in flats and get upset when they can't store stuff up there anymore.

LF: With lofts it is different everywhere you go; some have communal loft space most have loft access so the loft is not considered a 'common part'. Individual lofts are actually better for claiming CERT funding but sometimes these lofts can be huge and the size goes well over the grant maximum area leading to a large excess contribution to pay. There are also problems with people storing stuff in lofts in flats as they have no other storage space.

RS: There used to be a Residential Management Company in the block, formed of all 53 leaseholders long before RTMs came about. Unfortunately the company went bust in 2008 as they simply had no money despite the lease stating they must have a reserve fund of a suitable proportion. Too many of the leaseholders on the RMC committee were claiming housing benefit and didn't want to pay the service charge or in fact spend any money maintaining the building. This is a common problem seen in blocks that have RMCs when leaseholders are not interested in managing the building or spending money on it. The problem is getting worse in the recession, similar to what we saw in the 1990s. We'll now see a housing stock crisis coming up again in the next few years as problems deteriorate further.

PB: To claim funding, ideally a single proforma is provided to the landlord for the whole block asking for details of the tenants with regards to CERT criteria. Where there are multiple landlords, a number of forms have to be sent out, starting with a main contact in the block. If the landlord lives abroad it is more difficult as forms have to be signed by an authorised person, however where the landlord has an authorised signatory in the UK, this can make life easier to sign off. In the last year the super priority group was added to CERT, 35% of customers need to be in this group as the funding is linked to ratios. If the ratios don't match in a large block through funding simply cannot be obtained even if the residents and landlord are willing. This is becoming a real issue as it never used to work like this.

LF: In all but one situation the council partnership paid for any cavity and/or loft insulation costs that were not covered by CERT funding, they also paid for any access costs so there was no cost to residents or landlords. The high-rise in Littlehampton was much more expensive to access so a further contribution was requested from the residents. The freeholder who manages the block obtained 100% agreement to charge each flat their contribution from the service fund.

PB: We work with a number of insulation installers in the local area but for flats we know three specific companies who are more willing do the complicated jobs that no-one else will.

DP: Avalon is currently looking into a prefabricated external cladding that can bolt together onto the external wall of a block. This product is currently designed to build new houses but the way it works would be very suitable for abseil access so the company are working with the designer to adapt just the outermost layers for that purpose. A pilot project using it is planned for Camden following a European funding bid for research. We would first conduct a laser survey of the walls; we would be looking for a clear outside wall.

What are the most challenging barriers to insulating flats?

LF: 100% permission from leaseholders/landlord/management company is challenging. Only did loft in one block in the end because just one resident in the middle absolutely refused the work (even though it was free to him). One management company we came across actually had a company policy of not installing cavity wall in any of the buildings they manage so we couldn't do them.

LF: Before the flats insulation project started, although I had been approached, I only managed to get a section of a block insulated before the project was set up. Before that it was considered too complicated to arrange/co-ordinate and with access costs too it was also in general too

expensive unless the freeholder agrees to pay it out of the service fund so it can be paid in instalments.

PB: Sometimes only half the forms come back and whilst the Advice Centre tries to chase them up, there are only so many hours that can be spent on this. Sometimes managing companies are not always that helpful chasing up the forms. Some blocks have had to be abandoned for this reason.

PB: Some landlords simply don't want the work (for instance only want loft, not cavity wall) and have turned us away.

RS: As the Ground landlord, I wouldn't want to spend too much time co-ordinating the residents; time is money. Spending time talking and negotiating with no end product is not worth it. You don't get paid to produce a notice of works but it's a legal document that has to be sent out. Some leaseholders live abroad so can be difficult to chase. Technically under English law the leaseholder must have a contact/signatory based in England if they are not here in person; however this is often not followed.

LF: HMOs are not eligible for CERT funding. It's a problem with the occupants having bedsits not flats that share one postcode address and one energy meter even though the wholly or semi self-contained bedsits are really separate dwellings.

BI: Often it's the elderly private sector tenants that simply don't want the insulation. They often say it's just too much disruption.

LF: One loft in a block could not be insulated because of haphazard wiring all throughout the space. The management company were asked to sort it out and clean all the wiring up to make it safe but they ignored the advice. It would have been a hazard and irresponsible to go ahead so it was not completed.

LF: Poor maintenance of buildings is an issue; gutters leaking so water running down walls and essential re-pointing work. Wall ties are often said to be problematic but not so much in my experience. One block was refused insulation until the managing agent sorted the guttering, once sorted the insulation was installed.

PB: Poorly maintained and built properties shouldn't be insulated at all. In one case the maintenance issues had been clearly reported to the landlord at the time with recommendations to attend to them, but this was not acknowledged and led to problems. Any projects requiring scaffolding rarely go ahead unless maintenance of the facade is required anyway as it is so expensive. This is not such an issue in Dorset though as there are only really a few high-rise buildings.

DP: Avalon is a maintenance company so can offer to fix any maintenance issues identified such as windows or pointing that would normally stop us before insulation is installed.

Can we learn from social housing flats projects?

CO: There is no right or wrong answer to refurbishment, it very much depends on the structure, but also other things like living patterns and the needs of the customer.

DP: No, there is still much ignorance in the private sector about the need for renovation so it is a tougher challenge.

LF: I never hear about case studies or best practice from social housing projects so I won't learn anything but so many issues are different in private sector flats anyway.

What needs to happen to tackle the identified challenges and therefore help more flats to be upgraded?

LF: Local Authority assistance (i.e. endorsement, co-ordination) is very important, the West Sussex project would not have been so successful regardless of the grant funding aspect without endorsement and assistance from the West Sussex Local Authorities.

PB: Backing from local Authorities is very important for the success of these projects

LF: Whilst Green Deal finance will probably be very helpful, the endorsement of the work from Local Government is vital and goes beyond money.

CO: The Green Deal is likely to take off much quicker in commercial than residential, but this is a long-term scheme, Knauf are taking a 40 year view of it.

CO: Knauf are the only company (and system provider) who can offer internal and external wall insulation, everyone else just recommends internal or external; not a hybrid of the two. This may have implications for the green deal when impartial advice is going to be offered for solutions. There is a case study of a Victorian house online where she was offered 6 quite different pieces of advice to improve energy efficiency. It is important that the Green Deal assessors know what they are talking about; Assessors are not trained to install the systems, but are advising on their installation anyway- this is a risk.

BS: Financial incentives and regulation are the only solutions for the disinterested. Regulation is required if the entire housing stock is to be improved but there are different tiers that will react to different incentives

- Fuel Poor households – Motivated by chance of improved health and bill savings but often have nothing to invest.
- Landlords – most will need legislation, minimum standards (for re-letting) and guidance to force them to invest.
- Able to pay households – Will need financial incentive/reward/assistance and legislation, minimum standards (for re-selling) and guidance to force them to invest.

PB: It is concerning how long CERT funding will continue as there is talk at the moment that it will cease before the Green Deal starts at the end of 2012. Instead of removing CERT, the net should be widened for more people and continued beyond 2012 so that over time everyone has a chance to get a grant i.e. over 60s, young families. This would work better that the Green Deal model as experience so far has seen people not interested in a loan. The PAYS trials in Gloucestershire really found that only the keen “greenies” and those looking at refurbishment anyway were actually interested in taking up a long term loan to pay for works.

PB: I am very pessimistic that the Green Deal will work and that people will be interested.

RS: The Green Deal may help as all my blocks have individual meters in individual flats, although there is also common electricity for the block, this supply paid for by the landlord (freeholder) can be very costly, especially if the areas are heated in the winter. Any works the landlord wanted to pay for could go under the common area energy meter. I would imagine only 10% of people in flats would be interested in the Green Deal, you’d be lucky if more than 5 flats in a block would come forward, particularly where you’ve got a leasehold landlord not living in the block. Often up to 2/3 of a block might be short hold rental tenants. This can be because the landlord has moved out, possibly due to the condition of the flat, but they may have no plans to improve the building. Tenants are more likely to stay in a property if it is comfortable and energy efficient and buildings have to be upgraded over time, but it is always hard to find finances and will involve having to change people.

CO: Currently working with SWIGA on guarantees as at present the responsibility goes back to the manufacturer, not the installer. It is too easy to get a 1 day training course for installing external wall insulation; it's a potential problem for the 20 year Green Deal packages.

PB: Landlords are now being made aware of the recent announcements from the Government on minimum standards in future for the private rental sector. It's being used as promotional technique to get them to act now before they are forced. The Advice Centre is currently considering launching a 'Countdown campaign' to countdown to the beginning of the Green Deal which marks the end of grant funding. Currently working with Local Authorities to gain permission to door knock and heavily promote insulation in the next year under this guise. Also believe there will be opportunities for letting agents in the future to promote 'green deal free' properties that don't have additional charges for the resident. If grants can be taken up now, landlords will be able to partake in this concept.

BS: People on the whole do not understand leaseholders. Most leases do not allow for 'improvements' to be paid for out of the service charge. The FPRA believe cost effective, 'reasonable' energy efficiency measures such as cavity wall insulation should be allowed to be paid for from the service charge. The use of abseiling is interesting as it reduces the costs that with scaffolding may have seemed unreasonable. So should scaffolding be used and the case be challenged by a leaseholder and taken to a LVT, the scaffolding may be found as an 'unreasonable' cost. It will be difficult in some cases to establish what 'reasonable costs' might be and what they might be benchmarked against. Commonhold tenure is an alternative that with 100% agreement, a block could volunteer to change to it. It allows for leaseholders to have a share in the freehold (a common system in Australia).

RS: Cavity wall insulation is not maintenance as it is 'new' work, many freeholders would serve a section 20 notice to all, you require 75% of them to agree, but if more than 25% object you can't do it. The FPRA's campaign to change the legislation has a good point and is probably a good idea to makes things easier but whilst it is not explicitly said in many leases, there are ways to still do it without changing the law.

BS: The FPRA are currently working with FOE to lobby the Government on minimum standards. FPRA have concerns that rental tenants may be evicted if living in a large shared building where they have no control. If the flats are G-rated because the whole building needs work and the leaseholder wants to move out and rent rather than sell they need protection as it is not the residents fault so should not be suffer if it becomes illegal to rent poorly performing properties. Interior works may raise the SAP sufficiently but the measures may not be the best for the overall health of the building.

Appendix 6: Case Study Content Analysis Data

			A		B	C	D						E	F	G			H	I							J							K					Savings quoted (benefits)				L				M	N	P	Q
Case study no	Year published	Year case project work carried out	Type of building (structu	Type of building structu	Age of original building	Location	Problems reported in or						Instigated by	Led by	Funded by			Cost of works	Insulation measures installed							Other energy efficiency measues installed							Benefits identified					Energy saving - new kWh/m²/a	Energy saving	U-value (walls) W/m²/K	Reduction in Tonnes C	SAP improvement	Challenges identified				Payback or ROI calcula	Type of study	replicable in private sec	Considered a success?
1	2005	1996	1	1	1980s	2	8						5	4	1	5		0	2	7	8					3	8	9					2							0.5			1	3	4	5	2	1	3	1
2	2005	unknown	3	3	1980s	2	7						5	5	1	4		0	2	5	8					3							1	2	5	6	8	24		0.3			2				0	1	5	1
3	2009	2005 onwards	1	1	1980s	2	8	7					4	5	1	5	6	€250,000/ block	2	7	8					1	4						4	8								2	6			0	8	5	1
4	2005	2001	4	4	1990s	2	1	7					6	5	1	5	7	0	3	2	7	8				2	3	5					1	6					54%		CO2 saved = 1.4t/ flat/a		2	5	7		0	1	5	1
5	2005	unknown	7	7	1950s	4	7	8					3	4	2	7		€77,300/ block = €27.12/m²	2	5	9					1	3						1	2	8			157	53%	0.3			1	5			7	1	5	1
6a			1	1	1960s	1	2	5	7				3	4	1			0	2							2	4						4	8	9				40%				10				0	1	3	3
6b	1995	unknown	1	1	1950s	1	5	7					3	4	1			0	3							2	4						4	8	9				40%				8				6	1	3	3
7a	2004	unknown	1	1	1960s	1	3	9					3	4	1			£38,000/ flat	3							2	3	4	5				2	3						0.3		incr. From 60 to 90	5	9			0	1	3	1
7b	2004	unknown	5	5	0	1	3	9					3	4	1			£38,000/ flat	3							4	5						7	8	9								5	9			6	1	3	1
8	2006	1998	6	6	0	1	2	7					3	3	4			£20,944/ flat	2							1							2	4	7			bill savings £153/ flat/a				incr. From 44 to 67	0				0	1	3	1
9	?	unknown	8	8	1930s	1	6						0	0	1			0	2														2							0.2			0				6	2	2	1
10	2003	1992 onwards	7	7	0	1	1	2	4	5	7	8	3	4	2	3		£44,500/ flat	3	7	9					2	4						3						60%			incr. From 30 to 76	0				5	2	2, 3	1
11	2005	2005	2	2	1960s	1	11						3	5	1	3		block = £65,500/ flat	1	7	9					3	9						10					7000			CO2 saving 2365kg/ a = 29%		10				0	2	5	1
12	?	2005	7	7	0	1	6						4	5	3			0	3	6						2	9						1	4								0				6	3	2	1
13	2006	n/a	9	9	1960s	3	8	11					6	6	n/a			0	2	9						5	9						1	10				46	75%				9				0	5	4	3
14	2009	n/a	2	2	1980s	1	n/a						6	6	n/a			0	1	5						4	5	7	8	9			1	4					50%		CO2 saving 35kg/m2/a = 50%		0				0	5	4	3
15	2010	2009	9	9	ariable	1	8						5	4	n/a			£5,000-30,000/ flat	4	5	7					4	5	7	9				4	5									1	10			0	4	6	3
16	2006?	unknown	5	5	1960s	1	1	7	8				4	4	n/a			0	2	7	9					1	3	4	7				1	4				113	50%		CO2 saved 1100kg/a		9				0	5	6	3
17	2008	n/a	9	9	1960s	1	2	7	8				6	6	1	2		range of scenarios	1	2	4	5	7	8	10	1	3	4	7	8	9		1	3	4			range of scenarios					1	2			0	5	5	3
18	2010	2010	7	7	0	1	8						4	5	2			0	6							0							1	4				overall 357068kWh/a = saving of £8569/a					10				0	1	1	1

Appendix 7: Correlating coding manual for case study content analysis

A **What type of building is it?**

0 No information
1 Prefabricated concrete panels
2 Prefabricated concrete panels - with cavity wall
3 Prefabricated concrete panels - insulated
4 Lightweight prefabricated concrete panels (single layer
5 Reinforced concrete frame
6 Wimpey no fines concrete build
7 unspecified block of flats
8 Art Deco brick build
9 Other

B **Where is the building?**

1 UK
2 Eastern Europe
3 Western Europe
4 Other

C **What were the existing identified problems with the building?**

0 No information
1 Cold
2 Damp/mould
3 Thermal Bridging
4 Draughts
5 Antisocial behaviour
6 run-down/abandoned area
7 Poor condition/state of repair
8 Expensive to heat
9 Other

D **Who Instigated the project?**

0 No information
1 Residents
2 Landlord/freeholder (private)
3 Social housing provider/local authority
4 Private Co. /NGO/charity
5 Local authority (but not as landlord)
6 Other

E **Who led/co-ordinated the project?**

0 No information
1 Residents
2 Landlord/freeholder (private)
3 Social housing provider/ local authority (if landlord)
4 Local authority/Government
5 Private company/ NGO/charity
6 Other

F **How was the project funded?**

0 No information
1 Government grant
2 Other grant (including specific energy grants)
3 Landlord/freeholder paid
4 residents paid - upfront
5 residents paid - specific loan offered
6 residents paid - spread across service charge
7 Private sponsorship funding
8 Other

G **How much did the refurb cost?**

Specify any given information

H **What Insulation work was carried out?**

0 No information
1 Cavity wall insulation
2 Insulated render with cladding
3 Rain screen cladding
4 Internal lining
5 Draught proofing
6 pipe/tank insulation
7 Roof insulation
8 Floor insulation
9 Balconies enclosed
10 Other

I **What other measures were carried out at the same time**

0 No information
1 Window replacement
2 Window upgrade (single to double glazing)
3 Heating - controls & maintenance

4 Heating - replacement/upgrade
5 Ventilation - HVAC
6 Ventilation - other
7 lighting replacement/ upgrade
8 heating hot water - upgrade/replacement
9 Other

J What Benefits/improvements were identified?

0 No information
1 Carbon Saving/energy saving
2 U-value increase
3 SAP value increase
4 Bill savings
5 Greater warmth in general
6 improvement to the fabric of the building
7 reduced damp/mould problems
8 increased value of property
9 Social cohesion improvements/pride
10 Other

K What Challenges/barriers were identified?

0 No information
1 Financial - obtaining grant funding
2 Financial - resident contribution
3 Engagement with local government
4 Engagement with private sector
5 Resident communication & co-operation
6 Resident participation (totally against)
7 Lack of residents comm/ representative body
8 No mechanism for funds to maintain measures in future
9 Structural issues with building
10 Other

L What Payback or Return on Investment was reported?

0 No information
1 1-5 years
2 6-10 years
3 11-15 years
4 16-20 years
5 rent from new added flats
6 sales of new added flats
7 Heat Tariff income
8 other

M What kind of case study was it?

1 Real project - residents remained in situ
2 Real project - residents decanted
3 Real project - derelict/run down empty building
4 Modelled project - based on real building
5 modelled project - based on hypothetical block of flats
6 Other

N Is the case study replicable in private sector flats?

1 Yes
2 No, relies on building being empty
3 No, relies on 100% funding/grant
4 No (other reason)
5 Maybe but too little detail provided
6 Maybe but not tested in real life (only modelled)

P Was case considered a success (as implied by author of case study)

1 Yes
2 No
3 Partly

Appendix 8: News cutting from Littlehampton Gazette 09/06/11 (p19) showing author joining Avalon abseilers as they insulated the cavity wall of their first high rise block of flats outside of London

Energy officer takes the plunge

ABSEILING is not something that Arun's Jo Brooks had in mind when she became the council's energy efficiency officer.

But that's exactly what she did, from the top of Littlehampton's Kingmere tower block.

Daredevil Jo decided to take on the heart-pounding-challenge after a project to use abseilers to fit cavity wall insulation in the tower block was given the go-ahead.

She took the plunge in front of a large crowd of residents, with Littlehampton's new mayor, Alan Gammon, watching, too. Another resident, Matthew Ashman, also made the descent.

Jo said: "The most terrifying bit was climbing over the edge of a building so high up but once I was over that, I really enjoyed the descent and had a beautiful view of the coastline.

"Having done the abseil, I now have a lot more respect for the guys installing the cavity wall insulation. It must be hard work spending so long balancing on the ropes and using drills and insulation hoses.

"The residents all seemed really excited that the block was finally getting insulated so they will be cosy this winter, especially as they have not had any of the usual worries about scaffolding, such as blocking light, security, the length of time it's up and cost."

The work will take a couple of weeks and is being carried out as part of the West Sussex Flats Insulation Project, a two-year project which was set up in 2009 by Arun.

by **Tom Cotterill**
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DOWN THEY GO: Energy efficiency officer Jo Brooks is joined on the descent by Martin Flisher PICTURES: STEPHEN GOODGER L21133P11

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