



Department  
of Energy &  
Climate Change

# Qualitative research with social housing providers

A research project commissioned as part of the  
Evaluation of the Renewable Heat Incentive

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# Executive summary

This report summarises key findings of research into what social housing providers think about renewable heat technologies and the role that the Renewable Heat Incentive (RHI) has had in their decision-making. The project is part of a larger programme of research providing an independent evaluation of the RHI across domestic and non-domestic scheme participants and of the supply chains that serve them. The RHI evaluation was commissioned by the Department of Energy and Climate Change (DECC) and undertaken by NatCen Social Research (NatCen), Eunomia Research and Consulting, and the Centre for Sustainable Energy (CSE).

## Key research questions:

- How do social housing providers make decisions relating to the management and procurement of heating systems?
- How do social housing providers evaluate innovative heating technologies and in particular renewable heat technologies?
- What is the social housing provider experience of the RHI?

## Policy context

The Renewable Heat Incentive (RHI) is the world's first long-term financial support programme for renewable heat. The scheme is designed to bridge the gap between the cost of fossil fuel heat sources and renewable heat alternatives, through financial support for owners of participating installations. Scheme participants are paid a tariff per kilowatt hour of heat generated, with payments made quarterly for either seven years (domestic) or 20 years (non-domestic). Renewable heat technologies eligible for the scheme include biomass boilers, heat pumps and solar thermal systems. The non-domestic scheme also includes biogas, combined heat and power (CHP), and biomethane injection to grid.

The principal high level objectives of the RHI to date have been to:

- support the UK in meeting the 2020 renewable energy target;
- contribute to meeting carbon budgets as renewable heating systems deliver carbon savings compared to fossil fuel alternatives; and
- support the longer-term 2050 decarbonisation target by building sustainable supply chains

Where a single heat source serves more than one home it falls under the non-domestic scheme. Social housing providers may therefore apply under both the domestic and non-domestic strands, as they own homes that are heated individually and as part of heat networks. Consequently, this report considers social housing involvement in both domestic and non-domestic schemes.

## Methodology

This report summarises research exploring barriers and opportunities for greater deployment of renewable heat technologies in the social housing sector. The research involved 32 interviews with a purposively selected sample of social housing providers made up of both applicants and non-applicants to the RHI scheme. Interviews were conducted with staff with operational responsibility for managing heating systems and for setting the strategic framework within which asset management decisions were taken. Interviews were transcribed verbatim and analysed thematically. The qualitative study was conducted from January to March 2015, with final reporting

in July 2015. Full details of the methodology can be found in a separate technical report (available at <https://www.gov.uk/government/collections/renewable-heat-incentive-evaluation>)

## Key findings

### Management and procurement of heating systems

- Social housing providers reported how their social and charitable objectives focussed on providing decent and affordable housing to those that need it. These objectives coloured all aspects of asset management and resulted in a strong concern to also provide home that could be affordably heated.
- Overall, mains gas-fuelled systems were described by social housing providers as their heating system of choice due to lower running costs, ease of use and control, and lower maintenance requirements.

### Challenges of provision of affordable warmth in housing unconnected to the gas main

- In areas of housing unconnected to the mains gas network, social housing providers reported contending with an array of conventional non-renewable heat technologies which can be expensive to operate and difficult to control. This resulted in underheating of homes, leading to health impacts; damage to the building from damp and condensation; difficulties with renting out properties, impacting upon the rental income; and less income available to the tenant for other purposes including paying rent.
- To provide homes which could be affordably heated in areas of housing unconnected to the mains gas network, social housing providers looked firstly at the feasibility of connection to the gas main. If this was not feasible they looked at alternative heating systems: both renewable heating systems and next generation electric systems were considered. Other social housing providers prioritised a fabric-first approach in their strategy to provide affordable warmth.

### Planned and reactive replacement of heating systems

- Social housing providers reported that heating systems were generally replaced in a planned maintenance cycle based on the notional lifetime of the equipment. The replacement of a heating system was brought forward before its end of life if the existing technology was considered problematic to either tenants or landlords or both or because of wider contextual factors, such as the availability of funding for new systems through policies such as the RHI.
- Social housing providers reported that an asset management database<sup>1</sup> was the fundamental tool driving decisions related to the planned replacement of heating systems. Significantly, for understanding decision-making around renewable heat technologies, some databases were equipped with “energy efficiency modules” allowing Standard Assessment Procedure (SAP)<sup>2</sup> scores to be generated. These modules allowed social housing providers to estimate the effect of installing different types of heating systems on SAP scores allowing evaluation of different options in meeting SAP targets.

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<sup>1</sup> Asset management databases record details of every property managed by the landlord, describing the specification, age and lifetime of every asset, including heating system, at each address.

<sup>2</sup> The Standard Assessment Procedure (SAP) is the UK government’s recommended method for measuring the energy performance of the home.

- As decisions about the replacement of heating systems were planned years in advance, it was important for social housing providers to understand what grants, loans and subsidies for technologies would be available in the future.

### Trialling and becoming aware of innovative heating systems

- Social housing providers' institutional character influenced their receptiveness to trialling and investing in renewable heat technologies, and shaped how proactively they seized support opportunities (e.g. funds and technology trials). Attitudes to risk and innovation were reportedly linked to the size of the social housing provider and whether it was Local Authority led. Smaller social housing providers felt they had less ability to manage risk and Local Authority led social housing providers had more duties to show value for money.
- Sources of information through which social housing providers became aware of new developments in heating technology included promotional material from suppliers and sales representatives, and government websites. Social housing providers were found to be well-networked and particularly valued recommendations from other social housing providers with direct experience of innovative technologies as well as from individuals with expertise in sustainability.

### The importance of maintenance and running costs in renewable heat technology selection

- When choosing between conventional and renewable heat technologies social housing providers weighed up the upfront and maintenance costs of systems as well as the costs to the tenant of fuelling the system.
- In some cases, maintenance costs of renewable heat technologies were considered higher than conventional systems. This is partly because social housing providers rarely hold specialist maintenance skills internally, and so have to contract maintenance to external providers.
- Landlords reported mixed results with the capacity of renewable heat technologies to provide affordable heat. Different experiences highlighted the importance of context in the capacity of renewable heating systems to deliver improvements in affordable warmth. Factors included: the system being replaced; the renewable heat technology being installed; the condition of the building fabric; the capacities and skills of tenants; and local geography and climate.

### Tenant factors in renewable heat selection

- The ease with which tenants would be able to use and control heating systems was a clear influence on technology selection.
- Where running costs of renewable heat compared favourably with conventional systems social housing providers had invested in tenant training and energy advice to ensure systems were used effectively, and, where needed, investment had been made in increasing the fabric standards of the building.

## Reliability, the quality of installation and after sales support

- Alongside financial factors, the reliability of technology and the provision of after sales support were found to be key factors shaping the heating procurement decisions of social housing providers. An unexpected loss of heating service during a cold period could have very serious health impacts on vulnerable tenants, and landlords reported that renewable heat technologies do not appear to offer clear improvements in reliability over conventional alternatives. In addition good quality after sales support was critical in giving social housing providers the confidence to invest in new and specialist technologies, such as renewable heat.

## Renewable heat technology choices in the future

- For the foreseeable future it was reported that ASHPs will remain an option only for housing which is currently off the gas main or possibly for flats which are on the gas main. However, the upward trajectory of gas prices relative to electricity coupled with the long planning horizons used by landlords could mean that social housing providers begin to invest in ASHPs in the future in on-gas areas, especially as the market develops and more reliable, user-friendly models emerge.
- Landlords reported that individual biomass systems are not considered a long-term viable option for social housing providers, in either off-gas or on-gas areas. Social housing providers were looking at the viability of installing large-scale communal biomass systems, but high capital and very high maintenance costs remained barriers.
- High capital costs and the land area required for ground source heat pumps (GSHPs) mean these were rarely considered a viable heating option by social housing providers. Communal GSHP systems were considered a more feasible option.
- Solar thermal was reportedly not a priority technology given that it does not address tenants' space heating requirements and therefore does not make a meaningful contribution to the delivery of affordable warmth. However the technology was seen as compatible with ASHP installations.
- The ability of renewable heat technology to provide heat more affordably was not viewed as a given. It was dependent on what was being replaced and the individual circumstances of the installation, including fabric standards and geographical location. For renewable heat technologies to become more widely embraced social housing providers reported that they need to demonstrate their capacity to reliably deliver affordable warmth.

## Organisational and policy factors

- National energy efficiency policy focussed on meeting energy efficiency targets as well as organisational-related factors, such as social housing providers having a sustainability champion, both facilitated take-up.
- Being willing to take a 'risk' in trialling new technological developments was also an important driver of renewable heat adoption. This was linked to the size of landlord and also its governance (whether Local Authority led or not).
- National energy efficiency targets in Scotland and Wales are enshrined in regulation and are based on Standard Assessment Procedure (SAP) scores. In England, voluntary SAP targets are still found. Landlords reported how, despite some misgivings about the accuracy of the (SAP) it was widely used as a proxy for affordable warmth. Therefore, the way SAP treats renewable heat technology and rival technologies was found to be an important factor in decision-making.



## Influence of the RHI

- Among those who cited the RHI as an influencing factor, the scheme was felt to have strengthened the financial case for renewable heat technologies. However, whilst for some landlords the RHI payment was critical or very important to the decision to invest, for others it was thought of as more of a “bonus”.
- The RHI was also reportedly critical to decision-making about non-domestic systems, such as communal ground source heat pump and biomass systems.
- The RHI was less influential among social housing providers who were satisfied that renewable heat technology was the best choice for a particular situation and would have installed the technology regardless of the RHI, or for those who did not believe the scheme would cover the whole life costs of the technology and/or where there were concerns about the stability of the policy or where they did not feel that their housing stock was suitable for renewable heat technologies.

## Experiences of the RHI scheme

- Experiences of meeting the domestic RHI scheme requirements were positive except in some cases where applications had errors, in which case lengthy time periods elapsed between Ofgem receiving application data and responding with feedback.
- Across both the domestic and non-domestic schemes satisfaction with the process of applying for the RHI was positively influenced by factors such as whether an installer or consultant helped the applicant to complete the application form and how easy it had been to supply the required information.
- Where multiple applications were made, both domestic and non-domestic applicant landlords reported that the process was still time consuming.
- Satisfaction with the RHI payment system was influenced by the payment amount received and whether this was in line with expectations. Uncertainties around how much applicants could expect to receive from the domestic scheme reportedly could deter or delay installation of further renewable heat technologies.
- Some social housing providers made a trade off between the staff resource needed to make an application to the RHI and the funding that would result.
- Degression was considered a reasonable and fair approach. However, some felt that it was only fair so long as it mirrored a decline in costs of renewable heat technologies.

## Influence of the RHI on social housing providers' future plans

- Those social housing providers who had not installed renewable heat technologies or applied to the RHI described a number of reasons for this. Some mentioned that they would need to become more familiar with the technologies and were actively engaged in developing in-house knowledge of renewable heat technologies. Others described how renewable heating was not a strategic priority at present, with resources concentrated on improving the building fabric instead. A third group stated that they wanted to adopt a ‘wait and see’ approach.

- Non-applicant social housing providers described how the existence of the RHI would not propel installation of renewable heat technologies on its own. Rather, stock had to be in the right condition first and a strategic decision taken that it was now appropriate to begin considering renewable heat technologies in heating replacement programmes.
- For some applicants, the RHI payments were considered as an opportunity to further invest in renewable heat technologies and the energy efficiency of their building stock.

# 1. Introduction

## Research aims

Registered social housing providers manage around 3.5 million homes in the UK. Consequently, they are an important potential customer for renewable heat technologies at both domestic and non-domestic scales. The overarching aim of this research strand was to assist the Department of Energy and Climate Change (DECC) in understanding the barriers and opportunities for greater deployment of renewable heating in the social housing sector and the role that government policy, including the RHI, can play in increasing take-up of renewable heat technologies. Key research questions included:

- How do social housing providers make decisions relating to the management and procurement of heating systems?
- How do social housing providers evaluate innovative heating technologies and in particular renewable heat technologies?
- What is the social housing provider experience of the RHI?

## Methodology

The research involved 32 interviews with a purposively selected sample of social housing providers. Interviews were conducted with housing provider staff with responsibility for selecting heating systems. An even split of applicants and non-applicants were interviewed. A diversity of sizes of social housing providers were also sampled. The final resulting sample is structured as follows:

Table 1: Participant sample by size and applicant status

Size	RHI Applicant	Non-applicant	Total
Small (<1000)	1	5	6
Medium (>1000)	10	4	14
Large (>10000)	5	7	12
Total	16	16	32

Quotations from small applicants and non-applicants are attributed as “small applicant” and “small non-applicant”. Medium and large categories are collapsed to “large” i.e. they are attributed as “large applicant” and “large non-applicant”. Six of the 16 applicants in this research applied to both domestic and non-domestic strands of the RHI. Findings for both schemes are reported here. Interviews were transcribed verbatim and thematically analysed. The qualitative study was conducted from January to March 2015, with final reporting in July 2015. Full details of the methodology can be found in the technical annex published alongside this report.

## How to interpret qualitative data

This report shows the diversity of views and experiences among those interviewed. As this is qualitative research, references to the prevalence of those holding a particular view are not included as this could give a misleading sense of the prevalence of this view amongst the wider population. Interview quotations have been used where appropriate. Additional descriptive information has been included where this might help illuminate a finding and does not breach anonymity.

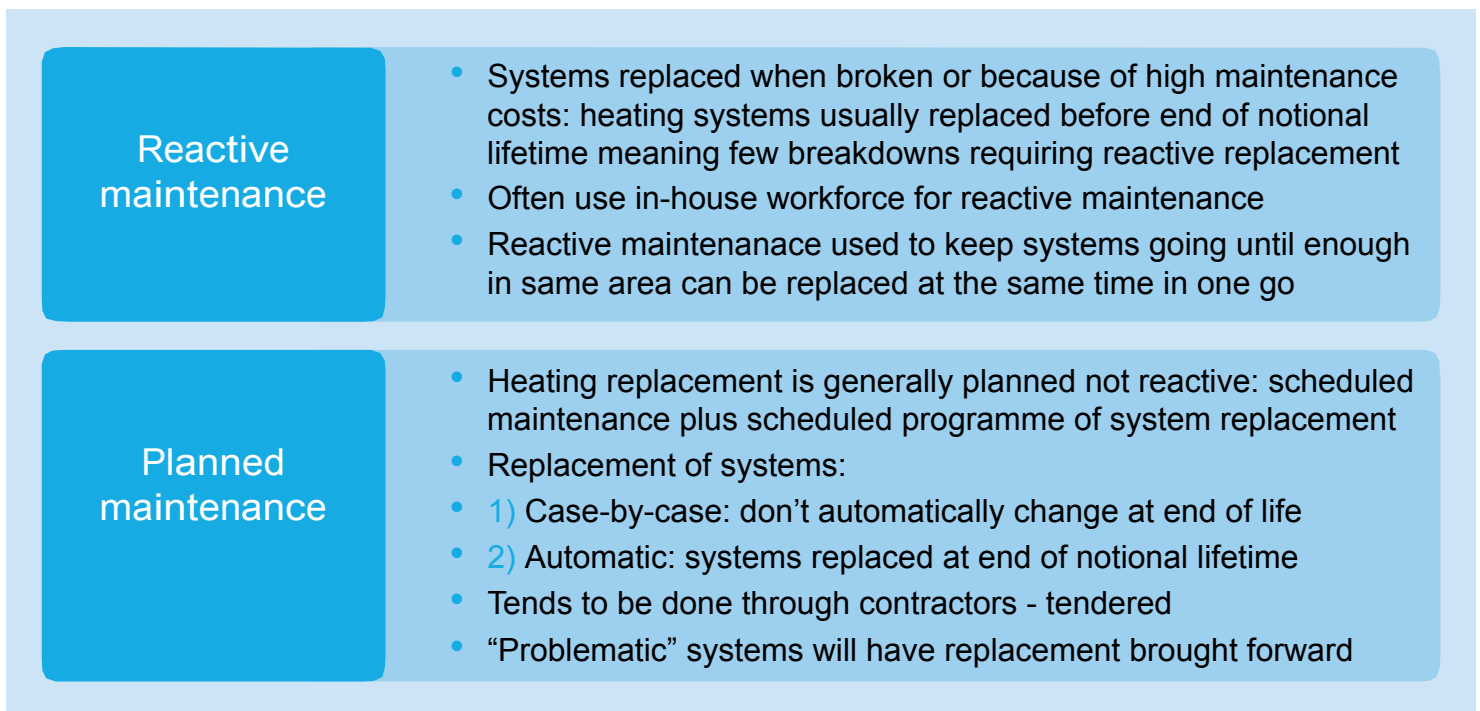
## 2. Management and procurement of heating systems

This chapter sets the report in context by exploring how social housing providers manage the heating systems in their housing stock. It illustrates the principle influences on decisions around selection and installation of heating systems and the logic underlying management processes and procedures. The chapters which follow focus specifically on social housing providers' views and experiences of renewable heat technologies and the RHI.

### Replacement of existing heating systems

Heating systems were replaced via two types of maintenance processes within social housing providers: planned and reactive. These have a number of distinctive characteristics, detailed in Figure 1.

Figure 1: Characteristics of reactive and planned maintenance



#### Planned maintenance

Planned maintenance had a number of important aspects which influenced response to renewable heat technologies and the RHI.

#### Asset management databases in planned maintenance

Social housing providers reported that an asset management database<sup>3</sup> was the fundamental tool driving decisions related to planned maintenance. The database recorded the specification

<sup>3</sup> Asset management databases record every property managed by the landlord, detailing the specification, age and lifetime of every asset, including heating system at each address.

and expected lifespan of heating systems allowing social housing providers to plan for their replacement over a long time horizon.

“ We know when things have been installed and we have the lifecycles against them so that the business plan for the organisation is fed from the demands of our stock. ” (Large applicant)

Asset management databases used by social housing providers had varying functionality. Significantly for decision-making around renewable heat technologies, social housing providers reported that some were equipped with “energy efficiency modules” allowing Standard Assessment Procedure (SAP)<sup>4</sup> scores to be generated. These modules allowed social housing providers to estimate the effect of installing different types of heating systems on SAP scores allowing evaluation of different options in meeting SAP targets.

#### Factors influencing the planned replacement of heating systems

Planned replacement of heating systems was triggered by systems reaching the end of their notional lifetime. Other factors that influenced whether or not systems were replaced included:

##### Government policy

Policies such as the RHI were reported to strengthen the economic case for replacing existing heating systems before the end of their notional lifetime, particularly among publicly funded organisations:

“ It doesn’t make economic sense to replace heating systems less than 10 years old, because it comes from public funding and people’s rents. But it does get to the stage where you have to think about doing it. Hopefully that’s where the RHI will come in and help you justify replacements. ” (Large applicant)

##### Tenant-related factors

Systems that did not provide adequate heat control, or were difficult for tenants to use and expensive to operate, such as old-style electric storage heaters and coal fired solid fuel systems, were identified by social housing providers as problematic and suitable for replacement. Landlords reported how the RHI facilitated bringing forward replacement of problematic heating systems before end of life. Chapter 5 describes the logic of different responses to the RHI scheme.

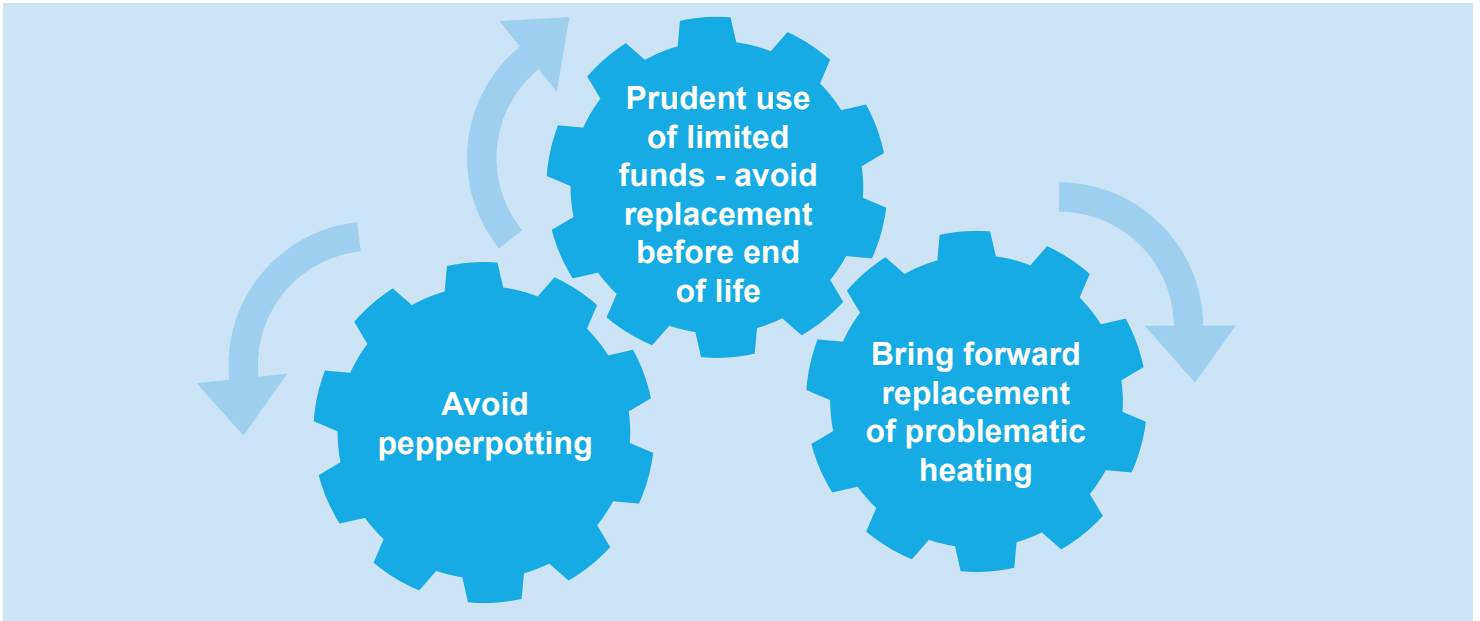
##### Avoidance of ‘pepperpotting’

While social housing providers did not want to delay replacing systems that failed to meet the needs of their tenants, this had to be balanced against the avoidance of selectively installing new systems into particular areas and so creating a situation where a single area of housing had a mix of system types and ages. This was considered highly undesirable from an asset management perspective and was termed “pepperpotting”:

“ Our policy is to wait until as late as possible for the youngest elements of the heating system to reach an age where they need replacing and then do everything at the same time. This means that there will be no more pepperpotting and everything is on an even keel. ” (Large applicant)

<sup>4</sup> The Standard Assessment Procedure (SAP) is the UK government’s recommended method for measuring the energy performance of the home.

**Figure 2: Balancing replacement of problematic heating with the need to avoid pepperpotting**



## Awareness of heating technologies

Landlords became aware of new heating technologies through active channels where information was actively sought out and through passive channels receiving information that had not been actively solicited. Figure 4 shows key sources of information discussed by social housing providers.

**Figure 3: Active and passive information channels**



## Passive channels

Social housing providers reported being “bombarded” with sales literature and calls from companies seeking to sell services and technologies. Social housing providers also developed longstanding professional relationships with particular manufacturers and their sales force. Such relationships fostered a degree of trust that gave social housing providers confidence to explore the new products suggested to be of interest, and sometimes gifted, by manufacturers for piloting.

“ We’ve got a longstanding relationship with [manufacturer x]. We’ve been fitting [manufacturer x] for in excess of 12 years now we’ve got a very strong bond with [manufacturer x]. (Large applicant) ”

For reasons of efficiency and due to concerns about the quality of information provided by some sales representatives, social housing providers reported using third parties for impartial and accurate information on heating systems. For example, a social housing provider employed an energy consultant on an ongoing basis to monitor technological developments on their behalf and to provide regular reports on the latest developments.

## Active channels

Landlords reported becoming aware of new developments in heating systems when developing their strategies around sustainability and providing affordable warmth for tenants. This entailed a combination of desk research, the use of external consultants and visiting trade shows and events. Social housing providers were found to be extremely well-networked, both amongst themselves and with the wider community of businesses, Local Authorities and communities in which they are embedded. They reported how they were in constant communication with one another attending national and regional professional forums and other fora with a specific remit to explore the potential of new heating technologies such as the Carbon Action Network. However, the most valued information about innovative heating technologies came from fellow social housing providers who had first-hand experience of trialling the technology.

“ They [social housing providers] set up this carbon saving alliance. So you’ve got the housing associations talking to one another, passing on their experience of the product they’ve obtained, whether it’s good, bad or indifferent. ” (Large applicant)

## Procurement

Replacement of heating systems is usually tendered to third parties, rather than undertaken in-house for reasons of demonstrating value for money and to comply with EU and national regulation. The RHI may potentially exert an influence at various points throughout these procurement processes. Procurement is driven by the business plan.

## The business plan

Social housing providers built a long-term business plan from the asset management database which allowed managers to see which assets would need replacement over a 30-40 year time period.

“ We tend to plan three years in advance, although our asset management database pretty much tells us what we need to do over the next 30 years. ” (Large non-applicant)

The shorter time frame was needed because financial circumstances, including availability of grants and loans and levels of rental income, were constantly shifting and could only be accurately appraised nearer the time when the funds were needed. Other considerations were whether the heating systems were still functioning well and therefore needed replacement at all and the policy direction of the social housing provider in terms of prioritising certain works over others. It was reported that because budgets are set years in advance it was vital to know what funding will be available for innovative and potentially more expensive technologies and therefore there was a need for medium-term certainty about the availability of grants, loans and subsidies such as the RHI.

## Specifying what to buy

After decisions about the need to replace systems are taken there remains a set of decisions about the exact product to be purchased. A number of processes determine this.

- Performance specification. Social housing providers reported that procurement regulation prohibits the specification of exact makes and models of systems. Instead social housing providers must specify performance and leave it to bidders to specify a make and model as a part of their tender submission:

“ Generally we procure in line with the EU legislation where you can't name a boiler. You can name a performance specification, what you want. ” (Large applicant)

- Tenants. Landlords described how tenants could have a role in the specification of equipment in procurement documentation, either through relatively informal channels where operations managers reported on tenant experience with particular technology or through more formal channels such as tenant consultation groups. Hence the views and experience of tenants were reported as playing a role in the selection of renewable heat technologies.
- Installers. In their tender submissions installers described the make and model of the system they intended to use. Some installers were reported to have suggested a different system type to that requested in the tender documentation. For example one landlord described how biomass boilers meeting the performance specification were offered by an installer tendering for the work as an alternative to a conventional oil system. However, it was reported that it was unlikely that such changes to the specification would be implemented at such a late stage in the procurement process:

“ We might take it on board [the recommendation for a different kind of system] if an installer who was chosen for the contract came to us, but the problem with that is, by that stage we kind of want to get it done so it would kind of hold things up. ” (Large applicant)

## Tendering and tender evaluation

Social housing providers sometimes used procurement frameworks where installers, suppliers and their equipment have been vetted thereby 'de-risking' technology choices. This was considered particularly important for innovative technologies such as those supported by the RHI.

Tenders were evaluated using matrices which evaluate both price and quality. Quality was based on various criteria including what added value the installer can bring to the work, how they intend to work with tenants and manage disruption, their internal quality management systems, and how they manage equality and diversity.



Social housing providers were also clear that they would generally favour tender submissions from contractors who were locally based and known to be well supported by favoured manufacturers. This was partly to ensure that the equipment was well maintained once installed with ready availability of parts and trained engineers and also so that the landlord could play its part in supporting the local economy. This again indicated how social housing providers try to align their business models with charitable and social objectives.

# 3. Evaluating renewable heat technologies against conventional alternatives

## The distribution of heating system types

Social housing providers reported using a wide variety of heating system types and described how the distribution of types was broadly driven by: a) whether the property was connected to the gas main and b) the built form of the property (flats or houses). Other influential factors included the characteristics of the tenant including whether they were vulnerable, whether the property was new build or existing, geography, climate and the social housing providers’ policies and attitudes to risk. Table 2 shows the reported distribution of types of heating systems by whether a gas main is present and the built form of the housing.

Table 2: Distribution of heating system types

	Unconnected to the gas main	Connected to the gas main
Flats	<ul style="list-style-type: none"> <li>• Electric storage heaters</li> <li>• Electric radiators and panel heaters</li> <li>• Air source heat pumps</li> <li>• Communal biomass fuelled boiler serving radiators</li> </ul>	<ul style="list-style-type: none"> <li>• Electric storage heaters</li> <li>• Communal gas fired boiler</li> <li>• Communal gas fired combined heat and power system</li> <li>• Communal GSHP serving radiators</li> <li>• Communal biomass fuelled boiler</li> </ul>
Houses	<ul style="list-style-type: none"> <li>• Electric storage heaters</li> <li>• Electric boilers serving radiators</li> <li>• Electric radiators and panel heaters</li> <li>• Oil boilers</li> <li>• LPG (propane) boilers</li> <li>• Open coal fires</li> <li>• Open coal fires with a “fire front”</li> <li>• ASHPs</li> <li>• ASHPs integrated with solar thermal</li> <li>• Biomass boilers using pellets</li> <li>• Infra red heating (radiant heating)</li> </ul>	<ul style="list-style-type: none"> <li>• Gas fired boilers serving radiators</li> <li>• Gas fired boilers integrated with solar thermal hot water systems</li> <li>• Gas fired boilers serving warm air heat distribution systems (ducting)</li> <li>• Electric storage heating in sheltered housing with vulnerable tenants</li> </ul>

When evaluating renewable heating against these alternatives six main groups of factors were found: financial factors, tenant-related factors, technical factors, factors related to the supply chain, policy-related factors and organisational factors. Each of these factors is discussed in turn below.

## Financial factors

Social housing providers described a range of finance-related reasons influencing uptake of renewable heat technologies. These included the comparative capital costs, maintenance and fuel costs, concerns over fuel poverty and the impact of future energy prices on housing providers and their tenants. All these costs were balanced when procuring new systems.

### Capital costs

Capital costs were an important factor influencing the type of heating system installed. Landlords viewed renewable heat technologies as having higher capital costs when compared with gas and electric heating systems, whether smaller scale (e.g. ASHPs versus electric storage heaters) or larger scale (e.g. communal biomass boilers versus larger gas boilers).

The capital cost was particularly important for Local Authority housing providers who were required to demonstrate prudent use of public funds.

“ There are financial barriers to everything we do, we’re a borough council, we have a limited amount of money. ” (Large non-applicant)

However the degree to which additional upfront cost was a barrier to investment in renewable heat systems varied between landlords.

Some felt that the case for investment in renewable heat technologies did not hinge on capital cost alone. A strong case for investment could be made based on other benefits of renewable technologies such as greater efficiency, improved SAP scores, improved heating control and wider social and environmental benefits. However, even amongst those who had installed renewable heat technologies some felt that the comparatively high capital costs remained a fundamental barrier to more widespread adoption of renewable heating systems, even with the RHI in place.

Three groups of response to the RHI were identified: those for whom the RHI was critical to the decision to install renewable heating, those who viewed the RHI as important but not critical and those for whom the RHI was considered a “bonus” because renewable heat would have been installed in any case. The logic underlying these perspectives is explored further in Chapter 4.

### Maintenance costs

Whilst mains gas fired systems were thought to be reliable and to have fairly low maintenance costs they were not an option in areas unconnected to the gas main. Amongst alternative systems for areas unconnected to the gas network, electric storage heating was thought to also have relatively low maintenance and servicing needs. This counted in their favour when selecting heating systems.

“ Well our preference is always gas, there’s no doubt about it, but obviously we realise gas isn’t everywhere. We’re reasonably happy with the electric installations, because it does what it says on the tin, they’re reliable, they don’t cause us a lot of aggro and we maintain them which is perfectly easy to do. ” (Large non-applicant)

Social housing providers who had direct experience of renewable technologies perceived the maintenance costs of renewable technologies to be greater than for conventional systems. Certainly there was no sense that renewable heating resulted in lowered maintenance costs. An increase in maintenance costs was considered to be partly related to the need to use external contractors to maintain renewable systems due to lack of adequate expertise in-house.

## Servicing costs

Not all aspects of mains gas fired central heating systems were considered favourably. For example, the expense and management of the annual servicing required by law for gas boilers was contrasted unfavourably with electric storage systems which do not have this requirement.

“ [Electric storage heaters] are a passive system, they just sit there, there’s virtually nothing to do. There’s no annual servicing, there’s no interruption with tenants, there’s no access issues. ” (Large non-applicant)

Servicing costs of ASHPs were considered to be reasonable in most cases and as comparable with conventional heating technologies other than electric storage heaters which were cheaper.

“ On the whole it’s not been too bad, an annual service, the price of which is really low, it doesn’t really seem to involve much, but we have had breakdowns and call outs, but you do with any heating system really don’t you. I wouldn’t say they’re over and above really. ” (Large applicant)

## Running costs

The technical performance of a system in having low running costs and therefore providing affordable warmth was a very high priority for landlords. For some, this consideration came before capital costs and other aspects such as lifespan:

“ I guess the main priority for us is affordability. So that’s the key element because without that nothing else works. But after that obviously we’ll be looking at the capital cost. Also, the lifespan of the product and what the servicing requirements are. So I would say they’re the fundamental issues. ” (Large applicant)

Low running costs also conferred a number of other benefits to the landlord. Homes with low running costs were reported to be less likely to be underheated therefore minimising risks of damage to the building from damp and condensation. Secondly, lower running cost homes were easier to rent out, with lower “void” times and therefore with a greater capacity to provide the rental income on which landlords depend. Thirdly, lower running costs meant that tenants had more income with which to pay their rent.

“ We have to put everything on the table, where they’ve got money left to pay their rent. So if we can find cheaper ways of providing heating and hot water, then so be it. ” (Large applicant)

Low running costs and controllability were considered to be the primary benefits of mains gas connected systems. Both these factors also meant that this system scores well in SAP. As landlords strive to meet SAP targets (both voluntary and as required by regulation in Wales and Scotland) achieved SAP scores were a major consideration when planning heating asset replacements.

“ The main driver is we’re trying to get people’s heating costs down. So we’re looking at people on storage heaters paying a fortune, they’re going cold they’re having to switch other forms of heating on at night so their bills are just going up and up. ” (Large applicant)

The various benefits of mains gas fired central heating meant that where no mains gas was in the area landlords explored costs of running the gas main to the area. Costs of mains gas connection were usually shared with the local gas distribution operator. However where the cost of connection to the gas main remained prohibitive, renewable and other heating system types such as next generation storage heating were considered.

Oil systems were, until quite recently, relatively expensive to run with poor SAP scores. The high price of oil had prompted a search for alternatives. However with the halving of the cost of oil over the last year it was thought that “it might make people change their opinion”. LPG has the same issues as oil being an expensive fuel and requiring careful budgeting with periodic deliveries. However both LPG and oil fuel boilers serving wet heating systems provided the control and zoning that tenants desired.

The relative cost of inefficient and expensive to run heating systems such as older electric storage heaters meant these systems were often prioritised for replacement, sometimes prior to their notional lifetime being reached. It was also notable that none of the applicants to the RHI in this sample were positive about electrical storage heating: the only positive comments came from non-applicants.

### The role of renewable heat technologies in reducing running costs

Landlords recognised that respective renewable heat technologies improved SAP only in some circumstances and that there were sometimes cheaper and more effective alternatives to using renewable heating. For example, it was recognised that replacement of old electric storage heating with ASHPs would improve SAP but there was much less certainty about whether a biomass boiler would achieve the same result. It was also recognised that greater insulation levels may be a more cost-effective route to SAP improvement than changing heating systems. An indication of SAP scores achievable with different configurations of heating systems and insulation is given in Appendix 1.

Experiences with renewable heat technologies resulting in reduced fuel bills versus conventional alternatives were mixed. Some landlords had chosen to replace systems such as electric storage heaters with renewable heat technologies such as ASHPs on grounds of reducing running costs and achieved good results:

“ Tenants are wearing coats and paying 40-50 pounds a week to heat their houses and afterwards they're wearing t-shirts and paying 25 and under. So, yeah, at the end of the day that's what makes it worthwhile and they've got money in their pocket. ” (Large applicant)

However, for another landlord results relating to running costs and usability of ASHPs had been disappointing:

“ They weren't perceived as very good by our tenants and weren't very controllable and they weren't generating the heat. And more importantly, they were quite expensive, which seems to defeat the [purpose] so they were having whopping electric bills and maybe it's because they were older type systems. But they're worth looking at as technology develops. ” (Large non-applicant)

Some landlords described how heat pump installations had only led to fuel bill reductions if the installations had been accompanied by insulation programmes, extensive education and training of tenants and the provision of user friendly controls. Where this had gone well tenants were reportedly universally accepting of the systems and achieving running cost reductions.

Other social housing providers installed more efficient non-renewable heat systems such as modern electric storage heaters which promise to address many of the technical issues with old fan driven storage heaters. These systems reportedly offered greater efficiencies plus lower capital and maintenance costs and greater ease of use as compared with renewable heat technologies. Unlike ASHPs they were also less vulnerable to vandalism and did not have noise issues.

Solar thermal was not considered to be effective in providing affordable heating as it only delivers a proportion of hot water used in the home. However, solar thermal was sometimes deployed in combination with ASHPs where it was considered as a compatible renewable heating system. This form of hybrid heating was viewed as having achieved mixed results however. One landlord found that heating bills were lower when the ASHP had been allowed to provide both the heating and all of the hot water. This may be linked to the location of the respondent on the west coast of Scotland which has mild conditions suited to ASHPs but also less intense insolation making it less suitable for solar water heating systems.

## Tenant related factors

The needs and circumstances of tenants were considered by social housing providers when choosing between heating systems.

### Control and the need for simplicity

Social housing providers compared issues such as ease of use, and the degree of heat control offered:

“ Whatever you put in has to be simplistic enough to operate. You can't overstate that, the number of things that people get wrong by thinking that tenants are going to spend the time and trouble working out how to use their heating system rather than just ring you. (Large non-applicant) ”

Electric storage heaters were criticised for being difficult to control for tenants, and as such leading to periods of over- or under-heating:

“ If you've got a wet system you can turn the radiators down in rooms that you're not using, whereas with storage heaters it just blasts out for seven hours and that's it. (Large applicant) ”

A counter to the issue of controllability and a source of frustration was the view that tenants did not operate their night storage systems efficiently despite various “education programmes”.

Tenants were reported to have particular problems with control of ASHPs and GSHP systems. Tenants had a lack of understanding of how the technologies heat space (and how this differs from conventional systems), were concerned that the requirement to keep their system running would result in high fuel bills, and had difficulty using the heating controls. Social housing providers that believed they were successful in overcoming these challenges attributed their success to introducing user-friendly heat controls, including controls that could be operated through smart phone applications and a very simple switch located near the front door which could be operated when the tenant went on holiday and which allowed them to increase or decrease the set point temperature by increments of one degree in a very simple fashion. Landlords had also gone to considerable lengths to provide tenants with accessible information such as YouTube videos, in home advice and support to help them to get the most from their system.

“ So that process, education, took a bit of time, but now people when they're leaving it on go well actually that's cheaper when I do that than trying to heat it up from scratch. So it's about education. ” (Large applicant)

Solar thermal systems were thought to add to the complexity of heating system control because they must be integrated with existing systems for heating and hot water provision. One landlord reported how they had successfully avoided issues associated with the additional complexity of control of a solar thermal system by connecting the solar thermal system into a communal hot water system serving sheltered housing.

### Vulnerability of systems to theft and vandalism

As well as considering the needs and circumstances of their tenants, landlords were also influenced by neighbourhood characteristics in selecting heating systems. Considerations included whether the area would benefit from investment in the quality of the housing stock and the likelihood of theft or vandalism to newly installed systems. For example ground mounted ASHPs external to the building were reported to be particularly vulnerable in this respect.

### Safety

Storage heaters have also had a role to play in heating in blocks of flats as they are considered to be safer than gas systems in these circumstances. Participants described a number of instances where, despite having a gas main nearby, a block of flats would be heated electrically nonetheless.

“ So for health and safety we've sort of said we don't think that's a good idea to install gas in the blocks. ” (Large applicant)

An alternative to installation of individual gas fired heating systems in blocks of flats is communal heating served by a centralised “commercial” gas fired boiler. This was an option that had been pursued by some landlords where electric storage heating needing replacement was present and a gas main was nearby.

As ASHPs are also an electrical heating system they were considered a possible replacement for electric storage heating in blocks of flats. Communal heating solutions were also mentioned included communal biomass and GSHPs solutions (see discussion of communal heating below).

### Management of biomass and solid fuel systems

Biomass and other solid fuel systems were considered inappropriate for social housing tenants. Elderly or vulnerable people were thought to be particularly unsuited to solid fuel systems due to difficulties with handling and moving the fuel and with the day-to-day practicalities of cleaning and using the systems. These handling issues applied to both biomass and old coal fired heat systems which despite remaining popular among some tenants, were steadily being replaced with alternative systems.

“ You can't really have tenants cleaning out coal fires. Coal's bad. We really can't have them doing coal, and so that's why we haven't gone down the line of pellets, pellet boilers things like that, you can't have tenants lugging about pellets. ” (Large applicant)

Budgeting for periodic deliveries of biomass (or oil) was also considered to be an issue and contrasted with the convenience of the supply of mains gas:

“ Tenants want to come in, switch it on and it’s working. That’s where they struggle with oil because a lot of them are on benefits and it’s sort of budgeting their money to do that. And it would be the same thing with biomass, ordering the materials in and then using it, down payments, how much can they put away for it? You know I’m doing all that and next door is just turning their gas on. ” (Large applicant)

Other concerns cited instances of tenants burning inappropriate and possibly damaging fuels in their biomass systems such as broken up wooden pallets<sup>5</sup> which could be freely available as opposed to using the requisite pellet fuel which must be paid for.

“ And the reality was you can’t afford to buy a bag of pellets. Well a pallet they could get for free so what are they going to do, they’re going to want to burn the pallet. ” (Large applicant)

This situation had resulted in one landlord being forced to re-weld the hoppers for a domestic biomass boiler plant in place after some tenants had wrenched the hopper away to allow non-pellet fuel to be used.

## Technical factors

Social housing providers described a range of technical factors that influenced uptake of renewable heat technologies.

### Property suitability

Landlords reported that the main circumstances in which they would install a non-gas system in individual houses which had access to the gas mains were if the property was a new build home, or a block of flats, or where gas heating was not considered desirable for health and safety reasons. Other than in these cases, there was no imperative to explore renewable heat technologies as an alternative to mains gas heating systems. In areas without a gas main social housing providers would weigh up the cost of connecting to mains gas versus the cost of installing renewable technologies.

### Heat pumps

Where the cost of connection to the gas main remained prohibitive ASHPs were seen as an increasingly viable option because of their comparability with traditional systems in terms of size, and relative ease of installation:

“ What we’re doing with those is we’re obviously looking anywhere we can lay gas, we run a fuel switching programme every year, on properties that we can connect up to the gas. If they’re completely off grid we’re looking at air source heat pumps as an alternative. ” (Large applicant)

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<sup>5</sup> Wooden pallets are small wooden platforms used to deliver goods using forklift trucks and sometimes discarded once the goods have arrived at their destination.



However, a barrier to choosing ASHPs in the short-term was the requirement to increase fabric standards for heat pumps to work efficiently. Heat pumps work best in buildings that require little energy to maintain a temperature once it has been reached. Social housing providers that had not yet installed heat pumps reported that once fabric standards had been addressed they would reconsider heat pumps.

Social housing providers also reported difficulties meeting the space requirements of horizontal GSHPs in their housing stock with only smaller gardens available and that creating access for a digger to dig the trenches or a machine to create a vertical borehole could also be problematic. Disruption, and high costs also militated against the deployment of GSHPs in individual housing.

### Communal heating

GSHPs were considered to be more feasible in serving communal heating systems. One landlord had successfully installed a communal GSHP system (bore holed), whilst others were investigating the potential of installing a GSHP to serve multiple buildings, with individual properties each having a unit fed by the GSHP.

Although biomass and GSHP heating systems were considered feasible for communal heating systems their use in serving a heat grid connecting individual houses (as opposed to blocks of flats) in off-gas grid areas was thought unfeasible because the homes would not be sufficiently densely grouped.

### Biomass boilers

While biomass boilers were considered viable in communal heating applications, they were not considered appropriate for individual homes because of the space required for fuel storage and issues with tenants handling solid fuel. Even when providing communal heating, social housing providers mentioned issues of access and storage:

“ I mean the system itself was okay for biomass...it was the layout of the building, the geography, you couldn't get to it. Where the boiler room was located, you couldn't get a delivery truck into the boiler room and to build a wood-chip store, it was too far away. ”  
(Large applicant)

### Grid capacity

The installation of concentrations of heat pumps in particular areas was reported to sometimes lead to grid capacity issues. In these circumstances, the distribution network operator (DNO) responsible for managing the grid sometimes contributed to the cost of upgrading the grid to meet the increased demand. However, the additional costs of upgrading the grid associated with ASHP or GSHPs may make the technologies unfeasible in this context.

“ The only problem we're actually having is sometimes the local power provider [is] coming back to us and saying we'd have to upgrade the local system to be able to put in air source heating so at that point we might look at alternatives. ” (Large applicant)

## Reliability

The reliability of heating systems was important to social housing providers because of the requirement to provide warm and affordable housing for tenants as well as the high cost of maintaining unreliable systems. Also, an unexpected loss of heating service during a cold period could have very serious health impacts on vulnerable tenants.

However landlords reported that renewable heat technologies do not appear to offer clear improvements in reliability over conventional alternatives. For example some landlords reported a lack of confidence in the reliability and longevity of ASHPs. In some cases, negative experiences had occurred at a time when the market was less developed and the technology had not fully matured. Poor experiences had acted as a barrier to further deployment of the technology in some instances.

“ As it stands at the moment if you said to me I'll 100% fund your air source heat pumps for your thousand properties I'd show you the door cause I wouldn't even let you give me them because I'd just have to employ so many members of staff to rectify the problems and stop the tenants wanting to lynch me. ” (Large non-applicant)

## Fabric first

Some social housing providers reported taking a 'fabric-first' approach, investing in improving the building fabric before trialling new heating systems. Reasons for this included the sense that affordable warmth could be most cost-effectively delivered by improving insulation standards first and that the alternative of putting more innovative heating technology into the homes was a riskier strategy, possibly exposing the landlord to greater maintenance costs and the chance of system failure:

“ You know we do very much have a belief in fabric first and trying to keep as much technology out of the houses that we can manage you know. ” (Small applicant)

## Supply chain factors

Supply chain factors including the quality of installation and post-installation support were also reported to have influenced decision-making about renewable heat technology.

## Quality of installations

Concerns were raised about the quality and expertise of installers of renewable heat technologies among social housing providers who had direct experiences of these technologies or who had heard about challenging experiences from other housing providers.

“ We're a bit wary on the heat pumps at the moment because...and I think we're not the only ones. A lot of heat pumps initially were installed with enthusiasm and great hopes and the companies that installed them, unfortunately, are not certified to maintain them. And we've had issues and very poor maintenance on some of ours. ” (Large applicant)

Comparatively, some landlords noted their experience of efficient and skilled installers:

“ But I've got to say we've got a really good contractor, they do a really good job they're really clean and tidy and they do all our gas systems as well ” (Large applicant)

Landlords also mentioned that installers who took care over the installation process and commissioning of the systems would also be favourably evaluated. This meant ensuring that the work was conducted in a tidy and undistruptive way and that installers were helpful in explaining the operation of a new heating system to tenants.

### Maintenance and after sales support

Landlords reported that renewable heat technologies require specialist knowledge to maintain them and that parts can be difficult to obtain. For this reason tender submissions for maintenance contracts from a local installer base that was well trained in the technology and supported by a favoured manufacturer were reported to be more favourably evaluated.

“ It’s not the technology itself it’s the people who are installing it and the people who are maintaining it...And that’s what we found personally and you know like that’s the hardest part to get somebody who can do it and obviously to find the funds to do it as well... it is really important especially for a social housing provider where you know we’ve got responsibilities of care you know to provide hot water for customers. ” (Large applicant)

Despite concerns, some social housing providers received good quality support from installers and manufacturers including the provision of maintenance services, training for housing provider staff and tenant support.

“ [The manufacturer] has provided great support, training packages for all our staff, clerical staff, frontline staff, as well as tenants and board members and local contractors. They had a skill centre here as part of the package that enabled other people to come and see the various technologies and training opportunities ” (Large applicant)

### Reliability of biomass supplies

Lack of confidence in the supply of reliable and affordable biomass was cited as a barrier to the uptake of biomass heating systems.

“ Biomass, we possibly wouldn’t go down that road because, well one thing we’re obviously keeping an eye on the cost of the pellets is going up considerably on a regular basis. ” (Small applicant)

There were also concerns over the additional cost of a contractor refilling hoppers with biomass.

“ We’ve then got to have a hopper, we’ve got to pay for somebody to keep going round and keep topping the hopper up. There’s a lot of ancillary costs to having a biomass system put in that would probably negate us having one if I’m absolutely honest. I would certainly go down the ground source route and air source before I’d really go into the biomass. ” (Small applicant)

Concerns over the sustainability of biomass fuel being shipped to the UK from distant sources were also mentioned.

### Policy related factors

Social housing landlords have social and charitable objectives focussed on providing decent and affordable housing to those that need it. Landlords reported how these objectives colour

all aspects of their asset management and procurement and associated formal and informal policy and translate to an overriding concern to provide homes which can be affordably heated. Renewable heat technologies can assist in providing affordable heating in some circumstances but associated reductions in carbon emissions also align with sustainability policies reported by some landlords.

### Internal policy factors

**Affordable warmth strategies.** In order to fulfil their charitable and social objectives social housing providers developed affordable warmth strategies which encouraged them to consider non-conventional heat systems where these made heating the home cheaper. Affordable warmth strategies had specific targets for average SAP ratings of homes and removal of tenants from fuel poverty. As discussed already, renewable heating was reported as helpful in meeting SAP targets in some circumstances but not in others depending on the renewable heat technology to be deployed and the condition of the building fabric. It was reported as having a role in meeting environmental pledges:

“ We have one pledge which is to reduce or eliminate fuel poverty by 2020, to be working, to quote it, “tirelessly to reduce fuel poverty by 2020” and a pledge 14, which is to be more “environmentally aware” . ” (Small applicant)

**Environmental and sustainability accreditation.** A social housing provider with the environmental management system, ISO14001, reported that this required that renewable heat technologies were evaluated when writing performance specifications for new heating systems. Another provider with Sustainable Homes Index for Tomorrow (SHIFT) accreditation, a sustainability standard for the housing sector, described their long-term plan for meeting environmental targets which included consideration of renewable heat.

### External policy factors

**National energy efficiency legislation.** National legislation<sup>6</sup> was a driver for the installation of more efficient heating systems (including renewable heat technologies) and efforts to improve the energy efficiency ratings of the properties among social housing providers with housing stock in Scotland and Wales. Renewable heat technologies were also reported to have been installed in new build properties to meet environmental standards in the Code for Sustainable Homes. However, none of the English landlords reported an external policy currently driving improvements in the efficiency of existing housing stock other than regulation prohibiting the provision of housing that would create a category 1 cold hazard as defined by the Housing Health and Safety Rating System.

**Planning legislation.** It was suggested that some housing providers may be deterred from installing ASHPs due to the perception that planning permission must be obtained for this technology in some parts of the country. The cost of obtaining planning permission in each instance was also described as a barrier.

<sup>6</sup> For example, the previous Scottish Housing Quality Standards which drove improvements in SAP ratings, and the Energy Efficiency Standard for Social Housing in Scotland, which drives improved energy efficiency.

## Organisational factors

A number of key organisational factors influenced the uptake of renewable heat technologies among social housing providers.

### Presence of a dedicated sustainability champion

This influenced procurement decisions and facilitated the installation of renewable systems. The support of senior staff was also very important. In some instances those improving the sustainability of the organisation were also its senior asset managers.

### Willingness of social housing providers to 'take risks' or trial new things

Some landlords were willing to branch out and try renewable heat technologies. However, some Local Authority landlords were more risk-averse and saw the requirement to ensure that public resources were used appropriately as a barrier to investment in renewable heat technologies.

### Lack of specialist knowledge

Some landlords reported that they had a lack of specialist knowledge of renewable heat technologies and/or time to explore the options available. This could result in social housing providers installing non-renewable systems. This was especially notable amongst council participants who reported focusing their efforts on bridging gaps left by government cuts, and so having a lack of capacity to look beyond this:

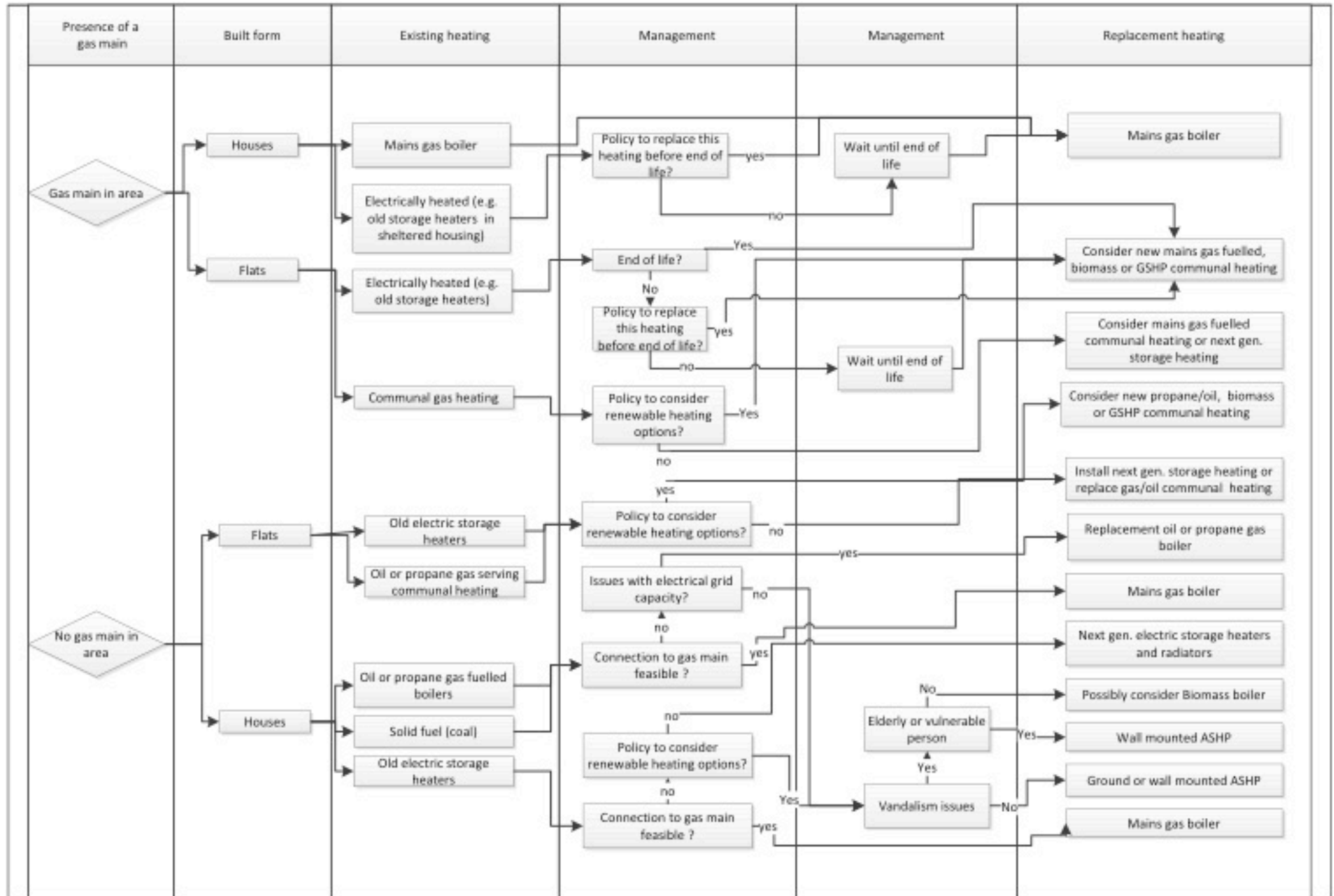
“ One of the principal problems is very limited capacity. We're a Local Authority at a time when the government is cutting our budgets. So, focus on this area is greatly reduced by the fact we're fire fighting all the time. ” (Large non-applicant)

### Financing the procurement of renewable heat technologies

Social housing providers reported how they primarily financed the procurement of renewable heat technologies through their own internal funding i.e. from rental income. Where grant funding was sought, this was in order to undertake pilots. Borrowing finance was only discussed by council-led social housing providers.

A decision tree which summarises the potential processes identified from this research by which landlords arrive at the decision to install a renewable heat technology is shown in Figure 4.

Figure 4: Decision-making processes for renewable heat technologies



# 4. The role of the RHI in decision-making

RHI applicants described how the RHI had been influential in their decision to select renewable heat technologies because it had strengthened the financial case for renewable heat technologies. Reasons for not applying to the RHI included factors related to finance but also a variety of other policy and capacity issues (some of which have already been discussed in Chapter 4). Reasons for application and non-application are summarised in Table 3.

Table 3: Reasons for applying to the RHI

Application	No application
<p><b>Payback income</b></p> <ul style="list-style-type: none"> <li>Schemes become feasible (esp. biomass)</li> <li>Used to pay off any loan for the renewable heat technology</li> </ul> <p><b>General income</b></p> <ul style="list-style-type: none"> <li>Money received for general recycling by social housing providers</li> <li>Money back to schemes</li> </ul> <p><b>Reinvestment income</b></p> <ul style="list-style-type: none"> <li>Secure funding for future installations</li> <li>Funding for further sustainability or fuel poverty work</li> </ul>	<p><b>Policy change</b></p> <ul style="list-style-type: none"> <li>Fear of potential change to the RHI after ECO experience coupled with limited staff resources</li> </ul> <p><b>Social housing provider policy</b></p> <ul style="list-style-type: none"> <li>Properties not suitable for renewable heat</li> <li>Focus on upgrading building fabric first</li> <li>Want to wait and see the technology mature</li> </ul> <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>Too busy/not enough staff resource</li> </ul> <p><b>Financial</b></p> <ul style="list-style-type: none"> <li>RHPP repayment from the RHI means that it is not worthwhile applying</li> <li>The RHI not thought to adequately cover additional costs of renewable heat technologies</li> </ul>

## Reasons for applying to the RHI

The strength of the financial influence exerted by the RHI varied quite widely. Some described the RHI as being critical to selection of a renewable heating technology over a conventional alternative whilst for others it was considered important in influencing the board but not essential. A third group tended to think of the RHI payments as a “bonus”.

### RHI critical to adoption of renewable heat

For some, RHI payments were very important or even critical in making the business case for a renewable heat installation over a conventional alternative. In these cases the income from the RHI was considered as “payback” directly linking the financial case for the investment with the RHI payment. Similarly where loans had been taken, the RHI payments were used to repay the loan, demonstrating a clear link between RHI payments and the additional cost of installation.

“ Now if RHI's going to stay in, it gives us the opportunity to say, yes we can do air source heat pumps, we've got to pay up front so then we can apply for a loan, but we know that RHI is going to pay it back in seven years rather than 10 years so that for us, that loan, is a lot cheaper. ” (Large applicant)

The RHI was further reported to be more critical for some renewable heat applications than others. For example, communal GSHP and biomass systems were viewed as financially unfeasible and would not proceed without RHI support. One landlord described how this was particularly important in offsetting the additional maintenance cost of a communal biomass boiler system:

“ We don't make money out of the RHI. The RHI goes in to supplement the running costs... [renewable heat technologies are] just massively too expensive otherwise. If I tell you it costs me £12,000, £13,000 a year to maintain a biomass system and it costs me £2,500, £3,000 to maintain a gas system you can see the difference. ” (Large applicant)

### RHI improves the business case

A second group of social housing providers described how the RHI was not critical to their decision to install a renewable heat technology, but still important. This was because it was thought that the upfront cost was only one of a range of considerations when selecting heating systems. Reliability and running costs to tenants, for example, were also important. So, any reduction in the relative capital cost of a renewable heat technology was reportedly welcomed and made it easier to gain approval at board level but it was not critical.

### RHI payments are a bonus

A further group described how RHI payments were considered as a bonus. Social housing providers in this group reported that they probably would have installed renewable heat technologies in any case because they were considered the best technology for the context. For example this was reportedly the case when replacing old-style electric storage systems in off-gas situations with ASHPs. So, RHI payments to this group were less tied to repayment of the investment and instead earmarked for funding for other schemes including helping tackle fuel poverty through efficiency measures:

“ The more money we get the better, because at the end of the day we spend it back on heating. None of this [RHI] money goes into salaries. It goes straight back into tenants to get them out of fuel poverty. ” (Large applicant)

RHI payments for those seeing it as a bonus were also earmarked for other sustainability work. One landlord described how they were considering installing photovoltaic systems in their housing stock initially funded by RHI payments.



## Reasons for non-application

Social housing providers described the following reasons for not applying to the RHI or for the RHI not being influential in the decision-making process.

### Renewable heat technologies the best option

Some landlords reported the RHI had not been influential in their decision-making because they would have installed renewable heat in any case because it was the best technology in the circumstances. Nonetheless these landlords would then go on to apply for the RHI seeing the payments as a “bonus” (see above).

### Concerns around the stability of the RHI policy

Changes to the Energy Company Obligation (ECO) funding criteria had raised fears that similar changes would be made to the RHI (domestic and non-domestic) so that some landlords were reluctant to start a project where funding was dependent on the RHI.

### Strategic priorities

As discussed in Chapter 4, some landlords described how their strategic priorities were in areas other than renewable heat, such as improving the fabric and insulation standards of the stock. Some described how once these priorities were met alternative heating technologies would begin to be explored. Landlords described how the RHI had changed the environment and was now in their thinking but that the properties had to be suitable for renewable heat technologies. They would not start installing renewable heat systems just because the RHI is there:

“ It’s quite important in that it gives us extra funding, so yes we’ll still be looking at it, but it’s got to be appropriate in the first instance anyway, the systems we install. ” (Large applicant)

### Resource capacity

Applying for grants and schemes was described as a resource intensive process that social housing providers did not always have the capacity for, even where they had installed RHI eligible systems under the domestic scheme. The cost of taking on additional capacity to deliver applications for the domestic scheme was also cited as an issue and in these cases the RHI payments were not considered sufficient to cover the staff resource needed to complete the application process.

### RHI repayments considered insufficient

There were cases where the RHI was thought not to provide enough of a business case to encourage the uptake of renewable heat technologies as it was expected that payments would not cover installation costs and any additional costs of fuel switching such as changing cooking equipment and removal of propane and oil tanks. Other costs that were mentioned as not covered were forgone rent if tenants had to be re-housed while works were carried out and additional costs of increasing the capacity of the electricity grid if concentrations of heat pumps created this requirement.

# Implications of the RHI for social housing providers' future practice

Applicant and non-applicant social housing providers described the implications of the RHI for their longer-term planning.

## Familiarity with renewable heat technologies needed first

Social housing providers that had not yet installed any renewable heat technologies in their stock described how they would need to become more familiar with the technologies before taking any further steps, including installing renewable heat systems and applying to the RHI. However the RHI was described as a stimulus to begin investigating the viability of renewable heat. In some instances landlords were in the process of developing a strategy for renewable heat technologies including writing briefing papers and conducting feasibility studies. Once this work was complete it was reported that they could begin to factor renewable heat technologies into longer-term thinking.

## The changing cost of technologies

Some social housing providers described how they would play a waiting game, continuing to monitor the costs and development of renewable heat technologies, waiting until the technology was considered mature and reliable and costs had fallen. There was a view among some that the cost of the technologies would come down as a result of the stimulus provided by the RHI.

## Degression

Other than for domestic biomass boilers, at the time of the research there had been no depressions so social housing providers were unable to speak from experience on whether degression had affected their decision-making<sup>7</sup>. Some landlords reported that the prospect of degression would not affect decision-making whilst for others it was a consideration. For example, it was reported that if rates were maintained at their current levels, replacement of storage heating systems would be brought forward before a system's lifetime had been reached.

“ If the payments stayed high and there was a better return then I think we might actually look to replace more Economy 7's ahead of when they're due if you like. ” (Large applicant)

The policy of degression was also considered as justified:

“ We don't want schemes that make money or finance us or anybody; we just want schemes that give you a fair return. ” (Large applicant)

However it was also reported that if degression was to take place and to be considered fair then it should mirror a decline in the cost of the technology. Paradoxically the example of the Feed-in Tariff for photovoltaics was perceived as an instance of fair degression as the Feed-in Tariff rates had reduced roughly in line with the declining cost of photovoltaic systems, but it was also reported that landlords had made money from the Feed-in Tariff and that this was not necessarily their objective.

## Opportunities to establish new funding for sustainability work

RHI payments were considered an opportunity to set up ring fenced budgets for investment in further sustainable energy measures in the stock. One landlord described how they were considering establishing a trading arm which would install photovoltaic systems in their housing stock but be initially capitalised with RHI payments. This was a model that had been used with Feed-in Tariff payments from photovoltaic installations.

<sup>7</sup> Only 2 of the sample had installed domestic biomass systems.

# 5. Experiences of the domestic RHI

Six of the 16 applicants in this research had applied to both domestic and non-domestic strands of the RHI whilst the remainder applied for the domestic strand only. Unless otherwise indicated analysis presented below refers to domestic applications only.

## Hearing about the RHI

Landlords described a variety of channels through which they had heard about the RHI. As described in Chapter 2, landlords described being extremely well-networked through both formal and informal channels. Landlords also reported receiving a stream of information about heating technologies much of which was linked to new products and services and some of which carried information about the RHI. Official channels such as DECC emailing lists and blogs were also mentioned as sources of awareness about the RHI.

## Applying for the RHI

The experience of applying for the RHI can be split into three stages: the pre-application stage where the applicant had to meet the scheme requirements; the application stage; and the post-application stage when applicants received payments.

### Meeting scheme requirements

Views on how easy it was to meet the domestic RHI scheme requirements were mixed. One view was that the scheme requirements were appropriate, while another domestic applicant maintained that they were onerous to comply with due to the volume of information required. Where challenges were experienced, these centred on:

- Social housing providers experiencing difficulties accessing properties to carry out Green Deal assessments and difficulties in finding a local Green Deal assessor in remote areas.
- A challenge experienced by Local Authority housing providers was in accessing title deeds from the Land Registry as they did not keep deeds for their properties<sup>8</sup>.
- The requirement for an Microgeneration Certification Scheme (MCS) accredited installer to carry out the installation was problematic for legacy applicants who had used in house installers who were not MCS-accredited, or an installation firm that had since gone out of business.

### Application stage

Experiences of the RHI application process were predominantly positive, although mixed and underpinned by:

- The level of support received with the application process. Those who used consultants or had assistance from the installer with completing the forms found that this had made the application process easier.

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<sup>8</sup> Landlord applicants are asked for the title deeds for the first application they submit as a means of checking ownership as per the scheme regulations.

- Whether the information that had to be submitted with the application was already held by the social housing provider. If the information was already held on file, it was easier to supply. This was particularly important for non-domestic applications.

“ Obviously the non-domestic one required a reasonable amount of information but we had all that on file. So, no, it was relatively straightforward. ” (Large applicant)

- Whether there were delays in finding out from Ofgem whether information that had been re-submitted was acceptable or not. For example, a social housing provider reported having waited several months to find this out.
- Whether bulk applications, that is, one application that covered more than one property, were possible. Bulk applications were generally considered to be easier than submitting separate applications for each property. However, views on whether bulk applications would be feasible were mixed.
- It was suggested that it would be beneficial if each social housing provider applicant was allocated a case officer that could act as a single point of contact. This would allow all information about a particular (possibly repeat) applicant to be held by the case officer so that the social housing provider did not have to repeat information to different staff, which would speed up the process.

“ One of the problems it seems to be is that I’ve asked for a contact point and an account manager but they haven’t got one yet and that would be very useful to have because of the sheer volume and we don’t want to be dealing with 20 or 30 different people. ” (Large applicant)

## Post-application: the RHI payment system

Factors that influenced satisfaction with the RHI payment system among social housing providers were:

### RHI tariff rates

Opinion regarding the tariff rates varied. Some landlords were happy with the rates, considering them “about right”. One landlord stated that anything that “delivered a 9-10 year payback” was acceptable. However, some landlords did not feel that the tariff rates covered the installation costs. For example a non-applicant landlord reported that he felt the RHI payment only met “about half” of the installation cost. Others felt that it was not necessary for the RHI to cover 100% of the additional installation cost, only a reasonable proportion of it, as landlords were not necessarily concerned with making a financial business case for investing in the renewable heat technology, nor making money out of it. The social and environmental benefits of renewable heat technology installation justified additional costs of renewable heat technologies not covered by the RHI payments:

“ it doesn’t even have to cover all of the money [referring to the domestic RHI], but it has to be close to and then that difference that you’re left with, that deficit, is balanced by the stuff that can’t be quantified necessarily with financial stuff, so the CO2, the savings to the customers, the stimulation of the market and supply chain and the economy. ” (Large non-applicant)

As discussed in Chapter 3, others thought that costs additional to the installation costs were not adequately covered and that this was a disincentive for further renewable heat technology installations. There were also concerns that the payments for biomass were not necessarily set to track an increase in the cost of biomass fuel. In consequence landlords could become locked into a heating system which became very expensive to fuel:

“ if the fuel isn't considerably cheaper, then it's going to be quite an expense for the users. Those that have bought into that system will lose at the end, I suppose. ” (Large applicant)

Some landlords that reported being happy with the level of payments were influenced in part by the sense that, as discussed in the previous chapter, payments for individual ASHP and solar thermal were helpful in making the business case for renewable heat technologies rather than critical to the adoption of the technology. This meant that in some contexts tariff rates were not reported to be a governing factor in driving renewable heat technology uptake.

However social housing providers also considered that higher tariff rates had encouraged them to install more systems than they might have otherwise and that it would also stimulate the “bringing forward” of the replacement of problematic heating systems with renewable heat technology alternatives before the notional end of life had been reached.

### Satisfaction with the method for calculating payments

The method for calculating the payments was considered very complicated therefore “you have to have some faith that DECC have got it right” but there were no real complaints about the underlying methodology.

### Satisfaction with the format of payments

Some mentioned that payment advice was not delivered in a helpful fashion. The current format meant it was not clear what each payment related to which made it difficult to understand how much the landlord was receiving and what it was for. There was also some concern that similar properties with identical renewable heat technologies were receiving different rates and that Ofgem had not provided adequate information accompanying the tariff payments for the landlord to better understand the payments. These uncertainties over what would actually be received in practice had meant that one landlord had put further ASHP installations “on hold”.

# Appendix 1: Standard Assessment Procedure results for a model home

Heating	solid fuel	propane Gas condensing combi boiler	old large volume storage heaters	Biomass boiler	oil condensing combi boiler	ASHP (with flow >35 degrees)	old volume storage heaters PLUS INSULATION. Walls brought up to U value 0.35. double glazing put in. Floor insulation to 0.5	mains gas condensing combi boiler	mains gas condensing boiler	GSHP	gas condensing boiler PLUS INSULATION. Walls brought up to U value 0.35. double glazing put in. Floor insulation to 0.5	ASHP (with flow <=35 degrees) integrated tank with immersion heater.
Hot water	electric immersion heater	propane Gas combi boiler	immersion heater	served by boiler	oil condensing combi boiler	ASHP (with flow >35 degrees) integrated tank with immersion heater	electric immersion	gas combi boiler	solar thermal hot water	GSHP	gas condensing boiler	ASHP
SAP	34	38	43	44	54	58	59	64	65	66	72	74
A-G	G	F	E	E	E	D	D	D	D	D	C	C
Co2/year	10806	3772	7713	1170	4712	3222	5391	3427	3250	2614	2397	2140
Co2/m2/year	154.37	53.89	110.19	16.71	67.32	46.02	77.01	48.95	46.44	37.34	34.25	30.57

In a poorly insulated flat (with walls and a floor with a U value of 1), heating via a solid fuel open fire, an LPG boiler or an old electric storage heater would all deliver very low SAP scores (34, 38 and 43 respectively). Replacing these systems with a biomass boiler makes a very marginal improvement (SAP 44); replacing with an ASHP (with a suboptimal flow rate > 35 degrees) delivers a SAP of 58; replacing with a mains gas condensing boiler delivers a SAP of 65. The addition of insulation (to current building regulation standards for new build, U = 0.35) to a home heated with, for example, old storage heaters, takes the SAP score to 59 (compared with 43 uninsulated). Therefore, in this model, for a poorly insulated flat with old storage heating (and not connected to mains gas), a better improvement to SAP scores is achieved by insulating the flat compared with replacing the storage heaters with a biomass boiler or an ASHP (with a flow rate > 35 degrees). Where insulation and an ASHP are installed together, so that the ASHP can operate more efficiently with flow rates < 35 degrees, then a SAP of 74 is achieved. These results suggest that a fabric first approach might deliver better SAP results in some circumstances compared with the installation of biomass boilers or ASHPs where insulation is not also installed.

