Department of Energy & Climate Change

Evaluation of the Renewable Heat Incentive

Interim report: the non-domestic scheme

URN [14/D324]

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Contents

Terminology and definitions

Throughout this report we refer to the following types of RHI stakeholder.

- **Applicants**. Organisations which have taken up or tried to take up the RHI.
- **Multiple applicants.** Organisations which have made more than one application to the RHI.
- **Possible applicants.** Organisations included in qualitative interviews that had either considered installing renewable heating technologies but decided not to or that went ahead with their installation but decided against applying for the RHI.
- **Respondents.** Individuals that took part in the quantitative surveys conducted as part of this evaluation.
- **Participants.** Individuals that took part in the qualitative interviews conducted as part of this evaluation.

The following describes the main RHTs which have received support so far under the non-domestic RHI.

- **Solid biomass boilers** burn wood biomass (usually pellets or chips) to heat hot water boilers where are used to either heat buildings and provide hot water (potentially via local heat networks) or, in some cases, to provide process steam for manufacturing.
- **Ground source heat pumps** extract heat from pipes which are buried in the ground. This heat is absorbed into a fluid and then pumped into a building, usually for space heating, albeit in some cases potentially to provide hot water. The pumps are typically driven by electricity.
- **Solar thermal installations** use tubes or 'collectors' to capture heat from the sun to heat water which is used for hot water and/or space heating.
- **Biomethane** installations use anaerobic digestion (AD) of biogenic materials (for example, food wastes or maize) to produce biogas, which is refined into biomethane and subsequently injected into the natural gas grid. Combined with natural gas, the biomethane can then be used for heating applications in homes and businesses.

The following technologies are also supported by the RHI, but uptake so far has been limited (for Air-source heat pumps, this could be largely due to the technology only becoming eligible for support from the end of May 2014 alongside other new or increased tariffs):

- **Biogas** installations use AD of biogenic materials to produce biogas, which is used to fuel a gas engine. This produces heat (usually along with electricity), which might be used for space heating, hot water or industrial 'drying' processes;
- **Water-source heat pumps (WSHPs)** extract heat from pipes which are laid under water. This heat is absorbed into a fluid and then pumped into a building, usually for

space heating, albeit in some cases potentially to provide hot water. The pumps are typically driven by electricity.

- **Air-source heat pumps (ASHPs)** extract heat from the air.[1] This heat is absorbed into a fluid and then pumped into a building, usually for space heating, albeit in some cases potentially to provide hot water. The pumps are typically driven by electricity.
- **Deep geothermal installations** draw heat from hot water aquifers at depths where temperatures are considerably hotter than the surface. This water can be extracted and used to provide space heating and hot water for buildings (usually via local heat networks); and
- **Energy from waste (EfW)** burn waste (typically from households and businesses) to heat hot water boilers where are used to either heat buildings and provide hot water (potentially via local heat networks) or, in some cases, to provide process steam for manufacturing.

[1] We use the term air source heat pumps in this report to refer to air-to-water heat pumps, i.e. those that use hot water as the vehicle for heat provision. It should be noted that air-to-air heat pumps, which use air as the heat carrier, are not currently supported by the RHI

Executive summary

This report summarises interim findings from an independent evaluation of the Renewable Heat Incentive (RHI). The evaluation was commissioned by the Department of Energy and Climate Change (DECC) and this report focuses on findings related to the non-domestic scheme from research being undertaken by NatCen Social Research, Eunomia Research and Consulting and Frontier Economics (the evaluation consortium).

Background and Context

Almost half of energy consumed in the UK is used to provide heat, 43 per cent of which is used in the non-domestic sector. Reducing carbon emissions from non-domestic heat is therefore an important part of meeting UK greenhouse gas reduction targets.

Renewable heat can be generated from a diverse range of technologies including biomass boilers, heat pumps and solar thermal and offers an alternative to combusting fossil fuels, which emits greenhouse gases. At present the markets for these technologies are relatively small and generally have higher lifetime costs than conventional alternatives such as oil and gas boilers. Therefore support is required to stimulate increased uptake, overcome barriers and develop the supply chain.

The non-domestic RHI was launched in November 2011 (with installations of eligible renewable heat technologies (RHTs) since July 2009 qualifying for support). The Renewable Heat Incentive (RHI) scheme aims to[2]:

- **incentivise the roll out of renewable heating technologies to contribute to the UK's 2020 renewable energy target**;
- **deliver significant reductions in the carbon emissions resulting from heating**; and
- **prepare for mass rollout of renewable heating technologies beyond 2020** by building sustainable supply chains, improving performance, reducing costs and increasing awareness of these technologies.

Under the non-domestic RHI, organisations with accredited installations receive a payment for each metered unit (kWh) of heat produced for 20 years following accreditation of the installation.

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[2] The full objectives for the non-domestic RHI are set out in DECC (2013) *Renewable Heat Incentive: expanding the non-domestic scheme – Impact Assessment.* Available at: https://www.gov.uk/government/consultations/renewable-heat-incentive-expanding-the-non-domestic-scheme

In addition, to the non-domestic RHI, the domestic RHI opened on 9th April 2014 to people who install renewable heating technologies in their homes.

Research objectives and approach

This report focusses entirely on the **non-domestic RHI scheme**. The aim of this process evaluation is to understand the administration, delivery and performance of the RHI and explore its effect on the renewable heat supply chain.

The outputs from the evaluation will help DECC to understand and assess how the non-domestic RHI is delivering relative to its objectives and support development of the scheme. This evaluation also helps ensure that DECC is conforming to principles of accountability, transparency and openness to scrutiny in policy-making.

To achieve these objectives a series of research projects were designed and delivered by the contractors. These included surveys and interviews with non-domestic RHI applicants, possible applicants, the wider non-domestic population and the investment community.

Uptake of the Non-domestic RHI

As of 31st March 2014, 5,235 full applications for the non-domestic RHI had been made. Of these 3,769 had been accredited by the Office of Gas and Electricity Markets (Ofgem), 1,372 were being considered and 94 rejected or withdrawn.

Notably, over 90 per cent of installations so far have been biomass boilers. This is a higher proportion than was expected when the scheme was launched[3]. **Just over 900 GWh of renewable heat has been generated under the scheme, again with the vast majority coming from biomass**. Where this report presents findings relating to applicants, therefore, these reflect a largely biomass population.

Until now, applicants[4] to the RHI can be characterised in the following ways:

- **they are more likely to be located off gas grid**. Almost three quarters of RHI applicants do not appear to have a connection to the gas grid, compared to less than a quarter in the general population;
- **they are mainly from the commercial and leisure sector (56 per cent) and agriculture (24 per cent)**. Although agricultural organisations comprise five per cent of the wider business population, they currently are responsible for 24 per cent of non-domestic RHI applications. A substantial number of applications (56 per cent) are

[3] See, for example, DECC (2011). *RHI Impact Assessment*. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48241/3775-renewable-heat-incentive-impact-assessment-dec-20.pdf

[4] Organisations which have taken up or tried to take up the RHI.

from the commercial and leisure sectors although, this is broadly in line with their share of the general population (66 per cent); and

- **they are more likely to be based in more rural locations** (the South West and Scotland).

The current deployment of Renewable Heat Technologies under the RHI therefore is more likely to be rural and off-gas, where the financial case for renewable heat technologies may be easier to make. Agricultural organisations, who are also likely to fit into these categories, have seen relatively high take-up.

Applicants' experiences of the non-domestic RHI

The applicant experience of the non-domestic RHI scheme involves a number of stages from development and submission of an application to receipt of tariff payments. In general, applicants have been positive about many aspects of the RHI. **The RHI payment and metering processes appear to be working well at present and applicants are satisfied with the requirements these aspects involve**. Around three quarters of applicants were "very" or "fairly" satisfied with metering. One in ten applicants (who are in theory eligible for payment) have experienced problems receiving payments.

Our findings suggest that the application process is the part of the RHI customer journey with the most room for improvement. It should be taken into consideration, however, that what applicants perceive as a problem may stem from the inherent complexity of the scheme design.

Organisations want to see more streamlining, clarity and consistency in the RHI application process where possible. While a third (34%) of applicants reported that the application process took four full-time equivalent days or less to complete, one-fifth (22%) of applicants reported that the application process took more than 15 days. Qualitative interviews with possible applicants also identified a perception that the application process is lengthy.

Just over half (54%) of applicants also reported experiencing problems completing their applications, particularly those applying for ground source heat pumps (GSHPs) or solar thermal. Those who experienced problems mostly reported a lack of clarity over the information they needed to provide and overly complex guidance (from Ofgem). This was a particular issue for GSHPs and solar thermal applicants, who experienced problems identifying and providing the right information.

The most common reason cited for applications being returned by Ofgem was inaccuracies or gaps in the details provided about the installation. This suggests there may be potential for improvements in simplifying the requirements for information provision or providing clearer guidance for applicants.

There are a number of multiple applicants to the RHI. The sample of applicants included in the qualitative interviews with multiple applicants reported very particular concerns with the RHI application process. These include the need to provide the same information separately for each application and perceived

inconsistency in decisions across applications (respondents reported application forms for what they saw as largely identical installations being approved earlier in the scheme and later rejected). There is the potential to provide a more effective, consistent and streamlined service for multiple applicants in the future.

Investing in RHTs

Awareness of RHTs

At present, **awareness of RHTs among the wider non-domestic population is high with 90 per cent of organisations having heard of at least one type of RHT**. Technologies with the highest take-up (biomass boilers, ground-source heat pumps and solar thermal) are the most well-known.

Seven per cent of organisations reported that they know “a lot” about RHTs with 51 per cent saying they know “a little”. Awareness of RHTs is highest in the industrial sector and amongst organisations that monitor their energy consumption regularly.

Awareness of the RHI

While awareness of RHTs is high**, awareness and understanding of the RHI amongst the wider non-domestic population is low with 79 per cent unaware of the scheme** prior to being surveyed. This suggests the RHI is not yet playing a major role in promoting wider awareness of RHTs

Awareness was higher among industrial organisations, small-scale Feed-in Tariff (FiT) claimants and those who spend a greater proportion of turnover on heating.

Qualitative interviews with possible applicants showed some misunderstandings existed around the attributes of RHI (e.g. how it differed from the small-scale FiT and whether it was a capital grant) and the eligibility criteria. This implies some organisations which could benefit from the RHI may not being doing so because of misconceptions.

Motivations, barriers and financing of RHTs

Amongst applicants, **motivations to invest in RHTs are largely driven by the financial return from the RHI tariff**. The environment and using ‘renewable’ energy sources is also important to a majority of organisations in their choice of technology, particularly for large and public sector organisations. The main barriers to investment for organisations are reported as a lack of confidence in the reliability of RHTs, the length of payback and uncertainty over the level of payback.

For the above reasons, the financial incentive offered by the RHI matters and there is clear evidence that a large proportion of installations would not have happened without the RHI.

More than three-quarters of RHI applicants financed their installations themselves and this group does not appear to have been constrained by access to finance. There appear to remain issues amongst those who did not self-finance and possible applicants, however, relating to securing external finance to invest in

RHI-supported installations (e.g. high transaction costs associated with small projects, high risk around heat off-take for large-scale CHP projects and uncertainty around future RHI tariffs). Non-applicants reported financing and cost as amongst the most significant barriers to installation of RHTs. These are both actual and perceived barriers - where in the latter case the perception of high cost deters further investigation into the technology.

Understanding of, and confidence in RHTs was mixed. Although awareness of RHTs is high, it appears that limited understanding of the technologies and a related lack of confidence in their performance may be a barrier to some organisations.

- 51 per cent agreed with the statement that RHTs are "cheap to run"
- 52 per cent were unsure whether RHTs would fulfil their heating requirements better than their current system; and
- 58 per cent were unsure whether RHTs were more reliable than conventional heating systems.

With the majority of current installations being self-financed and a lack of evidence of external financing playing a significant role at present, finance could become a barrier to growth of RHT take-up. Amongst the investor community, there is a general enthusiasm to invest in larger projects, but this is qualified by their frustration at a range of perceived barriers, including a lack of clarity over eligibility rules for the use of VCT and EIS funds and the viability of larger combined heat and power (CHP) projects. The asset finance and corporate lending sectors stated that their focus continues to be on biomass heating and there is relatively little understanding of, or enthusiasm (largely due to perceived longer pay-back periods) to invest in, other RHTs.

Installing and operating RHTs

The ongoing successful installation and operation of RHTs supported by the RHI is an important facilitator for take-up of the scheme. It helps improve confidence in the technologies and provides assurance that the supply chain is developing effectively. This is important in preparing for mass roll-out of RHTs in the 2020s – one of the main objectives of the RHI scheme.

The overwhelming majority of RHI applicants are satisfied with their RHT, with 90 per cent reporting that they are either "very" or "fairly" satisfied. Applicants for solar thermal report lower satisfaction than average with 65 per cent "very" or "fairly" satisfied. This is likely to be a reflection of lower heat output relative to expectations.

Applicants are also mostly satisfied with the installation process, with just under two thirds finding it "fairly" or "very" easy. Over half, however, did report at least one problem with their RHT installation with delays and unexpected cost being the most common issues.

In operating their RHTs, the vast majority of survey respondents to the *applicant survey* reported that their system was reliable. Organisations were also broadly satisfied with the customer service they had received once their RHT was operational.

How the non-domestic RHI is meeting its objectives and future research

The evidence so far suggests that:

- **the RHI is stimulating investments in RHTs**;
- **experiences with the installation and operation of RHTs have been positive**; and
- although RHTs are being installed in a wide range of sectors, the relatively low prevalence of non-biomass RHTs, larger systems, and the lack of non-self-financed installations shows that **areas of the supply chain still have room to develop**.

Further evaluation research is planned with the renewable heat supply chain and domestic and non-domestic organisations that will give DECC further insights into the performance of the RHI, its effect on non-domestic organisations and influence on the development of the supply chain.

1 Introduction

1.1 Background

In 2012, almost half (47 per cent) of the final energy consumed in the UK was used to provide heat. Of this, 57 per cent was used by domestic users, and 43 per cent by non-domestic.[5] The environmental consequences of this level of consumption are profound: in 2009 it was calculated that heat consumption contributes approximately a third of the UK's greenhouse gas emissions. Whilst the majority of this heat is derived from the burning of fossil fuels, such as natural gas, renewable heat contributed just 2.3 per cent of total heat consumption.[6]

The end use of this heat varies by context and can be split into three primary categories: space, water and process heating. Commercial and public sector buildings, like residential buildings, use heat mainly for space and water heating. Comparatively, the industrial sector also uses it to drive a diverse range of manufacturing processes, i.e. process heating. The UK industry consumes large amounts of energy, around 70 per cent of which is to provide heat. The majority of this is used in six key sectors: oil refining, basic metals, food and drink, pulp and paper, non-metallic minerals, and chemicals.[7]

The UK Government and the European Commission have taken a number of steps to reduce emissions of greenhouse gases and increase the amount of energy that is derived from low carbon sources. Two important pieces of legislation in the context of this evaluation include:

- The Climate Change Act: passed by the UK government in 2008, it commits the UK to reduce greenhouse gas emissions by at least 80 per cent in 2050 from 1990 levels; and
- The Renewable Energy Directive (2009/28/EC): put in place to help the EU meet its renewable target, each Member State has an individual goal to achieve a certain percentage of energy demand from renewable sources by 2020. The UK is legally committed to achieve a

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[5] Provisional estimates for 2012, DECC (2013) *Energy Consumption in the UK – Overall Data Tables, 2013 Update*, available at: https://www.gov.uk/government/collections/energy-consumption-in-the-uk, accessed 9 June 2014.

[6] DECC (2013) *The Future of Heating: Meeting the Challenge*, available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/190149/16_04-DECC-The_Future_of_Heating_Accessible-10.pdf accessed 9 June 2014.

[7] DECC (2013) *The Future of Heating: Meeting the Challenge*, available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/190149/16_04-DECC-The_Future_of_Heating_Accessible-10.pdf accessed 9 June 2014.

target of 15 per cent of the UK's energy consumption being derived from renewable sources by 2020.

There is huge potential for renewable sources of heat to contribute towards meeting these targets and recognition that the decarbonisation of the electricity market alone will not be sufficient. The first three carbon budgets released in December 2008 recognised that new policies would be needed to support deployment of renewable heat.[8]

Delivery of renewable heat is therefore a critical component of UK climate and energy policy.

1.2 Renewable Heat Technologies and the Renewable Heat Incentive

Renewable heat can be generated by a diverse range of technologies (RHTs), each with different technical and economic characteristics. The technologies are at a different stage of development, resulting in varied experiences for the customer and diverse requirements for the supply chain.

In 2011, the government introduced the Renewable Heat Incentive (RHI) and Renewable Heat Premium Payment (RHPP) to encourage the deployment of RHTs in both the domestic and non-domestic sector. The non-domestic RHI, the focus of this report, is administered by Ofgem and was specifically designed for non-domestic organisations that have installed and commissioned eligible RHTs since 15th July 2009.

The technologies eligible under the non-domestic scheme, as of 28th May 2014, include: solid biomass, biogas and biomethane combustion, ground, water and ASHPs, deep geothermal and solar thermal collectors. As of 31st March 2014 there were 5,235 full applications made for the non-domestic RHI scheme in England, Scotland and Wales. Take-up has not been evenly spread across the technologies, with 92 per cent of installations being solid biomass boilers. Recent changes to the scheme increased the tariff rates for certain technologies, specifically solar thermal and ground source heat pumps.[9]

1.2.1 RHI Process

The process begins when organisations wishing to install a heating system become aware of RHTs and the RHI scheme and decide to install one of these technologies. To receive the RHI a full application must then be submitted to

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[8] Committee on Climate Change (2008) *Building a low-carbon economy – the UK's contribution to tackling climate change,* available at: http://archive.theccc.org.uk/aws3/TSO-ClimateChange.pdf accessed 9 June 2014.

[9] DECC (2013) *Tariffs and Technologies affected by the 2013 Non-Domestic Early Tariff Review,* available at:https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/204449/Tariffs_and_technologies_affected_by_the_2013_Tariff_Review_3.pdf accessed on 9 June 2013.

Ofgem's RHI website. This includes providing relevant information such as technical specifications of meters and boilers, schematics, planning consents, invoices and commissioning documents. This is to demonstrate that the installation meets the RHI eligibility criteria, which relate primarily to the type, size, use and date of installation. The identity of the applicant (or authorised signatory) must also be successfully identified.

Once all the information has been reviewed and verified, Ofgem will make the decision as to whether the installation has met these criteria to be accredited. If it is accredited, then the organisation becomes a participant in the RHI scheme. As a member of the scheme, the organisation must then provide ongoing meter readings, indicative of the amount of renewable heat produced (kWh) by the accredited installation, in order to receive quarterly payments determined by a set of pre-defined tariffs. The installation is eligible for 20 years of support starting from the date of accreditation.

If uptake of the scheme is higher than expected and more than is affordable, the scheme budget will be managed via the process of 'degression'. This is a gradual reduction of tariffs for new applicants once certain trigger levels of spending are reached.

1.2.2 Key Challenges for the RHI

Despite the diverse characteristics of the sources of renewable heat, a number of barriers to rollout are common across each. The RHI aims to address the three most important barriers:

- **Cost**. Renewable heat can currently be more costly to consumers than conventional alternatives and a higher proportion of these costs are incurred up front. The RHI provides financial support to consumers in the form of a tariff payment for each kilowatt hour of renewable heat generated.
- **Supply chain.** The UK supply chain for the manufacture and installation of many renewable heat technologies is complex and relatively underdeveloped. The RHI is expected to drive the development of renewable heat supply chains by incentivising increased uptake. Providing a financial incentive to consumers (rather than directly to the industry) will help drive innovation, performance and cost-improvements.
- **Information**. Many consumers in the non-domestic sector are unfamiliar with the alternative options provided by RHTs. As uptake of RHTs increases with the RHI, customer awareness and interest in these technologies is likely to grow.

Since the advent of the RHI, these barriers are still present and continue to influence levels of take-up of RHTs. The overall number of installations is small in the context of the heat market as a whole. In comparison to the number of RHTs

registered under the RHI (as given above), 1.6 million gas boilers are installed per year, albeit this includes the domestic and non-domestic market.[10]

1.3 Research objectives

The aim of this evaluation is therefore to understand the administration, delivery and performance of the non-domestic RHI and explore its effect on the renewable heat supply chain. In this way it seeks to assess how the current operation of RHI is delivering relative to its objective of stimulating and supporting a market for renewable heat and identify the factors affecting its delivery. It aims to contribute to DECC's thinking in three main areas:

- **Provide evidence to inform potential changes to the scheme, or to wider renewable heat policy.** The non-domestic RHI is an innovative scheme, described by DECC as the first long-term financial support programme for renewable heat. The RHI needs to adjust and evolve as new information becomes available and this project must provide DECC with scheme-specific evidence on impact and effectiveness for key groups of potential and actual customers. In providing a thorough understanding of the market for renewable heat and drivers of customer uptake, the evaluation will also provide DECC with evidence relevant to wider renewable heat policy.
- **Add to DECC's understanding of interventions of this type and contribute to longer term institutional learning.** Moving to a low-carbon economy will require the roll out of a range of new technologies to energy consumers. Renewable heat has economic and technical characteristics in common with many of these technologies. For example, like much low-carbon distributed generation and energy efficiency investments, some renewable heat technologies entail higher up-front capital costs and lower running costs than conventional alternatives (in the absence of policy support). In addition, RHTs are relatively unfamiliar to non-domestic energy consumers. Therefore, a greater understanding of the drivers of take up of renewable heat under the RHI will have broad relevance to DECC's wider policy objectives. In considering wider policy objectives, it will be important to review impacts on other policy areas, such as fuel poverty, house building and energy efficiency.
- **Help ensure that DECC policy can conform to the important principles of accountability, transparency and openness to scrutiny.** The RHI will entail a cost to taxpayers. It is important that

[10] Frontier Economics (2013) *Pathways to High Penetration of Heat Pumps*, October 2013

DECC can make information on its effectiveness available to the public.

To achieve these aims a list of evaluation research questions has been developed by DECC. As part of designing the evaluation we have organised this into six key areas covering eleven high-level research questions. The list of 11 high level research questions in Table 1.1 represents a more detailed list comprising in excess of 100 questions.

Table 1.1 High Level Research Questions

Area	High level research questions
How the scheme is being administered	1. How effectively and efficiently has the scheme been administered and delivered?
The customer journey/experience	2. What factors (for example confidence, awareness, cost, or environmental concerns) have enabled or prevented uptake of renewable heat technology (RHT) through RHI? 3. What has the impact of installing RHT been for customers?
The market and supply side	4. How is the installer market adapting to the introduction of the RHI? 5. What has been the impact of the RHI on the RHT industry, supply chain and investment community? 6. What has been the impact of the RHI on the development of RHTs?
High level outcomes	7. How much renewable heat has been produced (TWh) under the RHI? 8. How many, and what type of, renewable heating systems have been installed?
Applicants to the scheme	11. What are the characteristic of the applicants entered in to the RHI scheme
Beyond scope of this report	
Impact evaluation	9. What has been the impact of the RHI on CO2 and other greenhouse gas emissions 10. What are the other (wider) impacts of the RHI?

1.4 Methodology

In response to these research objectives, the evaluation consortium, in collaboration with DECC, have designed a coherent series of research activities. Each project aims to address one or more of the specific research questions outlined above. Table 1.2 lists the seven areas of activity that this report is based on and identifies which of the research questions each activity addresses.

Table 1.2 Summary of research activities mapped against research questions

Activity	Summary	Research Question	N=	Sample frame	Mode	Respondent
Applicant survey	A telephone survey with a representative sample of RHI applicants	1,2,3,11	620	All full applications to the scheme as of December 2013	Telephone survey	Applicant registered with scheme
Multiple applicants qualitative study	Qualitative telephone interviews with a range of applicants that have made more than one application to the RHI	1,2,3	20	Respondents to the applicant survey identified as having made multiple applications	In depth telephone interview	Applicant registered with scheme
Investors qualitative study	Qualitative telephone interviews with a diverse range of possible investors in RHTs	2,4,5	28	Bespoke sample frame of key investor groups	In depth telephone interview	Representative of organisation
Wider awareness survey	An online survey of a representative sample of organisation across Britain	2	623	Online panel of business and public sector organisations	Online survey	Individuals who are part of organisation's decision making process for heating
Possible applicants qualitative study	Qualitative telephone interviews with organisations that are possible RHI applicants	2	23	Bespoke sample frame drawn from business registers	In depth telephone interview	Aware of renewable heat/RHI and reported their organisation as considered installing a renewable heating system/applying to the RHI
Workshop with Ofgem	A findings workshop with Ofgem staff to provide feedback on initial findings	1,11	N/A	N/A	N/A	N/A

1.4.1 Interpreting findings in this report

Findings from the **applicant survey** can be treated with a high degree of confidence. The response rate (36 per cent) is high considering the target population of businesses and non-domestic organisations. The questionnaire was developed through detailed consultation and piloted before finalising. As the survey samples from scheme administrative data, we had a range of variables available both to stratify our original sample by, and to assess and weight the achieved sample for non-response bias. Although the response rate is high, there is the potential for non-response bias that cannot be weighted for. Despite this we believe the resulting estimates provide an accurate representation of the view of applicants. The sampling strategy deliberately over sampled non-biomass technologies to allow robust analysis of these groups; the sample composition (and therefore findings) do, however, reflect scheme uptake, which is predominantly small and medium biomass. Throughout the report, whenever the text comments on differences between sub-groups of the sample, these differences have been tested for significance using the survey commands in SPSS 18.0 and found to be statistically significant at the 95% confidence interval or above.

The **multiple applicant qualitative study** was carried out in response to an emerging issue in the design process for the applicant survey. As we were able to sample these interviews from applicant survey responses they are group that we have detailed information about and the sample design reflects this by covering a diverse range of situations. Data collected from these interviews represent a comprehensive assessment of the views of this group.

The **wider awareness survey** was conducted with an online business panel. Quotas were set for responses by industrial sector and high-level geography (Scotland and rest of UK) to ensure robust estimates could be made for these groups. New cases were not issued once these quotas had been met. Findings from this survey therefore provide a good indication of overall trends and relative levels in the non-domestic population rather than precise estimates. We mitigated potential bias from this in the design and analysis stages – although we cannot correct for any self-selection bias onto the panel or in choosing to complete the survey. The quotas ensured robust estimates could be made for a range of key characteristics. We also introduced a stage of screening in the survey to limit the variation in respondents, only carrying out interviews with individuals with some involvement in their companies' decision making process for heating systems. The questionnaire was developed through detailed consultation and piloted before finalising. Final estimates were weighted to the ONS distribution of UK businesses by industrial sector (including public sector). Throughout the report, whenever the text comments on differences between sub-groups of the sample, these differences have been tested for significance using the survey commands in SPSS 18.0 and found to be statistically significant at the 95% confidence interval or above.

A bespoke sample frame for the **investor qualitative study** was created covering six key groups for the evaluation. Given the relatively low number of organisations providing finance for renewable heat installations, the organisations interviewed included both those already investing in renewable heat, and those which were already investing in renewable electricity installation and were considering investment in renewable heat. This approach was sufficient to provide a range of organisations and views. An even distribution of interviews was achieved across the main sampling criteria, and we are confident these data provide a comprehensive picture of these groups.

The **possible applicant qualitative study** faced two key methodological challenges; the need to identify organisations for whom renewable heat technologies or the RHI had been a genuine consideration, and finding the right respondent within an organisation to conduct the interview with. As a result of these factors we were unable to recruit as large (and therefore diverse) a sample as we intended despite screening a large number of organisations. The achieved 23 interviews however do provide a range of views across our main sampling criteria; organisations who have installed RHT, but not applied to RHI and organisations that have considered RHTs, but not installed. Recruitment was successful in public sector and educational organisations and the data we have is particularly strong in these areas.

The research projects above took place over the first five months of 2014 and target a selection of the research questions. Further research activities are planned for autumn 2014 and early 2015 to address the other research questions and to conduct an evaluation of the domestic RHI scheme. More information on the methodology of each project is provided in Chapter 7 with a full account of the methodology of each project in the Technical Report.

1.5 The RHI logic model

In order for the RHI evaluation to meet its objectives, the evaluation consortium was keen to engage with policy-makers and delivery staff within DECC to understand exactly how the RHI programme is designed to work. In previous evaluations across a range of complex social programmes NatCen has developed a logic model with key stakeholders. A logic model aims to provide a visual articulation of how the intended actions of a programme will lead to the intended results. It is a comprehensive series of causal linkages that reflect the underlying logic of the programme. This approach was selected for three reasons:

- A logic model, when developed through collaboration of key stakeholders, acts as a common reference point for those running the programme and the evaluators;
- It ensures that the key elements of the programme are covered by the design of data collection instruments; and
- It allows evaluators to understand the mechanisms of positive and negative outcomes and therefore distinguish between a breakdown in the

logic of the programme or challenges of implementation if aspects of the programme are not as effective as hoped.

We worked closely with DECC to develop the non-domestic logic model. Prior to the evaluators being appointed, DECC had already done considerable work on strategic logic mapping for the RHI. We were able to build on this and add to and refine the existing content to design a logic model appropriate for use in an evaluation. The strategic mapping provided a basis for understanding the intended results of the RHI. We then held a workshop with key stakeholders from DECC to fully articulate the assumptions underpinning these links, bringing policy, technical, marketing and delivery expertise and perspectives to the discussion.

The output of this process is a detailed visual logic model and a comprehensive table of supporting information that describes the rationale and assumptions for each causal link as well as any external factors other than RHI that could influence these outcomes. Figure 1.1 represents a high-level summary version of the final logic model. The more detailed version can be found in Technical report; however as this remains an evolving document throughout the life of the evaluation it should not be seen as the definitive logic model of the programme. The remainder of the report describes findings that relate primarily to programme activities and programme outputs.

1.6 Reading this report

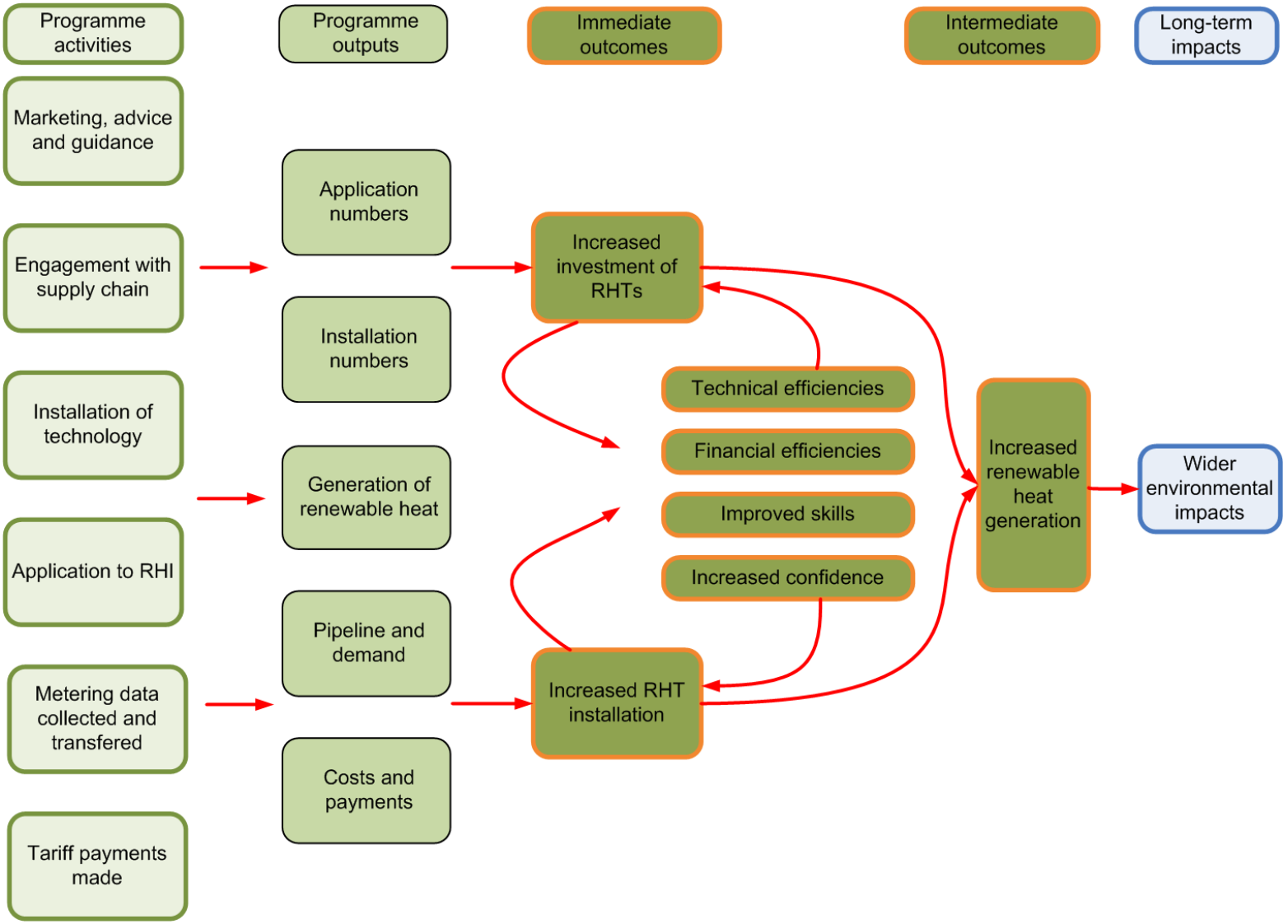
To draw out the implications of our findings for the RHI most effectively we have structured the report broadly in parts.

- **Current progress and experiences of the non-domestic RHI (Chapters 2 and 3)**. These chapters bring out the detail of how the RHI is currently operating and functioning.
- **The "customer journey" (Chapters 4, 5 and 6)**. These chapters work through the customer journey from initial awareness of RHTs and the RHI, through to their motivations and barriers to investment and, finally, installation and operation of their RHT. The rationale for this is to draw out how the RHI is influencing this customer journey and the supply chain.

1.7 What's happening next?

This report sets out interim findings for the non-domestic RHI. Further research is planned on the non-domestic RHI; in addition research on the domestic RHI (which was launched in April 2014) is now underway. These will all be included in a final report due to be published in 2015.

Figure 1.1 Summary of the Non-domestic RHI Logic Model



2 Current progress of the non-domestic RHI

- As 31st March, 3,769 applications had been accredited by Ofgem
- Over 90 per cent of accredited applications were for biomass installations.[11]
- RHI applicants are more likely than the general population of organisations to be off the gas grid and in rural areas, working in the agriculture sector and employing more than ten people.
- Just over 900 GWh of renewable heat have been generated by the applications successful in the scheme.
- The vast majority of this heat has been generated by biomass installations.

2.1 Who are the RHI applicants?

One of the first tasks for the evaluation was to understand more about the characteristics of the organisations that are applying for the RHI. This is important in order to understand the reach of the programme, but it is also important for interpreting the subsequent data we have collected from this group of organisations. This section draws on the data related to the scheme published by DECC,[12] administrative data provided by Ofgem and data from the *applicant survey* to profile the RHI applicants and compare their characteristics to national statistics where available.

The early applicants to the RHI at this stage of the programme have a specific profile and are not representative of the general population of organisations from which they are drawn. This group of organisations may be early adopters of some types of RHTs and typically the business case for investing in RHTs and applying to the RHI appears to be clearer for these organisations than others.

2.1.1 Number of applications

As of 31st March 2014, a total of 5,235 full applications had been made for support under the RHI scheme.[13] Of these applications, 3,769 had been

[11] Department of Energy and Climate Change (2014) *RHI and RHPP Deployment Data: March 2014*, April 2014

[12] Department of Energy and Climate Change (2014) *RHI and RHPP Deployment Data: March 2014*, April 2014

[13] Furthermore, a total of 86 preliminary applications had been made, with20 of these accredited, 46 being considered and 20 rejected or withdrawn.

accredited, 1,372 were being considered and 94 had been rejected or withdrawn.[14]

As part of the application base, there are a number of applications made by organisations that had already made previous applications ('multiple applicants'). Information relating to the multiple applicants has not been collected systematically as part of the applications process and therefore an estimate of the number of applicants has been made on the basis of the *applicant survey*. The survey revealed that 30 per cent of applicants were multiple applicants and 70 per cent single. The distribution of the quantity of applications made for the RHI is shown in Table 2.1 below.

Table 2.1 Number of Applications Reported by Applicants

Number of Applications	1	2	3	4	5	6	7	8	9+
% of Applicants	70	14	5	3	1	2	1	2	2

Source: Figures for all applicants are drawn from the applicant survey conducted as part of the applicant survey, question BAC1. Base: all respondents (620).

While the survey revealed some details relating to how many multiple applicants are in existence, it gave little information as to what type of multiple applicants they are. Consequently, as part of the evaluation we conducted a qualitative study with 20 multiple applicants, which revealed various attributes:

- Those who had made multiple applications for RHTs at a single site;
- Those who had made multiple applications for RHTs at multiple sites;
- Those who had made multiple applications for RHTs at multiple sites not owned and/or operated by them;
- Those who had made multiple applications for the same technology;
- Those who had made multiple applications for different technologies.

The proportion of applicants that had made multiple applications is a significant minority. It is important, therefore, in the following sections, to characterise the general population of RHI applicants and the profile of multiple applicants.

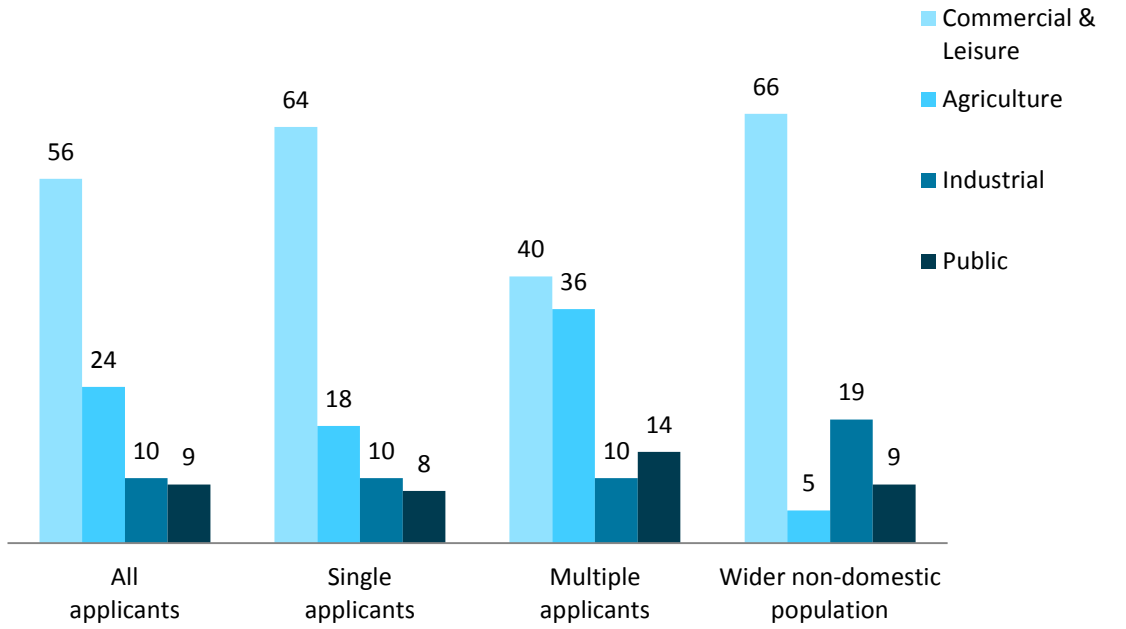
2.1.2 Organisation sector and size

Administrative data from Ofgem (Figure 2.1) shows that the largest sector from which RHI applications are drawn is the commercial and leisure sector (56 per cent) followed by the agriculture sector (24 per cent). While commercial and leisure is overwhelmingly the largest group, there are sectors which are over-represented among RHI applicants when compared with the general population from which they are drawn. The proportion of applicants from the agriculture sector, for example, is significantly greater than for the general population of organisations (24 per cent among applicants and five per cent in the general

[14] Department of Energy and Climate Change (2014) *RHI and RHPP Deployment Data: March 2014*, April 2014

population). There are no doubt a number of drivers that contribute to the distribution observed. Amongst these, the feasibility of deploying RHTs is perhaps the largest. All of these drivers are explored further in Chapter 5.

Figure 2.1 Number of applications by applicant type and sector



Source: Figures for all applicants are drawn from Ofgem's administrative data (field 'generator SIC code'); figures for single and multiple applicants are based on estimates provided from the applicant survey (BAC1; base: all respondents (620)). Figures for general business population are taken from Official National Statistics collected by the Office for National Statistics[15]

Based on data from the *applicant survey*, multiple applicants are even more likely than single applicants to be in the agriculture sector (36 per cent compared to 18 per cent), and less likely to be in the commercial and leisure sector (40 per cent compared to 64 per cent). No other differences are statistically significant.

As part of the application process, applicants are required to identify a SIC code[16] which best represents their organisation. By examining the top 10 SIC codes further detail can be explored on the types of organisations being accredited for the RHI (Table 2.2). The top 10 SIC codes are responsible of 82 per cent of accredited applications made under the RHI. The most represented sector is the Accommodation industry, representing 35 per cent of all accredited applications. The next largest SIC code represented is the Crop and Animal Production, Hunting and Related Service Activities with 23 per cent of accredited applications.

[15] Based on Table A1.1 (figures relate to the distribution in GB only) in Office for National Statistics (2013) *UK Business: Activity, Size and Location - 2013*, October 2013, http://www.ons.gov.uk/ons/rel/bus-register/uk-business/2013/stb---uk-business--activity--size-and-location---2013.html, accessed 23 June 2014

[16] See: http://www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/standard-industrial-classification/index.html

Thus within these top two SIC codes, over 50 per cent of accredited applications have been made.

Table 2.2 Top 10 SIC Code amongst RHI applicants

Rank	SIC Code	Sector	Accredited Applications
1	55 - Accommodation	Leisure	1,329 (43%)
2	1 - Crop and animal production, hunting and related service activities	Agriculture	850 (28%)
3	85 - Education	Public	180 (6%)
4	82 - Office administrative, office support and other business support activities	Commercial	139 (5%)
5	47 - Retail trade, except of motor vehicles and motorcycles	Commercial	121 (4%)
6	93 - Sports activities and amusement and recreation activities	Leisure	113 (4%)
7	10 - Manufacture of food products	Industrial	104 (3%)
8	16 - Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	Industrial	97 (3%)
9	87 - Residential care activities	Public	87 (3%)
10	2 - Forestry and logging	Agriculture	68 (2%)

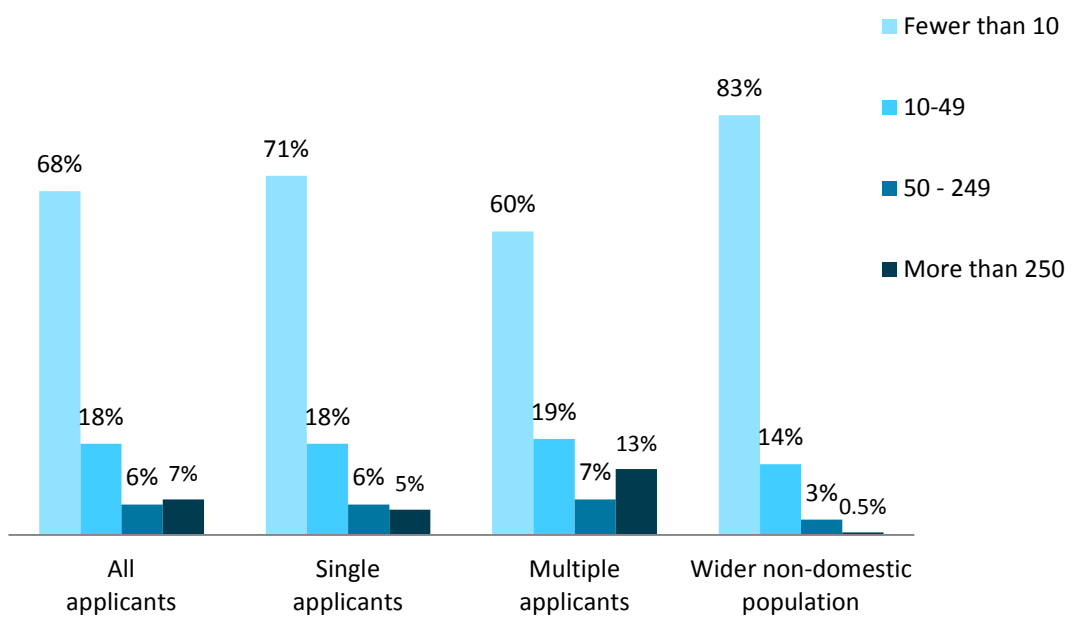
Source: DECC (2014)[17]

In the terms of the size of organisations applying to the RHI, two-thirds of applications are from organisations with fewer than ten employees (see Figure 2.2). These organisations, however, are under-represented among RHI applicants compared to the general population of organisations where they make up 83 per cent of total. RHI applicants are, therefore, more likely than the general population to have more than 10 employees (32 per cent among applicants and 18 per cent in the general population). RHI applicants are considerably more likely to have over 250 employees than the general population (seven per cent of applicants compared to less than one per cent in the general population); though 46 per cent of this group are public sector organisations (See Figure 2.3).

Looking at the other sectors, applicants from the agriculture sector are more likely to be from small businesses (fewer than 10 employees), whereas applicants from the industrial sector are more likely to be from medium-sized businesses (10 – 49 employees). Again it should be acknowledged that some organisations within these sectors will be responsible for multiple applicants, and thus counted multiple times.

[17] Department of Energy and Climate Change (2014) *RHI and RHPP Deployment Data: March 2014*, April 2014

Figure 2.2 Distribution of the size of organisation by number of applicants



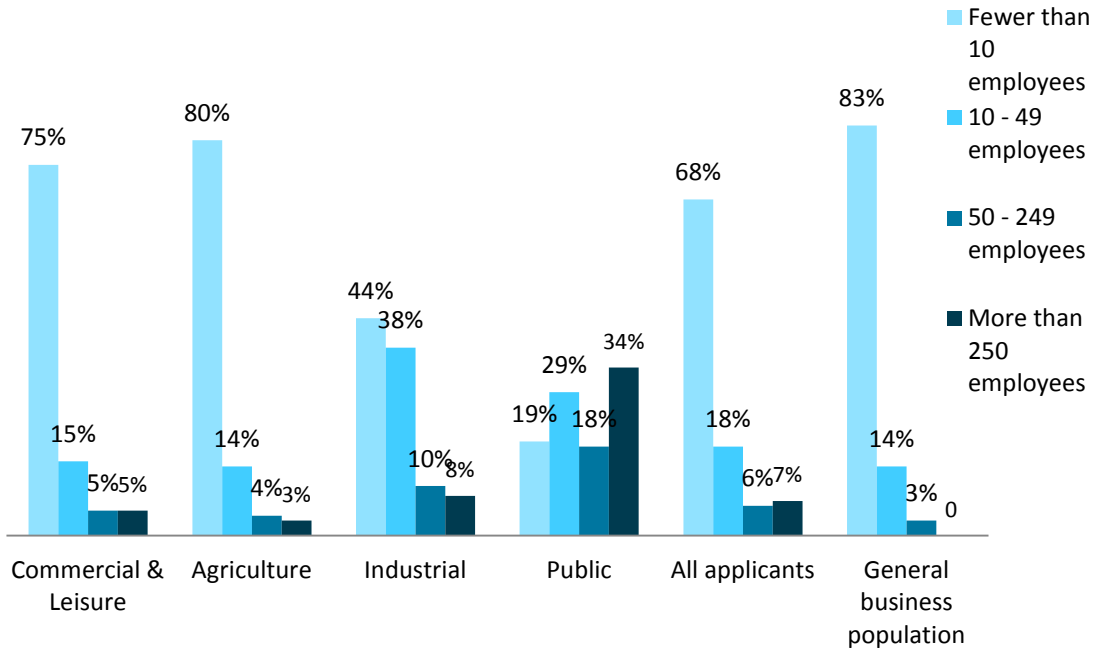
Source: All figures for applicants are drawn from the applicant survey (applicant survey, question BAC7 by question BAC1; base: all respondents (620)). Figures for general business population are taken from Official National Statistics collected by the Office for National Statistics[18]

Multiple applications to the RHI are more likely to be from organisations with more than 250 employees (14 per cent compared to five per cent of single applicants) and less likely to be from organisations with fewer than 10 employees (60 per cent compared to 71 per cent for single applicants).

Figure 2.3 shows how the size of organisation and organisational sector intersect among RHI applicants. The main points to note is that public and industrial sector organisations are typically much larger than other sectors and comprise the vast majority of all organisations over 50 employees. Again, like the applicant population as a whole, organisations with over 250 employees are represented more within all sectors than the general business population, with the Public sector having the highest representation.

[18] Based on Table A1.2 (figures relate to the distribution in GB only) in Office for National Statistics (2013) *UK Business: Activity, Size and Location - 2013*, October 2013, http://www.ons.gov.uk/ons/rel/bus-register/uk-business/2013/stb---uk-business--activity--size-and-location---2013.html, accessed 23 June 2014

Figure 2.3 Distribution of the size of business of applicants by sector



Source: Figures are drawn from Ofgem's administrative data and the applicant survey (applicant survey, question BAC7 by industry sector, based on the 'generator SIC code' field in the administrative data; base: all respondents (620)).

2.1.3 Location

The location of an organisation is likely to influence the motivation to install particular types of RHTs and thus apply to the RHI. More rural areas are likely to contain a higher proportion of organisations from the agriculture sector and organisations from other sectors involved in processes more appropriate for the installation of RHTs such as Biomass which typically require good access to feedstock and space.

In urban areas, lack of space, for example, may be a barrier to installing an efficient and appropriate RHT. Looking at the administrative data and our survey of RHI applicants, it is clear that this is reflected in the regional profile of RHI applicants, illustrated in Table 2.3.

Table 2.3 Distribution of the size of business of applicants by region				
Region/Country [19]	**All applicants (%)**	**Single applicants (%)**	**Multiple applicants (%)**	**General business population (%)**
East Midlands	8	7	7	7
East	7	8	4	10
London	1	1	<0.5	17
North East	4	3	6	3
North West	9	8	11	10
South East	7	10	2	16
South West	19	20	18	9
West Midlands	11	11	9	8
Yorkshire and the Humber	11	9	13	7
Scotland	17	16	21	8
Wales	7	6	9	4

Source: Figures for all applicants are drawn from Ofgem's administrative data (based on post codes of the registered address of the installation); figures for single and multiple applicants are from the applicant survey (question BAC1; base: all respondents (620)). Figures for general business population are taken from Official National Statistics collected by the Office for National Statistics.[20]

The table illustrates that organisations located outside of London and the South East are over-represented among RHI applicants. RHI applications are more likely than the general population to be located in areas such as the South West (18 per cent vs. nine per cent), Scotland (17 per cent vs. eight per cent) and Wales (seven per cent vs. four per cent); these areas are less densely populated and more rural according to Office for National Statistics.[21]

In contrast, London is significantly under-represented, with only one per cent of applicants compared to 17 per cent within the general business population. There are not many notable differences between multiple and single applicants – though multiple applicants are less likely to be from the South East (two per cent vs. ten per cent of single applicants). Other differences that appear in the table are not statistically significant.

Correspondingly, applicants to the RHI are far more likely to be drawn from postcodes which identify them as being off the national gas grid than the general

[19] Figures for all applicants are drawn from Ofgem's meter data; figures for single and multiple applicants are from the applicant survey.

[20] Based on Table A1.1 (figures relate to the distribution in GB only) in Office for National Statistics (2013) *UK Business: Activity, Size and Location - 2013*, October 2013, http://www.ons.gov.uk/ons/rel/bus-register/uk-business/2013/stb---uk-business--activity--size-and-location---2013.html, accessed 23 June 2014

[21] Based on Table A1.1 (figures relate to the distribution in GB only) in Office for National Statistics (2013) *UK Business: Activity, Size and Location - 2013*, October 2013, http://www.ons.gov.uk/ons/rel/bus-register/uk-business/2013/stb---uk-business--activity--size-and-location---2013.html, accessed 23 June 2014

population of organisations from which they are drawn.[22] Almost three quarters of RHI applicants (73 per cent) do not appear to have a connection to the gas grid, compared to less than a quarter (approximately 24 per cent) of all postcodes.[23] The magnitude of the over-representation of organisations off the gas grid among RHI applicants reflects more than the fact that off gas grid areas are more likely to be rural. Analysis conducted by DECC[24] suggested that the South West and Scotland had the highest proportion of properties without a gas meter (20 per cent and 18 per cent respectively) and thus this correlates with the relative high deployment of applications within these vicinities.

For organisations not on the gas grid, generating heat using fossil fuels is typically more expensive than for organisations on the gas grid. RHTs supported by the RHI scheme are, therefore, likely to compare favourably to systems involving the use of oil.

Within the applicant database, there have been no notable differences between single and multiple applicants in relation to whether they are on the gas grid or not.

2.1.4 Involvement in other government schemes

As part of the *applicant survey* we asked respondents whether they had claimed the Feed in Tariff (FiTs) for electricity-generating technology from a renewable or low-carbon source. Just under half of all applicants (48 per cent) had claimed the feed-in tariff; this rises to 61 per cent among multiple applicants. This demonstrates that, at least for the FiT scheme, a significant proportion of the applicant base for the RHI is familiar with other government schemes.

Applicants were also asked whether they had participated in any other government energy efficiency schemes. Thirty-nine per cent stated that they did not take part in other schemes (including the FiT); whilst just over a fifth of applicants stated that they participate within the Climate Change Levy. The participation rate within the Climate Change Levy appears to be low, as exemptions for the tax are available to only a small number of organisations.

All other government schemes (including the CRC, Renewables Obligation, climate change agreements, greenhouse gas reporting and the EU ETS) recorded less than ten per cent participation. It should be noted, however, that participation in many of the schemes is mandatory for some organisations, and thus participation rates are largely driven by organisational characteristics.

2.1.5 Summary

This section has described the profile of RHI applicants and multiple applicants. In summary, applicants to the RHI can be characterised as being typically larger

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[22] Figures for all applicants are drawn from Ofgem's administrative data, based on the post code of the registered address of the installation.

[23] Figures based on an estimate of the number of postcodes presented by ONS (see http://www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/postal/index.html) and research conducted by the Centre for Sustainable Energy (see http://www.cse.org.uk/resources/open-data/off-gas-postcodes)

[24] DECC (2013) Energy Trends: December 2013 special feature article - Off gas properties

than average organisations, deploying renewable technologies within more rural locations that are off the gas grid. The RHI applicants are, therefore, a distinct and unrepresentative sub-set of the wider non-domestic population.

2.2 Characteristics of applications made under the RHI

This section provides information on the characteristics of the applications made by RHI applicants. It describes the types of technologies applicants have installed, when applications were made and examines the purpose of the heat being generated. It also sets out the capacity of these installations and the total heat that has been generated by RHI applicants to date.

The data we present here are drawn from three sources: the data on the RHI scheme published by DECC, the administrative data provided by Ofgem and data from the applicants survey.

This section aims to provide a guide and snapshot of an ongoing programme rather than a definitive and final picture. Where the applicant survey provides either more current or more detailed information than the administrative data we present findings from the survey.

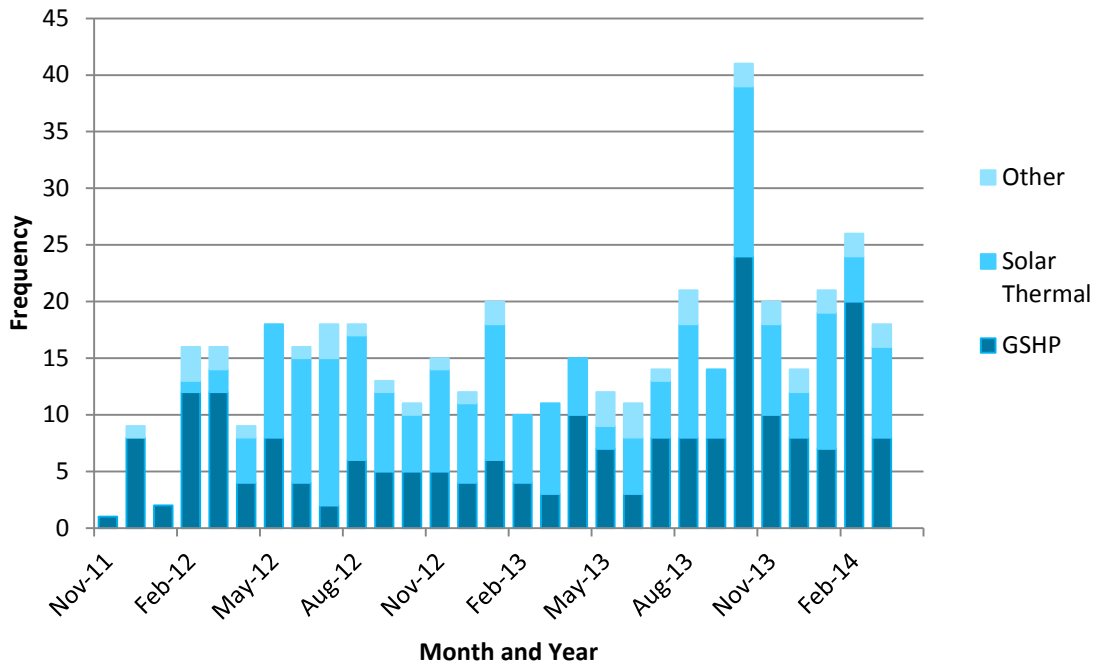
2.2.1 Timing of installations and applications

As described in the previous section, as of 31st March 2014, 5,235 full applications had been made to the RHI since the scheme opened. The rate of applications made to the RHI has been steadily increasing, with 392 applications made in the first six months of the scheme, increasing to 1,127 by November 2012.

Figure 2.4 and Figure 2.5 show the number of applications made in each month of the scheme. Although the rate of applications is increasing steadily, there was an obvious spike in the number of applications made in September 2013 with a total of 458 applications received.

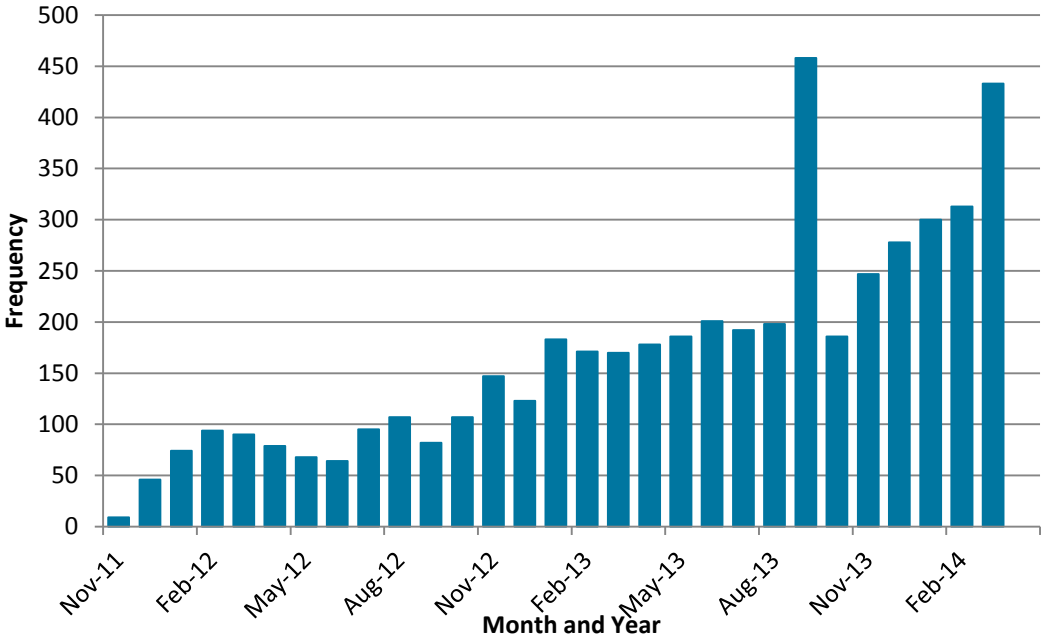
Examining the date of applications for biomass, as shown in Figure 2.5, there was a clear increase in September 2013. The most likely reason for this increase is the change to air quality requirements made for biomass installations, which came into effect on 24th September 2013. In fact, when we look closer at the profile of the applications made in September 2013, 93 per cent were made before or on 23 September 2013 and 20 per cent of total applications for that month were made on the last day of the old requirements, 23rd September 2013. This shows that a number of RHI applicants are clearly well informed about the requirements for receiving accreditation for the RHI. Note also that a spike in the number of applications received by Ofgem was also seen for GSHP and Solar Thermal installations; the reasons for this increase have not been explored in this research.

Figure 2.4 First date of submission of RHI application for non-biomass aggregated by month and year



Source: Ofgem administrative data, based on the 'Date of first submission' field.[25]

Figure 2.5 First date of submission of RHI application for biomass aggregated by month and year



Source: Ofgem administrative data, based on the 'Date of first submission' field.[26]

[25] Note that the data presented uses the Administrative Data from Ofgem rather than data from DECC due to the availability of the breakdown of applications by technology.

It is also worth considering at the profile of commissioning dates for installations. Although a similar increasing trend over time has been observed, there was a drop in installations commissioned in the months after the peak in September 2013, as would be expected due to the time lag between commissioning an installation and submitting an RHI application.[27]

2.3 Types of installation and technology

2.3.1 Technology type

A whole range of technologies are eligible for an RHI application. As illustrated by Table 2.4, however, the overwhelming majority of full applications are made for biomass boilers (92 per cent) and in particular small biomass boilers (81 per cent). Consequently, the profile of all RHI applicants is heavily reflective of the profile of biomass applicants. The only other technology sub-groups large enough to be of interest to the quantitative research that was conducted for this evaluation are solar thermal (3.6 per cent) and GSHP (4 per cent).

Throughout the following sections we indicate any specific differences in relation the characteristics of organisations applying for those technologies as it is important for interpreting the findings throughout the rest of report. Other technologies applied for by less than one per cent of applicants are not referred to in this report.

Table 2.4 Distribution of Installations by Tariff Band

Tariff Band	All applicants (%)	Combined (%)
Medium Municipal Solid Waste	<0.1	<0.1
Large Municipal Solid Waste	<0.1	
Small Bio-Methane	0.1	0.3
Small Biogas	0.2	
Small Water Source Heat Pump (WSHP)	0.2	0.3
Large Water Source Heat Pump (WSHP)	0.1	
Small Solar Thermal	3.6	3.6
Small Ground Source Heat Pump (GSHP)	3.7	4.0
Large Ground Source Heat Pump (GSHP)	0.3	
Small Solid Biomass Boiler	78.9	91.7
Medium solid Biomass Boiler	12.1	
Large Solid Biomass Boiler	0.7	

Source: Ofgem administrative data, based on the 'Tariff band' field

Given the dominance of biomass boilers, there is only limited variation in terms of what kinds of organisations install which technologies. Table 2.5 shows

[26] Note that the data presented uses the Administrative Data from Ofgem rather than data from DECC due to the availability of the breakdown of applications by technology.

[27] Except for preliminary applications, all installations must be commissioned before an application can be submitted.

technology type broken down by the organisational sector. Most notably, public sector organisations are more likely than applicants as a whole to install GSHPs and solar thermal, though these technologies represent a small proportion of all public sector installations (seven per cent and 12 per cent respectively)[28].The agriculture and industrial sectors are almost exclusively (97 per cent) applying for biomass boilers.

Table 2.5 Distribution of technology installed by industry sector (%)

Technology Type by Industry Sector[29]	Commercial & Leisure	Agriculture	Industrial	Public
Solid Biomass Boiler	90	97	97	81
Ground Source Heat Pump (GSHP)	5	1	1	7
Solar Thermal	4	1	1	12
Other	1	1	1	<0.5

Source: Ofgem administrative data, based on the 'Technology type and 'Generator SIC code' fields

Examining the distribution of technology types by business size, there are greater differences than by sector (Table 2.6). Larger companies are more likely to install non-biomass installations, in particular solar thermal installations, which are installed by 17 per cent of companies with more than 250 employees.

Table 2.6 Distribution of technology installed by organisation size (%)

Technology Type by Industry Sector	Fewer than 10 employees	10 - 49 employees	50 - 249 employees	Over 250 employees
Solid Biomass Boiler	93	92	82	76
Ground Source Heat Pump (GSHP)	4	3	6	7
Solar Thermal	3	3	10	17
Other	0	2	2	0

Source: Applicant survey, question BAC9, base: all respondents (620).

The capacity of installations installed under the RHI range from the smallest solar thermal installation with a capacity of 1 kWth to the largest biomass installation, which has a capacity of 80.5 MWth. As shown earlier in this section, the majority of biomass installations are small (less than 200 kWth), and only a small proportion are large (1,000 kWth or larger). Looking specifically at the large biomass installations, it should be noted that 74 per cent of these are installed by the industrial sector, despite the industrial sector only making up 10 per cent of all installations. The median size of biomass boilers in each of the three tariff bands are 99 kWth for small biomass boilers, 500 kWth for medium biomass boilers and 4,000 kWth for large biomass boilers.

Multiple applicants are more likely to have installed solar thermal than single applicants, but otherwise there are no notable differences between these two

[28] Note that the difference is only statistically significant for solar thermal installations or when the two technologies are combined together.

[29] Figures drawn from Ofgem's meter data.

groups. There are also only small differences between technologies installed by applicants off and on the gas grid.

2.3.2 Heat production and use

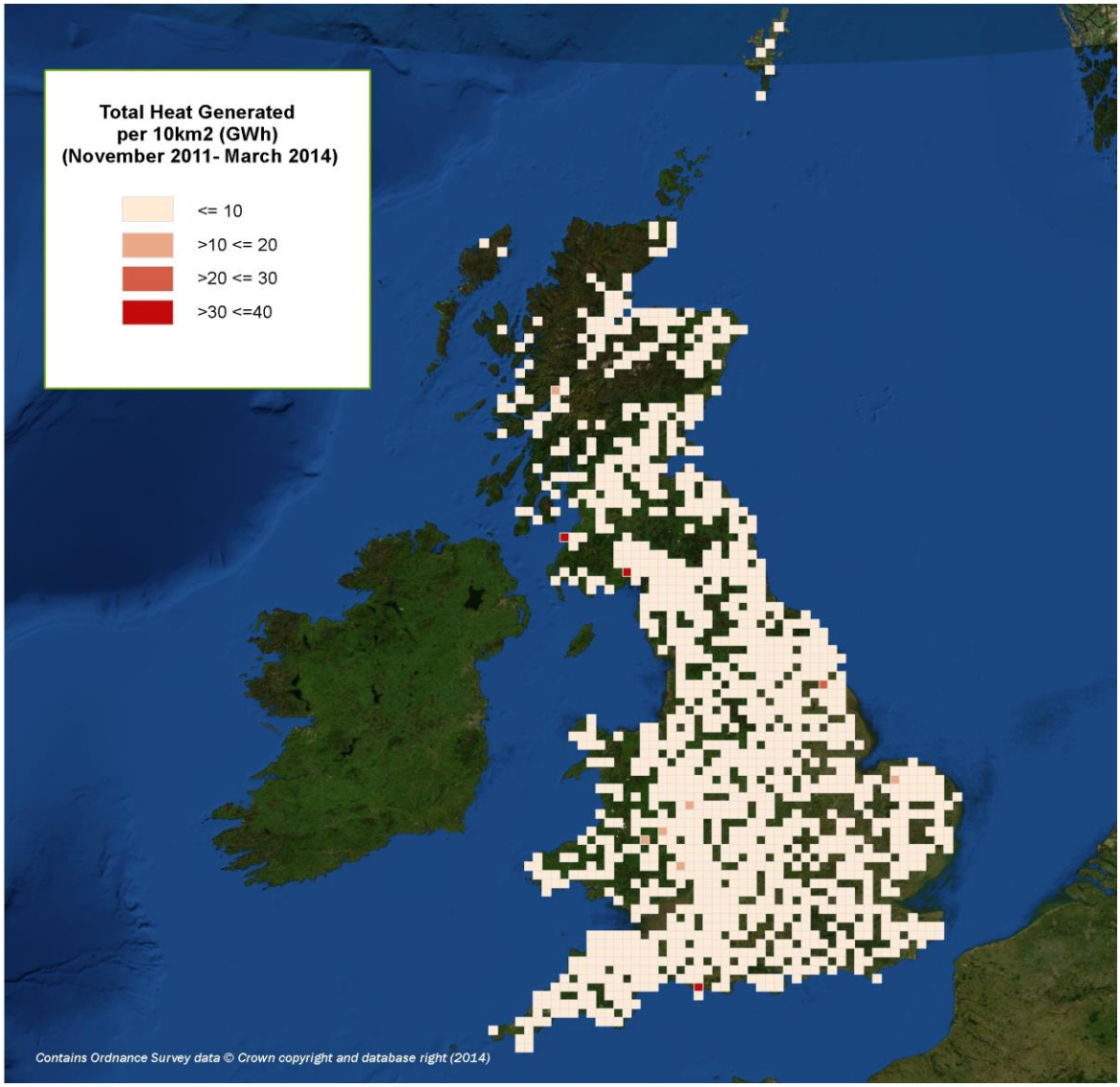
The administrative data collected by Ofgem provides information of the capacity of all installations accredited through the RHI, the heat being generated and the purpose to which this heat is put.

The total capacity of all RHI installations stands at 706 MWth as of 31st March 2014.[30] Throughout the life of RHI, 909 GWh of renewable heat has been produced, based on payments made up to 31st March 2014.

The distribution of the renewable heat can also be represented geographically. Figure 2.6 shows the aggregated quantity of renewable heat generated by RHTs supported by the RHI. The figure shows that across Great Britain there are large areas which have generated renewable heat – expanding across the length and breadth of the nation. There are a small number of 'hot spots' which are typically (but not universally) distributed close to coastal areas.

[30] Department of Energy and Climate Change (2014) *RHI and RHPP Deployment Data: March 2014*, April 2014

Figure 2.6 Aggregated renewable heat generated by RHTs supported by the RHI since 28 November 2011



Source: Ofgem's administrative data.

There are number of uses that this heat can be put to in the non-domestic sector, illustrated by Table 2.7.

Table 2.7 How applicants use the heat produced by RHT (%)					
Heating Use	**Biomass**	**Heat Pump (Ground and Water)**	**Solar Thermal**	**Other**	**Total**
Space heating only	20	36	1	0	20
Water heating only	2	2	74	0	5
Process heating only	3	0	0	23	3
Space and water heating	70	60	24	5	68
Space and process heating	1	0	0	5	1
Water and process heating	0	0	0	9	0
Space, water and process heating	3	0	1	27	3
Unknown	1	1	0	32	1

Source: Ofgem administrative data, based on the 'Technology type and 'Heating Use' fields

The total percentage of installations providing space heating of some capacity is 91 per cent and for water heating 75 per cent. For process heating this figure is seven per cent. The administrative data collected by Ofgem highlights differences between how different types of technologies are used. Heat pumps (ground or water source) and Biomass boilers provided space and water heating for 60 and 70 per cent of applicants respectively. When we include the use of the technologies exclusively for space heating, nearly all organisations used Heat pumps (96 per cent) and Biomass (90 per cent) to provide space heating in some capacity. Conversely, and as we would expect, Solar Thermal systems were more likely to be used for water heating only (74 per cent of installations).

Among different sectors there are also differences in how heat is used. As could be expected, a larger proportion of the industrial sector than of any other sector uses RHT installations for process heating (26 per cent compared to three per cent overall). A small proportion of the agricultural sector also reports using process heating (11 per cent), while for public and commercial and leisure, the numbers are zero per cent and two per cent, respectively.

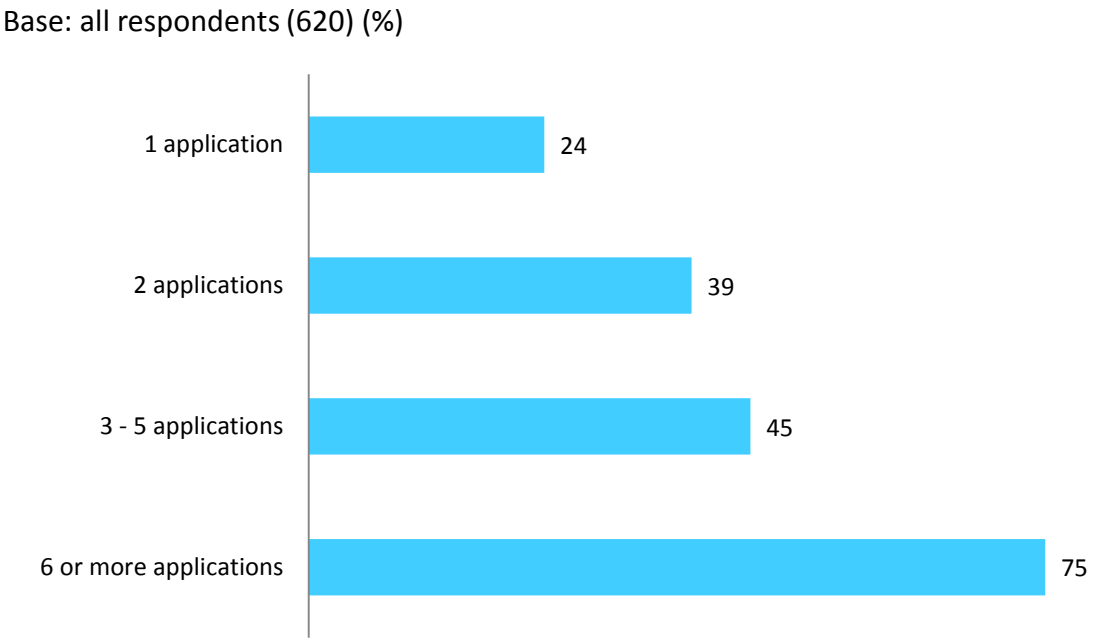
Some technologies are also deployed in very specific ways, particularly heat pumps. As expected, underfloor heating is by far the most common method of deploying heat from GSHP and WSHP installations. According to the *applicant survey* data 82 per cent of GSHP and WSHP installations are deploying heat through underfloor heating, while 43 per cent use radiators and six per cent use other means (respondents could select multiple answers to this question).

2.4 What are applicants' future plans

As part of the *applicant survey* we also explored organisations' future plans in relation to RHTs and the RHI. The data is presented in Figure 2.8. Overall, a third of respondents (32 per cent) plan to apply for the RHI for more installations. When looking at this by the current number of applications, as the number of applications an organisation has already made increases, they become more

likely to plan to make further applications. A quarter (24 per cent) of single applicants plan to make further applications. This compares to four in ten (39 per cent) of those with two applications and three quarters (75 per cent) of those with six or more applications.

Figure 2.8 Proportion of applicants who plan to make further RHI applications, by current number of applications



Source: Applicant survey, question BAC2 by BAC1.

3 Applicants' experiences of the non-domestic RHI

- Overall, applicants to the RHI seem to be broadly positive about their experience of the RHI but with some specific areas identified for improvements
- The application process is the part of the RHI with the most room for improvement: over half of respondents had experienced problems completing their application, with the most common problems relating to provision of the right information and the nature of the application process.
- It should be taken into consideration, however, that what applicants perceive as a problem may stem from the inherent complexity of the scheme design.
- Satisfaction levels among applicants are highest in relation to metering and payment, with around three quarters very or fairly satisfied with metering and fewer than one in ten experiencing problems with receiving payments.
- Applicants for solar thermal and heat pumps appear to have a less positive overall experience: they are more likely to have problems with their applications and take longer to complete them; heat pump applicants were also less positive about the required approach to metering.
- Multiple applicants to the RHI report very particular concerns that relate to the complexity of the application process. Efforts should be made where possible towards providing a more appropriate service for multiple applicants in the future.

3.1 Who is submitting the RHI applications

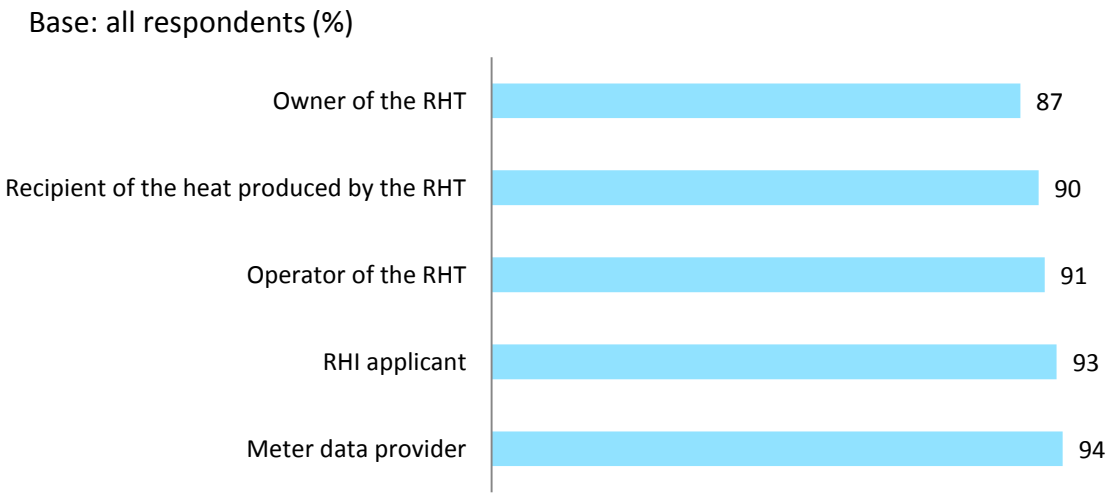
This section describes the role of organisations in the application, metering and payments from RHI and the installation and operation of the RHT. It also describes the professional profile of the individuals completing the RHI application. Findings are drawn from the RHI *applicant survey*.

3.1.1 What was the respondent organisation's role?

There are a number of different roles that organisations can play and activities in which they can be involved as part of the RHI: making the application, owning the installed RHT, operating the installed RHT, being the recipient of the heat, providing meter data and receiving tariff payments. The survey of RHI applicants asked a series of questions which aimed to examine the extent to which applicants played each of these roles.

Figure 3.1 presents a series of statements that respondents to the *applicant survey* could select as best describing their role (multiple selections were permitted).

Figure 3.1 Organisation's Role in Relation to the RHI and the RHT

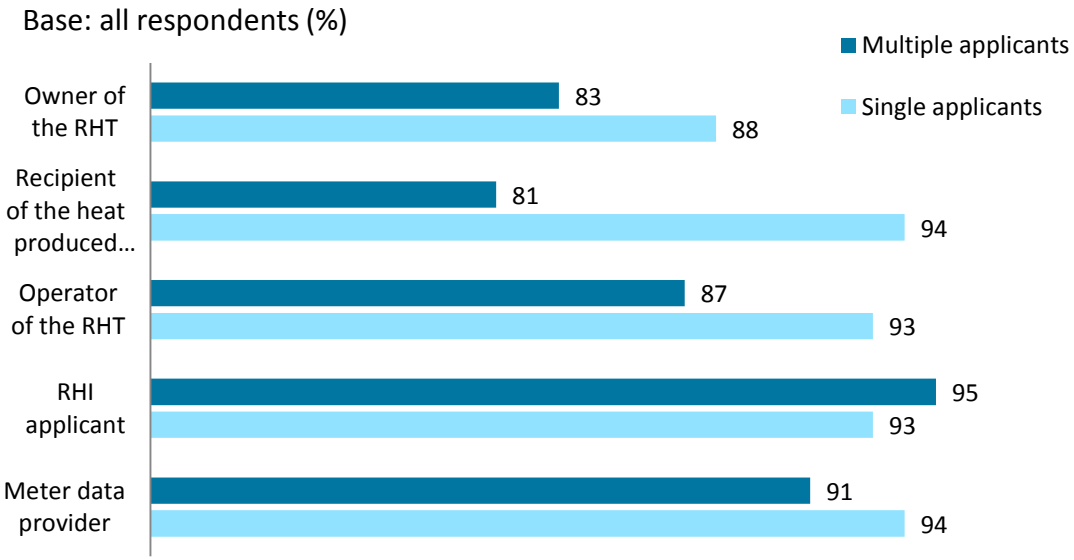


Source: Applicant survey, combined responses from questions BAC5A, BAC5B and BAC5C. Respondent could select multiple answers.

Only the owner of the installation is allowed to be the applicant to the scheme. As part of the application for accreditation, the applicant will be required to declare that they are the owner, or representative owner, of the relevant eligible installation.

Over 90 per cent of respondents described themselves as the RHI applicant, the operator of the RHT or the recipient of the heat produced. A slightly more nuanced picture emerges; we compare this with responses to the same question from multiple applicants', as shown in Figure 3.2. There is not a great deal of variation here apart from in relation to whether applicants are the recipient of the heat produced by the RHT. Nineteen per cent of multiple applicants, compared with just six per cent of single applicants, were not recipients of the heat produced by the RHT. This suggests that where organisations are completing the application on behalf of another that is receiving the heat they are doing this for multiple sites and technologies.

Figure 3.2 Organisation's role in the RHI by whether single or multiple applicant (%)



Source: Applicant survey, combined responses from questions BAC5A, BAC5B and BAC5C by BAC1. Respondent could select multiple answers.

It should be noted, however, that this finding is from a representative survey of applicants, not a census of all applicants. We cannot, therefore, rule out the possibility that organisations applying for RHI support, but which are not the operator of the RHT or the recipient of the heat, may have chosen not to take part in the survey when invited.

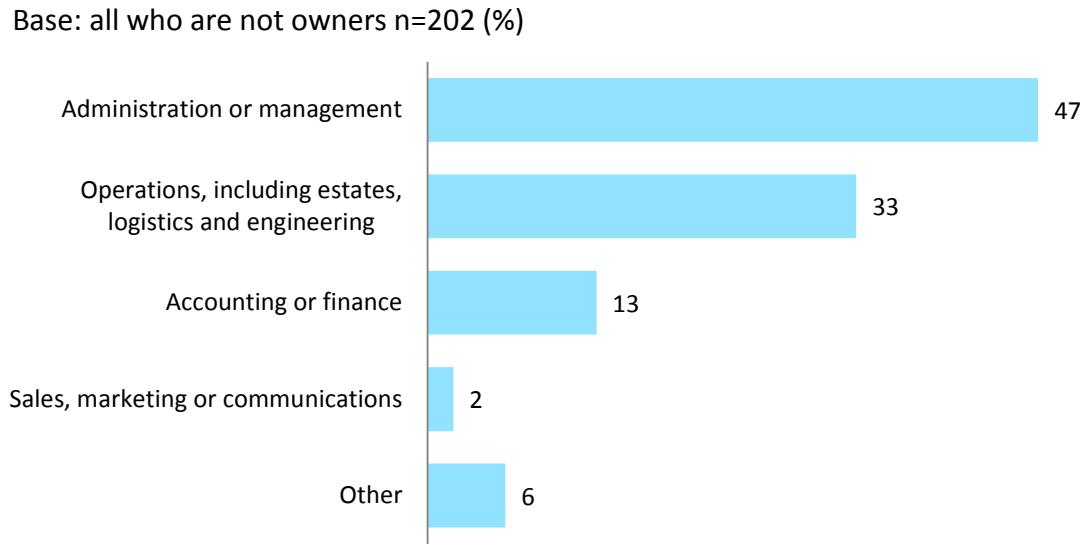
3.1.2 Who exactly completed the application?

The applicant survey asked a series of questions about the respondent. Just over two-thirds (68 per cent) were owners of their organisation. These owners were predominantly (83 per cent) from small organisations (employing less than 10 people). Respondents from the agricultural sector were most likely (81 per cent) to describe themselves as the owner of the organisation.

Figure 3.3 presents data on the department within which the respondent worked. Of the remaining 32 per cent that were not owners of their company, the next largest group described themselves as Executive/Senior Management (18 per cent) with a smaller number as Middle Management (10 per cent) or Non-Management (four per cent).

Findings from *qualitative interviews with possible applicants* suggest that there is a perception that the burden of researching RHTs and applying for RHI is greater for those without specialist energy knowledge. The following section, however, explores experiences of the RHI application process and notably in this context, no statistically significant relationship was found between experiences of the application and the role or department of the respondent.

Figure 3.3 Respondents' department or area of work within their organisation



Source: Applicant survey, question BAC4.

3.2 Applying for the RHI

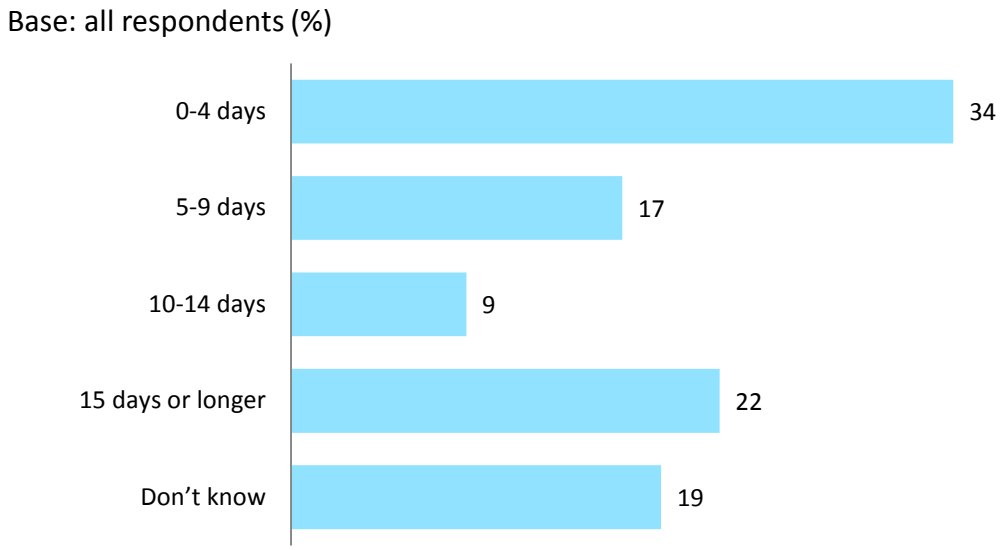
This section describes applicants' experiences of applying for the RHI. The application process is an important step in the customer journey as it involves interaction with Ofgem and requires applications to provide organisational data and information about installations. Applicants are also required at this stage to ensure that their RHT is fit for purpose and eligible for the RHI.

The initial point of contact applicants have with Ofgem and the scheme is through Ofgem's telephone advice line or the RHI website, where the initial application is made. The process involves organisations providing relevant information such as technical specifications of meters and boilers, schematics, planning consents, invoices and commissioning documents. This is to demonstrate that the installation meets the RHI eligibility criteria, which relate primarily to the type, size, use and date of installation. Queries on applications from Ofgem are considered a normal part of the process as RHT installations can be very different and in many cases complex. This section describes applicants' experience of this process.

3.2.1 Time taken to complete the application

We asked respondents to the *applicant survey* to estimate the amount of full-time equivalent days their organisation had spent completing the RHI application. Figure 3.4 shows that a third of respondents (34 per cent) estimated that it took less than five days to complete the RHI application with one fifth (22 per cent) taking 15 days or longer. Almost one fifth (19 per cent), however, did not know the answer to this question.

Figure 3.4 FTE days taken to complete RHI application (%)



Source: Applicant survey, question RHI1.

There is little difference between the estimated amount of time taken by single applicants and multiple applicants. It might have been expected that the application process could become more familiar and therefore less burdensome for multiple applicants. *Qualitative interviews with multiple applicants* provide some suggestions for how this process could be speeded up. The way the application process has been designed does not allow for economies to be realised for multiple applicants, because there is no completed template that applicants can return to for their subsequent applications. Instead, participants described the application process as repetitive, submitting the same organisational information each time they applied.

Applications appear to be more time consuming for certain technologies. Respondents that had made applications for GSHPs and solar thermal estimated that they spent more time on their applications than the average. Forty-three per cent of GHSP applications and 50 per cent of solar thermal applications took 15 days or longer. In the case of GSHPs, it is possible that this is the result of the greater complexity of metering requirements, as the technology can be used to provide both renewable (supported by the RHI) and non-renewable heat (not supported by the RHI). The lower prevalence of GHSP and solar thermal installations supported by the RHI however may also be a cause, with the supply chain and Ofgem having less experience of dealing with these systems.

In terms of which types of organisation are spending more time on the application process, one of the most notable findings relates to the public sector, with 40 per cent of respondents taking more than 15 days. Large businesses also tend to take longer, with 41 per cent taking more than 15 days. The reasons for this difference are currently unclear; however we are aware that larger applicants are more likely to install GSHP and solar thermal installations, which are technologies that applicants have most problems with submitting applications for (see section below), which could contribute to the differences observed, though these are still a proportion of applications.

It does appear, however, that the time taken to complete applications is reducing over time. Discussions at the workshop with Ofgem suggest that this may reflect an improvement in the application process or increased familiarity of Ofgem staff with the common problems that arise. Twenty-one per cent of respondents in the first six months of the scheme estimated that their application took fewer than five days to complete; this increased to 49 per cent for applications made in year 3. Similarly, 27 per cent of respondents estimated that their application took longer than 15 days in year 1 of the scheme compared to 13 per cent in year 3. Within the second six months of year 2 (28 May 2013 – 27 November 2013), however, there is a significant difference between time taken before and after 24 September 2013, when metering arrangements were changed. Between 28 May and 23 September 2013, 40 per cent took less than 5 days to make the application, whereas between 24 September and 27 November 2013, only 22 per cent took less than 5 days.

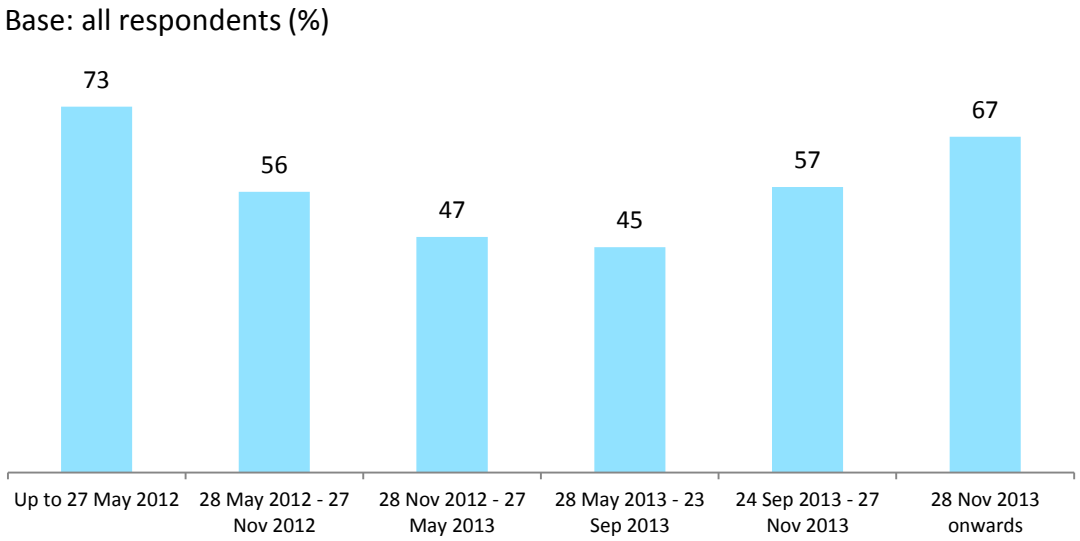
3.2.2 Problems with the application process

The *applicant survey* also aimed to explore respondents' satisfaction with the application process. Over half (54 per cent) reported that they had experienced problems with their application. As with the time taken to complete the application, problems were more likely to be reported by respondents completing applications for GSHPs or solar thermal. More than eight in ten (81 per cent) reported problems with their applications for solar thermal and nearly nine in ten reported problems with their applications for GSHP (88 per cent). Again, as with the time taken for completion of applications, there does not appear to be a difference in the likelihood of experiencing problems between single and multiple applicants. Similarly, the only notable difference relating to characteristics of organisations is that 62 per cent of those in the public sector experienced problems with the application process, compared to only 39 per cent in the industrial sector.

A slightly more nuanced story emerges in relation to the association between experiencing problems and the date of an application. The lowest prevalence was seen in year 2, with fewer than half (48 per cent) experiencing problems with their application. Around two thirds of applicants, however, experienced problems in both year 1 (63 per cent) and year 3 (67 per cent). This does not mirror the pattern identified in relation to time taken to complete the application, as discussed above, which saw a continuous improvement since the beginning of the scheme. Although the situation appears to improve from year 1 to year 2, this trend is reversed for year 3. The explanation here is likely to be found in the changes made on 24th September 2013 to the air quality requirements for biomass installations.[31] This is supported by looking at the group of applicants who applied within the second six months of year 2 (28 May 2013 – 27 November 2013), as within this group the number of respondents reporting problems increased from 45 per cent to 57 per cent after 24 September 2013, as seen in Figure 3.5.

[31] This was suggested as a possible explanation at the workshop with Ofgem staff: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/295733/20140324_Air_Quality_Factsheet_FINAL_updated_version.pdf

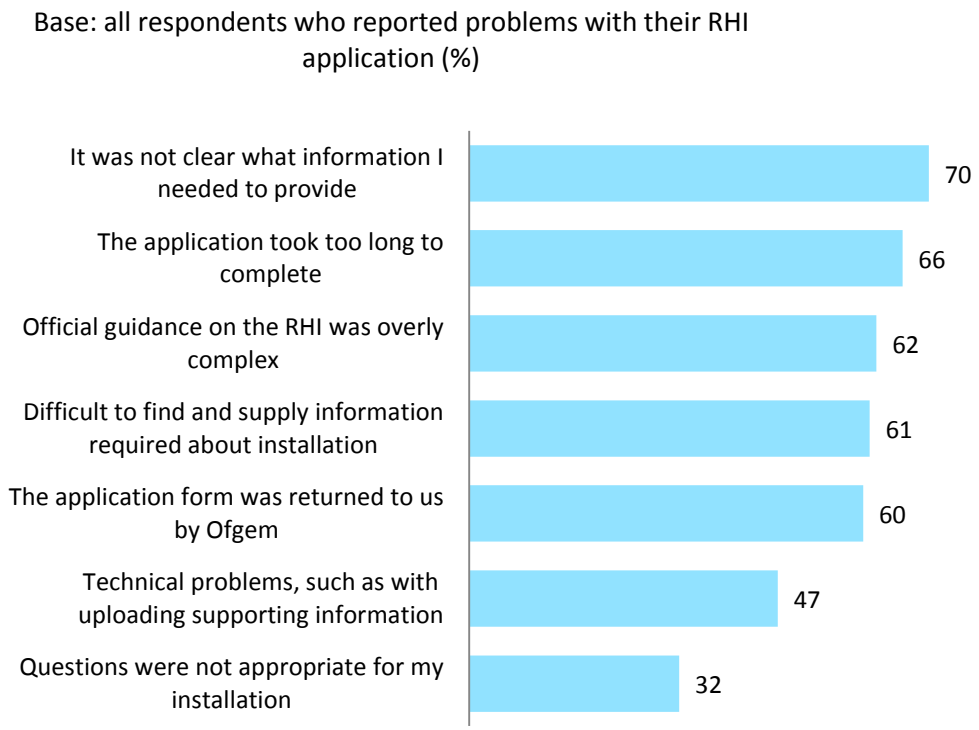
Figure 3.5 Problems experienced with the RHI application by date of application



Source: Applicant survey, question RHI2 by application date (from Ofgem's administrative data)

In asking respondents about whether they experience any problems with the application process, the resulting data is based on the respondent's perception of what constitutes 'a problem'. To understand more about this, we also asked respondents about the nature of the problems they experienced. Respondents were provided with a list of potential problems and were invited to select an unlimited number that applied to their experience of the application process; the most frequently cited problems are presented in Figure 3.6 (other problems not listed here were only selected by fewer than 10 per cent of applicants.

Figure 3.6 Type of problems experienced with the RHI application



Source: Applicant survey, question RHI3. Respondents could select multiple answers

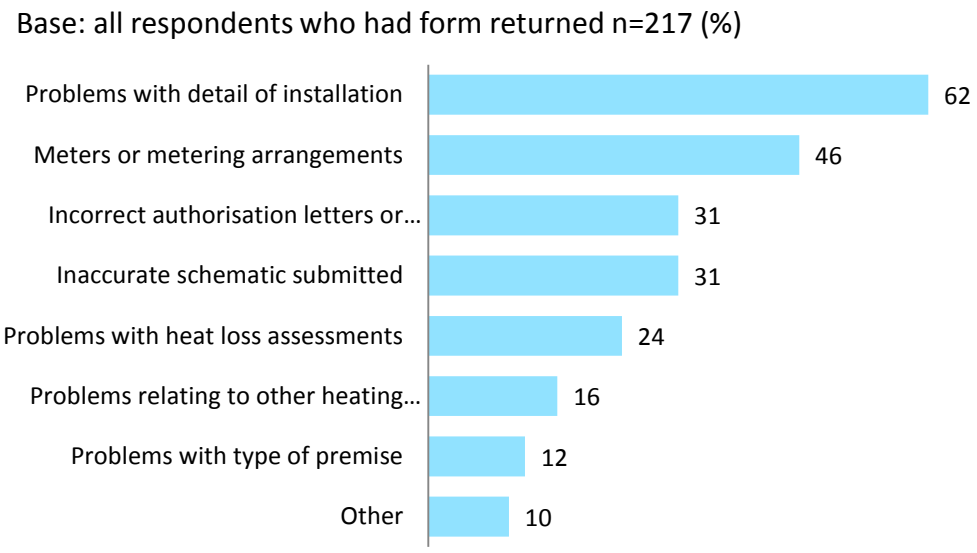
Again, it is worth considering that whilst applicants may perceive some of the issues listed below as a problem, these may be experiences inherent to the complexity of the RHI scheme itself. Seven in ten (70 per cent) respondents who experienced problems reported a lack of clarity over the information they needed to provide with their application. Related to this, six in ten of those who experienced problems found the official guidance overly complex (62 per cent) or were unable to supply all the required information (61 per cent). In particular, it seems that this lack of clarity was more of an issue for early applicants with 78 per cent of applicants who experienced problems in the first year of RHI unclear what information to provide compared to 59 per cent of the latest group of applicants (in year 3, since 28 November 2013). Problems identifying and providing the right information was a particular problem for applications for GSHPs or solar thermal: this was reported as a problem by 85 per cent and 84 per cent of applicants who experienced problems respectively, compared to 54 per cent of biomass applications with problems. This may explain why GSHP and solar thermal applicants were more likely to have spent longer on their applications, as discussed above.

Two thirds (66 per cent) of applicants with problems felt the application took too long and just under half had technical problems with the application website. Of those who felt the application took too long, over 50 per cent reported it taking 10 full time equivalent days or more (14 per cent took 10-14 days, while 40 per cent took 15 days or over).

Nearly two thirds (60 per cent) of all applicants who experienced problems also had their application form returned by Ofgem. It is not straightforward to interpret this data as there may be respondents who also had their applications returned but did not consider this a problem, but as an expected and standard phase of the application process. Consequently, this data is only for applicants who described the return of their form as a problem. Within this group, applications for solar thermal installations were more likely to be returned (88 per cent) than applications for GSHP (62 per cent) or biomass (59 per cent).

Where respondents reported that their application had been returned by Ofgem, we also asked why applicants thought this had happened. The reasons for this are shown in Figure 3.7.

Figure 3.7 Reasons RHI application was returned



Source: Applicant survey, question RHI4. Respondents could select multiple answers

The most common reason was problems with the details the applicant had provided on the installation, selected by 62 per cent of those who had their application returned. Just under half (46 per cent) of respondents who had their application returned reported that this was because of problems with metering.

It is worth noting that we did not ask respondents about the perceived scale of the problem they were describing. Equally, this data reflects applicants' perception of a problem with the process; in some cases, according to discussions at the workshop with Ofgem, what is described may be considered by Ofgem as a perfectly normal (and in some cases inevitable) part of the application process, assuming that it does not become a repeated problem. Further qualitative research with a full range of RHI applicants is required to fully understand the problems applicants may be having with the process and the extent to which they may act as a barrier to further applications being made.

3.2.3 Further experiences of multiple applicants

As highlighted above in relation to specific issues, in addition to the *applicant survey*, we also conducted qualitative interviews with a small sub-sample of multiple applicants to provide a more detailed picture of their experiences. These were the only qualitative interviews held with applicants and it is likely that a number of the findings also relate to single applicants. That said, as explored in chapter 2, the population of multiple applicants is a very particular one as differences with the general population of organisations are more pronounced: they are more likely to be larger organisations and drawn from the agriculture and public sectors. They remain a diverse group, however, and our qualitative sample aimed to capture this diversity. It is also worth noting that a general finding from the qualitative interviews was that typically multiple applicants have extensive knowledge and expertise around energy use and technologies.

There was a general impression amongst respondents with multiple RHTs that the application process had not been designed with them in mind. Participants from across different sizes of organisation and sectors, reported that the time required for RHI administration was considered unsustainable in the longer term,

with their time being better spent doing other (non-renewable heat related) activities to generate a better return on investment (ROI). In some cases, the efficiency savings gained through using the RHTs and revenues from the RHI were perceived to be wholly lost in administration tasks. Experiences of the application process were mixed among multiple applicants although it was clear that their problems with the process were specific to making more than one application. These related to the application form, inconsistency or delays in decision making and interactions with Ofgem, which we discuss in turn below.

Firstly, multiple applicants identified a number of **issues with the application form**. They described their frustration at being required to provide the same organisational information separately for each application. They also reported the lack of an index or easy way to navigate the application form and get to relevant questions more quickly. There were also issues regarding the lack of a checklist so that they were able to prepare responses in advance of applying. If a respondent encountered an issue with a particular question they were not able to proceed to the next question until this was resolved. This meant it was time consuming for respondents to retrieve documents and prepare responses multiple times as new questions were encountered. There was also a concern raised about the limit placed on the size of files that could be uploaded to the website, which meant that poor quality images such as schematics and photographs were submitted. This resulted in Ofgem requesting better quality images as they were not able to make an accurate assessment of compliance with the requirements.

A second set of concerns related to **inconsistency and delays in decision making**. Multiple applicants reported different experiences for applications identical in substance. Typically, this referred to applications made earlier in the scheme being approved and later applications that were in their opinion identical being rejected. There were specific issues raised by public sector organisations regarding the requirements attached to grant funding received for the installation of the RHT. As a result of this issue, one respondent reported that the level of questioning from Ofgem left them with no alternative but to withdraw applications (although it was not clear whether these had actually been *withdrawn* or whether they remain dormant in the system). More generally, multiple applicants reported some issues with applications being left unresolved for over a year. For larger organisations, Board members reacted negatively to delays, potentially jeopardising investment in future RHTs. A commercial organisation stated that metering decisions could have resulted in significant additional costs had they not been challenged, and consequently reviewed and revised by Ofgem. There were also concerns regarding the technical nature of queries and the fact that only the authorised signatory receives all correspondence when this individual is not always best placed to respond to Ofgem's technical queries.

Finally, and linked to the above, multiple applicants described their **interactions with Ofgem**. In general, it was reported that Ofgem staff were often helpful and positive, and some were described as having been 'brilliant' in terms of the service provided. They were not always sufficiently knowledgeable, however, to deal quickly and effectively with queries from multiple applicants. As noted above, organisations and individuals involved in multiple RHTs are typically very well-informed about RHTs and so in some instances became frustrated when it was

clear to them that Ofgem staff did not have the same level of understanding. A commercial organisation stated given their size and number of RHTs installed, they wanted to arrange face-to-face meetings with Ofgem to resolve their issues, suggesting a chargeable service if required. Thus far, however, applicants have only been able to raise queries over the phone or by email, with the latter often resulting in significant delays. As part of this study, Ofgem has confirmed that face-to-face meetings are available for complicated or multiple applications, although it does not appear that any of the multiple applicants interviewed were aware of this.

Currently, Ofgem separates the engagement with applicants, with review specialists receiving core technical training and support to be able to respond to the majority of queries, and technical staff being available for support and direct engagement as required.

3.2.4 Improving the application process

As part of RHI *applicant survey*, respondents were able to provide free text responses regarding their experiences with the RHI. We also asked participants in the *qualitative studies with possible applicants and multiple applicants* to provide recommendations to raise awareness of RHTs and the RHI, suggest improvements to the application process and address barriers specific to applicants with multiple RHTs. Suggestions from respondents, which came from both other research strands are outlined below:

- Application process needs to be simpler and tailored towards respondents with multiple RHTs:
- Simplification of the eligibility of technologies and metering
- Introduce deemed heat metering similar to Domestic RHI
- Website needs to be more user friendly
- Checklist of questions up front so that can prepare responses and documentation
- Account managers should be appointed for applicants with multiple or large RHTs
- Response times could be improved for application queries especially emails
- Applicants and installers should receive Ofgem emails about an application
- Ofgem staff need to be more appropriately trained where resources will allow, with staff preferably qualified engineers that provide clear and consistent advice as issues arise at any stage in the accreditation process
- Dissemination of case studies providing real experiences of the RHI

Ofgem and DECC are already making efforts in a relation to a number of these suggestions including simplification.

3.3 Experiences of the operational phase of RHI

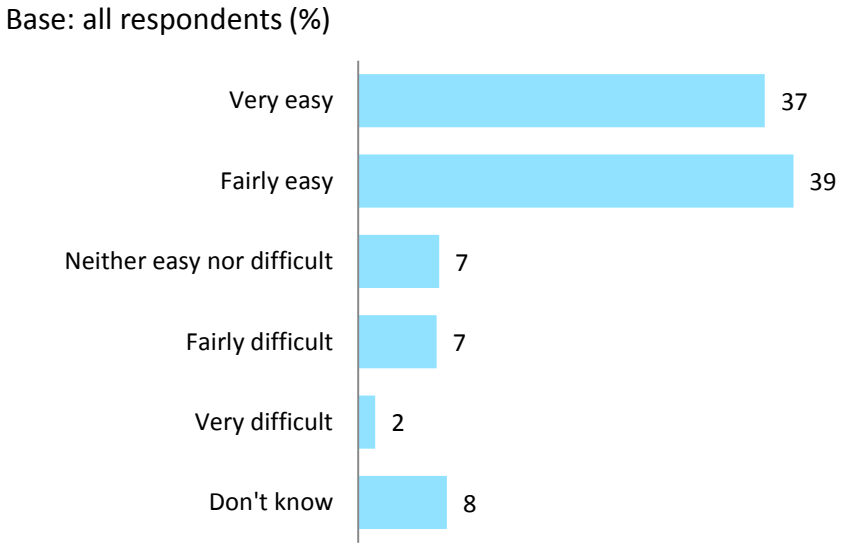
This section describes the experiences of RHI applicants after their application has been approved. Once an installation is accredited, there are a number of requirements for organisations to comply with the scheme, including maintenance of equipment, logging fuel use for biomass, and retaining service and fuel receipts. This section focuses however, on three key elements of the process. The first is taking meter readings and submitting heat data, which then triggers the second key element, tariff payments made to organisations under the RHI. Finally, we look at views on the annual declaration of compliance required from organisations.

3.4 Experiences of the meter data system

The metering system is a crucial part of the RHI programme. Not only does it provide the information to trigger payments for applicants, it also provides DECC with data on the capacity of systems being installed and the total amount of heat being produced. Consequently it is crucial that the system works as intended and is understood and supported by the applicants. Using data from the *applicant survey*, this section describes respondents' overall views on the metering system, the nature of any problems they encountered and whether they have had to provide estimates of their heat production rather than actual meter data.

In general, the overall impression of the meter system amongst applicants is positive. Respondents were asked two questions about the requirement to collect meter readings regularly these being, how easy or difficult it was, along with their overall levels of satisfaction. Figure 3.8 shows results from the former, whilst it should be noted that these are very similar to those for the latter.

Figure 3.8 Overall Impression of requirement to collect meter readings regularly (%)



Source: Applicant survey, question RHI6

Almost three-quarters of respondents were positive about the meter data requirements reporting that the system was fairly or very easy (a similar percentage reported or that they were fairly or very satisfied with the system).

Only eight per cent were fairly or very dissatisfied with the meter data system and only nine per cent found it fairly or very difficult.

There is only limited variation in these views when we look at the data by various sub-groups. Attitudes towards the metering system do appear to be less positive for GSHP applications: 23 per cent of these applicants were fairly (13 per cent) or very (10 per cent) dissatisfied with the metering system, compared to seven per cent of biomass (4 per cent fairly dissatisfied and two per cent very dissatisfied).

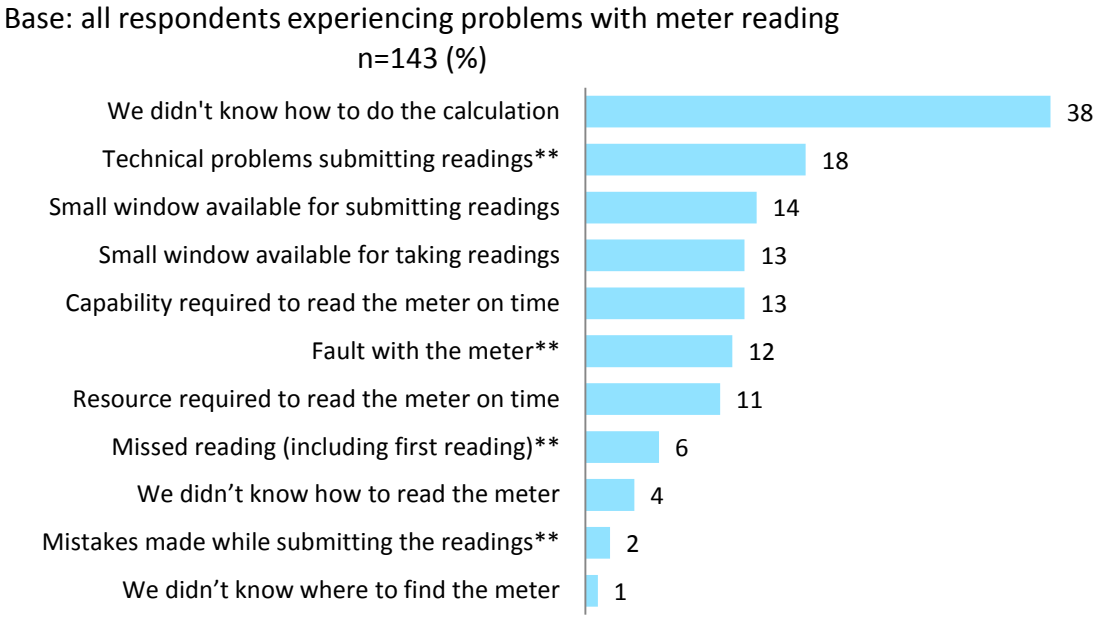
A similar level of variation was found in relation to the first question where 25 per cent of GSHP and solar thermal applicants report some degree of difficulty collecting meter readings compared to 7 per cent of biomass applicants. Large businesses were also more likely to be dissatisfied (23 per cent overall – 19 per cent dissatisfied and four per cent very dissatisfied; compared to eight per cent overall dissatisfaction for small businesses). This may seem counterintuitive, given that it would be expected that larger businesses would have more resource to commit to collecting and submitting meter data. We also know, however, that large businesses are more likely to have installed technologies other than biomass, which might be driving lower level of satisfaction.

Despite this general high level of satisfaction, almost a quarter of all applicants (23 per cent) had experienced problems collecting or submitting meter data. Of these, 60 per cent reported some level of satisfaction with the system overall.

This could indicate that some of those who are identifying problems could be identifying relatively small problems. Furthermore, in the previous section, it was shown that almost half of those who had had their application returned by Ofgem cited problems with metering arrangements and almost two-thirds (60 per cent) of those who are reporting problems are reporting that they are overall satisfied with the system. This may also then suggest that despite some technical issues, applicants understand the rationale and role of the metering system and largely see the burden as proportionate. It should be noted, however, that evidence relating to each of these points has not been gathered thus far.

It is useful, however, to look in more detail at the types of problems respondents had experienced with the meter data system. A range of problems were identified, illustrated in Figure 3.9. This question allowed respondents who had problems to select multiple issues. The problem most frequently cited was not knowing how to complete the required calculation. All other problems were experienced by fewer than 20 per cent of those experiencing any problems at all.

Figure 3.9 Problems experienced collecting or submitting meter data



** Reported under 'Other'

Source: Applicant survey, question RHI8. Respondents could select multiple answers

We also asked respondents whether they had been required to submit estimates of their heat generation at any point. Only around one in ten (11 per cent) of respondents had been required to do this, suggesting that the majority of applicants who have problems with collecting or submitting meter data overcome these problems before estimates are required. Where estimates had been provided, the most common reasons for this related to delays in being able to take a meter reading (44 per cent of those providing estimated data) or a fault with the metering equipment (38 per cent of those providing estimated data).

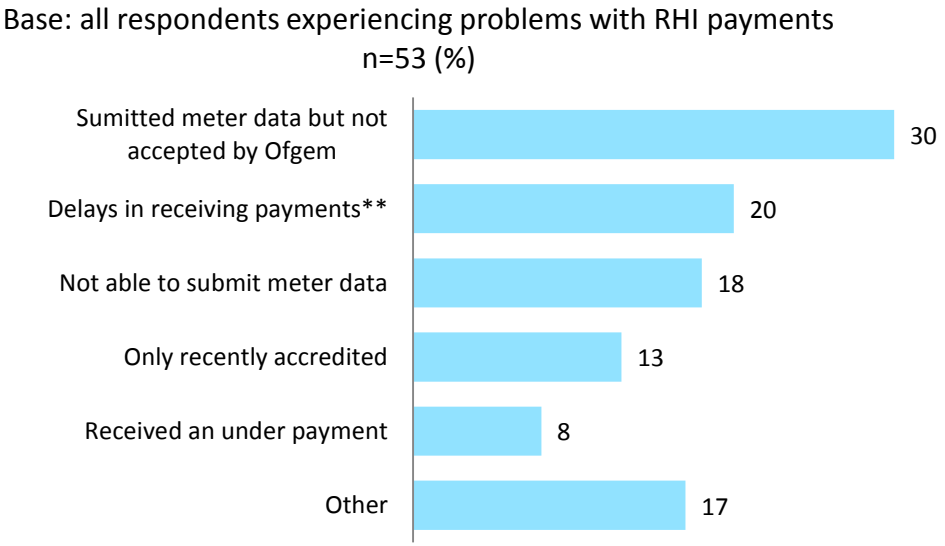
3.5 Experiences of the RHI payment system

The second important feature of the RHI post-application phase is the payment system. As evidenced in Section 5.1, RHI tariffs are an important factor towards attracting organisations to install RHTs by improving the business case for installation and it is therefore crucial that the payment system functions properly such that the reputation and credibility of the scheme is maintained.

One in ten respondents who were in theory eligible to receive payments reported experiencing problems with their payments. Of those who had experienced problems, we asked why they thought this was; responses are displayed in Figure 3.10. Thirteen per cent of this group had not received a payment because their application had only been recently accredited – this should not be interpreted as a problem with the system or the process. However, some payment issues related to the requirement for meter data; 30 per cent reported that their meter data was not accepted by Ofgem and 18 per cent that they had not been able to submit it. Twenty per cent had experienced delays in the payment and eight per cent had received a lower payment than they felt they were entitled to. According to

Ofgem, delays in payment or under payment are very rare and the responses here are likely to be due to applicants misunderstanding the payment structure or schedule.

Figure 3.10 Problems experienced receiving RHI payments (%)



** Reported under 'Other'

Source: *Applicant survey*, question RHI14. Respondents could select multiple answers.

3.6 Experiences of annual declarations process

Once an installation is accredited, the authorised signatory is required to submit an annual declaration that their installation continues to comply with the RHI eligibility criteria and ongoing obligations. For those respondents that had submitted these, 78 per cent found it very (36 per cent) or fairly easy (42 per cent) with only four per cent having some degree of difficulty with it the submission. This strongly suggests that this process is not functioning as a deterrent to further applications.

4 Awareness of Renewable Heating Technologies and the RHI

- Awareness of RHTs is high, with 58 per cent reporting to know a little or a lot about RHTs
- Awareness was strongest among larger organisations (78 per cent knowing a little or a lot), those that use more energy and monitor heating consumption, and in the industrial and commercial sector.
- Awareness of the RHI was considerably lower among smaller organisations, with just 50 per cent knowing a little or a lot.
- Misunderstanding of the RHI scheme was identified in qualitative interviews, including uncertainty associated with the basic principles of the scheme and the eligibility criteria.

Throughout Great Britain organisations require heating technologies to provide space, water and process heating. In servicing their heating demand, each organisation's choice of technology is often based on a multitude of factors, including (but not limited to) economic, technical and environmental considerations. For organisations that have applied or have considered applying for the RHI, the RHI itself may also be a factor which has influenced the choice of heating technology deployed.

Prior to appraisal of these factors, a more fundamental issue is that organisations need to be aware of RHTs. One possible route to that awareness is the RHI scheme, which may encourage organisations to consider and appraise RHTs. However, it's important to recognise that awareness is not the same as understanding, as simply being aware of RHTs will not lead to their deployment. For most organisations, awareness of RHTs comes earlier in the decision making process for their heating technologies and thus may lead to understanding.

In either case, a deeper understanding of those organisations that are less likely to be aware of the RHI and RHTs can help increase take-up in the future through strategies such as targeted communication. We start by examining organisations' knowledge of RHTs in general, before looking at their awareness of specific technology types. Awareness of RHI and factors associated with it are then reviewed, before we conclude by discussing organisations' attitudes to energy saving.

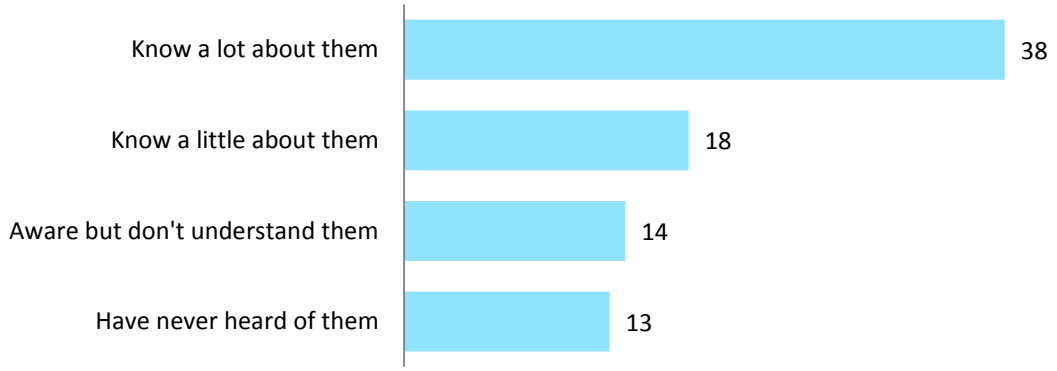
4.1 Awareness and knowledge of Renewable Heat Technologies

The wider awareness survey found that over half of respondents claimed to have some knowledge of RHTs. Larger organisations, organisations in the industrial sector, and those that had claimed the FiT or frequently monitored their energy consumption were more likely to be knowledgeable.

Over half (58 per cent) of organisations claimed to either 'know a lot' or 'know a little' about RHTs (the combination of which is hereby referred to as 'some knowledge'), with the remainder (42 per cent) either being aware of RHT's, but not understanding them or never having heard of them (see Figure 4.1).

Figure 4.1 Organisations' knowledge of RHTs

Base: all respondents with valid data n=615 (%)



Source: Wider awareness survey Q32: How much would you say you know about renewable heat and renewable heat technologies?

The results from the *qualitative interviews with possible applicants* found knowledge and awareness existing along a wide spectrum of knowledge levels amongst the interviewees. Where organisations had greater knowledge, this was driven by the fact that the organisation's principal activity used large quantities of energy, or where organisations were large enough to employ specialist operational, estates and/or energy staff that had duties to explore heating technologies. These organisations expressed a clear understanding of the range of RHTs available and their strengths and weaknesses. Staff in these specialist roles, drew on a range of information sources about RHTs including professional networks and trade associations; journals and trade magazines, seminars and conferences, consultants and suppliers.

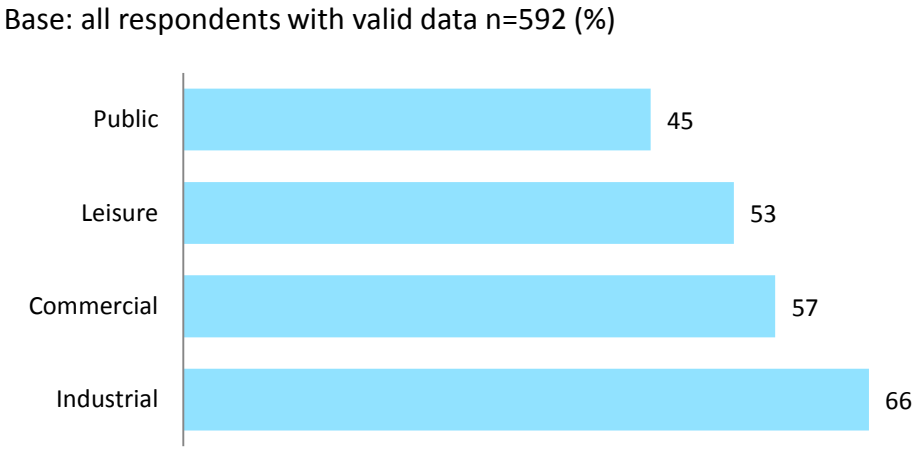
Typically, smaller organisations or those without dedicated energy staff found it difficult to set aside time to improve their knowledge of RHTs in particular. Sources of information on RHTs for this group were typically the experiences of friends and colleagues, and the advice of RHT suppliers, building contractors and consultants.

These findings are reinforced when we look in more detail at the data from the wider awareness survey. It appeared that size of organisation had a significant influence on knowledge of RHTs, with 71 per cent of organisations with 250 employees or over reporting some knowledge in the subject area. Conversely,

just 50 per cent of the smallest organisations (1 – 4 employees) reported having the same level of knowledge.

Organisational sector was another characteristic that drew interesting results from the survey, illustrated in Figure 4.2.

Figure 4.2 Respondents answering 'know a little' or 'know a lot' about RHTs by sector



Source: Wider awareness survey, Qu 32: How much would you say you know about renewable heat and renewable heat technologies? by Qu 5: Which industry category does your organisation fall under?

Industrial organisations were the most likely to report some knowledge of the RHTs (66 per cent), which might have been expected due to their high energy usage. It is important to note, however, that organisations which spent more on heating were not more likely to be knowledgeable on the subject of RHTs. By contrast, public organisations were the least knowledgeable, with 45 per cent claiming to have at least some knowledge on the subject.

An interesting relationship can be discerned between knowledge of RHTs and the frequency of monitoring heating consumption. In the *qualitative interviews with possible applicants*, organisations that employed energy managers or specialists monitored energy more frequently. This task was described as being a core part of their role and they had felt they had a professional responsibility to have a basic knowledge of RHTs.

This finding was supported within the wider awareness survey, with those organisations that monitor heating consumption more frequently being more likely to be aware of RHTs. Organisations that monitored their consumption weekly were almost twice as likely to have some knowledge of RHTs (79 per cent) than organisations that monitored consumption annually or less often (41 per cent).

As part of the research we also aimed to explore the extent organisations find out about RHT through other policies. Organisations were asked whether they participated in the government's FiT scheme in particular. Interestingly, among those who had participated, 78 per cent had some knowledge of RHTs, compared to 55 per cent among those that had not participated in FiT.

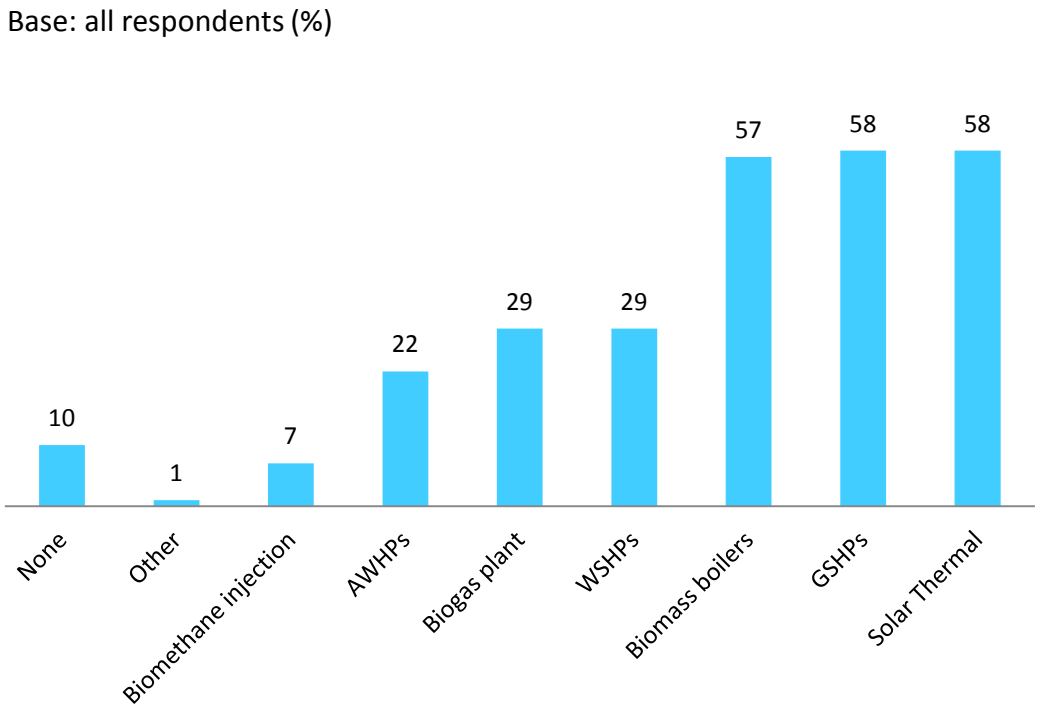
Exploring other questions within the survey, there was no apparent relationship between awareness of RHTs and connection to the gas grid or the role of the decision-maker in the organisation.

4.1.1 Awareness of specific Renewable Heat Technologies

As well as assessing respondents' knowledge of RHTs in general, the survey sought to explore their awareness of specific types of technology. This section presents these findings in relation to organisation characteristics. In summary, although awareness of specific RHTs was inconsistent, 90 per cent of the respondents had heard of at least one technology type. The qualitative interviews did not explore awareness of specific RHTs to this level of detail and thus are not referenced in the discussion below.

Respondents were asked which RHTs they had heard of prior to the survey, with the results shown in Figure 4.3.The highest levels of awareness were shown for solar thermal, GSHPs and biomass boilers, with over 50 per cent of all organisations having heard of these technologies. By contrast, just 7 per cent of organisations had heard of biomethane injection, which is unsurprising given that the technology is not relevant for most organisations.

Figure 4.3 Organisations' awareness of different RHTs (%)



Source: Wider awareness survey, Qu 39: Prior to taking part in this survey, which of the following types had you heard of before?

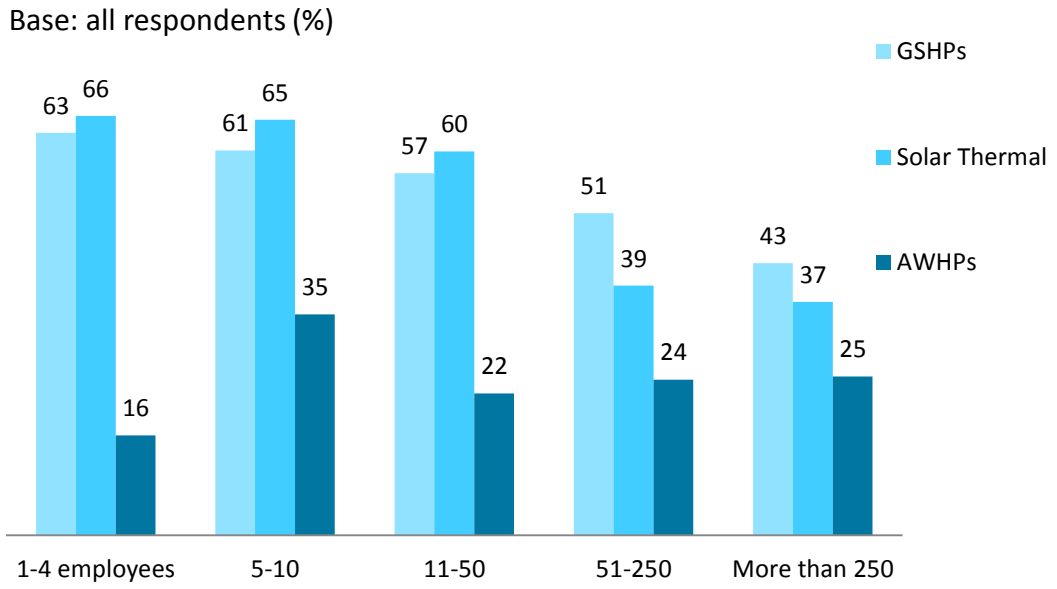
Although 58 per cent of organisations claimed to have heard of solar thermal, there is a possibility that a significant proportion interpreted this to mean solar photovoltaic (PV). In anticipation of this an informative paragraph on the technology was included within the question, but the caveat still remains and should be kept in mind when interpreting the results.

The survey responses showed that awareness of RHTs varied by the size of organisation, as shown in Figure 4.4. The results show that larger organisations

were more likely to have heard of GSHPs or solar thermal technologies, whilst smaller organisations were more likely to have heard of AWHPs. Statistically significant differences were not identified for biomass boilers, WSHPs, biogas plants and biomethane injection by size of organisation.

The results from Figure 4.4 appear contrary to the commentary in Section 4.1, which highlights the finding that larger organisations were more knowledgeable about RHTs than smaller organisations. The reason for this is that Figure 4.4 only reports the findings from four technologies as the others did not produce statistically significant results. In this way, Figure 4.4 does not present the whole picture, and although smaller organisations held more knowledge of certain technologies (notably GSHPs and solar thermal) in general it remains the case that larger organisations have greater awareness of RHTs overall (particularly when biomass is taken into account).

Figure 4.4 Organisations' Awareness of RHTs by Size of Organisation (%)



Source: Wider awareness survey, Qu 39: Prior to taking part in this survey, which of the following types had you heard of before? By Qu 7: How many employees does your organisation have across all sites?

Also of interest is the relationship between awareness of RHTs and wider engagement with other energy initiatives. Almost all (97 per cent) of organisations that had conducted an energy audit had heard of at least one type of RHT, compared to 86 per cent of organisations that hadn't conducted an energy audit.

No statistically significant relationship was found between awareness of RHTs and industry sector.

Once an organisation becomes aware of an RHT, and if they wish to learn more about it, they will look to certain channels to supply more information. In this way, the search for advice acts as a linkage between awareness and understanding. Organisations taking part in the qualitative research identified a range of sources of information. Participants with a job that required specialist energy knowledge or

expertise described consulting professional networks and trade associations, journals and trade magazines and well attending seminars and conferences. Where participants had less energy expertise, they tended to rely more on consultants and suppliers as well what they heard from colleagues or peers.

Within the survey organisations were also asked who they would seek advice from if they were to install a new heating system. The most popular response was the Energy Savings Advice Service (42 per cent). This was followed by a tradesperson (35 per cent), consultant (34 per cent) and government (34 per cent). Fewer than one in five (17 per cent) people said they would seek advice from Ofgem. When asked who they would trust the most, almost half (45 per cent) of organisations said tradesperson. Next was an Energy Savings Advice Service (30 per cent), followed by the Government (22 per cent). Ten per cent of organisations selected Ofgem.

Respondents were also asked who they would seek advice from if they were considering a renewable heating system, the results were similar to the above, with Energy Savings Advice Service proving to be the most popular (39 per cent), followed by tradespeople (31 per cent) and government (28 per cent). Once again, tradespeople emerged as most trustworthy (47 per cent), followed by Energy Savings Advice Service (25 per cent) and the Government (21 per cent).

4.2 Awareness of the RHI

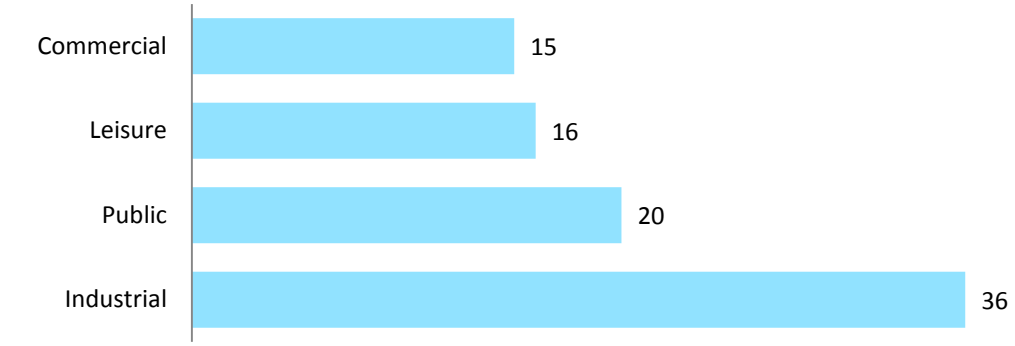
This section examines the characteristics of participant organisations in relation to whether or not they had heard of the RHI. In summary, there was a low awareness of the RHI amongst the organisations surveyed and interviewed, especially compared to their awareness of RHTs.

Awareness of the RHI was also addressed in the survey. In the wider awareness survey, 79 per cent of respondents reported to be unaware of RHI prior to being contacted about the survey. Despite the low level of awareness of the RHI scheme, a closer look at the results reveals a number of significant relationships between the respondent characteristics and awareness of the RHI.

With regards to organisational sector, industrial organisations were the most aware by some distance, with 36 per cent of organisations having heard of the scheme. Conversely, just 15 per cent of commercial and 16 per cent of leisure organisations had heard of the RHI (as shown in Figure 4.5).

Figure 4.5 Organisations' awareness of RHI by industry sector (%)

Base: all respondents with valid data n=577 (%)

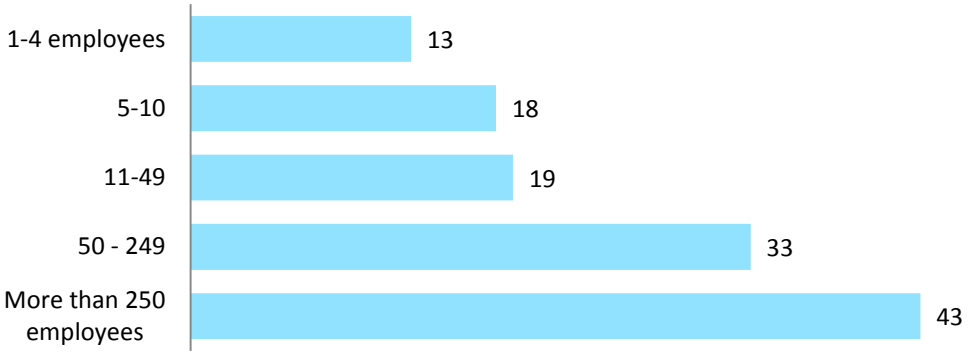


Source: Wider awareness survey, Qu 46: Before we contacted you, had you ever heard of the Renewable Heat Incentive? By Qu 5: Which industry category does your organisation fall under?

Another interesting relationship is between awareness and size of organisation, as determined by number of employees. This is presented in Figure 4.6, which shows that the largest organisations (over 250 employees) were more than three times more likely to have heard of the RHI than the smallest organisations (1 – 4 employees).

Figure 4.6 Awareness of RHI by size of organisation (%)

Base: all respondents with valid data n=602 (%)



Source: Wider awareness survey, Qu 46: Before we contacted you, had you ever heard of the Renewable Heat Incentive? By Qu 7: How many employees does your organisation have across all sites?

The *qualitative interviews with possible applicants* provide some insight into some of these differences. Participants who were specialist energy or sustainability roles had heard of the RHI and had researched it in more detail, whereas smaller businesses were less aware of the detail of the scheme and we know that larger organisations, with energy professionals, are more likely to be in the industrial sector. This premise is supported by the results of the survey, with over a third (35 per cent) of organisations that spent more than 10 per cent of their annual turnover on heating having some awareness of the RHI. Just 14 per cent of

organisations that spent 0-5 per cent of annual turnover on heating had heard of the scheme.

The *qualitative interviews with possible applicants* also suggest that knowledge and awareness of the RHI was also partly dependent on the stage businesses had reached in considering RHTs. Organisations interviewed at an early stage of the process were unaware or only vaguely aware of RHI. Organisations at a later stage of the process had greater knowledge of the scheme and in some instances had looked into the tariffs, the accreditation process and calculated the payback period of their chosen installation. This suggests that organisations interested in installing RHTs were finding out about RHI rather than being encouraged by the availability of RHI to investigate RHTs.

Of the 21 per cent of wider awareness survey respondents that had heard of the RHI, almost all said that the information they received from a variety of sources was useful (92 per cent). Almost two thirds (65 per cent) of those who found the information useful said that this was because it explained which RHTs are supported by the scheme and over half (52 per cent) said it was because it explained how the application process works. Fewer organisations cited tariff information (36 per cent) and an explanation of how the scheme could be useful to their own organisation (35 per cent) as a reason.

Where they had heard of RHI, however, participants described confusion with other government initiatives including Feed in Tariffs and the Green Deal. Another view was that the RHI was a capital grant scheme, which appears to be confusion with the RHPP; thus demonstrating that awareness does not always imply understanding. Additionally there was further confusion over the detail of the scheme including whether some installed RHTs were eligible, how long it would take for the investment to be paid back, the eligibility of existing metering and whether it was possible to apply for the RHI retrospectively (rather than in advance of installation). Participants without an energy specialism also described a general point of being difficult to keep up to date with the timings and details of all the available schemes due to other priorities.

Finally, there was also a view that the lack of awareness of RHI might be a barrier to actually installing RHTs. There is a role for RHI to play in order to break down such barriers if organisations become aware of the payback RHI offers:

> *"the only way you are going to get people interested is to tell them how much they are going to save when they do something"*
>
> (Local Authority)

4.3 Views on energy efficiency

In this section we examine respondents' views and engagement with energy efficiency in a number of ways, including:

- Concern with saving energy; and
- Mitigation against increasing energy costs

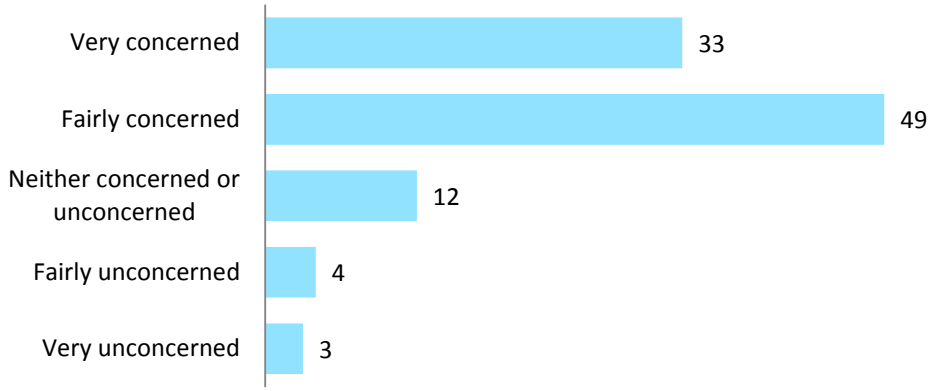
4.3.1 Concern with Saving Energy

We asked respondents to the wider awareness survey how concerned they were with saving energy and the data is displayed in Figure 4.7. The majority of organisations reported being either 'fairly concerned' (49 per cent) or 'very

concerned' (33 per cent) and only seven per cent being unconcerned. Larger organisations were more likely to be 'very concerned' about saving energy than smaller ones. Those with over 250 employees were the most likely to be 'very concerned' (48 per cent), followed by those with 51-250 employees (38 per cent). In comparison, 29 per cent of organisations employing between 1-50 people reported to be very concerned. This high level of concern was expressed across all industry sectors, with no statistically significant differentiation identified.

Figure 4.7 Organisations' concern with energy saving (%)

Base: all respondents with valid data n=619 (%)

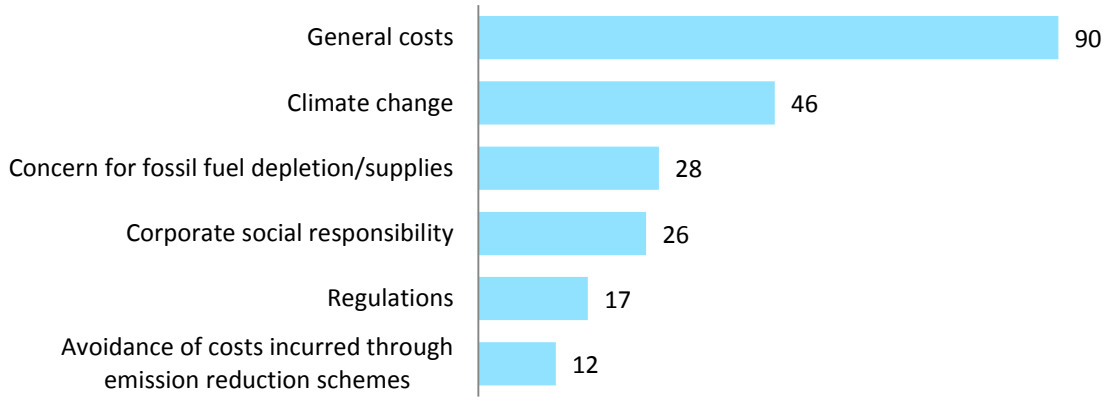


Source: Wider awareness survey, Question 17: To what extent would you say that your organisation is concerned with saving energy?

We also asked respondents why they were concerned with saving energy; the data are presented in Figure 4.8.

Figure 4.8 Organisations' reasons for concern with energy saving

Base: all respondents who were concerend about saving energy n=510 (%)



Source: Wider awareness survey, Question 18: What are the reasons for your concerns (on saving energy)? Respondents were able to select multiple responses to this question

The most frequently cited reason was cost, which was reported by 90 per cent of organisations. This was twice as prevalent as the second highest result, climate

change (46 per cent). Smaller organisations were the most likely to list cost as a reason, with 96 per cent of organisations with 1 – 4 employees citing it compared to 82 per cent of organisations with over 250 employees. Conversely, larger organisations were more likely to list regulations, corporate social responsibility or avoidance of costs incurred through emissions reduction schemes as a reason for concern.

The wider awareness survey also identified a relationship between concern with saving energy and whether an organisation had installed an RHT. Those that had installed an RHT were more likely to be 'very concerned' about saving energy (47 per cent) than those that had not (27 per cent).

4.3.2 Mitigation against increasing energy costs

Organisations that reported to be concerned over higher energy prices in the future were asked how they might mitigate against such increases. The majority (57 per cent) said that they would install energy efficient measures, though the figure was higher amongst organisations of over 250 employees (69 per cent) and lower amongst organisations with 1 to 4 employees (49 per cent).

As well as larger organisations, those connected to the gas grid were significantly more likely to install energy efficient measures as a means of alleviating higher energy prices. Around six in ten (62 per cent) of those connected to the grid would adopt these measures compared to four in ten (42 per cent) of those that were not connected.

5 Motivations and barriers to investment in RHTs

- Factors affecting investment in RHTs fall into four categories: technical, financial, organisational and the wider context within which they work.
- Financial factors represent the main motivation for investment in RHTs for 71 per cent of respondents to the *applicant survey*, including the income available from the RHI (43 per cent).
- For RHI applicants, environmental factors do not appear to be a major trigger for installation of a new heating system, but do affect technology choice, particularly for larger organisations.
- Over two thirds (69 per cent) of respondents to the applicants survey financed their installations themselves and do not appear to have been constrained by access to finance.
- There do appear to be wider issues with securing external finance to invest in RHI-supported installations.
- Amongst the investor community, there is a general enthusiasm to invest in larger projects but this is qualified by the frustrations at a range of perceived barriers.
- The asset finance and corporate lending sectors stated that their focus continues to be on biomass heating and there is relatively little understanding, or enthusiasm for, the alternative RHTs (to biomass).
- Other barriers to investment relate to technical factors such as a lack of confidence in RHTs, financial factors, such as the length of payback periods, and uncertainty over the returns and organisational factors linked to the nature of a particular business.

5.1 Factors affecting take-up of RHTs

Organisations choosing to install an RHT make two distinct but related decisions. The first is the decision to replace their existing system; the second deciding what

to replace it with. A crucial part of this evaluation is to identify the factors that influence these decisions; to understand what motivates organisations to change their system and to install an RHT, as well as any related barriers.

We collected quantitative and qualitative data from applicants and possible applicants across four projects to provide some insight in this area. Drawing on the *applicant survey*, the wider awareness survey and the *qualitative interviews with multiple applicants and with possible applicants* a range of factors emerged as influential. To help describe this diversity of influences, we have categorised them under four broad headings:

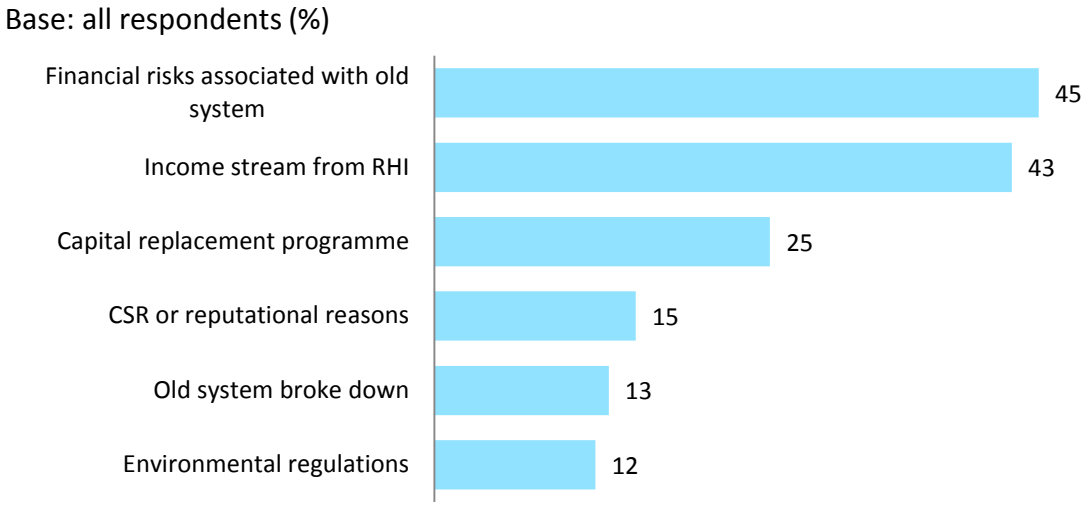
- **Technical factors** related to the specific attributes and perceptions of RHTs
- **Organisational factors** related to the ethos, structure, set-up and day-to-day activities of the applicant
- **Financial factors** related to the monetary costs and benefits associated with RHTs
- Factors related to the **wider context**, such as the economic climate and regulation

Making reference to these four categories, the next three sections explore what motivated RHI applicants to replace their system, the broader set of barriers and enabling factors that influence decisions to install an RHT across all organisations and, for RHI applicants, the factors that influenced their particular choice of RHTs.

5.1.1 Why did RHI applicants replace their system?

For retrofits of RHTs, the majority (59 per cent) of applicants have replaced oil boilers. The remainder replaced gas boilers (20 per cent), electric heating (14 per cent), biomass (14 per cent), direct combustion of fossil fuels (6 per cent) and other (3 per cent). An aim of the *applicant survey* was to find out why organisations which were retro-fitting installations into existing buildings were replacing their old system in the first place. Respondents were asked to select from a range of reasons that could have influenced their decision to replace their old system, as shown in Figure 5.1.

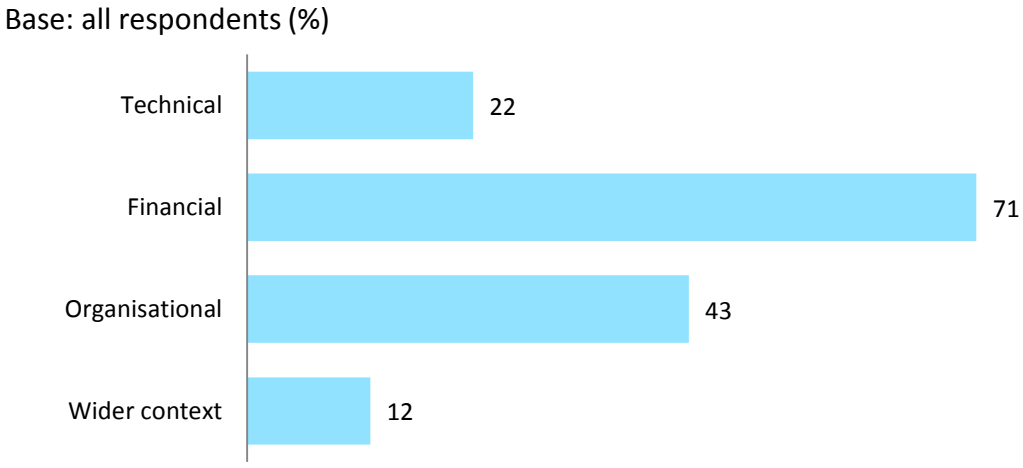
Figure 5.1 Reasons for replacing old system among RHI Applicants



Source: Applicant survey, question PRO4. Respondents could select multiple answers.

The two most common influences reported by respondents were financial risks associated with the old system (45 per cent) and the income stream associated with the RHI (43 per cent). The only other influence to be selected by more than 15 per cent of respondents was an existing capital replacement programme. For this question, respondents were able to select as many of the influences as were relevant to their decision. To understand the situation more clearly, we grouped the responses under the four category headings described above: technical, financial, organisational and wider context. Figure 5.2 illustrates the proportion of respondents that selected at least one reason from each of the four categories.

Figure 5.2 Aggregated reasons for replacing old system among RHI Applicants



Source: Applicant survey, question PRO4. Respondents could select multiple answers.

Organising the factors in this way underlines the importance of potential financial benefits, with 71 per cent of respondents selecting at least one financial factor. Organisational factors, including corporate social responsibility (including

environmental considerations) and the existence of a wider capital replacement programme, were selected by 43 per cent of respondents. Technical factors, such as the old system not functioning or breaking down, are less influential. Just over one in five respondents (22 per cent) selected one of these options. Finally, just over one in ten selected reasons associated with the wider context, primarily the driver created by environmental regulations.

The data also indicate that the later an installation has been commissioned, the more likely it is that the financial return from the RHI influenced their decision to change. For the most recently commissioned installations (from May 2013 onwards), 51 per cent reported the RHI as a reason compared to 37 per cent of those with installations commissioned before the start of the RHI in November 2011. However this trend is not statistically significant due to limited base sizes.

There are also some differences associated with the type of system that applicants were replacing. Financial risks are more likely to be associated with oil boilers compared to gas boilers or biomass boilers (53 per cent of respondents citing this as a reason for replacing an oil boiler, compared to 35 per cent for those replacing a gas boiler or biomass boiler). Of those replacing their biomass boilers, 32 per cent reported that this was because it had broken down compared with 12 per cent for oil boilers and 10 per cent for gas boilers.

5.1.2 What factors affect the uptake of RHTs

As noted throughout this report, the respondents to the *applicant survey* do not necessarily represent the general population of organisations from which they are drawn. Consequently, we also conducted *qualitative research with a group of possible applicants* to the RHI. These include both organisations with an RHT which have not applied for the RHI and organisations who are considering changing their system and for whom an RHT is a possible option. In this section, we describe the four categories of factors that influenced thinking and decision-making about RHTs for possible applicants, bringing in evidence from the applicants survey and interviews with multiple applicants where relevant.

Technical factors

The data suggests that the technical characteristics of RHTs influenced whether organisations were actively considering installation or not. Issues highlighted by participants in the *qualitative research with possible applicants* included availability of fuel, the perceived safety and reliability of technologies and issues related to the supply chain.

The wider awareness survey asked questions on respondents' perceptions of the technologies in order to gauge whether respondents had any understanding of RHTs. The themes explored revealed potential technical barriers to uptake. Just over three-quarters (78 per cent) of respondents perceived RHTs to be expensive to install. By comparison, over half (51 per cent) agreed with the statement that RHTs are cheap to run. When asked whether they thought RHTs would fulfil their heating requirements better than their current heating system, just over half (52 per cent) were unsure, and 34 per cent agreed. Similarly, 58 per cent were unsure whether RHTs were more reliable than conventional heating systems.

Availability of fuel sources and storage was identified as an influencing factor by participants in the qualitative interviews. For biomass boilers in particular, concerns about the quality of feedstock, e.g. damp pellets, were raised as a

barrier to installation. The need to transport large quantities of feedstock and provide adequate storage for this material was also identified as a barrier to installation, and some scepticism was also voiced around the long-term stability of biomass feedstock markets:

> *'I suppose we are peripherally considering biomass-powered CHP [Combined Heat and Power], but I'm very concerned about the stability of the biomass market. When you look at the costing models for biomass CHP it makes all sorts of assumptions about the price stability over very extended periods of time, which I think are not subject to any evidence.'*
>
> *(Food manufacturer)*

In contrast, for businesses intending to use waste products produced as part of their core business as a fuel source (for example, sawmills producing wood and food waste used to generate biogas), at no additional cost, this was seen as a strong facilitator to installing particular RHTs.

Safety considerations were raised as a potential barrier to RHT installation. Examples given included concerns about the safe storage of biomass feedstock, costs and safety concerns associated with mitigating the risk of water-based disease in some systems (though on the latter point, participants were unsure of the specific risks) as a disincentive to installing RHTs. In one case, the respondent spoke about a move towards electric-powered point-of-use water heating to avoid these issues.

Views were mixed on the long-term *reliability* of RHTs. Where concerns were expressed, these included the view that GSHPs become less efficient over time. Furthermore, an energy manager from a Local Authority reported that building managers were averse to biomass boilers due to problems with poor feedstock and fuel-handling equipment breaking down.

Among RHI applicants there was also concern and uncertainty relating to the reliability of RHTs. Just under half (49 per cent) of respondents to the applicants survey reported being uncertain about reliability before installing their RHT. More than four in ten (44 per cent) of all respondents were concerned about performance in relation to heat output, but this was of concern to over half of organisations who had installed solar thermal (56 per cent). This is not a statistically significant finding due to small base sizes but may indicate that this is a greater concern for solar thermal owners.

There was also a set of factors that related to the UK *supply chain* for RHTs. One view was expressed that the market in the UK for RHTs was underdeveloped and as a result it was difficult to source experts to install and maintain them. Examples were given of installations that did not function properly from the outset, or had broken down and were difficult to repair. These experiences had in some cases deterred businesses from installing further RHTs:

> *'One of our earliest experiences with [Solar Thermal] was a very bad experience. We had a new student residence building…with a solar thermal system on it which didn't work and you know because of the way the building had been built I think the contractor that did that didn't know what they were doing. So we ended up with a system that, that didn't work and that put us off.'*
>
> *(Energy Manager, Higher Education)*

These concerns were also identified among those that had installed an RHT and applied to the RHI. Around four in ten (39 per cent) of respondents to the *applicant survey* reported being uncertain about how they would fix a broken RHT and around a third (35 per cent) reported uncertainty about the availability of installers and maintenance services in their area.

Finally, the extent to which RHTs were felt to provide energy and/or carbon savings also played a role in decision making. Where RHTs were not felt to provide sufficient savings, three reasons were identified. Firstly, higher levels of energy efficiency in new buildings were felt to reduce the need for RHTs because heating costs were anticipated to be low. Secondly, where reducing carbon was a main driver and budget and time resources limited, priority was being given to energy efficiency measures in some cases, including improving heating controls, insulation and fostering energy efficient behaviour change. Finally, renewable heat sources were not always felt to be the most effective way of helping to achieve carbon reduction. For some larger organisations, preferences were stated for fossil-fuelled CHP and heat networks.

> *'Certainly [for] the town centre type buildings, it's gas CHP...that's the technology that's most appropriate for us, but obviously isn't in the RHI. I guess longer-term, things like trying to develop heat networks in the town centre. But again, we're kind of waiting for policy on CHP and district heating, which is kind of promised. But it, it is the most cost-effective and most appropriate form of carbon reduction for us.'*
>
> *(Energy Manager, Local Authority)*

Financial factors

Financing the installation of RHTs is discussed in more detail in Section 5.3. It is important here, however, to acknowledge the role financial factors play in determining whether to install an RHT. Two issues emerged: the up-front costs of RHTs and the size and timing of the financial return available.

For small businesses in particular, the capital costs of RHTs was identified as a primary barrier to installation, despite an acknowledgement from some that the return on investment in the long term was good:

> *'It's just lack of working capital - getting this building converted took considerably more than I was expecting, and so we're just struggling to get working capital together to - to go any further with the renewables, but it is high on my agenda to try and get that done.'*
>
> *(Managing Director, Brewery)*

It was also true, however, that capital costs were not a primary barrier for all. A number of possible applicants who were convinced of the business case for RHT installation expressed their intention to fund RHT installations from their own capital or by raising finance. For this group, reduced running costs and reducing their reliance on gas and oil were key facilitators to installing RHTs. Despite this, the length of time required for a satisfactory ROI was raised as an issue, with businesses highlighting the perception of long pay back periods as a barrier to installation. In these circumstances, some businesses were exploring funding mechanisms whereby investors provided the upfront capital and shared the benefits, freeing the business to use its own capital for projects considered to have a higher rate of return. More fundamentally, there was also a view amongst some organisations that RHTs were less cost effective when compared with

renewable *electricity* technologies (for example, Solar PV), and therefore efforts to reduce energy costs were being directed towards these alternatives.

Organisational factors

The context in which businesses are operating, including business needs, tenure and geographical context were all taken into consideration in the decision making process over whether to install RHTs.

Firstly, the knowledge and expertise of staff influenced how and whether decisions were made. As discussed in Section 1.3, levels of knowledge and expertise in relation to RHTs were variable. In larger organisations, some Energy Managers reflected that a lack of understanding of RHTs and how they work among other members of staff has led to misconceptions about their viability and this was identified as a barrier to installation. In some instances, such Energy Managers also described difficulties convincing other staff within the business of the benefits of RHTs, particularly where there was a perception that RHTs required greater maintenance than traditional boilers.

> *'Certain barriers [have] held [RHT installation] back till now. It tends to be from our building and maintenance department and perceived issues with boilers, with wood pellet and biomass boilers…reliability, storage of fuels, health and safety issues... Our mechanical engineers are very averse to Biomass at the moment.'*
>
> *(Energy Manager, Local Authority)*

Organisations also identified their *current tenure* as a barrier to RHT installation, particularly if they were occupying buildings on short to medium term leases:

> *'I guess one of the issues with it is because we're tenants, the idea of spending lots of money on investment is not desperately appealing... it isn't our property as such. Sort of big capital investment doesn't really appeal that much.*
>
> *(Owner, Flour Mill)*

In these instances, businesses reported that the ROI would need to be relatively quick to make the capital investment attractive.

Location was both a barrier and facilitator to RHT installation. For businesses with physical space, good access for fuel delivery (in the case of biomass), buildings that could accommodate RHTs and climate conditions suitable for the technology concerned these were facilitators to their installation:

> *'The ground source [heat pumps] seem to work good here in [this area of Scotland] because it's a fairly steady temperature, so you can predict what's going to happen. We don't have much frost and we don't have heat waves in the summer, so it's pretty - pretty steady.'*
>
> *(Managing Director, Brewery)*

For others, building type and location were barriers to installation. Simply not having the space to install ground source heat pumps or biomass, or difficulties with access for fuel supplies were reasons given for not installing RHTs.

Timescales were also an issue for some organisations. The need for greater preparation and planning before an RHT is installed was highlighted as a potential barrier to installation. Boilers breaking down and the need for immediate

replacements (in the case of schools for example) meant there was not time to consider an RHT.

Finally, the importance of *environmental considerations* to organisations was also a factor. At an organisational level, a commitment to environmentally friendly policies and practice was a facilitator to RHT installation. Organisations that were working towards meeting their CRC Energy Efficiency Scheme commitments identified this as a driver for RHT installation, while others spoke of using renewable heating technologies as "*the right way to do things*". Multiple applicants also cited similar reasons for the installation of RHTs. Large businesses in particular explained the wide roll-out of RHTs across multiple sites as playing a part in reaching a company-wide renewable heat target. Drawing on the results of the wider population survey, 68 per cent of organisations reported that the environment and use of renewable sources of energy was important to them.

Wider regulatory and economic context

Beyond the technological, financial and organisational considerations, the wider regulatory and economic context also influenced decision-making in relation to RHTs.

Firstly, the *economic context* was identified as both a facilitator and barrier to RHT installation. Energy costs and the potential to reduce these was a key facilitator along with rising energy prices for oil and gas and the expectation that these would continue to rise. The wider population survey discerned that 91 per cent of respondents were concerned about rises in energy prices in the future. Within this group, however, only 21 per cent said that they would generate heat themselves in order to mitigate against such rises, with the installation of energy efficiency measures proving far more popular (57 per cent). Despite this result, 43 per cent said that rising energy costs would strongly influence their choice of technology in the future (and 49 per cent said that it would have a moderate influence). One interpretation of this result could be that whilst the willingness to change technology is there, the knowledge of RHTs is not. Organisations may therefore choose measures that are more familiar to them and that may reduce costs further in order to combat high energy prices, such as energy efficiency.

The current economic climate and recent history of negative or low economic growth were also identified as a barrier to installation. In part this was because businesses were experiencing difficult operating conditions and focusing on their core business, but also because RHTs were viewed as untried technology without a proven track record of reliability and efficiency and therefore a risk:

> *'Well, I think some of the big local authorities are very much risk-averse, and I think they're risk-averse simply because the local authorities need them to be risk-averse, in a way… in the current financial climate where, you know, we're going round thinking of cutting statutory services… the idea of taking on un-tried and tested technologies which we're not sure, we don't want to be trailblazers at a time when, when any sort of mistake could actually cost us money which we can ill afford.'*
>
> *(Energy Manager, Local Authority)*

Secondly, organisations also described the influence of *environmental and planning regulations*. A strong incentive for RHT installation for a number of participants was planning requirements that specified a minimum percentage of

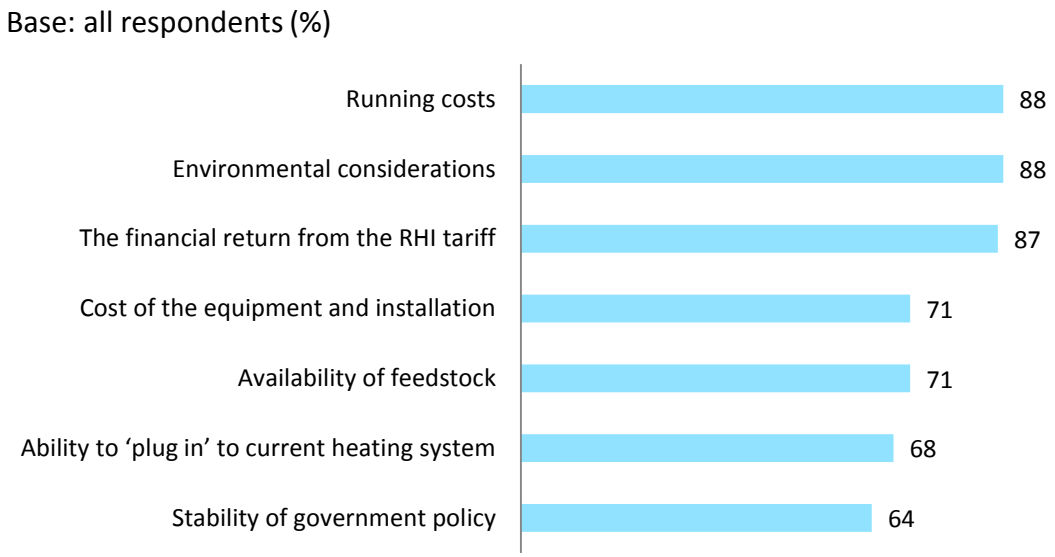
energy for new buildings had to be drawn from renewable sources. Achieving certification under the Building Research Establishment Environmental Assessment Method (BREEAM) scheme for sustainable buildings was also identified as a primary facilitator to RHT installation, particularly where this was a condition of receiving a grant for example.

Environmental and planning regulations were also identified as barriers to RHT installation. Examples were given of buildings with listed status that prevented the installation of solar thermal panels; buildings in world heritage sites with more restrictive planning processes; and buildings in high density urban areas with air quality regulations that restricted the use of biomass boilers.

5.1.3 What factors affect the choice of particular technologies

The previous section has provided an insight to the range and importance of different factors that affect decisions to install an RHT. As part of the *applicant survey*, we also wanted to understand why organisations had installed a particular technology. In order to do this we asked respondents what factors had affected their choice of technology and which of the factors they had selected was the single most important.[32] Figure 5.3 illustrates seven factors that were selected by over half of respondents.

Figure 5.3 Factors considered in choice of technology for RHI applicants



Source: Applicant survey, question PRO7. Respondents could select multiple answers.

The factors listed also fit under the four category headings used throughout this section: financial, organisational, technical and wider contextual factors. As with the decision to replace their system in the first place, financial considerations

[32] The survey did not explicitly specify whether the choice of technology was between RHTs and fossil-fuelled heating or between different RHTs, however the survey was designed with the intention of gathering information about the choice between all types of heating systems. Based on the results achieved, we believe this to have been the understanding in the majority of cases but we cannot rule out that it may have been interpreted differently for a minority of respondents.

feature prominently in RHI applicants' choice of technology. Almost nine in ten considered running costs (88 per cent) and the return they would receive from the RHI (87 per cent), and seven in ten (71 per cent) took into account the costs of equipment and installation.

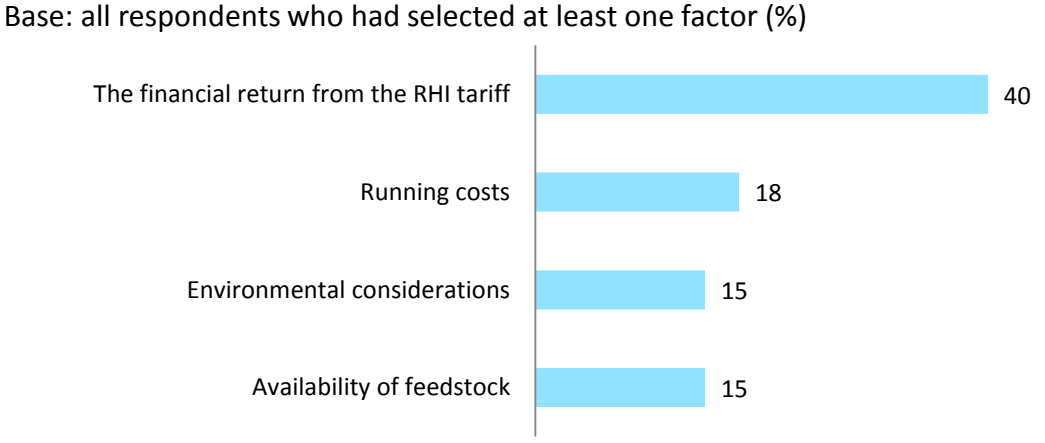
Under organisational factors, environmental considerations were reported by almost 9 in 10 respondents (88 per cent) as influencing their choice of technology. This may be unsurprising given that RHI applicants may have selected an RHT over a non-renewable source, yet this finding is in sharp contrast to the proportion of respondents reporting environmental considerations (four per cent) as influencing their decision to replace their system in the first place.[33] Concern for environment, therefore, appears to be only a very minor driver towards triggering the installation of a new system for RHI applicants, but plays a key role in determining technology choice.

Respondents reported two technical influences that related to ease and convenience as influencing their choice of technology: around seven in ten respondents selected the availability of feed stocks (71 per cent) and two thirds (68 per cent) cited integrating the new technology with a current system. Finally, almost two-thirds (64 per cent) also cited the stability of government policy as influencing their decision.

Although the factors above are assumed to be mainly positive (i.e. factors 'pulling' applicants towards a particular technology), interviews with multiple applicants also provide some insight into negative or 'push' factors. For example, one respondent in the accommodation sector reported selecting their technology based on *not* wanting to be reliant on any particular fuel, thus discounting oil, gas and biomass before selecting a combination of GSHPs and solar thermal. Furthermore, as also discussed in Section 5.1.2, other multiple applicants specifically discounted some technologies (GSHPs in particular) due to pre-conceived ideas of difficulties or problems associated with these types of installations.

We also asked respondents to the applicant survey to identify the one factor that was most important in their choice of technology. The findings, shown in Figure 5.4, identify four main factors that emerge as most important.

Figure 5.4 Most important factor in choice of technology for RHI applicants



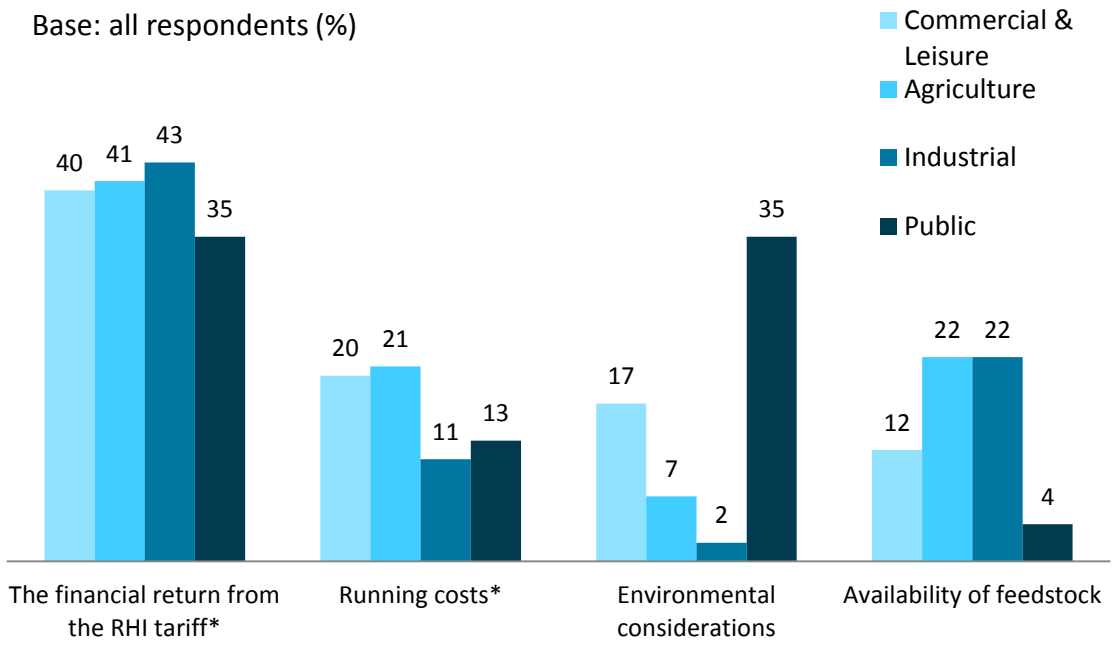
[33] Note however, that reporting environmental considerations was not a pre-coded response that respondents could choose and the four per cent came only from those answering 'other'.

Source: Applicant survey, question PRO8.

The financial return from the RHI was reported as the most important factor for 40 per cent of respondents, by far the most frequent response. Fewer that two in ten selected running costs (18 per cent), the environment (15 per cent) and the availability of feed stocks (15 per cent). No other factor was selected as the single most important influence on the choice of technology by more than three per cent of respondents.

When looking beyond the specific technology chosen, however, a clearer narrative can be identified by exploring which kinds of organisation are more or less likely to select influences from three main categories as one of the most important influence on their choice of technology. These categories are considerations related to the environment, finances and ease, and the organisations more likely to select these as the most important factor are summarised in 5.5 and 5.6.

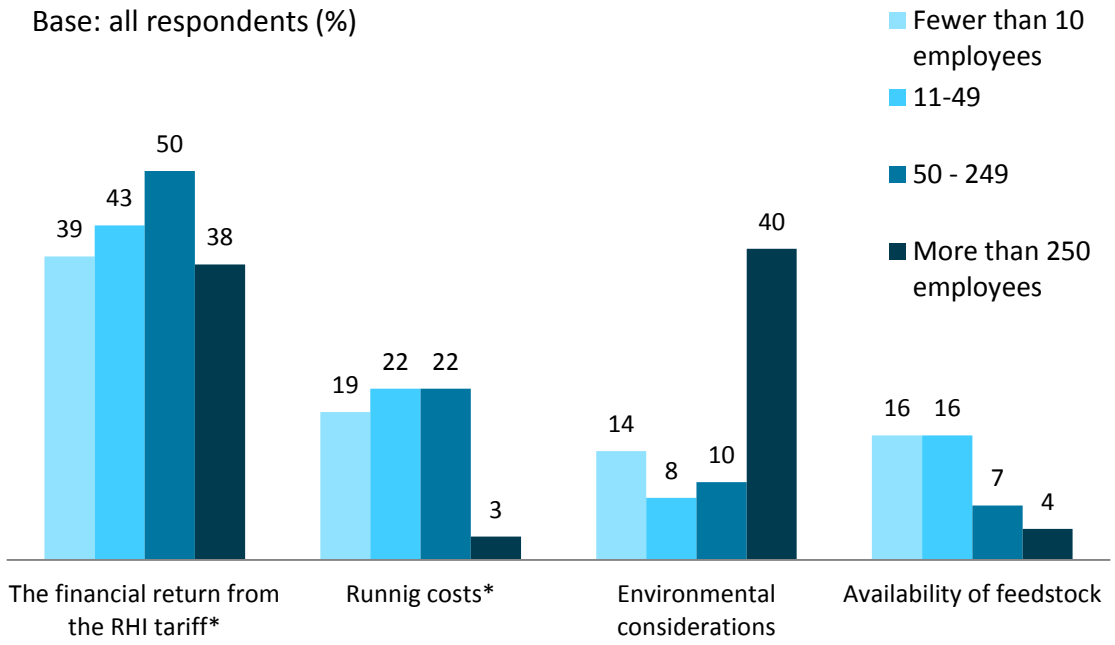
Figure 5.5 Most important factor in choice of technology for RHI applicants by Sector



**Differences are not statistically significant*

Source: *Applicant survey, question PRO8 by SIC Code*

Figure 5.6 Most important factor in choice of technology by Business Size



** Differences are not statistically significant*

Source: Applicant survey, question PRO8 by BAC9

Organisations more likely to be influenced by environmental considerations tend to be larger, public sector organisations. Overall, 15 per cent of respondents reported environmental considerations as the most important influence on their choice of technology; the equivalent figure for organisations employing over 250 people is 40 per cent and for public sector organisations 35 per cent. There is considerable overlap between large and public sector organisations in our sample, which should be taken into consideration here, but these findings may illustrate the influence of organisation-wide environmental policies or targets that both these kinds of organisations are more likely to have in place. In contrast, technical factors, specifically in the guise of the availability of feedstock, were less likely to be of concern for public sector organisations: 15 per cent of all respondents reported this as the most important factor compared to four per cent for public sector organisations.

The factors that influence choice of technology for RHI applicants also appear to be related to the timing of the commissioning of the RHT installation. This is summarised in Table 5.1.

Table 5.1: Factors in choice of technology for RHI applicants by commissioning date (%)							
		Up to 27 Nov 2011	**28 Nov 2011 - 27 May 2012**	**28 May 2012 - 27 Nov 2012**	**28 Nov 2012 - 27 May 2013**	**28 May 2013 onwards**	**Total**
The financial return from the RHI tariff	Selected as a factor	66	88	87	93	94	87
	Most important factor	21	32	46	42	47	40
Environmental considerations	Selected as a factor *(trend not significant)*	80	92	91	88	90	88
	Most important factor	24	26	17	12	7	15

Source: Applicant survey, question PRO7 by commissioning date (based on Ofgem's administrative data); base: all respondents (620);
Source: Applicant survey question PRO8 by commissioning date (based on Ofgem's administrative data); base: all respondents who selected at least one factor in choice of technology (603).

Respondents could select multiple answers for PRO7

Firstly, there is a mixed relationship with environmental concerns. Whilst the number of respondents selecting it as one factor is increasing over time, the more recent the accreditation date the less likely environmental considerations are to be selected as the most important influence. Conversely, more recently commissioned installations are more likely to report the financial return from the RHI as one of, or the most important, factors.

5.2 The role of the RHI

This section of the report describes the role of the RHI in influencing the 'customer journey' by removing or lowering barriers to the deployment of RHTs. In particular, the analysis explores how the RHI influences:

- Awareness of the RHTs; and
- Understanding and deployment of RHTs.

5.2.1 Awareness of RHTs

A starting hypothesis for the role of the RHI scheme is that the existence of the RHI improves awareness of RHTs within organisations. As described in Section 4, awareness levels of RHTs among organisations within the wider population are relatively high, but conversely, awareness levels of the RHI reported by these organisations were somewhat lower. Thus, at face value, it is difficult to see a direct connection between the awareness of RHTs and the RHI.

This aspect was further explored within the *qualitative research conducted with possible applicants*. Within our sample we identified organisations that were aware of RHTs, but had not installed any because of barriers unrelated to the RHI. For example, barriers such as tenure or lack of space to house an RHT were highlighted by some of the participants. In such cases, these barriers to RHT

installation meant that the RHI had likely never become a consideration for them, and so awareness of RHI was understandably low.

Possible applicants made a number of recommendations around improving the information available to organisations about RHTs and the RHI. These included:

- The development of pay-back calculators that provide a simple mechanism for organisations to see the potential financial benefits of RHI;
- The use of case studies that provide examples of the benefits of RHTs and the RHI to businesses in a range of circumstances, including evidence of their performance and cost-effectiveness; and
- Independent advice and information (i.e. not from the RHT supply chain) on RHTs and regional contacts for the RHI to support businesses to make informed decisions.

Although the survey of non-domestic organisations showed that awareness of renewable heat technologies is higher than awareness of the RHI, multiple applicant's recommendations suggest that more information about both may encourage organisations to deploy renewable heat.

5.2.2 Understanding and deployment of RHTs

The logic model suggests that understanding of renewable heat technologies amongst the wider population will improve as more are deployed. The applicant survey appears to support this with 45 per cent of applicants citing familiarity with the technology as a factor in their choice of technology.

The applicant survey also provides evidence that RHI applicants' decisions to install renewable heating systems and their choices of specific technologies were influenced by the availability of the RHI. Almost nine in ten (87 per cent) of applicants consider the RHI tariff as a factor in the choice of technology and 40 per cent named it the most important factor. Thus it appears that these applicants' understanding (and indeed choice) of RHTs was influenced by the RHI.

We can explore this further by looking at retro-fit installations (new buildings are excluded from this analysis, as they would have installed a new heating system anyway). Respondents with retro-fit installations were asked whether their installations would have happened without the RHI; 47 per cent report that they would not. Of those retrofit installations that *would not* have happened without the RHI, 46 per cent cited the financial return from the RHI tariff as the most important reason for replacing their old system. The comparable figure for retrofit applicants who reported their installations *would* have happened without the RHI is 40 per cent, showing that the RHI tariff is also an important motivation or benefit for this group, if not the deciding factor.

This is further reinforced by evidence from the multiple applicant qualitative study, where participants described how the RHI had helped make the business case for RHTs. One participant from the accommodation sector noted that the RHI income made a GSHP viable. Given that the installation costs alone amounted to the same as the expected running costs of an oil boiler over 20 years, the addition of RHI income appears to have significantly improved the business case for the GSHP. Furthermore, one organisation supplying biomass boilers to clients in the

domestic sector specifically moved into the non-domestic sector after the RHI became available in 2011, which also demonstrates some impacts on the supply chain.

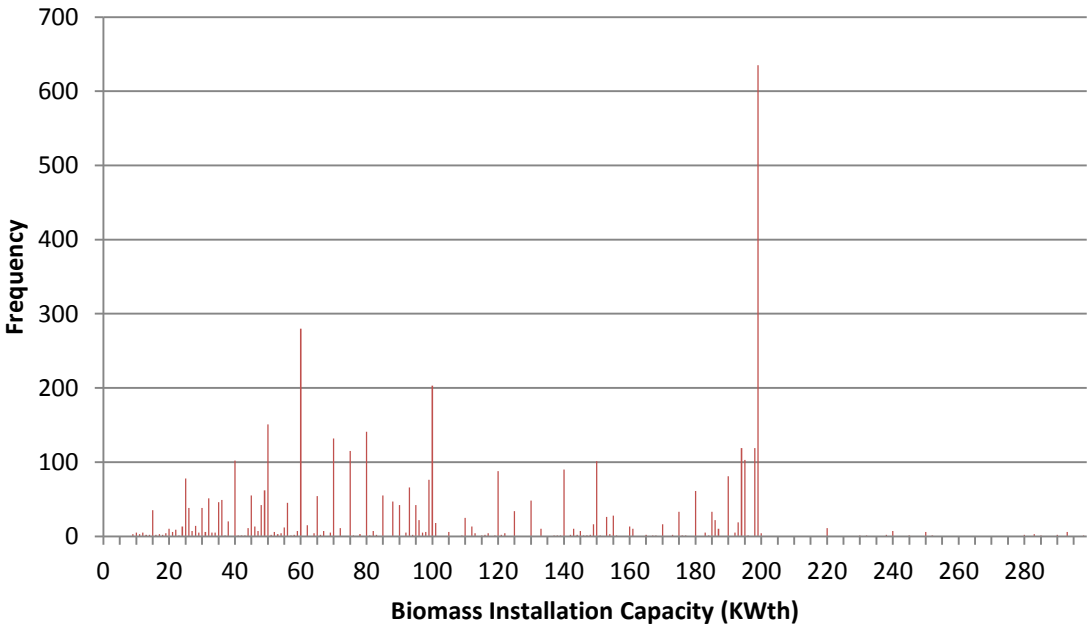
5.2.3 Influence of Tiers and Banding

It is also relevant to consider whether the characteristics of the RHI scheme, in particular the banding of the biomass tariffs, are influencing the size of installations. The biomass bands are associated with the following capacities for installations:

- Less than 200 kWth;
- 200 kWth and above & less than 1MWth; and
- 1MWth and above.

Based on the administrative data as of 31 March 2014, 13 per cent of all biomass applications are 199 kWth, 1 kWth under the 200 kWth threshold. A further 12 per cent of all biomass applications are between 190 kWth and 198 kWth (inclusive), shown in Figure 5.7 below.

Figure 5.7 Frequency of Biomass Installation Capacities (0-300kWth) as of 31 March 2014



Source: Ofgem's administrative data, based on the 'Installation capacity (kWth)' field

In the applicant survey, respondents were asked whether the banding of biomass tariffs impacted on the size of installation they chose. Only 17 per cent reported that the banding had impacted on the size of installation they chose. However for the specific group of applicants which installed boilers sized between 190 kWth and 199 kWth, the figure is higher with 52 per cent of respondents reporting that the tariff had impacted on the size of installation they chose. These results seem to underplay the significance of the biomass tariff, especially given that 16 per cent of all applications are within 10 kWth of the first tariff boundary. One

explanation for this is that applicants are influenced by advice received from the RHI supply chain, for example from installers.

In fact, only 19 per cent of all applicants said they had made the decision about the size of their installation on their own, while two thirds (66 per cent) said they had made it after receiving advice from their installer and 15 per cent after receiving advice from someone else. When we look at those who said banding had affected their choice, two thirds (66 per cent) still report that this decision was made after receiving advice, either from an installer or someone else. This indicates that it may not be applicants themselves who are influenced by the banding of biomass tariffs, but the supplier market more generally. Further research is required in this area as to fully understand the influence of tariffs and the supplier market, including the role of installers and the products available to customers.

5.2.4 Influence of RHI scheme structure

The timing of the deployment of RHTs is also an important factor to consider in relation to the impact of the RHI. For respondents to the applicant survey, the RHI appears not to have been a significant factor. This is because only 31 per cent of both retro-fit respondents who would have installed their heating system in the absence of the RHI and respondents who undertook new builds, reported to have changed their commissioning date in response to the RHI. Of those who did change the date, the majority (69 per cent) commissioned their installation earlier. This could be driven by degression, with applicants carrying out installations earlier to insure against future lower tariffs. However *qualitative research with multiple applicants* suggests that it may also be that the availability of the RHI tariff is bringing forward the point at which an organisation can afford to replace their previous heating system. For example, a public sector organisation described the RHI as enabling a quicker roll-out of further RHT installations due to RHI income being re-invested in new installations.

Conversely, elements of the scheme design may sometimes mean that organisations struggle to use it to develop business cases for RHT installations. This issue was explored further with multiple applicants and potential applicants to the RHI. In particular, it was noted that the fear of degression of RHI tariffs may impact business plans, or increase the risk that desired payback on their RHTs may not be achieved. For one public sector organisation, they also noted problems with ownership of the RHT. The owner and occupants of the buildings where they had installed RHTs were different organisations, and therefore they were not eligible to receive the RHI. This meant that their planned RHT roll-out would likely be discontinued.

5.3 Financing RHTs and the RHI

The two previous sections have described the factors that influence decisions to replace a heating system and install an RHT as well as the specific influence of the RHI. The financial factors have been shown to be crucial both as a barrier (in relation to up-front costs and payback periods) and a motivator (on the form of lower running costs and the return from the RHI). Given the central importance of financial factors, this section, drawing largely on the *investor qualitative study*, describes the sources of finance available and used by RHI applicants as well as some of the barriers to accessing finance.

To frame the subsequent analysis, it is useful here to provide a brief glossary of terms used:

- Private equity firms – this refers to dedicated companies which raise funds from other investors to purchase equity (i.e. 'shares') in other companies (in this case, usually those developing renewable heat infrastructure) on the basis that this equity will increase in value over time, and thus can be sold at a future profit;
- Enterprise Investment Scheme (EIS) – this is a Government initiative designed to boost investment in smaller, higher risk companies, by providing tax benefits for those investing through the scheme. EIS investments are usually equity-based and are often made by private equity firms, which raise funds from other investors, as described above;[34]
- Venture Capital Trust (VCT) – this is a similar Government initiative designed to boost investment in smaller, higher risk companies, by providing tax benefits for those investing through the scheme. Again, VCT investments are usually equity-based and are often made by private equity firms, which raise funds from other investors, as described above;[35]
- Project Finance – this refers to lending (generally from banks) for energy infrastructure projects. In contrast to 'asset-based' lending (or asset finance) funds are secured on the basis of future revenues from the infrastructure rather than on the wider assets of the company, parent or group;
- Asset finance – this refers to lending (usually for equipment or capital investment), which is secured on the wider assets of the company, parent or group. With specific regard to renewable heat installations, this might include both 'hire purchase' or 'leasing' of equipment;
- Energy supply companies (ESCos) – these are 'arms-length' companies, which are set up for the purpose of providing heat to businesses (or households) on a tariff (i.e. per MWh) basis. It can incorporate all development, capital and ongoing operating and maintenance (O&M) costs. Typically, it is a structure used to provide clear governance and flows of monies where a number of stakeholders are involved in a heating project; and
- 'Social' funding – this term refers to funding which provides capital for the development of renewable heating installations (often being

[34] For further information, see http://www.hmrc.gov.uk/eis/

[35] For further information, see http://www.hmrc.gov.uk/guidance/vct.htm#1

developed by community groups). The funding usually either comes via public sector grants or from philanthropist trusts.

There are a range of sources of finance and associated structures, which might be used to fund RHI–supported projects. These usually include forms of equity debt and self-funding, often in combination. Equity investment might be made by the eventual user of the heat, by dedicated private equity firms or by entities which have an interest in the project development phase, such as energy utilities, energy supply companies (ESCos) and Engineering, Procurement and Construction (EPC) contractors. Debt can come in the form of asset-based financing schemes, traditional lending from high street or investment banks and loans from community or public sector focused funds.[36]

The size of a project, and thus of the related investment, is usually the key determinant in terms of which forms of finance are available. Typically, projects, for which the heat generated is used for space and/or water heating in a building, are more suited to finance by the owner's equity, potentially alongside traditional lending, such as a bank loan. In contrast, larger projects, in which either large volumes of steam are produced for industry (often for an external customer) or heat is sold to a number of users (as part of a wider heat network) are more suited to third party private equity and infrastructure lending as part of a 'project finance' package. Where projects can securitise loans with wider assets, for example land and property, asset finance schemes or asset-based lending might be used.

For many dedicated private equity funds or lenders, the research found that size is again the key strategic consideration when investing in the renewable heat market. Many fund managers and lenders operate business models that are geared towards high capital-spend, long term investments. The fund managers interviewed for this study, therefore, largely stated that they need a minimum of a £5 million investment to justify transaction costs. As described further in Section 5.5.1, however, the research also found that projects with lower capital demands, potentially down to a level of around £0.5 million can be supported by specialised private equity funds which are deemed to present a higher 'risk and reward' profile. In such funds, the associated retail investors can benefit from one of two Government tax relief schemes; the Enterprise Investment Scheme (EIS), and the Venture Capital Trust (VCT).

It should be noted, however, that following an announcement in March 2014, this situation has changed following the enactment of the Government's 2014 Finance Act. The Act includes the stipulation that projects will no longer be eligible to benefit from investments backed by EIS (and SEIS), or VCT tax relief if they are also supported by the RHI. The interviews undertaken for this study were held prior to the Government's March 2014 announcement, and therefore we have not been able to gather any views on its impact. We are aware, however, that since

[36] Examples of such community or public sector focused funds include Salix Energy Efficiency Loan Scheme, FSE Group (various schemes), and Carbon Leapfrog Community Energy Fund.

the announcement in March 2014 the Government is seeking to consult with interested parties so to understand the impact of the changes further.[37]

5.4 Method of finance chosen by industry/technology and over time

Data from the survey of applicants show that more than three-quarters (77 per cent) of those surveyed financed either some or all of the installation and purchase of their RHTs using their own finances or balance sheet.[38] The second-most common, though far less prevalent, type of financing are bank loans with 12 per cent using a general bank loan and 9 per cent using a bank loan specific to RHT. Only a very small minority of applicants use asset finance packages or external private equity. It should also be noted that the vast majority (91 per cent) of applicants used just one method of financing, eight per cent used a combination of two different methods of financing, whilst one per cent used three methods and none used more than three.

There is also a small level of variation between the types of financing used by different market sectors. The industrial sector was found to be least likely to use own finances or balance sheets (61 per cent) with the public sector most likely to do so (83 per cent).

Again, the *applicant survey* showed that there are a number of variations across technology types. Whilst it is acknowledged that the sample size for GSHPs and solar thermal installations was relatively small, owner-applicants for these technologies appear to be are more likely to use own finances (88 per cent) than those of biomass installations (76 per cent). Whilst this is a relatively small difference, *qualitative interviews with investors* suggested that biomass is a more widely understood technology with the associated rewards therefore more certain, and thus greater sources of external finance are available. [39]

Furthermore, although a relatively small number within the sample, medium-size biomass installations (200 – 1000 kW) are more likely to be financed by external private equity (6 per cent) than other technologies. Whilst again this is probably being driven by the greater investor familiarity with biomass than with other technologies, the *qualitative interviews with investors* suggest that it is also likely to be the result of potential higher internal rates of return (IRR) on equity than for other technologies.

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[37] See: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/340079/Consultation_Tax-advantaged_venture_capital_schemes.pdf

[38] 69% of the total number of applicants surveyed used *only* their own finances or balance sheet. It is recognised that in some circumstances that a bank loan could be interpreted as balance sheet lending and therefore the distinction between the two forms of lending may have been misunderstood by some participants in the research.

[39] As described in Section 5.7, however, it should be noted that the applicant survey did not include respondents relating to any large biomass, large biogas or biomethane projects, which might have had different experiences to applicants for smaller biomass installations

Owner-applicants of solar thermal installations are least likely to use a general bank loan with only 1 per cent doing so. This may reflect the generally lower upfront costs of the technology.

Whilst the survey suggests that no significant variation exists between financing methods used by single and multiple applicants, there is some variation in respect of the timing of applications. Earlier RHT installations were more likely to use a grant (11 per cent of those commissioned prior to the start of the RHI) and less likely to use an asset finance package (one per cent of those commissioned prior to November 2012). Less than one per cent of recently commissioned installations (since May 2013) were funded via a grant and eight per cent an asset finance package.

As the RHI regulations only allow recipients of grants for installations commissioned prior to the start of the RHI to be accredited (and only if their grant is re-paid), a steep drop in use of grants following the start of the RHI was expected. Interviews with community funding organisations indicated that they were rarely approached for finance since the RHI had been available. At the same time, the increase in the use of asset finance schemes may be the result of the ongoing greater range of such products being developed and actively marketed by the asset finance industry, which was a finding from the *qualitative interviews with investors*.

5.5 Barriers to provision of finance

A range of barriers were perceived by the respondents during the *qualitative interviews with investors*. In Sections 5.6.1 to 5.6.2 we have grouped these under three key themes (structural barriers, those relating to the RHI and those driven by comparisons with alternative investment opportunities), within which many specific concerns are described

5.5.1 Structural barriers in the renewable heat market

A major constraint, as discussed to some degree above, is that institutions specialising in high value, low risk investment portfolios, such as banks and pension funds highlighted that these characteristics are not core features of the RHI market. This is largely **fragmented into small projects, which several respondents stated represent higher risk, yet lower returns**, when compared with projects generating electricity. The private equity firms interviewed stated that they generally find the due diligence and transactional work for many small opportunities far too onerous and costly.

At the same time, however, as highlighted in Section 5.4, a limited number of private equity fund managers (largely those which are investing funds raised via EIS and VCT schemes) described how they reduce such costs and successfully make investments in smaller (biomass) projects by aggregating multiple projects together. Despite this, these respondents also highlighted the complexity of this approach, whereby multiple individual installations that form part of the same transaction need to be at the same stage of project development.

All investor types perceived some risks to be inherent to RHTs. In particular, respondents highlighted the greater risk associated with projects where generation is attached to **district heating infrastructure**. For example, one respondent highlighted that the planning and consenting regime in the UK is not well designed to facilitate underground heat networks. Land rights were thought

to be more of an obstacle than in, for example, some parts of Scandinavia, where local planning authorities appear to have the same rights (in terms of forcing way-leaves and using compulsory purchase orders) to facilitate heat networks as National Grid does in the UK for electricity and gas networks.[40]

Across most respondents from major providers of project finance, and to a lesser extent, private equity, perhaps the greatest barrier to investment in large projects was found to be **'counter-party' (heat off-take) risk**, i.e. the risk that the organisation to which heat (or mostly, steam) is supplied will be around in the long-term to pay back any debt.[41] Several respondents described how it is not possible to 'port' heat demand to another user in the same way that electricity can simply be sold via another power purchase agreement (PPA), but via the same national grid. Two private equity funds highlighted that this risk does not exist for biomethane installations, which inject into the natural gas grid, or is largely mitigated by projects supplying heat networks, particularly if a large proportion of the load goes to a district heating scheme, supplying residential properties. That said, the same respondents acknowledged that such networks are hugely challenging to get to a stage of financing for reasons highlighted above.

5.5.2 Barriers related to RHI

Whilst RHI revenues can often represent the bulk of heat project revenues, both the asset-based lenders and asset finance companies interviewed for this study **do not regard them as representing security on lending risk** as would physical assets, such as land or buildings. Rather the RHI tariff is regarded by these respondents as a 'performance risk'; that is, if for example, a boiler does not operate to its expected capacity factor, this will reduce RHI income and viability of the installation. It was also highlighted by three asset finance companies that in many cases, the assets themselves also do not constitute security, primarily due to the lack of 'portability' as highlighted above. This is particularly acute for GSHP and geothermal projects, for which much of the asset is 'stuck in the ground'.

In addition to operating risk, nearly all interviewees (when asked a question on the matter) responded that **the current lack of ability for projects to 'lock-in' to an RHI tariff at pre-accreditation** (unlike under the FiT scheme) functions as a constraint to projects with long lead times.[42] Two respondents also volunteered that they were nervous that the Government could heavily degress tariffs or 'pull' RHI funding altogether for new installations, due to budgetary constraints, as the mechanism is funded out of general taxation rather than being a consumer levy.

A number of asset finance companies highlighted the **difficulties caused by RHI 'ownership' rules**. It was described how these do not enable organisations to keep assets 'off balance sheet' via taking asset finance under an 'operating lease' model. This is because in such situations, the asset finance provider would essentially need to be the applicant receiving revenues, which would then be

[40] A way-leave is a written legal agreement between a developer and the land/property owner that grants access to install, maintain or repair equipment located on that land/property

[41] Furthermore, there is risk that such organisations will not use the full capacity of the installation at the forecast times, thus reducing project revenues

[42] DECC has previously consulted on 'tariff guarantees'

transferred to the heat user. This model was universally unacceptable to the asset finance organisations interviewed for this study.

Amongst VCT and EIS fund managers, there also appeared to be a **lack of clarity over eligibility rules for the use of VCT and EIS funds**.[43] One respondent described a case in which a project was accepted by HMRC as sufficiently high risk to qualify for EIS, only to be told at a later stage that this was not the case. There was also some surprise among most all private equity funds that, for the reasons discussed above with regard to off-take counterparty risk, renewable heat projects seem to be perceived by HMRC as lower risk than electricity projects.

At the time the interviews were conducted, there was also some confusion among the large infrastructure lenders interviewed as to the **viability of larger combined heat and power (CHP) projects** which will receive the RHI, alongside an electricity strike price as part of a Contract for Difference (CfD), as compared to the situation under the Renewable Obligation (RO) regime. This was cited by participants as representing a key barrier to large scale CHP. DECC has since clarified the rules around this, and offered flexible 'grace periods' to reflect the uncertainty associated with heat off-take. DECC also plans to keep the effectiveness of this approach under review if credible alternative approaches emerge.

Comparison with non-heat renewable technologies

Comparisons were made by most interviewees between the relative attractiveness of investment in RHTs (supported by the RHI) compared with other forms of renewable or low carbon energy. The vast majority of the companies interviewed had a background in renewable electricity and had subsequently moved into consideration of heat projects during the last 2-3 years, largely driven by the RHI. It is therefore important to understand how **the experience of renewable electricity might have shaped their view of heat as a proposition**. Table 5.2 provides a simplified summary of the comparative risks of biomass heating and GSHP projects relative to those of solar photovoltaic (PV) and onshore wind projects supported by the FiT. The information presented in Table 5.2 is drawn from various comments during interviews with the full range of respondents and gives a simplified summary of the *perceived* risks.

[43] Again, it should be noted that the qualitative interviews with investors were undertaken prior to the recent Government announcement on the eligibility of RHI projects for such funds

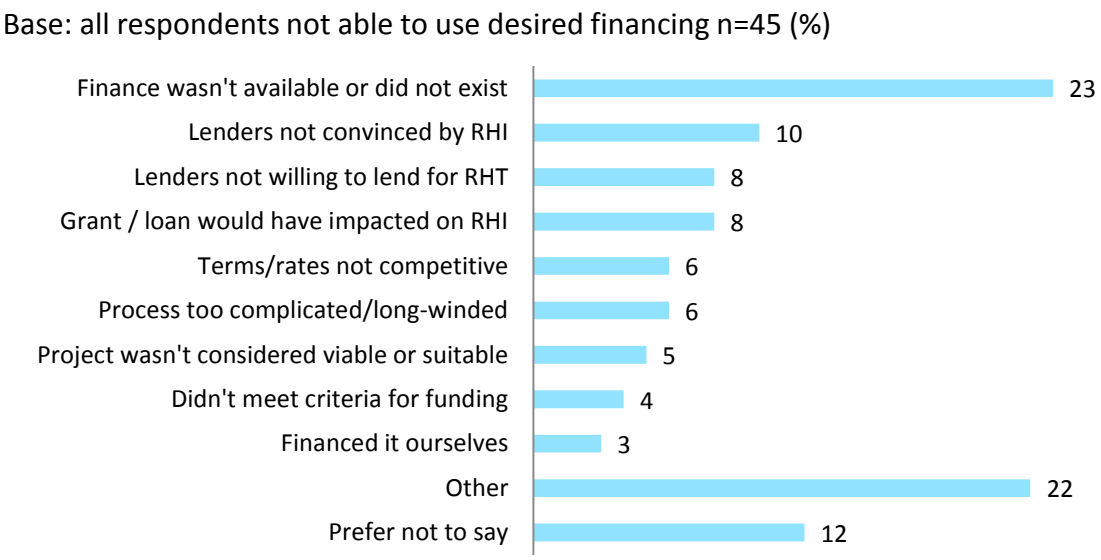
Table 5.2: Heat vs. Non Heat Relative Perceived Risk Levels						
Risk	**Rationale**	**Large Biomass (under RHI)**	**Large GSHP (under RHI)**	**Biomethane (under RHI)**	**Large PV (under FiT)**	**Onshore Wind (under FiT)**
Fuel supply	High risk where supply is subject to fluctuations in price and availability of feedstocks	High (unless fed by 'captive' fuel source)	N/A	High (unless fed by 'captive' fuel source)	N/A	N/A
Security of heat offtake	High risk where reliance on small number of counterparties	High (unless linked to district heating scheme)	Medium	Low	Low	Low
Inadequate operational performance	Investors and brokers have limited technical understanding of the operational performance of RHTs	Low	High	Medium	Low	Low
Wider business activities are reliant on the operation of the installation	High risk where installation is critical to business user, i.e. it is main source of energy	High (unless part of multiple heat source)	High (unless part of multiple heat source)	N/A	N/A	N/A
Risk of not making a reasonable return on investment)[1]	*Higher risk where the IRR available is not commensurate with the level of risk taken on by investors*	Medium	High	Medium	Low	Low
Notes: 1. It should be acknowledged that new tariffs were confirmed by DECC, following consultation, shortly after the research was undertaken						

5.6 Perceived barriers to preferred financing options

In the applicants' survey, respondents were asked about their preferred method of financing. Over nine in ten (91 per cent) of all applicants were able to use the method they had originally wanted. There is likely, however, to be a significant degree of self-selection happening as only organisations which have been able to fund RHT installations (which, as shown in the previous section, is chiefly from own finances or balance sheets) have become RHI applicants. Consequently, there may be a very different response to a similar question if posed to possible applicants or those which were not successful in funding an RHT.

With regard to the small group of applicants which could not access their preferred method of financing, the most common reason, mentioned by almost a quarter of those who responded to this question, was that the preferred method was not available or did not exist (23 per cent) as shown in Figure 5.8.

Figure 5.8 Reasons RHI applicants could not secure preferred financing



Source: Applicant survey, question PRO15 (open-ended – responses were coded to one or more answer category).

Other less common reasons (cited by ten and eight per cent, respectively), related to the attitude or views of lenders, including both 'lenders not being convinced by RHI' and 'lenders not willing to lend for RHTs'. This is broadly consistent with the views of asset-based lenders and asset finance companies, as described in Section 5.5, which do not consider revenues from the RHI as representing security against loans.

Qualitative interviews with multiple applicants provided more detail on some specific issues associated with securing finance. One respondent organisation, which also acts as advisor or installer of RHTs, reported that a client had initially been unable to seek external financing. Once one RHT had been installed using

its own finances, however, the viability of further projects could be proven based on the performance of the first installation, and thus lenders gained confidence and were willing to provide finance for further installations.

5.7 Investment outlook

The *applicant survey* suggests that applicants do not see access to finance as a significant constraint to RHI applications thus far. It is acknowledged that this survey does not include information on potential applications, which were never submitted. Furthermore, the applicant survey did not include respondents relating to any large biomass, large biogas or biomethane projects, which might have had different experiences to applicants for smaller installations.

Amongst the investor community, the *qualitative interviews* suggested that there is a general enthusiasm to invest in larger projects but this is qualified by the frustrations expressed from both private equity and lenders at a range of perceived barriers. In contrast, the majority of those interviewed across all investor types are continuing to focus on renewable electricity as a more attractive prospect, due to higher returns and lower risks.

The interviewees from the asset finance and asset-based lending sectors stated that their focus continues to be on biomass heating, albeit they do have some concerns relating to accessing sufficient feedstock (at an acceptable price) which meets RHI sustainability criteria.

Amongst all investor types, there is relatively little understanding of the alternative RHTs (to biomass), and the potential barriers or opportunities specific to them. Consequently, the vast majority of investors have not so far devoted sufficient time to develop strategies and models to enable significant investment in technologies other than biomass. Analysis of all qualitative data suggests that the general trend seems to be that investors (particularly lenders) move fairly slowly, behind the technology development curve. This is demonstrated by the interviews with private equity firms, which were only cautiously optimistic that biomethane (gas to grid) is becoming an attractive investment opportunity, albeit potentially limited by concerns relating to feedstock (food waste) availability.[44]

[44] It should be noted that the interviews were undertaken prior to the launch (May 2014) of DECC's recent consultation on reviewing the RHI tariffs for biomethane to grid injection

6 Experiences of installing and operating RHTs

- Respondents to the *applicant survey* were very positive about their RHT(s), with 90 per cent of respondents reporting to be satisfied with their technology (of which 5 per cent were very satisfied).
- More than nine in ten (95 per cent) of respondents to the *applicant survey* reported that their RHT met their needs all or most of the time.
- Organisations' perception of the installers and manufacturers of their RHTs was altogether positive, with over 80 per cent reporting that they would recommend them to others.
- Over nine in ten (92 per cent) reported that their installation was reliable and 78% were also broadly happy with the customer service they had received once their RHT was operational.
- The most common problems reported were delays in the installation of the RHT (33 per cent) and unexpected associated costs (32 per cent)

Respondents to the *applicant survey* reported being overwhelmingly satisfied with their RHT, with nine in ten (90 per cent) reporting that they are very or fairly satisfied with their RHT overall and only six per cent responding that they are either fairly or very dissatisfied.

The most notable group of applicants who report lower overall levels of satisfaction are those with solar thermal installations, of which two thirds (64 per cent) report being overall either very or fairly satisfied with their RHT. Just over a quarter (26 per cent) are either fairly (20 per cent) or very (six per cent) dissatisfied; this compares to 6 per cent of all applicants who are dissatisfied (very or fairly). There are no notable differences in overall satisfaction between different types of organisations, with different sectors and business sizes reporting similar levels of satisfaction.

We also asked applicants how their overall satisfaction levels compared to their original expectations. Close to half (42 per cent) expressed that they were a little or much better than expected; however, despite more than 90 per cent being satisfied, 15 per cent responded that their satisfaction was a little or much worse

than expected. The largest group of applicants (43 per cent) reported that they were neither more nor less satisfied than expected. Overall, this indicates that the vast majority of RHTs are performing as well as or above the levels initially expected.

This remainder of this chapter describes the experiences of organisations who have installed the technologies covered by the RHI in relation to:

- The installation of the RHT
- how easy they are to operate;
- how reliable they are and, in the cases where they are not, how easy it is for operators to have problems resolved; and
- views on suppliers and engagement with the market as a whole.

6.1 Installation of RHTs

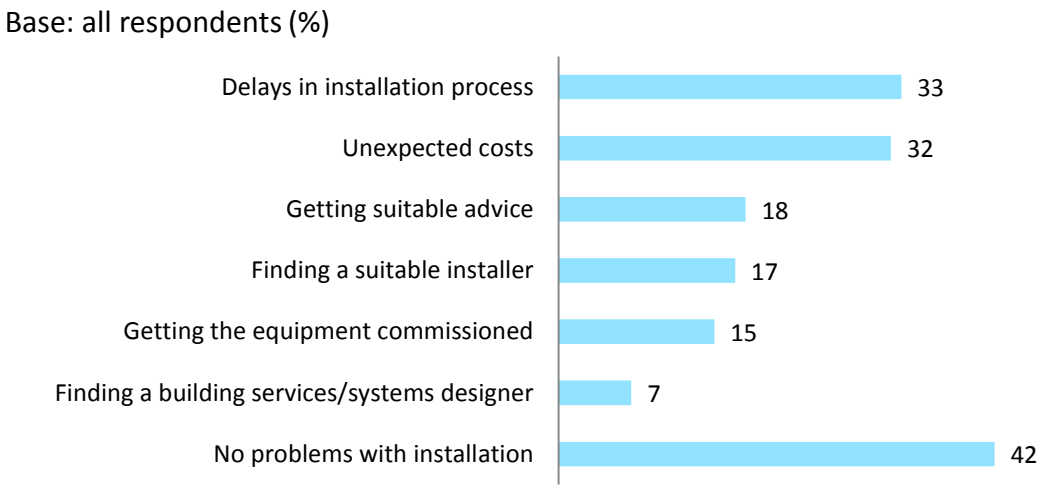
Overall, the majority of respondents to the *applicant survey* are positive about their installation experience, although over half did report experiencing problems.

6.1.1 Experiences of the installation process

Overall, just under two thirds of RHI applicants (63 per cent) are reporting that they found the installation process for their RHTs either fairly or very easy, with one quarter (24 per cent) reporting some degree of difficulty with the process. For half of all applicants (50 per cent) the installation process was neither easier nor more difficult than expected, while for more than a quarter (28 per cent) it was a little or much more difficult than expected.

Despite only a quarter of applicants expressing difficulty with the process of installation, more than half (57 per cent) experienced at least one problem. Figure 6.1 presents data on the types of problems experienced with the installation.

Figure 6.1 Problems experienced by RHI applicants with RHT installation process



Source: Applicant survey, question PRO33. Respondents could select multiple answers.

Delays and unexpected costs were experienced by a third of applicants (33 per cent and 32 per cent, respectively). Additional problems experienced include getting advice, finding a suitable installer and getting the equipment commissioned, each experienced by less than one in five applicants.

Interviews with **multiple applicants** revealed some of the specific problems encountered by applicants. Respondents with different combinations of technologies (ground source heat pump and solar thermal installation, solar thermal and a solid biomass boiler) reported similar problems with installers not providing suitable meters, not installing equipment correctly or not showing much knowledge about the technologies they were installing. For example, one participant working for a large leisure business had encountered issues with the installation process of their meter and felt that plumbers and installers he engaged with lacked the necessary skills and experience

In other case, difficulties related to retrofitting new RHTs in way that integrated effectively with the existing system, which could lead to unanticipated costs or requirements. A participant working for a small leisure business respondent retrofitting a GSHP into a modern heating system had to increase the existing radiator capacity substantially at extra costs to achieve the desired output.

Despite these issues, there was an alternative view that where properly planned and researched the installation process was relatively easy. In some cases this also related to the fewer safety considerations that come with something like a GSHP compared to gas boilers.

Looking at **installation experiences by type of technology** installed, there are few notable differences. Although it appears solar thermal installations may have an easier time with the installation process with only 11 per cent reporting some amount of difficulty with it, compared with 24 per cent, this is not a statistically significant finding, and the percentage of applicants with solar thermal reporting no problems is the same as for all other technology types. There are also no notable differences between the experiences of different types of organisations, whether split by sector or size of business.

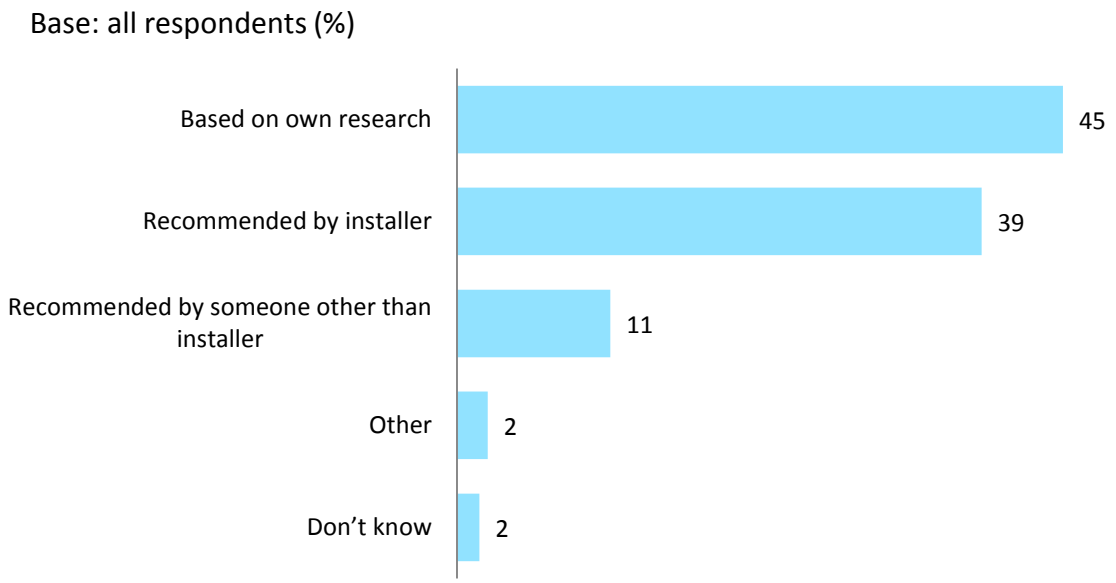
Examining problems with the installation process **by commissioning date**, there is an increasing trend for more recently commissioned installations to have experienced problems with delays. While there does not appear to be an increase in general problems with the installation of RHTs over time, delays do appear to be more prevalent. Of installations commissioned before November 2011, only 24 per cent experienced delays; for installations commissioned since May 2013, this had risen to 40 per cent. From the survey and interviews undertaken it has not been possible to establish why this increase might be seen – although one possibility is that the supplier market for renewable heating systems has not kept up with the number of people wanting to install renewable heat.

6.1.2 Engagement with the supplier market

This section examines the relationship between RHT owners and their suppliers, specifically looking at the process of finding relevant tradespeople and owners' perceptions of them.

The *applicant survey* asked respondents how they selected their RHT manufacturer; the data are illustrated in Figure 6.2 below.

Figure 6.2 How applicants selected the manufacturer of their RHT



The data reveal that almost half of organisations (45 per cent) chose their manufacturer through their own research before selecting an installer, whereas 39 per cent used the manufacturer recommended by their installer and 11 per cent took the recommendation of someone other than their installer.

When it came to identifying installers, 50 per cent of respondents found their installer through a recommendation from someone, with 23 per cent finding them through their own web search.

The high percentage of organisations making decisions based on the advice of others, specifically tradespeople, represents a route through which RHT uptake could be increased through trusted professionals with a large knowledge base who are often invited onto people's property. For example, if an organisation needed a replacement for a broken conventional gas boiler, an installer could recommend they switch to an RHT instead.

Organisations' perceptions of the installers and manufacturers of their RHTs were altogether positive, with the majority of respondents reporting that they would recommend them to others. Eighty-one per cent said they would recommend their installer and 89 per cent said they would recommend their manufacturer to others installing the same technology, broadly suggesting a strong relationship between organisations and the supplier market.

6.1.3 Timing of installation

Relevant to the customers' experience with the RHT installation process is the length of time taken between decision to install, and commissioning of the installation. An efficient lead time is likely to facilitate confidence in the supplier

market. The results of the *applicant survey* showed that over two-thirds (67 per cent) of customers had their RHT installed within six months of making the decision to install. Almost nine in ten (87 per cent) completed the process within a year.

The lead time of the public sector was significantly longer than for others, with an average time of 11.4 months. By comparison, the average lead time for industrial organisations was 6 months and 7.3 months for all organisations. This difference in lead times is likely to be reflective of the organisational sector, rather than the supplier market, as internal decision-making and procurement processes are known to take longer in the public sector than in the private sector.

6.2 Operation of RHTs

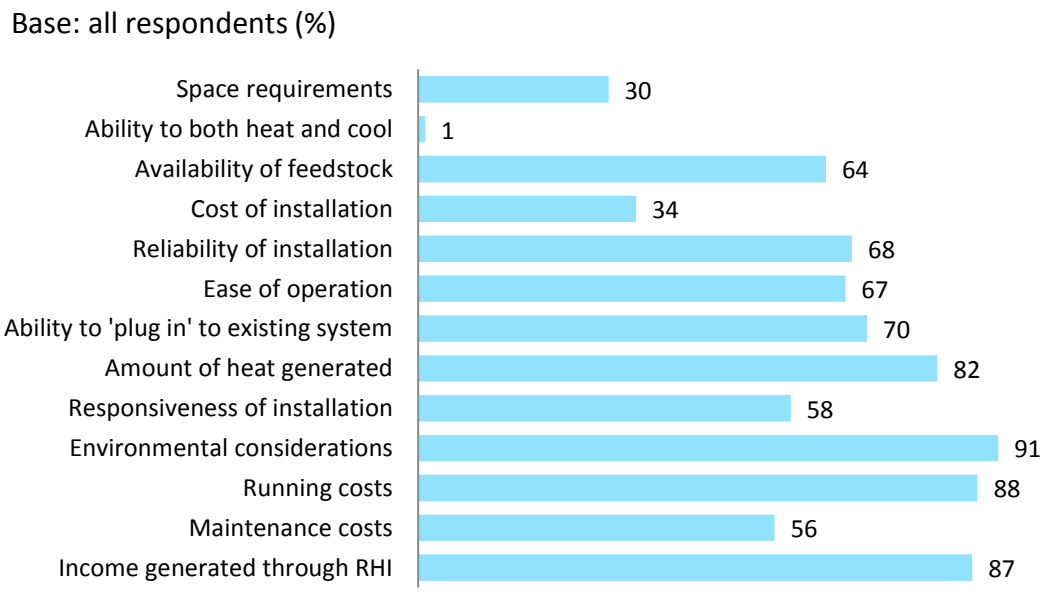
Once the RHT is installed, a successful customer experience hinges on the operation of the technology. Whether it is through the ability of the technology to meet the owner's requirements, its reliable operation or effective service when dealing with performance issues, a strong relationship can facilitate uptake through recommendations to other organisations or multiple onsite installations.

6.2.1 Overall satisfaction

The *applicant survey* asked several questions about organisations' satisfaction with their technology and whether they would recommend it to others. Overall, there was a very positive response for satisfaction with the ease of operation of RHTs. Eighty-six per cent of respondents reported to be satisfied with their technology (of which 41 per cent were very satisfied).

Following on from this, we asked respondents what, if any, they thought the main benefits of their technology were. The data is illustrated in Figure 6.3 below.

Figure 6.3 Reported benefits of RHT by RHI applicants



The most frequently cited response was environmental considerations (91 per cent). Next was running costs in terms of fuel or energy (88 per cent) and the amount of revenue it generates under the RHI (87 per cent). Conversely, the cost of installation was much less frequently reported on, with 34 per cent citing it as a benefit.

Another encouraging response from the survey was the fact that 93 per cent of respondents said that they would recommend their RHT to others. Of the five per cent that would not recommend it, the most commonly cited reason was reliability, given by 30 per cent of this five per cent of respondents.

The *qualitative interviews with multiple applicants* also identified some interviewees reporting issues with biomass boilers, GSHPs and solar thermal. These were of varying magnitude, from problems being fixed in days to others taking over a year to fix.

The cost of installation (21 per cent) and the amount of revenue generated under the RHI (21 per cent) were also popular reasons given for not recommending their RHT. It is interesting that amount generated revenue should be listed as a reason to not recommend the technology, when a high proportion of organisations also quoted it as one of the principal benefits of the scheme. This could be indicative of a lack of satisfaction with current tariff rates (though we were not able to explore this result further, for example by type of RHT installed, due to small base sizes).

6.2.2 Reliability

The ability of RHTs to function effectively, reducing the need for unnecessary maintenance and the associated costs, is a key function of customers' satisfaction with their installation.

Overall, more than nine in ten (92 per cent) of survey respondents reported that their installation was reliable (54 per cent said reporting that it was very reliable). Over a quarter of respondents (26 per cent) found that it was getting better over time, with one per cent feeling the opposite and 68 per cent finding that it was not changing over time.

Further analysis of the results reveals that owners of GSHPs were more likely to find the technology very reliable in comparison to biomass boilers and solar thermal collectors, with 76 per cent reporting them to be very reliable, though there was no significant difference in overall reported reliability between technologies.

Respondents were also asked to what extent they felt that their RHT met their heating requirements. Almost all (95 per cent) respondents said that that their installation met their needs all or most of the time. Owners of solar thermal collectors were the least likely to find that their installation met their requirements, with 57 per cent reporting that they met their needs all or some of the time. This does not necessarily reflect poorly on the technology, as unlike other

technologies it is dependent on factors outside of the owners' control to function effectively (i.e. inability for the technology to react to demand).

Respondents reporting that their RHT did not meet their heating requirements all of the time were asked why this was. Half (50 per cent) said it was because it could not generate sufficient heat and over a fifth (22 per cent) said it was due to reliability issues.

The evaluation is also interested in understanding the extent to which applicants are relying on their RHT for all their heat needs. As part of the *applicant survey* we asked respondents whether they had a back-up system installed alongside the RHT. More than half (59 per cent) of all applicants have a back-up system installed, though this was much more likely for applicants with solar thermal installations (90 per cent with a back-up system) due to the intermittent availability of sunlight.

The *applicant survey* also asked respondents to report on the maintenance requirements of their RHTs. Just over half of applicants (56 per cent) found that the maintenance requirement for their RHT was about the same as expected. Thirteen per cent found that it required significantly or slightly less maintenance than expected, while more than a quarter (27 per cent) found that it required slightly (21 per cent) or significantly (six per cent) more maintenance than expected.

6.2.3 Cost of Operation

The *applicant survey* also explored respondents' satisfaction with the costs of operating RHTs. The survey found that 77 per cent of RHI applicants are very (31 per cent) or fairly (46 per cent) satisfied with the operating costs of their RHT, while only eight per cent are fairly or very dissatisfied. Information relating to the costs of feedstock for biomass has been reported separately in Chapter 2.

6.2.4 Engagement with the supplier market

A positive interface between RHT customers and suppliers is paramount to increasing the uptake of these technologies. Just over half of respondents to the *applicant survey* (57 per cent) said that the maintenance requirements for their RHT were about the same as expected, with 27 per cent saying that they were more than expected. Further exploration of these results revealed that, out of GSHPs, solar thermal and biomass boilers, GSHPs were least likely to require more maintenance then organisations' expectations (two per cent). By comparison, 16 per cent of solar thermal operators and 28 per cent of biomass operators felt that their technologies required more maintenance than expected.

When asked how often organisations sought help due to poor performance since they had their RHT installed, 41 per cent said never. The second most frequent response was once or twice (30 per cent). However, 13 per cent had sought help more than five times. When this result is broken down by technology type (specifically GSHPs, solar thermal, and biomass boilers) biomass boiler owners were most likely to have required assistance more than five times (13 per cent). In comparison, three per cent of GHSP or solar thermal owners had the same

number of incidents. In these cases, the issue was mostly related to poor technical performance (72 per cent). However, a considerable 41 per cent of cases were claimed to be the fault of installers or manufacturers.

We also asked respondents how long it took for these issues to be resolved. Encouragingly, the majority (61 per cent) were fixed within 48 hours. A small number (5 per cent) were never resolved.

Overall, the organisations surveyed were broadly happy with the customer service they had received, with 78 per cent saying that they were satisfied.

6.2.5 Length of warranty for RHTs

Respondents to the *applicant survey* were asked to identify the length of warranty for their RHT; the data is presented in Table 6.1. A third of all applicants (32 per cent) reported having no warranty for their RHT. Where a warranty is in place, the most common length of warranty was 1 year, as reported by 37 per cent of those with a warranty; the mean length is just over 3 years.

Table 6.1 Length of warranty for RHT installation (RHI applicants)

Base: All respondents	*Applicant survey*
	%
No warranty	32
12 months or shorter	25
13 – 24 months	17
25 – 36 months	9
4 – 7 years	12
More than 7 years	5
Other	< 0.5
Total	100
Unweighted base	*620*

Source: Applicant survey, question OPE22

6.2.6 Biomass Fuel

As biomass is the most frequent technology supported by the RHI it is important to consider the source of the biomass fuel and the costs associated with procuring it.

Fuel Supply

The majority of biomass applicants purchase their fuel, with 59 per cent purchasing all of their fuel, while 29 per cent source all of it for free and 12 per cent both purchase and source fuel for free. Four in ten applicants are thus self-supplying some or all of their fuel, whereas seven in ten are purchasing some or all of their fuel.

The industrial and agricultural sector organisations are more likely to be self-supplying to some degree, with more than half of applicants in these sectors source some or all of their fuel for free. The public sector is least likely to be self-supplying – almost 90 per cent purchase their fuel.

There also appears to be a small variation between the size of installation and whether fuel is bought, with 78 per cent of small biomass installations (0-49kw) buying their fuel compared to 46 per cent of larger biomass installations (200kw or greater).

Type of Fuel

The most common form of fuel for biomass boilers is pellets, which is used by 43 per cent of all biomass installations. The next most common is chips (used by 32 per cent) and logs (used by 22 per cent). All other types of fuels, including off-cuts, wood waste, sawdust and straw are used by fewer than 10 per cent of biomass owners supported by the RHI.[45]

Fuel Sourcing

Three quarters (72 per cent) of applicants who purchase their fuel do this through a dedicated fuel broker or merchant while a quarter (25 per cent) purchase it from a producer such as a forestry manager or saw-mill. Only 10 percent purchase their fuel through their boiler provider or a service company.[46] Despite a large number using a dedicated fuel broker, less than one fifth (19 per cent) of those who purchase their fuel have a supply contract.

Of those applicants that do have a supply contract, more than half (57 per cent) have a contract that is between one and two years long, while 30 per cent have a contract that is longer than two years long and 15 per cent have a contract less than one year long.

Three quarters (76 per cent) of self-supplying applicants produce some or all of their fuel themselves, such as from their own woodlands, saw-mill or forestry. One quarter (27 per cent) gather it themselves, and 15 per cent acquire it for free from elsewhere.[47]

Price of Fuel

The most frequently reported fuel cost range for those who purchase all of it is between £200 and £249 per tonne (as reported by 30 per cent of those that purchase their fuel), including transport. The median cost interval lies between £150 and £199 per tonne, as shown in Figure 6.2.

As Figure 6.2 shows, this range conceals a wide variation in costs, depending on the characteristics of the RHI applicant and the fuel. Looking at the two most common fuel types, pellets appear to be more expensive, with 82 per cent of

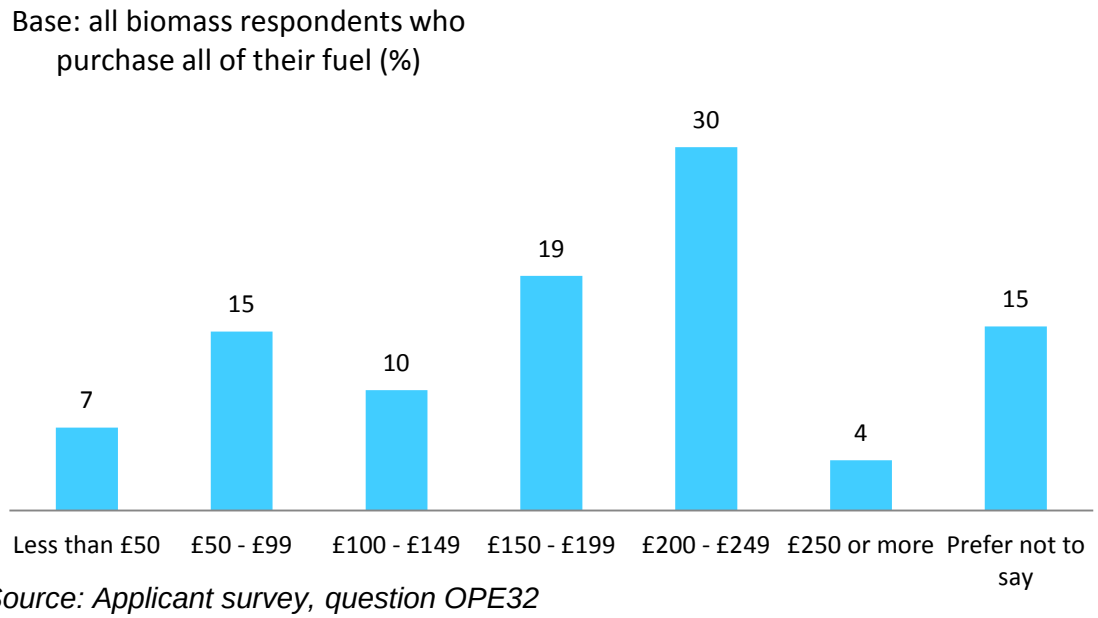
[45] Note: percentages do not add to 100 per cent as respondents could select multiple answers.

[46] Note: percentages do not add to 100 per cent as respondents could select multiple answers.

[47] Note: percentages do not add to 100 per cent as respondents could select multiple answers.

organisations sourcing pellets paying £100/tonne or more, whilst 32 per cent using chips paying £100/tonne or more.

Figure 6.4 Price paid of biomass fuel per ton by RHI applicants who purchase all of their fuel (including transport)



Source: Applicant survey, question OPE32

There are also variations by sector. The price of biomass paid by non- agricultural organisations is more likely to be £100 or more than the price paid by agricultural organisations (79 per cent vs 59 per cent).

Exploring the variations in costs further, applicants who use a dedicated fuel broker or merchant are more likely to pay more for their purchased fuel, with 69 per cent paying £100 or more per tonne, compared to 27 per cent of those who do not have a fuel broker or merchant. Additionally applicants who use a producer are more likely to pay less for their fuel, with 20 per cent paying £100/tonne or more compared to 70 per cent of those who do not use a forestry manager or saw-mill. There was no notable relationship between the fuel cost and whether the applicant had a supply contract.

6.3 Interface with the RHI process

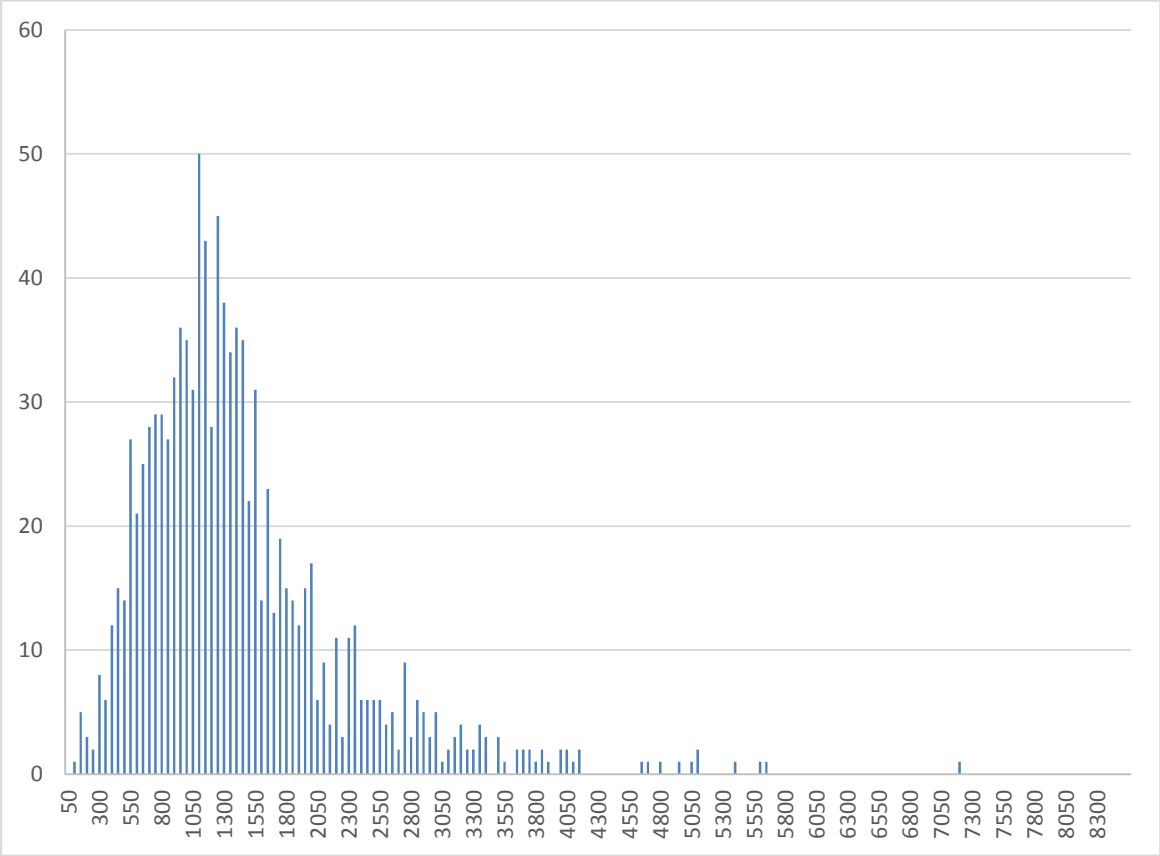
As part of the *applicant survey* respondents were asked whether the tiering of the biomass tariffs impacted on the way they operated their installation. For small and medium sized Biomass plants (<1MWth) successful applicants can receive two different tiers of payment. The Tier 1 tariff (a higher tariff) is paid until the installation has operated up to 15 per cent of the annual rated output (i.e. the equivalent of 1,314 hours at the rated capacity of the installation), whilst the Tier 2 tariff (a lower tariff) applies the operation of the installation beyond 15 per cent of the annual rated output.

The tiering system has been introduced so that installations with high load factors are not over-supported. However, the design of the tiering system has the potential to impact on the operation of small and medium scale Biomass facilities. Operators with additional heating systems may be able to operate their alternative heating systems once the Tier 2 threshold is met, as the cost effectiveness of their alternative system may be better than operating their Biomass installation.

In order to examine the extent to which this is occurring (if at all) we asked a question within the *applicant survey* on whether the tiering of the tariffs impacted on the operation of their installations. A relatively small percentage (three per cent of applicants) reported that tiering did impact on their operation of the technology.

This issue has been further examined by looking at the payment data provided by applicants to Ofgem. **Error! Reference source not found.**Figure 6.5 shows the number of operational hours in a year reported by small and medium size biomass installations over the course of the RHI scheme. The figure shows that whilst there is a peak of operational hours around the 1,100 hrs/year, there are also a number of instillations which have operated slightly beyond the 1314 hrs/year threshold, thus there is not a clear pattern of operators falling just under the Tier 2 threshold.

Figure 6.5 Annual Operating Hours of RHTs



Source: Administrative data from Ofgem.

7 Overview of research and summary of findings

In this chapter we recap on the research conducted for this evaluation before presenting the key findings and recommendations from the research on the non-domestic RHI. These are interim findings and recommendations; findings from future research on the non-domestic RHI will be included in the final report due to be published in 2015.

7.1 Overview of research conducted

7.1.1 Desk research

To inform the design of subsequent research strands, the consortium carried out a review of the administrative data collected by Ofgem and existing RHI consultation materials

7.1.2 Applicant survey

To collect quantitative data from RHI applicants we conducted a 30 minute survey using Computer-Assisted Telephone Interviewing (CATI). The sample was drawn directly from Ofgem administrative data and selected to be representative of RHI applicants. In drawing the sample, the sampling frame was stratified by the following variables:

- Type of technology applied for;
- Application status (grouped into three categories as above);
- Applicant sector (grouped into four categories);
- Government Office Region;
- Whether on/off the gas grid.

To ensure the issued sample included applications for a range of technology types and application statuses, a census was taken of the following applications from organisations with single applications:

- any application where the technology differs from Solid Biomass Boilers (across all application statuses)
- any application that was rejected, cancelled, withdrawn or excluded (across all technology types)

From an issued sample of 1735 applicant organisations, 620 productive interviews were completed. Table 7.1 below shows the breakdown of the final sample by a number of key characteristics.

Table 7.1 Fieldwork response by key characteristics[48]			
	Number in issued sample	**Number in achieved sample**	**Response rate %**
Technology type			
Ground Source Heat Pump	129	50	39
Solar Thermal	71	31	44
Solid Biomass Boiler	1515	531	35
Other[49]	20	8	[40]
Application status			
Receiving RHI	1171	420	36
Applying for RHI (or in review)	512	185	36
Application failed (withdrawn/ rejected/ cancelled/ excluded)	52	15	29
Industry sector			
Agriculture	353	120	34
Industrial	160	49	31
Commercial & Leisure	1073	396	37
Public	149	55	37
Government Office Region			
East	126	50	40
East Midlands	127	41	32
London	17	7	[41]
North East	74	25	34
North West	168	50	30
Scotland	275	89	32
South East	156	59	38
South West	350	135	39
Wales	117	47	40
West Midlands	155	52	34
Yorkshire and the Humber	170	65	38
On/off gas grid			
Off gas	1294	477	37
On gas	441	143	32
Total	**1735**	**620**	**100**

The questionnaire was designed in conjunction with DECC researchers and policy colleagues. An initial version was piloted with 50 RHI applicants and the content and format refined ultimately to cover the following topic areas:

- Organisation characteristics, heating requirements and application status

[48] Percentages in square brackets are based on 50 cases or fewer.

[49] The other category combines: bio-methane, biogas, and water source heat pumps because the total number of applications was too small to provide a response figure for these technologies separately.

- Decision making processes of customers in applying for the RHI
- Applicants' experiences associated with the RHI scheme
- Procuring and installing renewable heat technologies
- Experience of operating renewable heat technologies
- Performance of renewable heat technologies
- Pre and post installation experiences
- Satisfaction with the RHI and renewable heat technologies

A number of RHI organisations make multiple applications. For this survey, we decided to interview these organisations about one of their applications only in order to keep respondent burden to a reasonable level whilst still collecting a representative sample of views.

7.1.3 Multiple applicants qualitative study

Initial analysis of the applicant data for the non-domestic RHI identified a significant minority of 'multiple applicants'. These were identified as two or more applications from the same postcode/telephone number. Of 4,317 applications for individual RHT technologies, 2,825 of these are the only application made by that organisation. The remaining 1,492 applications are accounted for by multiple applications from 425 organisations.

This raised interesting questions about the motivations and experiences of multiple applicants and the experience of applicants with specific combinations of technologies. While these organisations have not been systematically removed from the *applicant survey*, the questionnaire was not considered the most suitable vehicle to collect data to address these questions. Instead, we designed and conducted a small qualitative study following up respondents to the survey who had made multiple applicants.

The final achieved sample comprised 20 interviews including a variety of technology combinations and other criteria such application status and geography captured where possible. Table 7.2 below illustrates the technology combinations of the final sample.

Table 7.2 Multiple Applicant Technology Deployment

Technology Combination	**Number of Interviews**
Biomass Only	8
GSHP Only	3
Biomass and Solar Thermal	3
Biomass and GSHP	2
Solar Thermal and GSHP	2
Biomass, Solar Thermal and GSHP	2
Total	**20**

Telephone interviews were conducted between March and June 2014. Topic guides were used to guide the discussions and interviews took approximately half an hour.

7.1.4 Wider awareness survey

The aim of this strand of the evaluation was to provide wider context to the non-domestic strand by measuring the awareness of and attitudes towards Renewable Heat Technologies (RHTs) and RHI among UK businesses as a whole regardless of whether they had applied for RHI. It also aimed to provide broader measures of energy use and attitudes towards energy saving.

The sample was selected from Research Now's Business Panel. This is an opt-in panel of professionals who are recruited via different means and who are rewarded for the completion of surveys they are sent. Only panel members who had decision making powers in facilities were selected for the survey as the aim was to find people who would be in the position to respond about the heating decisions in their organisation. The number of business panel members with decision making responsibilities in relation to facilities was 50,000.

The Business Panel includes detailed information on the industry sector of the organisation that decision makers worked in. The target sample size for the main stage survey was set at 600 cases and quotas set for the industry sectors and geographical area (Scotland / rest of UK).

Overall 623 interviews were achieved during main stage fieldwork. Table 7.3 shows the distribution of achieved cases by industry and geographical area. It should be noted that Research Now's panel contains relatively few organisations in the agricultural sector and it was not possible to achieve a larger number of responses for this group without compromising the wider validity of the survey.

Table 7.3 Achieved sample by industry and geographical area

Industry	
Agriculture	22
Industrial	137
Commercial	252
Leisure	104
Public	105
Other	3
Total	623
Geographical area	
Scotland	103
Rest of the UK	520
Total	623

The questionnaire was developed by Eunomia with input from NatCen and sign-off from DECC. A pilot survey was conducted to test the questionnaire and some questions were amended as a result. The survey covered the following topic areas:

- Organisation's characteristics;
- Take-up of RHTs;
- Concern with energy saving and spending on heating
- Awareness of and attitudes towards RHTs;
- Awareness of RHI; and
- Information sources for RHTs and RHI

Once a clean data set was delivered, the data were weighted according to ONS population distribution. The ONS population figures are based on a snapshot of the Inter Departmental Business Register (IDBR) taken on 12 March 2013.

7.1.5 Possible applicants qualitative study

This was a qualitative study designed to explore the views and experiences of non-domestic possible applicants to the RHI. The findings from this strand of the evaluation are therefore intended to complement the findings from the non-domestic wider business survey which provides a broader snapshot of the views and experiences of the wider business community.

A sample frame was drawn from publically available lists of businesses and the sample was purposively selected to achieve diversity across a range of sampling criteria including business sector and region.[50]

Businesses were initially contacted by telephone and a short screening questionnaire conducted to identify businesses that had either:

- installed RHTs but not applied for the RHI, or
- had considered (or were in the process of considering) RHT installation.

In total telephone calls were made to 745 businesses, from which 200 businesses were screened (the remaining were 'non-contacts' where we were unable to speak to a member of staff responsible for heating). Of the 31 businesses found to be eligible to participate, 23 interviews were achieved.

[50] These lists were online business directories including; for England, Yell.com and 192.com; for Wales, iwales.co.uk; for Scotland, iscotland.co.uk. Organisations were not targeted specifically, rather we filtered the search by sector and region to provide a list of organisations that were relevant to the study

In larger organisations (for example, Local Authorities, Hospital Trusts, supermarket chains) respondents were typically staff members with a specific responsibility for energy, typically Energy Managers. In the case of small businesses, they were less likely to have a member of staff with this specific responsibility, so respondents were typically Managing Directors and owners. Table 7.4 below provides a break-down of the achieved sample.

Table 7.4 Achieved sample of non-domestic possible applicants

		Installed RHT (not applied for RHI)	Considering / considered RHT installation	Total
Sector	Agriculture	0	1	1
	Commercial	1	1	2
	Education	4	1	5
	Industrial	2	3	5
	Leisure	0	3	3
	Public sector / non-profit	4	3	7
Region	East	3	1	4
	London and South East	1	3	4
	North East	0	2	2
	North West	0	1	1
	South West	1	1	2
	East Midlands	1	1	2
	West Midlands	0	1	1
	Scotland	3	2	5
	Wales	1	0	1
	UK wide	1	0	1
Total		**11**	**12**	**23**

Challenges with identifying businesses with the right characteristics and recruiting busy professionals means that this sample is smaller and therefore less diverse than anticipated. As such the data provide a detailed insight into organisations awareness and motivations, but the range and diversity of views may not be fully reflective of the complex and diverse wider non-domestic population.

Interviews were conducted in March and April 2014. Topic guides were used to guide the discussions and interviews took approximately half an hour.

7.1.6 Investors qualitative study

This was a qualitative study designed to explore the views and experiences of a range of organisations operating in this sector, including private equity firms, banks and asset finance companies. The findings from this strand of the evaluation aim to represent investor's perspective, which should be seen in conjunction with the views on financing obtained from the applicants survey.

We initially identified a number of types of investment, or Investor 'Sub-groups' within the sample frame for interview. These were as follows: asset finance providers, private equity firms, infrastructure developers, banks, and energy service companies (ESCO's). From the collection of previously known contacts and through general research, a total of 111 businesses were identified as being in the investor population, with the 68 most active were targeted for interview.

In total, 28 telephone interviews were conducted with businesses across 6 key investor types. Given the relatively low number of organisations providing finance for renewable heat installations, the organisations interviewed included both those already investing in renewable heat, and those which were already investing in renewable electricity installation and were considering investment in renewable heat. The interviewees were typically heads of departments with investment portfolios in the renewables sector. Table 7.5 below provides a break-down of the achieved sample.

Table 7.5 Achieved sample of investors

Investor type	**Achieved sample**
Private Equity Firms (non VCT/EIS)	8
Private Equity Firms (VCT/EIS)	3
Infrastructure Lenders	4
Asset Finance	5
ESCO's	5
Community / Public Sector Lenders	3
Total	**28**

Telephone interviews were conducted in March and April 2014. The topic guides was developed in conjunction with DECC and interviews took around 30 minutes.

7.1.7 Analysis

Quantitative data were analysed using SPSS. Significance testing was carried out across all analysis and differences presented in the report are all statistically significant unless otherwise stated.

The qualitative data were analysed using a framework approach to qualitative data management, which is systematic and comprehensive. This approach ensures the study's findings are robust and grounded in the data (Ritchie and Lewis, 2003). Verbatim interview quotations are provided in the report to highlight themes and findings where appropriate.

More detail on the analysis and a detailed summary of the findings for the qualitative projects can be found in the technical report. Data tables from the quantitative projects are available as part of the Data Annex.

7.1.8 Ofgem workshop

A findings workshop with Ofgem staff took place in order for the organisation administering the scheme to provide feedback on initial findings from the above activities. The workshop was attended by Consortium partners from the evaluation team, DECC policy officials and researchers, and officials from Ofgem involved in the running of the scheme.

Discussion was structured around key findings on the applicant experiences of the RHI application process, metering and payment. Findings from the workshop are included and specifically referenced throughout the report.

7.2 Summary of findings

7.2.1 Current progress of the non-domestic RHI

- As of 31st March 2014, 5,235 full applications for the non-domestic RHI had been made. Of these 3,769 had been accredited by the Office of Gas and Electricity Markets (Ofgem), 1,372 were being considered and 94 rejected or withdrawn.
- The vast majority of installations so far have been *small* biomass boilers (over 90 per cent). Up until now, applicants to the RHI have been more likely to be off-gas grid and are mainly from the commercial and leisure sector (56 per cent) and agriculture (24 per cent).
- Applicants are also more likely to be based in more rural locations conducive or amenable to RHTs (e.g. the South West and Scotland).

7.2.2 Experience with the non-domestic RHI

- In general, applicants have been positive about many aspects of the RHI.
- In particular, the RHI payment and metering processes appear to be working well at present and applicants are satisfied with the requirements these aspects involve.
- However, organisations want to see more streamlining, clarity and consistency in the RHI application process, with one-fifth (21 per cent) of applicants reporting that the application process took more than 15 full-time equivalent days.
- Over half (54 per cent) of applicants also reported some problem with the application process (particularly those applying for GSHPs or solar thermal).
- Those who experienced problems mostly reported a lack of clarity over the information they needed to provide and overly complex guidance.

- For multiple applicants, increased familiarity with the process does not appear to improve the user experience due to the repetitive nature of the process.

7.2.3 Investing in RHTs

- At present, awareness of RHTs appears to be reasonably high with 90 per cent of organisations having heard of at least on type of RHT.
- Amongst those who knew about RHTs the attitudes to the technologies are mixed, however, with only around half positive.
- Among the wider non-domestic population, awareness and understanding of the RHI is low with 79 per cent reporting not having heard of RHI prior to the survey.
- Qualitative data identified some misunderstandings around the attributes of the scheme (e.g. how it differs from the Feed-in Tariff scheme and whether is it is a capital grant).
- Motivations to invest in RHTs are largely driven by the financial return from the RHI tariff. Environmental considerations (from an organisational perspective) and using renewable sources are also important to the majority of organisations and more important for large and public sector organisations than those in other sectors.
- The main barriers to investment reported are a lack of confidence in the reliability of RHTs and uncertainty over the length of payback and level of returns.
- For these reasons the financial incentive offered by the RHI matters and there is clear evidence that a large proportion of installations would not have happened without the RHI.
- However, there appear to remain issues with securing finance to invest under the RHI. A large majority of applicants financed their installations themselves, while non-applicants reported financing and cost as amongst the most significant barriers to installation of RHTs.
- Amongst the investor community, there is a general enthusiasm to invest in larger projects, but this is qualified by the frustrations at a range of perceived barriers.
- That said, with specific regard to biomass the asset finance and asset-based lending sectors expressed confidence with regard to the future of the market. Amongst all investor types, however, there is relatively little understanding of any technologies other than biomass.

7.2.4 Installing and operating RHTs

- The overwhelming majority of RHI applicants are satisfied with their RHT, with 90 per cent reporting that they are either “very” or “fairly” satisfied.
- Applicants for solar thermal report lower satisfaction than average with 65 per cent “very” or “fairly” satisfied.

- Applicants are also mostly satisfied with the installation process, with just under two thirds (63 per cent) finding it “fairly” or “very” easy.
- Over half (57 per cent) did, however, report at least one problem with their RHT installation with delays and unexpected cost being the most common issues.
- In operating their RHTs, the vast majority (92 per cent) of survey participants claimed their system was reliable.
- Over three quarters (78 per cent) of organisations were satisfied with the customer service they had received once their RHT was operational.

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