



Department
of Energy &
Climate Change

Analysis of customer data from phase one of the renewable heat premium payments (RHPP) scheme

Research Report
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Executive Summary

The Renewable Heat Premium Payment (RHPP) Scheme provides a one-off grant to help householders with the cost of installing renewable heat technologies. This report presents findings from the analysis of householder questionnaire data collected as part of RHPP1.

Background

The Renewable Heat Premium Payment (RHPP) Scheme is a government scheme that provides a one-off grant to help householders¹ with the cost of installing the following renewable heat technologies:

- Air Source/Air-to-water heat pump (ASHP)²;
- Ground-source or water-source heat pump (G/WSHP)³;
- Biomass boiler; and
- Solar thermal hot water.

RHPP is an interim scheme to support renewable heat installations before the Renewable Heat Incentive (RHI) is expanded to cover the domestic sector. The RHPP Scheme has been administered in two phases:

- The first phase of the scheme, RHPP1, ran from 1st August 2011 to 31st March 2012 and included both a householder scheme and a social landlord competition.
- The second phase, RHPP2, opened in April 2012 and was due to close in March 2013 but has been extended until the end of March 2014 ahead of the RHI scheme for householders and social landlords.

The scope of this report is restricted to the analysis of householder questionnaire data collected as part of RHPP1 only. A separate evaluation of RHPP2 is in progress, and is due to report in autumn 2014.

The Department of Energy and Climate Change (DECC) commissioned AECOM to undertake quantitative analysis and reporting of private householder questionnaires to learn about consumers' motivations and experiences of installing and using renewable heat technologies. The Energy Saving Trust (EST) administered questionnaires to voucher recipients who had installed renewable heat technologies (RHT) as part of the scheme.

Methodology: post-installation and follow-up questionnaire

Two separate questionnaires were designed for owner-occupiers⁴ applying through the householder voucher scheme. The questionnaires used for the research were designed by

¹ Subject to meeting eligibility requirements

² Air-source heat pumps exclude air-to-air and exhaust-air heat pumps

³ Ground-source heat pumps (or ground-to-water heat pumps) is used to mean a heat pump that collects heat from the ground, water in the ground, or surface water.

⁴ The questionnaire was designed by DECC for owner-occupiers to record motivations for installing renewable technologies and how it was used in practice. Although private landlords and tenants could apply, the questions were not wholly applicable to them so data from these groups were not analysed or presented in this report.

DECC and administered by the Energy Saving Trust in the form of an online census⁵. All private householders who redeemed their RHPP1 voucher following the installation of a renewable heat technology were sent a web link to the relevant questionnaire.

The first questionnaire, a post-installation (PI) questionnaire⁶, was issued immediately after installation and consisted of 50 questions that focused on motivations for taking part in the scheme and experiences of installation. The second questionnaire, the follow-up (FU) questionnaire, was similar in length and focused on experiences and patterns of use.

The follow-up questionnaire was issued four to nine months later to allow all participants to experience the use of the renewable heating system for a period of time during the winter before answering it. In practice, follow-up questionnaires were issued in May/June 2012 (Wave 1) for renewable heating technologies installed up to 31 January 2012, with the remainder being issued in January and February 2013 (Wave 2). Data collected up to 19th February 2013 was included in the analysis.

Multiple applications could be made for RHPP1, where, for example both a heat pump and solar thermal system were being installed. Seven per cent of private households installed more than one type of technology and received a voucher for each, and therefore were invited to complete post-installation and follow-up questionnaires for each⁷.

RHPP1 resulted in 4,959 renewable heat technology installations at 4,623 addresses of owner-occupiers, which provided:

- 3,958 post-installation questionnaires, returned by 3,772 owner occupiers; and
- 2,734 follow-up questionnaires, returned by 2,694 owner occupiers.

Note:

Results in this report are based on responses to two stages of questionnaire completed by owner-occupiers who installed one or more renewable heat technologies under the RHPP1 scheme. For the first questionnaire the response rate was 80% and for the second, 55%. Tests show no bias arose from non-completion, hence the results can be assumed to be representative of all installations.

The data from both questionnaires was appended to the scheme administration data using a unique reference number. The resulting data set is complex, and includes several populations, who may be termed as 'respondents', 'responses', 'technologies', 'systems' or 'installations' depending on the context and whether the results are from the post-installation (PI) or follow-up (FU) questionnaire, and whether we are considering households (i.e. individuals), or technology types. As far as practicable, the text in the report states the population being referred to for each result reported. Should the reader be unclear as to the base/source of population in question, please refer to the Terminology section in Chapter 1.

Objectives

⁵ On-line completion was the only option offered. As all voucher recipients were expected to complete the questionnaires, the exercise is considered as a census rather than a survey.

⁶ Copies of the questionnaires are included in Appendix A

⁷ Therefore respondents may have completed up to four questionnaires; two at each stage

The report focuses on the following research questions:

- What are the characteristics of those returning the post-installation questionnaire (PI respondents) and how do they compare to the eligible populations for each renewable heat technology?
- What are the motivations behind the decision to install a renewable heat technology, including if, when and how RHPP1 influenced the choice?
- What was the experience of installation, and what are the views on any guidance provided?
- What are the views on the performance of renewable heat technology in relation to expectations, and have these views developed over time?
- What is the experience of renewable heat technology in practice, including fuel sourcing and use of additional heating and energy?
- What lessons can be learned to influence take up of renewable heat technology to the wider population?

Profile of respondents and how they compare to the eligible populations

The eligible⁸ population for solar thermal under RHPP1 was households in England, Scotland or Wales (GB). Where the renewable heating technology being installed was ASHP, G/WSHP or a biomass boiler, the RHPP1 scheme was only open to households in England, Scotland or Wales that were not connected to the gas grid.

Compared with the respective eligible populations for RHPP1, PI respondents lived in larger houses that were much more likely to be detached. They were less likely to be aged over 65, and more likely to be in employment. Average incomes were estimated⁹ to be 10 to 20% higher amongst PI respondents than the eligible populations.

PI respondents shared many common characteristics regardless of the type of technology they had installed:

- Over half (56%) were aged between 45 and 64, and 18% were aged 65 or over;
- 68% were in employment;
- Almost half (46%) had incomes below £41,600, and almost a quarter (23%) had incomes over £72,000. The average household income¹⁰ was estimated to be £55,000;
- Over four fifths, (83%) lived in detached properties and 13% lived in semi-detached properties;
- Less than half (44%) lived in two person households;

⁸ Additional criteria, for all the types of technology, applied to meet eligibility, including: the property having loft insulation to 250mm and cavity wall insulation where practical; the product and installer being certified under the Microgeneration Certification Scheme (MCS) (or equivalent).

⁹ It has not been possible to ascertain robust data on incomes of home owners amongst the eligible off-grid population; hence a range has been estimated based on a combination of census and housing data.

¹⁰ As the questionnaires recorded income bands and not raw data, average incomes are estimated from the proportions in each band.

- 38% lived in four bedroom houses and 29% lived in houses with five or more bedrooms. The average number of bedrooms was 4.0;
- Almost half (45%) had lived in the property for less than three years;
- A third (33%) of properties dated from 1990 or later.
- Key differences in the profiles by the type of technology installed are presented below;

A quarter of PI **ASHP** respondents lived in the East Midlands and East regions and a further fifth (22%) in the South West of England. Compared with the off-grid population in the north of England there were relatively few ASHP installations.

The average household income was £51,500; the average number of bedrooms was 3.8 and over four fifths (81%) lived in detached properties. Over half (51%) had lived in their homes for less than three years. Most (69%) were not planning on moving while a fifth (20%) expected to move within ten years. Homes were relatively new; 38% of buildings dated from 1990 or later.

More than a quarter (29%) of PI **biomass boiler** respondents lived in Scotland, and a further 22% in the South West.

Almost three quarters (73%) were employed, and the average household income was £53,500. Most (85%) lived in detached properties and a further 12% in semi-detached buildings. The average number of bedrooms was 4.1. Almost half (47%) of the properties were built before 1900, and just 21% were built since 1990.

More than a third (34%) had lived in their property for less than three years, and more than a fifth (22%) had lived there more than 16 years. Only 10% planned on moving within the next ten years and 68% did not plan to move at all.

Almost a fifth (18%) PI **G/WSHP** respondents lived in the East of England (East Midlands and East region) and a further 10% in Wales.

Almost three quarters (74%) were employed, and the average household income was £61,500. Most (92%) lived in detached properties. The average number of bedrooms was 4.1; 34% lived in houses with more than four bedrooms. While almost a third (31%) of the properties were built before 1900, over half (51%) were built since 1990. Almost a quarter (23%) had yet to move in to the property at the time of completing the questionnaire, and a further 36% had lived in their property for less than a year. At least 40% of PI respondents who installed a G/WSHP did so in a new self-build property.

Almost a quarter (23%) of PI **solar thermal** respondents lived in the South West, and a further 19% lived in the South East.

Almost two thirds (65%) were employed, and average household incomes were around £54,500. Most (80%) lived in detached properties and a further 14% in semi-

detached buildings. Over a third (35%) of properties were built between 1950 and 1989, and a further 24% were built since 1990.

Almost half (45%) lived in four bedroom houses and a further 24% in houses with three bedrooms. Almost a third (31%) had lived in their property for less than three years, and more than a fifth (21%) had lived there more than 21 years. Only 16% planned on moving with the next ten years and 61% do not plan to move at all.

What are the motivations for installing a renewable heating technology¹¹

Environmental factors, including self-sufficiency, were high on the list of factors influencing the decision to install a renewable heating system. However, saving money, off-setting rising fossil fuel prices and the availability of funding were all contributing factors:

- Almost four fifths (79%) of renewable heating technology installations were motivated by rising fuel prices;
- A similar percentage (78%) resulted from a desire to help the environment;
- A wish to save money was an influential factor for just under three-quarters (72%) of installations;
- Two thirds (68%) of installations arose from a desire to reduce dependence on fossil fuels;
- Three fifths (60%) of installations were motivated by the perception that it was a more efficient heating technology compared to a previous heating system.

How has RHPP1 influenced the decision?

The availability of a grant and/or funding was a key motivation to install 53% of renewable heating technologies. However, it is not clear whether this referred specifically to the RHPP1 voucher payment or future RHI payments. Almost half (44%) of installations were 'fairly likely' and a further 30% 'very likely' to have gone ahead without a grant. The cost of renewable heating systems was largely met through savings.

When was the decision taken to install a renewable heating technology?

A fifth (21%) of respondents took the opportunity to install renewable heating system while building a new home (this proportion was much higher, at 40% where G/WSHP was installed). Similar numbers installed their renewable heat technology as part of a refurbishment or upgrade to their homes. Almost a third (31%) of respondents needed to replace their existing heating systems, and a quarter (25%) wished to make their homes warmer.

Almost half (49%) of respondents installed their renewable heating system in spite of their previous systems working well, while just six per cent were replacing broken systems, indicating that overall the decision to install a renewable heat technology was planned, rather than as a result of an emergency.

¹¹ Results based on responses to post-installation questionnaire

It would appear that moving to a new home can be a catalyst for replacement of heating systems or, in the case of new-build, taking the opportunity to install renewable heat technologies.

What are the experiences of installation?¹²

The majority (73%) of installations were easy to arrange, but least easy for G/WSHP installations (61% found it easy) and most easy for solar thermal systems (82%).

Support was generally provided for 86% of installations, usually in a written format, but for a fifth (21%), it was felt more information or support was needed to get the best out of the system.

Two fifths (40%) of PI respondents said they had loft insulation and/or cavity wall insulation installed in their home at the same time as the renewable heating technology in order to meet the eligibility requirement. Most respondents had previously addressed home insulation in advance of installing their renewable heat technology: 84% already had loft insulation, 52% of respondents had cavity wall insulation.

What are the views on the performance of renewable heat technology, and have these views developed over time?

Satisfaction with the renewable heating technology was high, at both the PI and FU stages, 91% and 92% respectively.

At the follow-up questionnaire stage:

- Advice or guidance had been required for 54% of installations, including how to get the best out of the system (31%)
- 9% of installations had experienced manufacturing faults (5% in Wave 1, and 16% in Wave 2);
- 14% of installations had experienced installation faults (9% in Wave 1, and 21% Wave 2);

At the follow-up questionnaire stage, for renewable heating systems that provided heating for the home (ASHP, G/WSHP and biomass boilers);

- The systems were perceived to provide enough heat; around 89% said the temperature was about right even on the coldest nights and 88% were satisfied with the time taken to get to the desired temperature in winter.
- However, over the slightly colder winter of 2012/13, there was an increase in the proportion of FU ASHP and FU biomass boiler respondents who said they had been too cold on the coldest days.

More than a quarter (27%) of FU solar thermal respondents were dissatisfied with the amount of hot water from their panels in winter, but this may be that their expectations were unrealistic.

Propensity to recommend renewable heat technology to others

¹² Results based on responses to post-installation questionnaire

At the follow-up stage, 90% would recommend renewable heat technologies to others, albeit with some words of caution, including installing it in a suitably designed property with a good standard of insulation, and being prepared for a long payback period in some cases.

There was a slight reduction in the proportion who would recommend renewable heat technologies from the post-installation stage (91%) to 90% when the renewable heating system had been used for some time, including over a winter period.

Are perceived benefits being realised?

When asked what impact installing a renewable heat technology could have had on the value of their house, more than half (54%) of FU respondents thought that the value of their property had been positively affected. Responses also indicated that there had been both positive and negative changes in fuel bills, reflecting the change in energy mix used, but the data does not show whether the total amount spent is more or less, or by how much.

How is renewable heat technology being used?

Actions taken when too hot/cold,

Of FU respondents with a renewable heating system (ASHP, G/WSHP or biomass boilers):

- Almost half (48%) said they would put on additional layers of clothing if they felt too cold;
- 41% would turn up the thermostat in the event of feeling too cold;
- More than half (57%) had used supplementary heating systems in addition to their renewable system in order to achieve a comfortable temperature.

Wood burning stoves were the most usual type of supplementary heating used during winter; 838 (43%) had used one, and when used, usage was regular, with seven per cent using one for more than a few hours per day. However, comments indicated that the use of supplementary heating was not necessarily an indication that their heating needs were not being met by their renewable heating system, but there were other benefits, including a boost of heat for a particular room, or just for 'cosiness', for example;

"...more for the cosiness of the wood burning stove rather than a need for extra heat"
(G/WSHP, very satisfied)

How are they sourcing fuel (biomass)?

Of FU biomass boiler respondents:

- 72% use just pellets to fuel the system, 25% use just logs, and 3% use both sources;
- A third (n=98) of log users collect their fuel locally, including 45 people who have their own forest or woodland.

Has renewable heat technology influenced how energy is being used and considered?

When asked whether installing a renewable heat technology had changed the way energy in the home was used, over half (55%) of FU respondents said that they now gave a lot of thought to saving energy in their home. A further 43% gave this a fair amount of thought.

What lessons can be learnt to influence the take up of renewable heat technology to the wider population?

Most installations were planned, rather than emergency replacements. It would appear that moving to a new home can be a catalyst for replacement of heating systems or, in the case of self-build, taking the opportunity to install a renewable heat technology. Installing at this stage is likely to maximise the benefits:

- By minimising any disruption from installation works; and
- By the fuel cost savings justifying the initial investment, providing these people stay in their homes for a long time.

For those completing the questionnaires, the value of their home was not a major motivation for change, although they hoped value would increase.

There has been sense to the location of where technologies have been applied, with biomass and ground source heat pump systems more widely used in rural areas than air source heat pumps and solar thermal. Solar thermal is also more prevalent in the south where hours of sunshine tend to be greater.

The majority of installations appear to have been successful, as the owners are happy with their systems. However there is a small number of cases where respondents are not satisfied, and this could threaten a poor reputation for the sector whilst it is still developing.

There were a number of installations with faults at early stages (14%). This hopefully is due to the systems being relatively new. However it suggests a need for substantial effort to improve installer training to reduce the number of problems caused by installation rather than the equipment itself.

The provision of information on operation of the systems can also be improved, although some information was provided to nearly all users. Help to make best use of the systems is the main need; some respondents commented that the installers didn't fully understand all aspects the systems they were installing.

In operation, most users are content with the heat being delivered. Some concerns remain for the coldest weather, and this is greatest for ASHP systems. This makes sense as their performance is weakest under these conditions. Some users were also disappointed with the delivery of solar thermal systems in winter, which may reflect a lack of understanding of their potential.

Most users of biomass systems were happy with the effort required to re-fuel the system. It is too early to know if maintenance becomes an issue for any of these systems over time.

The data from the questionnaires in terms of running cost is from very early stages of use of the technologies, and it is unclear to what extent bills have increased or decreased. However study of whether heat pumps are delivering any cost savings will be very important, as qualitative evidence suggests that some users are concerned over the size of their electricity bills.

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