UK Government

RAF052/2223: Evaluation of the Boiler Upgrade Scheme

2025 Interim Report

DESNZ (2026)

Acknowledgements

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Contents

Glossary

Boiler Upgrade Scheme (BUS)	The Boiler Upgrade Scheme (BUS) is a grant-based mechanism to support the uptake of low carbon heating (LCH) systems in domestic and small non-domestic properties in England and Wales.
Low carbon heating (LCH) system	A low carbon heating (LCH) system is one that provides heat and hot water without using fossil fuels. Examples include the three types of system supported under the BUS (air source heat pumps, ground source heat pumps, and biomass boilers), as well as systems that are not eligible for support under the BUS (e.g. solar water heating systems).
Air Source Heat Pump (ASHP)	An air source heat pump (ASHP) transfers heat from outside a property to heat water (usually in a water tank), which is then used to provide heat and hot water within a property. They are powered by electricity.
Ground Source Heat Pump (GSHP)	A ground source heat pump (GSHP) transfers heat from the ground – whether through a horizontal ground loop or a vertical borehole – to heat water (usually in a water tank), which is then used to provide heat and hot water within a property. They are powered by electricity.
Biomass boiler	Biomass boilers burn organic materials to provide heat and hot water. The organic materials used as fuel typically include wood pellets, wood chips, and wood logs.
Department for Energy Security and Net Zero (DESNZ)	The Department for Energy Security and Net Zero, or DESNZ, is the Government department with overall responsibility for the BUS.
The Office of Gas and Electricity Markets (Ofgem)	The Office of Gas and Electricity Markets (Ofgem) is the government regulator for the electricity and gas markets in the UK. Ofgem administers the BUS on behalf of DESNZ.
Distribution Network Operator (DNO)	Distribution Network Operators (DNOs) control the connection of properties to the National Grid and need to be notified if property owners want major electrical changes to a property (such as installing a heat pump).
Energy Performance Certificate (EPC)	Energy Performance Certificates (EPCs) provide a rating (from A to G) of the energy efficiency of a property. They are valid for 10 years from the date of issue. At the start of the BUS, to be eligible for a voucher properties were required to have a valid EPC with no

	outstanding recommendations for loft or cavity wall insulation. This is no longer the case.
Microgeneration Certification Scheme (MCS)	The Microgeneration Certification Scheme (MCS) is an accreditation scheme for installers of small-scale renewable energy technologies, including heat pumps and biomass boilers. Any LCH system installed under the BUS must have been done so by an MCS-certified installer.
The Home Insulation and Energy Systems Quality Assured Contractors Scheme (HIES)	The Home Insulation and Energy Systems Quality Assured Contractors Scheme (HIES) is a consumer protection organisation covering the installation of renewable energy products, including heat pumps and biomass boilers. Like the RECC (see below), members of the HIES go through an accreditation process and commit to abide by the Scheme's rules and code of practice.
Renewable Energy Consumer Code (RECC)	The Renewable Energy Consumer Code (RECC) is a consumer protection scheme for the installation of small-scale renewable heat or power generation systems, including heat pumps and biomass boilers. It is similar to the HIES (see above).
Self-build home	A new home commissioned by the potential user of the home, rather than by a third-party developer. The self-builder's input might vary from doing the actual building work to contracting the work to an architect or building company. Unlike new build homes, self-build homes are eligible for support under the BUS.
Domestic	Domestic properties are buildings which function as a home or other domicile for a household.
Non-domestic	Non-domestic properties are buildings in which businesses or other organisations operate, which do not principally function as a home or other domicile.
Renewable Heat Incentive (RHI)	The Renewable Heat Incentive (RHI) was the predecessor initiative to the BUS, the domestic version of which closed to new applications in March 2022. It provides financial support to increase the uptake of renewable heating technologies, including heat pumps and biomass boilers.
Green Homes Grant – Vouchers (GHG-V) Scheme	The Green Homes Grant – Vouchers (GHG-V) Scheme ran from September 2020 till March 2021, and provided grants to encourage the uptake of energy-saving renovations and renewable heating technologies, including heat pumps and biomass boilers.

Energy Company Obligation (ECO)	The ECO scheme supports the delivery of energy efficiency measures – including LCH systems – in the homes of low income, fuel poor and vulnerable households. It is delivered by energy suppliers. The current scheme (ECO4) runs from 2022-2026.
Home Upgrade Grant (HUG)	The HUG scheme supports low income owner occupiers and private rented tenants in off-gas grid properties in participating areas of England with a low EPC rating to install energy-saving measures and LCH systems. The current scheme will be replaced by the Warm Homes: Local Grant scheme from April 2025.
Warm Homes - Social Housing Fund	The Fund (previously known as the Social Housing Decarbonisation Fund) supports social housing providers to install energy-saving measures – including LCH systems.

Executive Summary

In March 2023, the Department for Energy Security and Net Zero ('the Department') commissioned a combined process, impact, and economic evaluation of the 2022-2025 Boiler Upgrade Scheme (BUS)[1]. The BUS supports the installation of low carbon heating (LCH) systems – heat pumps and in limited circumstances biomass boilers – in domestic and small non-domestic properties in England and Wales. It subsidises the upfront cost of these systems by issuing grants, delivered in the form of 'vouchers'. In October 2023 the grant value increased to £7,500 for air source heat pumps (ASHPs) and ground source heat pumps (GSHPs), whilst the grant value of £5,000 for biomass boilers remained the same. The research presented in this report includes evidence from before and after the grant uplift was introduced.

This evaluation of the BUS is being undertaken by ICF, working with Eunomia, University College London (UCL) and BMG Research. This 2025 Interim Report, which presents evaluation findings, is the second published deliverable, following the 2024 Interim Report[2]. It is informed by research with property owners and LCH installer companies. Property owner research consisted of three waves of a survey of property owners that recently had a LCH system installed under the BUS (3,913 survey responses in total), a follow-up survey of respondents to the first two waves that was carried out after they had used their LCH system for at least one heating season (1,642 survey responses), in-depth case studies of six property owners with an installation, 30 interviews with property owners that had not applied to the BUS, and 5 interviews with property owners that had applied for a BUS voucher but not had an installation (because the voucher was not issued or because their voucher expired[3] before the installation was completed). Installer research consisted of two waves of a survey of BUS-registered installer companies (516 survey responses in total), and interviews with 10 LCH installer companies that were not registered with the BUS.

Main findings

Uptake of the BUS by property owners

- **Between May 2022 and October 2024, the BUS part-funded 37,417 LCH system installations**. Prior to the uplift in the grant value at the end of October 2023 (up to £7,500 for ASHPs and GSHPs) there was an average of just under 1,000 installations per month. After the uplift, this number increased to just under 1,800 installations per month. Most of these installations were ASHPs in domestic properties, often replacing natural gas systems (which was the case for 50% of installations).

[1] The extension of the BUS from 2025 to 2028 is not the focus of this evaluation.
[2] DESNZ (January 2025) Evaluation of the Boiler Upgrade Scheme: 2024 Interim Report
[3] ASHP and biomass boiler vouchers are valid for three months after issue, and GSHP vouchers are valid for six months.

- **The types of properties receiving LCH systems under the BUS has remained largely unchanged**. The share of properties that were 'newly built'[4] increased between waves 1 and 2 of the survey, peaking at 25% at wave 2 (corresponding to installations that took place in the second half of 2023) then dropping to 20% at wave 3. However, aside from this change, no other significant shifts were observed in the types of properties receiving LCH systems, suggesting that, while the overall number of installations increased, the types of properties where these systems were installed remained relatively consistent over time. Similarly, there were no major changes in the characteristics of participating property owners.
- **Regarding property owners' motivations for switching from fossil fuel heating systems to LCH systems, there was no significant change between 2023 and 2024**. However, after the grant uplift, more property owners reported that the availability of BUS funding influenced their decision to install a LCH system when they did. Specifically, 69% of post-uplift respondents said they had acted when they did because of the BUS grant, compared to 64% pre-uplift. Additionally, 15% of post-uplift survey respondents indicated that they had not acted earlier because they thought the BUS grant was previously too low.
- **The proportion of property owners who said they would have been unlikely to install a LCH system without the BUS increased from 52% pre-uplift to 60% post-uplift**. Although this is a self-reported assessment of the impact of the BUS, it aligns with the finding that the grant uplift stimulated demand among property owners who might have otherwise delayed or not installed a LCH system.
- **Qualitative research with property owners found that the most common reasons for not joining the BUS included a belief that a LCH system would not be suitable for their properties – especially older or poorly insulated homes**. Other concerns included perceived high upfront and running costs, perceived disruption during installation, doubts about whether the system would provide enough warmth, and a perception that it was not the right time in their lives to switch (e.g. because they were planning to move home).

Participation in the BUS by installer companies

- **At the end of October 2024, 1,710 installer companies were registered with the BUS**. There was a spike in registrations in the months after the Scheme launched. Since then the average has been around 33 new installer registrations each month. The large number of registered installers and the fact that most are actively installing LCH systems under the BUS (see below) suggests that there is a good level of choice available to property owners. A competitive market is conducive to lower costs for consumers.

[4] New build properties are not eligible for support under the BUS. Self-build properties – which accounted for up to 16% of installations up until the end of October 2024 – are eligible if they have been built mainly using the labour or resources of the first owner and have never been owned by a business or organisation. 'Newly built' was a term used in the property owner questionnaire to encompass self-build projects and major renovations, as it was felt that this would be more consistently understood by respondents.

- **Businesses that joined the BUS in the months after it launched were typically experienced LCH system installers looking to sustain or expand their activities**. Since then, the Scheme increasingly attracted businesses that were new to the LCH market (35% of wave 2 respondents that registered between May 2023 and April 2024 did so to start installing LCH systems). Between waves 1 and 2 of the installer survey, businesses also became more likely to have expanded their market offerings due to the BUS (e.g. wider geographical coverage, more types of property covered).
- **Most BUS installers (75%) delivered LCH system installations both inside and outside the Scheme**. LCH system installations became more important to them as a source of income over time, especially amongst those that were more active under the BUS. At wave 1 of the survey only 31% of installers generated more than half their total annual revenue from LCH system installations; by wave 2 this had increased to 37% of the installers that had registered before May 2023 – i.e. the longer-standing participants.
- **The distribution of BUS installations amongst registered installers was somewhat skewed**. Ten percent of installers delivered 68% of the installations that took place between May 2022 and October 2024. Sixteen percent of registered installers had not completed a single BUS-funded installation, suggesting that some of the 1,710 registered companies are not active participants.
- **The proportion of installers that believed there were factors that limited demand for BUS installations amongst consumers decreased between waves 1 and 2 of the survey**. Whilst 82% of wave 1 respondents perceived there to be barriers, this fell to 69% of wave 2 installers that had registered before May 2023. Reflecting the grant uplift in October 2023, the share of installers that thought demand was held back by the size of the BUS grant fell from 69% to 54% between waves 1 and 2 of the survey.
- **The proportion of installers that believed there were factors limiting their ability to deliver BUS installations decreased between waves 1 and 2 of the survey (from 57% to 44%)**. The types of issues they faced were largely unchanged over time, with the availability of skilled staff and time spent on administrative and compliance tasks (largely Microgeneration Certification Scheme (MCS)-related) the two most notable factors affecting their delivery. There was a statistically significant decrease between survey waves in the proportion of installer company respondents who said they had faced issues getting approvals from a Distribution Network Operator (DNO)[5] (32% of this sub-group of installers at wave 2, down from 45% at wave 1).
- **Qualitative research with ten LCH system installers that had not registered with the BUS found that there were various perceived supply and demand related issues that deterred them**. A key barrier was a perceived negative impact of the Scheme on their cashflow, because of the lag between installation and grant payment. Some were put off by the requirement to be MCS registered. Others had plentiful LCH system installation work in other markets (e.g. serving the social housing sector).

[5] DNOs control the connection of properties to the National Grid and need to be notified if property owners want major electrical changes to a property (such as installing a heat pump or an electric vehicle charging point). Upgrades to the connection infrastructure may be required, especially if multiple heat pump installations are proposed for a single street.

Delivery of the BUS

- **Most property owners that had a LCH system installed were satisfied with their overall experience of the BUS**. Levels of satisfaction increased after the grant uplift – 85% said they were very/fairly satisfied before this compared to 91% afterwards. There was a particularly pronounced increase in the share of property owners who said they were very satisfied (up from 53% before the uplift to 71% afterwards).
- **It became easier between waves for property owners to find an installer to carry out a BUS installation**. The percentage of property owners who found it very/fairly easy to get a quote increased from 79% (wave 1) to 84% (wave 3).
- **Property owners often undertook supplementary works to support their LCH system, most commonly installing a new or larger water tank (84% of property owners)**. They typically carried out these supplementary works at the same time as their LCH installation. Property owners also frequently installed additional energy generation/storage (solar photovoltaic (PV), batteries) or energy efficiency (floor insulation) measures alongside their LCH system, often to reduce the running costs.
- **After the grant uplift, more property owners reported that it was easy to pay for the cost of installation not covered by the BUS grant**. The percentage of owners who found this very/fairly easy increased from 63% to 72%. The types of finance used (mostly savings or investments) did not change significantly following the uplift. Also unchanged were installers' billing models, with most property owners (76%) reporting that their installer had reduced the cost by the value of the BUS grant.
- **Most installers (69%) said they had not experienced any cashflow problems due to the BUS**. A larger value grant could have increased the risk to installer companies, due to the likely lag between the completion of an installation and receipt of the BUS grant. Installers that had experienced cashflow problems had most commonly adjusted their workload and scheduling (declining or spacing out work).
- **Property owners' experiences of having a LCH system installed improved slightly between waves**. This was especially true of system handover, where the percentage of property owners who were very satisfied grew from 29% (wave 1) to 40% (wave 3).
- **A third of property owners (32%) said they had experienced an issue with their LCH system that needed addressing since it was installed**. This included instances where LCH systems did not provide heat or hot water and affected heat pump units and ancillary equipment including hot water tanks, radiators, pipework, and smart controls. Issues were typically fixed by the installer that installed the LCH system. A minority of property owners (10% of survey respondents) had made a formal complaint about their installation experience.
- **Over half (58%) of on-grid property owners had disconnected their properties from the gas grid since having their LCH system installed**. Another 3% had tried but not (yet) succeeded. If property owners had not tried to disconnect from the gas grid, this was most commonly because they still used gas for cooking (cited by 80% of follow-up property owner survey respondents who had not tried to disconnect).

Lived experiences of LCH systems

- **Most property owners were satisfied with the temperature of their properties using their LCH system**. They usually described the temperature of their properties as about right, whether overall (93%) or on the coldest mornings or evenings (both 86%). Most (70%) survey respondents were very/fairly satisfied with how quickly their property heated up, and 83% were very/fairly satisfied with how evenly their property heated up.
- **Just under half (44%) of property owners used at least one type of supplementary heating over the winter, in addition to their LCH system**. An open fire or stove that burned wood or coal was the most used method.
- **Most property owners (94%) thought the temperature of their hot water was about right when heated using their LCH system**. They were largely happy with how quickly their hot water heated up (86% were very/fairly satisfied) and how much hot water there was (89% were very/fairly satisfied).
- **Property owners were typically satisfied with the noise produced by their LCH system**. This was true even on cold days when their system was working much harder than normal (85% said they were very/fairly satisfied with the noise on the coldest days).
- **Property owners' confidence that they understood how to use their LCH system controls was mixed**. Many reported gaps in their knowledge: 32% said they were slightly/not at all confident about how to control their system to minimise running costs.
- **Property owners had mixed experiences with their total energy bills since installing their LCH systems, though most commonly they reported that their bills had decreased (37% of survey respondents).** Various factors influenced the direction of change of energy bills, including property owners' confidence using their system and whether they had solar PV and battery storage installed (several property owners thought this was what had kept their electricity bills low).
- **A third (35%) of survey respondents had changed their energy tariff since having their LCH system installed**. Looking at the type of tariffs that property owners were on (regardless of whether they had switched), half (50%) had standard fixed/variable tariffs at the time of the follow-up survey, but many were on time of use (35%) or special heat pump tariffs (11%). Often, they had switched to these latter two tariffs in response to having their LCH installed, to bring down costs.
- **Overall, most property owners (89%) were very/fairly satisfied with their LCH system after a heating season of use**. Just 3% of property owners that responded to the follow-up survey were very/fairly dissatisfied. Follow-up survey respondents were also asked the same question in the wave 1 and 2 survey, and the general trend was that property owners became more satisfied with their LCH system between surveys.
- **Most property owners (57%) already had or definitely would recommend their LCH system to friends**. Nine percent of follow-up survey respondents definitely/probably would not recommend it. This question was also asked in the wave 1 and 2 survey, and the proportion of property owners who would or would not recommend a LCH system was broadly similar in that survey and the follow-up survey. It seems likely that most property owners made up their minds about their LCH system soon after it was installed.

Introduction

In March 2023, the Department for Energy Security and Net Zero ('the Department') commissioned an evaluation of the 2022-2025 Boiler Upgrade Scheme (BUS). The study is scheduled to finish in March 2026 and is being undertaken by ICF, working with Eunomia, University College London (UCL), and BMG Research.

The Boiler Upgrade Scheme (BUS)

The BUS was set up by DESNZ to support the installation of low carbon heating (LCH)[6] systems – heat pumps and, in limited circumstances, biomass boilers – in domestic and small non-domestic properties in England and Wales. The BUS was launched with an initial £450 million budget and was initially scheduled to run for three years between April 2022 and March 2025. The Government confirmed a £295million budget for the scheme from April 2025 to March 2026, and funding for future years will be confirmed as part of Phase 2 of the Spending review. It was subsequently extended for another three years until March 2028 and was allocated an additional £1.547 billion of funding. This evaluation focuses on the 2022-2025 phase of the BUS, not the extension phase[7].

The BUS is a key component of the Government's plan to decarbonise the heating of buildings, as outlined in the Heat and Buildings Strategy[8]. The electrification of heating is the only proven option for decarbonising the majority of buildings in the UK, and so increasing the deployment of heat pumps is a strategic priority. The BUS is part of a package of measures designed to support LCH deployment, alongside support through the Energy Company Obligation (ECO), Home Upgrade Grant (HUG) and Warm Homes - Social Housing Fund. The introduction of the Future Homes Standard from 2025 will also set a building performance and efficiency standard that fossil fuel boilers will not be able to pass, resulting in low carbon heat as standard in new buildings.

The BUS is increasing the uptake of LCH systems by subsidising their upfront costs, thus tackling one of the main barriers faced by consumers. The subsidy takes the form of a 'voucher', currently worth £7,500 for air source heat pumps (ASHPs) and ground source heat pumps (GSHPs), and £5,000 for biomass boilers. The grant value increased in October 2023 from the prior values of £5,000 for ASHPs and £6,000 for GSHPs. The other notable change to the BUS was the removal from May 2024 onwards of the requirement for eligible properties to have no outstanding recommendations for loft or cavity wall insulation on their Energy Performance Certificate (EPC). Other key features of the BUS are that new build properties are not eligible. Self-build properties are eligible provided they are not built by companies or developers. The total capacity limit of any individual LCH system installed must not exceed 45

[6] The term low carbon heating (LCH) system is used to collectively refer to air source heat pumps (ASHPs), ground source heat pumps (GSHPs) and biomass boilers.
[7] The BUS extension period will be evaluated through separate means which are yet to be decided.
[8] BEIS (2021) Heat and Buildings Strategy

kWth[9,10]. The BUS has an installer-led delivery model and only registered installer companies (who must also be accredited by the Microgeneration Certification Scheme (MCS)) can apply for and redeem vouchers. The BUS is administered by Ofgem on behalf of DESNZ.

Evaluation aim and methodology

The Department commissioned a combined process, impact, and economic evaluation of the 2022-2025 BUS. This is the second evaluation Interim Report, following on from a 2024 Interim Report[11]. A Final Report will be published in 2026. This report is based on the following research activities, further details about which are provided in a separate Technical Methodological Report[12]:

- **Research with property owners that had a LCH system installed under the BUS**. Two separate surveys were carried out. The first survey consisted of three waves of an online survey which was completed by 3,913 property owners (a response rate of 33%)[13]. Survey data were weighted. The survey explored property owners' experiences of participating in the BUS, including why they joined the Scheme and how satisfied they were with their experiences. The second survey consisted of a one-off 'follow-up' online survey of individuals who responded to waves 1 or 2 of the property owner survey. This survey was completed by 1,642 property owners (a response rate of 63%)[14]. The survey took place after property owners had their LCH system for at least one winter heating season and explored their experiences of using their system and their satisfaction with the temperature of their property. The evaluation team also carried out six in-depth case studies of property owners with a BUS installation, to explore their experiences of the Scheme and with using their LCH system.
- **A survey of BUS-registered installer companies**. This consisted of two waves of a telephone survey that was completed by 516 installer companies[15]. Survey data were

[9] kWth (kilowatt thermal) is a measure of thermal output (heat).
[10] Shared Ground Loops (SGLs) may now have a limit of 300 kWth, however the limit was 45 kWth when this research was conducted.
[11] DESNZ (January 2025) Evaluation of the Boiler Upgrade Scheme: 2024 Interim Report
[12] DESNZ (2025) Evaluation of the Boiler Upgrade Scheme: 2025 technical report
[13] At each wave a sample of 4,000 property owners was selected from a sampling frame consisting of individuals with a BUS-funded installation completed in a 6-7 month period prior to the survey launch (excluding anyone being investigated for compliance or fraud reasons). The wave 1 survey took place in August/September 2023 and involved installations completed between 1 October 2022 and 30 April 2023, wave 2 was in February/March 2024 and involved installations from 1 May 2023 to 31 October 2023, and wave 3 was in August/September 2024 and involved installations from 1 November 2023 to 30 April 2024.
[14] The sampling frame consisted of everyone who responded to waves 1 or 2 of the property owner survey, excluding six individuals who had participated in follow-up property owner case studies. A total of 2,602 people were contacted. The survey took place in July/August 2024.
[15] At each wave the sampling frame consisted of installer companies registered with the BUS, excluding anyone that was suspended or had started but not completed the registration process. The wave 1 survey took place in August/September 2023 and involved 1,057 installers registered as of April 2023. The wave 2 survey took place in August/September 2024 and involved 1,110 installers registered as of April 2024 – excluding any companies that were contacted as part of the wave 1 survey and either responded or opted out of all surveys.

weighted[16]. The survey explored installers' experiences of joining the BUS and, if relevant, submitting applications and completing installations.

- **Interviews with property owners that had not participated in the BUS and non-BUS registered installer companies**. Thirty interviews were completed with property owners who had not applied for a BUS voucher[17] and five interviews were completed with property owners who had applied for a BUS voucher but not had an installation[18]. Interviews investigated the factors that deterred property owners from seeking to have a LCH system installed and, if relevant, their experiences of trying to access the BUS. Ten interviews were also undertaken with LCH system installers who were not registered with the BUS[19], to understand why this was the case.

The strength of the evidence in this report is that the analysis is based on a rich and varied evidence base about the experiences of property owners and installers that have participated and not participated in the BUS. Survey data provide evidence from representative samples of property owners and installers. Achieved samples were sufficient to enable statistical significance testing of results, for example to compare survey responses between different groups. Where results are statistically significant this is indicated in the report text; if not indicated this means that results were not statistically significant.

As noted above, the design of the BUS has changed over the course of the evaluation. Research with property owners took place before and after the uplift in the grant value, enabling analysis of if and how the uplift affected BUS take-up. Research with installers took place before and after the uplift and the changes to insulation requirements, enabling analysis of the impacts of these adjustments on installers' experiences of the Scheme. The evidence enables analysis of why installers and property owners have chosen to participate in the BUS, what has deterred them from participating, how effectively it is being delivered, their experiences of using their new LCH system, and areas for improvement.

Turning to the limitations, the small number of non-participating installers interviewed (10) meant that there were groups that it was not possible to engage with. There was low

[16] Installer survey data were not weighted for the analysis that was undertaken in the 2024 Interim Report, so the analysis presented here is not comparable with that report.
[17] Interviewees were purposively sampled from a sampling frame consisting of 2,870 respondents to a survey that was carried out in May and June 2023 as part of separate research study led by ICF exploring British owner occupiers' willingness to pay for an ASHP. They were all at least aware of ASHPs and had made a choice not to have a heat pump installed through the BUS – rather than simply being unaware that this option existed – and would thus be able to answer questions about their thought processes. Interview quotas were set to ensure coverage across a range of property owner characteristics – see the separate Technical Methodological Report for details.
[18] Interviewees were purposively sampled from a subset of the database of BUS applications limited to individuals who had either: i) applied for but not been issued with a voucher; or ii) been issued with a voucher that expired (in both cases excluding anyone who subsequently successfully reapplied). Interviews were sampled in two phases: firstly in September 2023 and secondly in May 2024. This was because it was initially planned to complete all interviews in September 2023 but there were significant difficulties with recruitment, and after a research hiatus, interviewing resumed in May 2024.
[19] The main sampling frame for interviewees was the MCS register, which was analysed to identify installer companies that installed BUS-eligible technologies, were based in England and Wales, and which were not registered with the BUS as of February 2024. Recruitment was challenging – a total of 245 companies were contacted and 8 interviews were completed. To achieve the target of 10 completed interviews, 2 interviews were sourced from i) LinkedIn contacts; and ii) membership of the Heat Pump Association.

representation amongst Welsh installers (1 interviewee), and no representation from larger businesses or biomass boiler installers. It was also only possible to interview five property owners who had applied for a BUS voucher but not had an installation, limiting the conclusions that can be drawn about this group. Many non-participant property owner interviewees were unaware of the BUS and some installers did not have a detailed understanding of the Scheme. Given these knowledge gaps, therefore, they were sometimes unable to fully articulate what it was about the BUS that had deterred them from participating, and what they thought could be improved.

Uptake of the BUS by Property Owners

This chapter discusses uptake of the BUS, and analyses if and how the profile of participating property owners and properties has changed since the 2024 Interim Report was published. It then analyses the results of qualitative research into why property owners with fossil fuel heating systems have not accessed the BUS.

Key findings

Between May 2022 and October 2024 the BUS part-funded 37,417 LCH system installations. Prior to the uplift in the grant value in October 2023 (up to £7,500 for ASHPs and GSHPs) there was an average of just under 1,000 installations per month. After the uplift, this number increased to just under 1,800 installations per month. Most of these installations were ASHPs in domestic properties, often replacing natural gas systems (which accounted for 50% of properties with BUS-funded installations).

The share of properties that were 'newly built'[20] increased between waves 1 and 2 of the survey, peaking at 25% at wave 2 (corresponding to installations that took place in the second half of 2023) then dropping to 20% at wave 3. However, aside from this change, no other significant shifts were observed in the types of properties receiving LCH systems. This suggests that, while the overall number of installations increased, the types of properties where these systems were installed remained relatively consistent over time. Similarly, there were no major changes in the characteristics of participating property owners.

Regarding property owners' motivations for switching from fossil fuel heating systems to LCH systems, there was no significant change between 2023 and 2024. However, after the grant uplift, more property owners reported that the availability of BUS funding influenced their decision to install a LCH system when they did. Specifically, 69% of post-uplift respondents said they had acted when they did because of the BUS grant, compared to 64% pre-uplift. Additionally, 15% of post-uplift respondents indicated that they not acted earlier because they thought the BUS grant was previously too low.

The proportion of property owners who said they would have been unlikely to install a LCH system without the BUS increased from 52% pre-uplift to 60% post-uplift. Although this is a self-reported assessment of the impact of the BUS, it aligns with the finding that the grant uplift stimulated demand among property owners who might have otherwise delayed or not installed a LCH system.

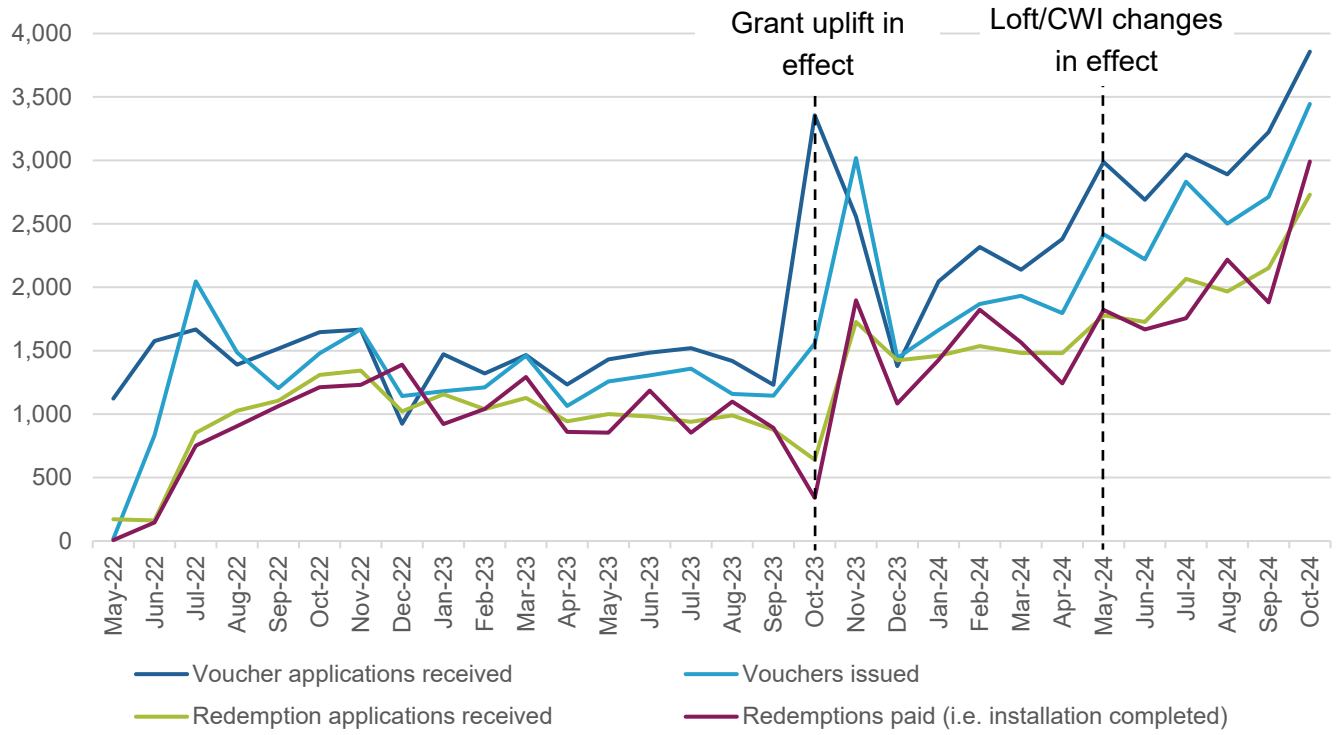
[20] New build properties are not eligible for support under the BUS. Self-build properties are eligible if they have been built mainly using the labour or resources of the first owner and have never been owned by a business or organisation. 'Newly built' was a term used in the property owner questionnaire to encompass self-build projects and major renovations, as it was felt that this would be more consistently understood by respondents.

Qualitative research with property owners who had not accessed the BUS found that the most common reasons included a belief that a LCH system would not be suitable for their properties – especially in older or poorly insulated homes. Other concerns included high upfront and running costs, disruption during installation, doubts about whether the system would provide enough warmth, and the perception that it was not the right time to switch.

BUS applications, vouchers issued, and installations

As Figure 1 shows, the number of BUS voucher applications and vouchers issued each month increased steadily after the grant uplift was introduced[21]. The removal of the requirement that properties have no outstanding loft or cavity wall insulation (CWI) recommendations (which came into effect in May 2024) coincided with a slightly smaller peak in monthly application numbers.

Figure 1: The volume of BUS applications and redemptions, per month# (May 2022 to October 2024)[22]



Source: DESNZ (November 2024)[23]; Notes: # the months correspond to the date that the step was logged in the BUS administrative database – the spike in the number of applications received at the end of October 2023 and the time lag till voucher issuance meant that in November 2023 the number of vouchers issued exceeded the number of applications received in that month; data are for all technology types and for domestic and non-domestic.

[21] The number of new applications spiked after the grant uplift came into force, though DESNZ analysis found that half of the new applications received in the first week after the grant increase were reapplications (i.e. applications made and approved prior to the uplift and then withdrawn and resubmitted to benefit from the higher grant).
[22] October 2024 was used as the cutoff because this aligned with the period of the BUS when the most recent fieldwork with property owners and installers was carried out; more up to date application and redemption statistics are available from the Boiler Upgrade Scheme official statistics.
[23] DESNZ (November 2024) Boiler Upgrade Scheme statistics: October 2024

Between May 2022 and October 2024, the BUS part-funded the installation of 37,417 LCH systems. The rate of system installation increased significantly after the grant uplift came into effect. Between June 2022 (the first full month of the BUS) and September 2023 (when the uplift was announced) there was an average of 981 BUS-funded LCH system installations per month. Between November 2023 (after the uplift came into effect at the end of October 2023) and October 2024 after this there were an average of just under 1,781 installations per month. Over half (57%) of the total number of BUS-funded installations took place in the 12 months between November 2023 and October 2024, compared to 43% in the preceding 18 months.

Most BUS-funded installations were ASHPs (97% of the total), installed in domestic properties (99.5% of the total). In half of all cases (50%) the LCH system replaced a natural gas-fuelled heating system. In 16% of cases there was no previous heating system: in most cases this was because the property was new (a self-build[24]). The characteristics of BUS-funded installations as of October 2024 were very similar to those reported in the 2024 Interim Report, indicating that the amendments to the Scheme did not alter the types of LCH systems installed significantly.

Characteristics of property owners and their properties

The 2024 Interim Report provided an in-depth analysis of the characteristics of properties and property owners that received BUS-funded installations, based on wave 1 of the property owner survey which was carried out in summer 2023. Since then, two additional survey waves have been completed, with the most recent (wave 3) conducted in summer 2024. This wave included property owners who received the uplifted BUS grant. Below is a summary of the main ways in which the profile of property owners with a BUS installation changed – or did not change – over time.

A notable trend was a statistically significant increase in the proportion of properties that were ‘newly built’ when the BUS-funded LCH system was installed. ‘Newly built’ was a term used in the property owner questionnaire to encompass self-build projects[25] (which accounted for up to 16% of all installations up until the end of October 2024) and major renovations, as it was felt that this term would be consistently understood by respondents. In wave 1, 16% of property owners reported that their property was ‘newly built’ at the time of installation[26]. This increased to 25% of property owners at wave 2, before dropping to 20% at wave 3[27]. Over time,

[24] Note that new build properties (e.g. properties owned by a developer whilst they were being built) are not eligible for support under the BUS. Self-build properties are eligible.
[25] Self-build properties must have been built mainly using the labour or resources of the first owner and should never have been owned by a business or organisation.
[26] Unweighted base: All respondents (n=1,310 at wave 1 and n=1,305 at wave 3). QR03: Is this property newly built? By this we mean that the current property is built on a site where there was either no property previously, or the previous property was wholly or largely demolished. We also mean that this property was built around the same time that [the LCH system installed] was installed.
[27] BUS administrative data records whether an installation was at an eligible self-build property. Note that this definition is narrower than the one used in the property owner survey, with the latter including cases where existing properties were largely but not entirely rebuilt. BUS administrative data on the prevalence of self-build properties corroborates the trends observed in the surveys: the share peaked amongst BUS installations in late

increasing shares of BUS-funded installations have taken place in on-grid properties. By the end of October 2024, 57% of all BUS installations were in on-grid properties, compared to 53% by the end of September 2023 when the previous Interim Report was published[28].

Apart from this, there were no statistically significant changes over time in the characteristics of properties where LCH systems were installed under the BUS. As described in the 2024 Interim Report, properties tended to be used as main homes. Houses were often relatively large (53% of domestic property owners said they had four or more bedrooms[29]) and most were detached (56% of domestic property owners[30]).

Turning to the characteristics of the property owners who participated in the BUS, there was a statistically significant decrease between survey waves in the proportion who said they were very concerned about climate change (from 71% at wave 1 to 65% at wave 3[31]). Conversely, the share who said they were only fairly concerned rose from 24% at wave 1 to 28% at wave 3[32]. BUS participants from 2024 were also more knowledgeable about LCH systems than participants from 2023. In wave 3 of the survey, 55% of property owners said they knew a fair amount or a lot about LCH systems before joining the BUS, a statistically significant increase from the 50% who said the same at wave 1[33]. The characteristics of property owners – their annual household income, the extent to which they were struggling to pay their energy bills, household demographics – was analysed in the 2024 Interim Report. There were no statistically significant changes in property owner characteristics between survey waves.

Why property owners participated in the BUS

Reasons why property owners had a LCH system installed under the BUS

Property owners' motivations for having a LCH system installed were explored in detail in the 2024 Interim Report. There were no substantive changes in motivations since that analysis, and the environmental benefits of moving to a LCH system remained the most cited motivation.

2023 (which is when the sample for the wave 2 survey was drawn) before declining. In October 2024 12% of properties were classed as self-builds, compared to 24% in October 2023.

[28] The share of BUS properties that are off-grid – 43% as at October 2024 – was much higher than the national share, where 15% of domestic properties in England and Wales were not on the gas grid in 2023. Source: DESNZ (2024) Subnational estimates of properties not connected to the gas network.

[29] Unweighted base: All respondents (n=3,907). QA03a How many bedrooms does the property have?

[30] Unweighted base: All respondents (n=3,907). QA02a Which of the following best describes the property?

[31] Unweighted base: All respondents (n=1,310 at wave 1 and n=1,305 at wave 3). QF04 How concerned, if at all, are you about climate change, sometimes referred to as 'global warming'?

[32] This survey question replicated a question asked as part of the UK-wide Public Attitudes Tracker (PAT) survey, noting that this is a survey of the whole population, not just property owners eligible under the BUS. As was the case with BUS participants, the share of people nationally who said they were very concerned about climate change also dropped slightly between 2023 and 2024, down from 40% in summer 2023 to 37% in summer 2024.

[33] Unweighted base: All respondents (n=1,310 at wave 1 and n=1,305 at wave 3). QF06 When you first heard about the BUS, how much would you say you knew about a [LCH system installed]? Again, this question replicated a question used in the PAT survey. The share of the UK population who said they knew a fair amount or a lot about LCH systems was pretty much unchanged between 2023 and 2024, going from 32% in summer 2023 to 33% in summer 2024.

Across the three survey waves, a substantial majority of respondents (85%) identified a desire to reduce their carbon emissions, while 77% wanted to lessen their reliance on fossil fuels[34].

Property owners were also asked why they elected to have a LCH system installed when they did, rather than waiting. The 2024 Interim Report found that the most common trigger for action was the opportunity to access the BUS grant, and the grant uplift seems to have amplified this even further. Amongst property owners who accessed the pre-uplift grant, 64% cited the availability of BUS funding as a reason for their decision to act. This figure increased to 69% for those who accessed the post-uplift grant, representing a statistically significant rise[35]. Property owners were also asked what had previously stopped them from having a LCH system installed at their property. At wave 3 (i.e. post-uplift) they were shown the option 'the BUS grant value was too low' and amongst property owners that received the uplifted grant, 15% selected this response[36]. Together these two pieces of evidence suggest that the grant uplift did enable and prompt many property owners to join the BUS, which is reflected in the increase in installations from November 2023 onwards (Figure 1).

As noted previously, between waves 1 and 3 of the survey the proportion of property owners who indicated that their property was 'newly built' increased. This change was reflected in survey respondents' answers to the question on what had previously stopped them from having a LCH system installed. At wave 1, 12% explained that this was because their property had only recently been built and 23% said they had only recently moved into their property. At wave 3 these proportions were 14% and 30% respectively[37]. Case studies included examples of property owners who had timed their LCH system installations with major renovations of their properties, to reduce the disruption experienced and because they could integrate their new heating system into their remodelled property (e.g. by combining it with new underfloor heating).

Whether property owners would have had a LCH system installed anyway

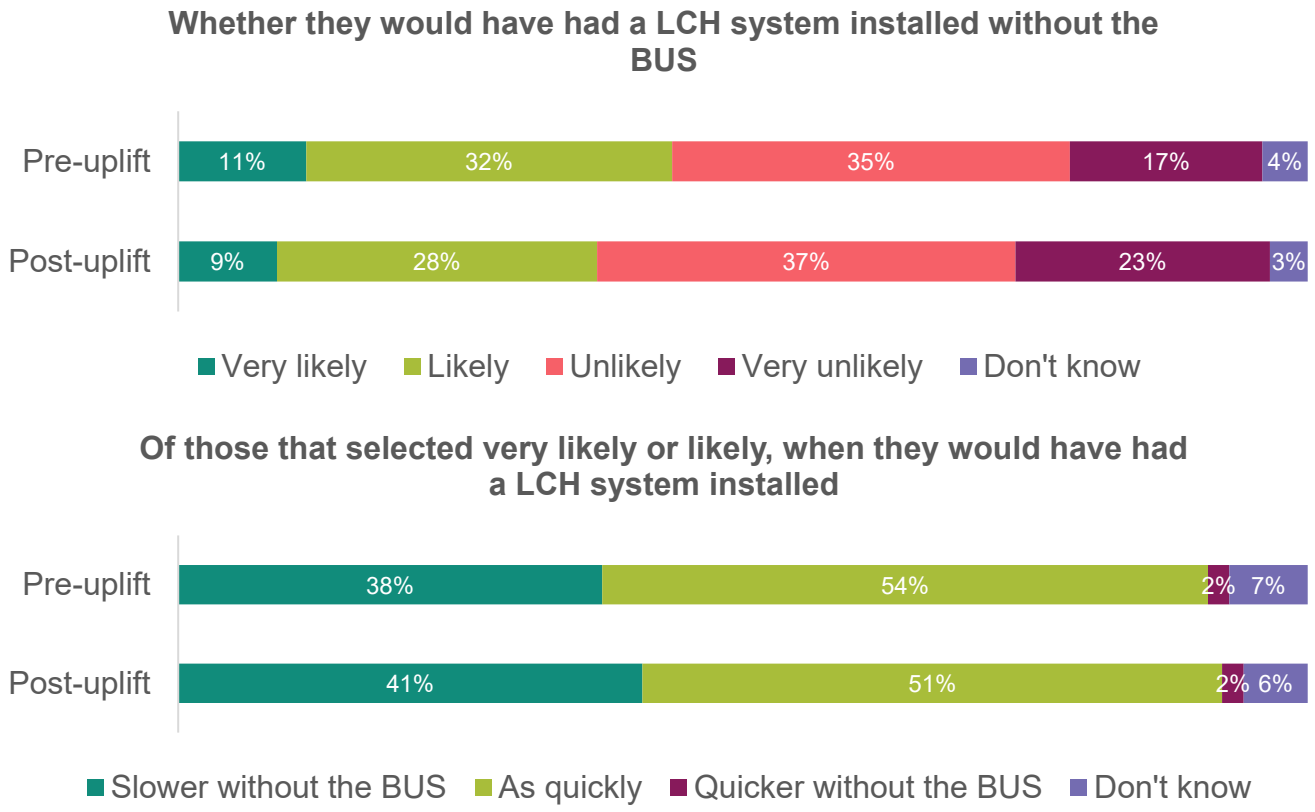
Before the grant uplift, 52% of property owners said they would have been unlikely or very unlikely to have installed a LCH system in the absence of the BUS (the upper chart in Figure 2). After the grant uplift, this figure increased to 60%, which is a statistically significant change. This suggests that the grant uplift increased the additionality of BUS installations – i.e. a greater share of them only happened because of the Scheme. It is important to note that these are self-reported intentions, not actual behaviours. This reflects what property owners said they would do, not necessarily what they would have done without the BUS.

Property owners who indicated they would have likely installed their LCH system anyway were asked when this would have happened (the lower chart in Figure 2). In the post-uplift group, a slightly higher percentage of respondents said the installation would have been delayed

[34] Unweighted base: All respondents (n=3,913). QB02. Why did you decide to install [LCH system installed], rather than a fossil fuel heating system?
[35] Unweighted base: All respondents (n=2,591 for pre-uplift and n=1,284 for post-uplift). QB03. Did any of the following prompt your decision to have [LCH system installed] installed now, as opposed to waiting?
[36] Unweighted base: All wave 3 respondents that received the uplifted grant (n=1,284) QB04. Why did you not previously have a [LCH system installed] installed in the property?
[37] Unweighted base: All respondents (n=1,310 at wave 1 and n=1,305 at wave 3).

without the BUS (41% compared to 38% of respondents from the pre-uplift group). However, the difference between the pre-uplift and post-uplift groups was not statistically significant, so we cannot draw any definitive conclusions about the impact of the grant uplift on the timing of installations in the absence of BUS support.

Figure 2: Property owners' assessment of whether BUS installations would have happened anyway, and if so, when



Source: Wave 1 Property owner survey. Upper chart - QB05. If the BUS grant had not been available, how likely would you have been to have had a [LCH system installed] installed anyway? Lower chart - QB05a. Without the BUS grant, would the installation of the [LCH system installed] have been done as quickly? Unweighted base: Upper chart - All (n=2,591 for pre-uplift and n=1,284 for post-uplift). Lower chart – All that selected very likely or likely at QB05 (n=1,084 for pre-uplift and n=436 for post-uplift).

Why property owners did not participate in the BUS

The 2024 Interim Report acknowledged that, at that point, research had only been carried out with property owners that had a BUS-funded installation. To provide a more rounded assessment of Scheme take-up, 30 interviews were conducted with property owners who had never applied for a BUS grant.

Characteristics of interviewed property owners

All interviewed property owners were using fossil fuel heating systems – either gas or oil boilers – to heat their homes. Interviewees' properties were broadly similar to the properties of BUS participants (in terms of property type, size and age). Because the sample was selected

purposively to achieve an even balance of property owner characteristics, interviewees were less likely than the BUS population to have a higher household income and were less likely to be very concerned about climate change.

Interviewees' understanding of LCH systems varied significantly. Some had only recently become aware of LCH systems, whilst others had known about them for many years (the latter tended to report a deeper understanding of these systems). About a quarter of the sample reported having seen a LCH system in operation - mostly in a friend's or neighbour's house. Several others had seen images of LCH systems in the press or on the internet. Interviewees had mixed perceptions of LCH systems and most believed that there were likely to be benefits and drawbacks to having one installed. Nearly all interviewees felt that environmental benefits (e.g. a reduced carbon footprint) were the main reason to have a LCH system installed.

Barriers to take-up of LCH systems

Just over half of the 30 interviewees said they had recently considered replacing their existing gas or oil boiler with a LCH system[38]. Interviewees identified a range of barriers to take-up of LCH systems, which are discussed below.

Concerns that a LCH system would not be appropriate for their property

The most commonly identified barrier amongst interviewees was a concern that a LCH system would not be appropriate for their property. This was a particular issue for individuals living in older and/or poorly insulated properties, who were concerned that their properties would not be able to retain sufficient heat, resulting in low room temperatures and/or high system running costs. Many of the interviewees believed that LCH systems were best suited to more modern, well insulated properties. Several interviewees did not think they had sufficient or appropriate external wall space on which to site an ASHP (e.g. because they lived in mid-terraced properties with a full-width conservatory or bi-fold doors). Interviewees explained that they had heard negative stories about the suitability of LCH systems in newspapers and on the internet, though no specific sources were cited.

> *"I'm not convinced by heat pumps, and don't think they would work in my old property. I still don't have double glazing and probably don't have enough roof insulation so I don't think it would work very well."*

Non-participant property owner with an oil boiler, interviewed May/June 2024

High installation costs and the disruption caused by installations

High installation costs were a particular concern amongst interviewees who were not aware of the BUS and the availability of grants, though other interviewees were also deterred by the costs they would incur even after the BUS grant was factored in. Many interviewees were also concerned about the scale of work required and the changes they would need to make to their properties (e.g. new pipework, radiators, water tanks). This was a particular issue amongst

[38] This is a relatively high share given the level of awareness of LCH systems amongst the UK population and likely reflects the origin of the sample for these interviews – i.e. individuals who volunteered to participate in a research study on willingness to pay for an ASHP.

older interviewees, those with young families, and those who had recently refurbished their properties, who were reluctant to commit to an installation process that would cause upheaval.

Timing issues

Some other interviewees were reluctant to proceed with the installation of a LCH system because they did not think that it was an appropriate time for them to do so. Some had recently installed a new fossil fuel boiler and did not want to change what they saw as a functional heating system. Others were planning to move house soon.

> *"My boiler broke down 18 months ago, but it was an emergency situation that needed sorting quickly, so I didn't have time to investigate [LCH systems], and just went for a like-for-like replacement. So I now have a relatively new gas boiler and have no plans to change it."*

Non-participant property owner with a gas boiler, interviewed May/June 2024

Some older interviewees did not want to commit to installing a LCH system because of their age and raised concerns about payback periods as well as uncertainties about how long they would be able to continue living in their current properties.

> *"I am in my late 70s, so my new oil boiler will hopefully outlive me, and I have no plans to move, so I don't think I will ever get one installed."*

Non-participant property owner with an oil boiler, interviewed May/June 2024

Expectations of high running costs

Some of the property owner interview sample raised concerns about the running costs of a LCH system when compared to their existing heating systems (which were all gas or oil boilers). In many cases these concerns were prompted by high electricity prices, which they compared unfavourably to historic averages and the equivalent price of gas.

> *"I had considered [installing a LCH system] but then rejected it because of energy prices over the last 12-18 months, which meant the costs of installing and running heat pumps became extortionate compared to the cost of a gas boiler. So I decided to go with a like-for-like replacement on my gas boiler."*

Non-participant property owner with a gas boiler, interviewed May/June 2024

Concerns about the operation and effectiveness of LCH systems

Interviewees expressed various concerns about the operation and effectiveness of LCH systems when compared to their existing fossil fuel heating systems. Examples included worries about the heating and hot water temperatures when using a LCH system, a perception that LCH systems took a long time to heat a property, a perceived risk of Legionella from lower water temperatures, concerns about excessive noise generated by LCH systems, and a loss of internal and external living space due to the need for a water tank, LCH system unit, additional/larger radiators, etc. In many cases these perceptions had been shaped by articles and discussions that interviewees had read online or in newspapers, or heard on the radio, or had sometimes heard from friends or neighbours who had already installed a LCH system.

Participation in the BUS by Installers

This chapter contains analysis of the number and profile of installer companies that registered with the BUS. It then analyses the results of qualitative research into why LCH system installers have not registered with the BUS.

Key findings

At the end of October 2024, 1,710 installer companies were registered with the BUS. There was a spike in registrations in the months after the Scheme launched. Since then, the average has been around 35 new installer registrations each month.

Businesses that joined the BUS in the months after it launched were typically experienced LCH system installers looking to sustain or expand their activities. Since then, the Scheme increasingly attracted businesses that were new to the LCH market (35% of wave 2 respondents that registered between May 2023 and April 2024 did so to start installing LCH systems). Between waves 1 and 2 of the installer survey, businesses also became more likely to have expanded their market offerings due to the BUS.

Most BUS installers (75%) delivered LCH system installations both inside and outside the Scheme. LCH system installations became more important to them as a source of income over time, especially amongst those that were more active under the BUS. At wave 1 of the survey only 31% of installers generated more than half their total annual revenue from LCH system installations; by wave 2 this had increased to 37% of the installers that had registered before May 2023 – i.e. the longer-standing participants.

The distribution of BUS installations amongst registered installers was somewhat skewed. Ten percent of installers delivered 68% of the installations that took place between May 2022 and October 2024. Sixteen percent of registered installers had not completed a single BUS-funded installation, indicating that some of the 1,710 registered companies are not active participants.

The proportion of installers that believed there were factors limiting demand for BUS installations amongst consumers decreased between waves 1 and 2 of the survey. Whilst 82% of wave 1 respondents perceived there to be barriers, this fell to 69% of wave 2 installers that had registered before May 2023. Reflecting the grant uplift in October 2023, the share of installers that thought demand was held back by the size of the BUS grant fell from 69% to 54% between waves 1 and 2 of the survey.

The proportion of installers that believed there were factors limiting their ability to deliver BUS installations decreased between waves 1 and 2 of the survey (from 57% to 44%). The types of issues they faced were largely unchanged over time, with the availability of skilled staff and time spent on administrative and compliance tasks (largely MCS-related) the two most notable factors affecting their delivery.

Qualitative research with ten LCH system installers that had not registered with the BUS found that there were various supply and demand related issues that deterred them. A key barrier was a perceived negative impact of the Scheme on their cashflow, because of the lag between installation and grant payment. Some were put off by the requirement to be MCS registered, or because there was plentiful LCH system installation work available elsewhere (e.g. in the social housing sector).

Profile of installer companies that have participated in the BUS

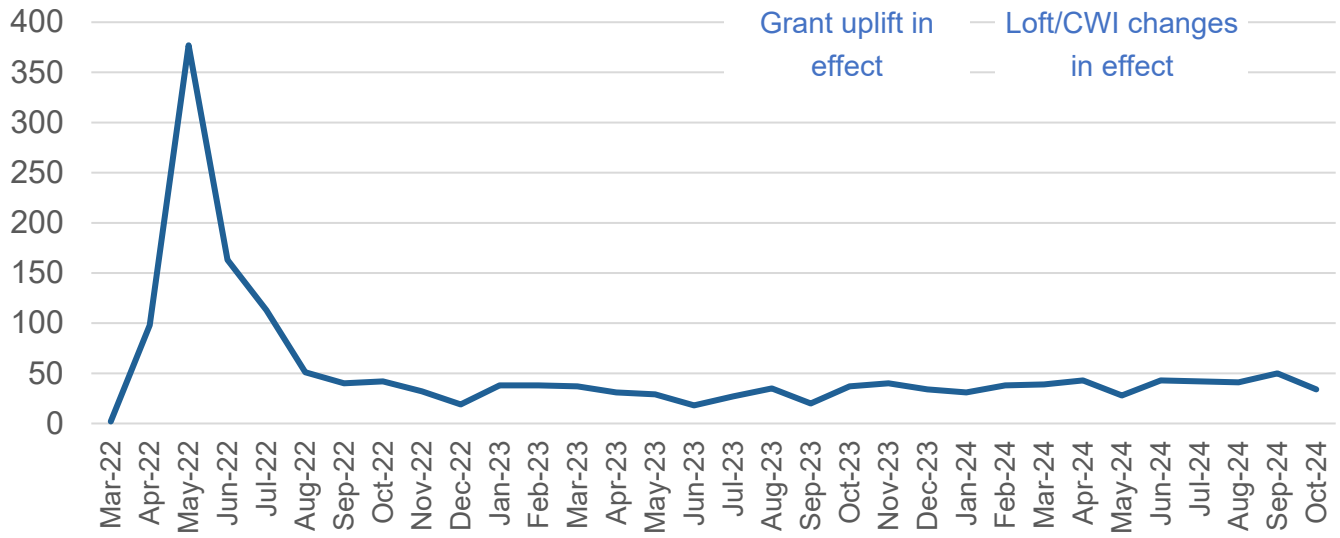
The number of BUS registered installers

As at the end of October 2024 a total of 1,710 installer companies were registered with the BUS. Note that this figure does not equate to actual installer capacity since companies could be registered but inactive, and companies can be temporarily suspended if they no longer meet Ofgem's criteria for being part of the BUS[39]. This figure also does not describe the total number of installers that have ever been BUS registered, since companies may de-register (e.g. if they cease trading or wish to exit the market, or if a temporary suspension is made permanent). This is also a count of the number of installer companies, not the installer workforce able to work on LCH system installations.

Figure 3 shows the monthly volume of new installer registrations since the Scheme opened in March 2022. There was a spike in registrations soon after the BUS launched: 44% of the installers registered as of October 2024 had registered in the first few months of the Scheme (between March and July 2022). Between July 2022 and October 2024, an average of around 35 new installers registered with the Scheme each month. The grant uplift in October 2023 did not have a noticeable impact on the volume of new registrations.

[39] As at the end of October 2024 a total of 207 registered installers were temporarily suspended.

Figure 3: The volume of new BUS installer company registrations, per month (March 2022 to October 2024)[40]



Source: DESNZ (Scheme Monitoring Data); Note: data shows new registrations and does not show de-registrations or cases where registration has been suspended.

Characteristics of BUS installers

Evidence about the characteristics of BUS-registered installer companies comes from the two waves of the installer survey, which were undertaken in summer 2023 and summer 2024.

Most BUS-registered installers were micro businesses, which is typical of the LCH industry. Combining both survey waves, most businesses (61%) said they had between 2-9 employees (across all their operations, not just employees delivering BUS installations)[41]. Another 7% were sole traders. A quarter (26%) had between 10-49 employees, making them small businesses. Comparing between survey waves[42], there were no statistically significant differences in business size, meaning the size profile of businesses that joined the Scheme in the year after it was launched was not that different to that of businesses that joined later.

Installers' LCH installation activities

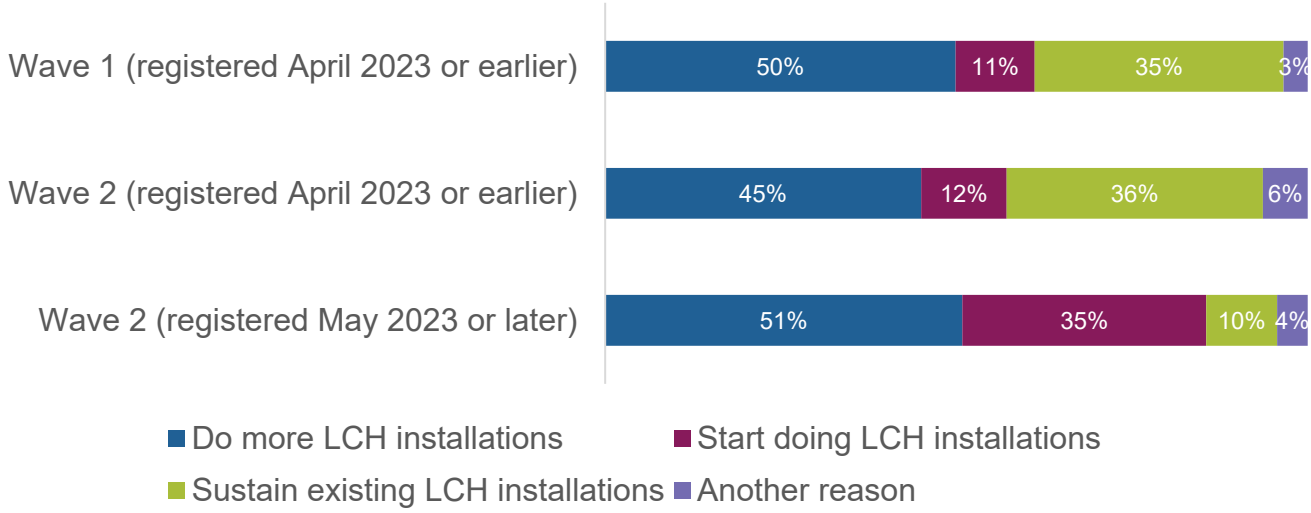
The 2024 Interim Report found that many of the installer companies that responded to the wave 1 survey had delivered LCH installations supported via previous government grant schemes, notably the Renewable Heat Incentive (RHI) and the Green Homes Grant –

[40] As previously, October 2024 was used as the cutoff because this aligned with the period of the BUS when the most recent fieldwork with property owners and installers was carried out.
[41] Unweighted base: All respondents (n=516); QA01. As of right now, what is the number of employees for the business?
[42] The installer survey sample was made up of three groups: businesses that responded to the wave 1 survey, businesses that were BUS registered when the wave 1 survey was designed but only responded to the wave 2 survey, and businesses that became BUS registered after the wave 1 survey. The wave 1 survey sample was created in April 2023, so the first two groups were all registered with the BUS in its first year, whereas the third group consisted of businesses that registered between May 2023 and April 2024 (i.e. newer entrants to the BUS market). Whenever comparisons are made between waves these three groups have been considered separately.

Vouchers (GHG-V) Scheme. They saw the BUS as a natural extension to these previous government schemes, and most joined the BUS to enable them to sustain or expand their LCH installation activities.

Wave 2 survey data suggested that the picture has changed slightly since then, with newer entrants to the BUS market less likely to be established LCH system installers. A third (32%) of the wave 2 respondents that had registered with the BUS since May 2023 (i.e. newer Scheme participants) said they had not installed any LCH system units in the year prior to them joining the BUS. At wave 1 the share was just 12%[43]. Not surprisingly this was also reflected in the revenue that businesses reportedly derived from LCH system installations prior to joining the BUS: 27% of wave 1 respondents said over half their revenue had previously come from LCH system installations, compared to 7% of wave 2 respondents that registered since May 2023[44]. As Figure 4 shows, a third (35%) of businesses that registered with the BUS in May 2023 or later did so because they wanted to start doing LCH installations, compared to just 11% of businesses that responded to the wave 1 survey.

Figure 4: Installers' reasons for registering with the BUS



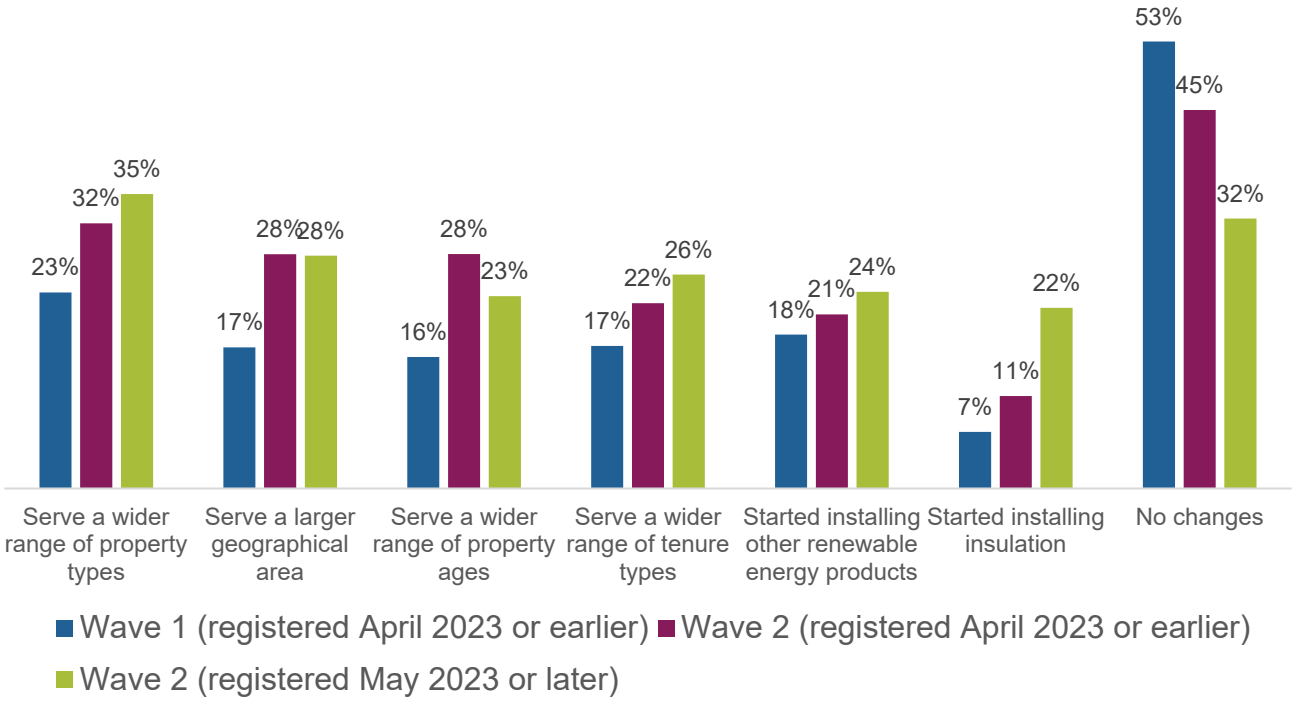
Source: Wave 1 and 2 Installer Survey. QB01: Did you sign up your business with the BUS so that you could…? Base: All (n=247 for wave 1, n=156 for wave 2 registered April 2023 or earlier, n=113 for wave 2 registered May 2023 or later).

Figure 5 shows the proportion of BUS-registered installers that reportedly changed their market offerings when they joined the Scheme. Data are disaggregated between wave 1 respondents and the two groups of wave 2 respondents to illustrate change over time. Evidence suggests that the BUS has caused an increasing share of installers to diversify, for example by serving a wider range of property types than they did before the Scheme. At wave 1, 53% of installers said they had not made any changes to their market offerings – this could have been because

[43] Unweighted base: All respondents (n=247 for wave 1 and n=113 for wave 2 new entrants); QA06. In the 12 months before your business registered with the BUS, approximately how many [LCH system(s) installed] units did your business install in England and Wales?
[44] Unweighted base: All respondents (n=247 for wave 1 and n=113 for wave 2 new entrants); QA07(1). Approximately what proportion of your business's revenue is from [LCH system(s) installed] installations? Before you started working on BUS installations.

they did not (yet) see the need to or because they were already adequately diversified. Amongst wave 2 respondents who registered with the BUS in April 2023 or earlier (i.e. a group that was comparable to the wave 1 respondents), by the time of the wave 2 survey only 45% said they had not made any changes. A quarter (28%) had started to serve a wider geographical area, and 28% had started to serve a wider range of property ages.

Figure 5: Changes to installers' market offerings as a result of the BUS



Source: Wave 1 and 2 Installer Survey. QE01: Have you made any of the following changes to your market offer because of the BUS? Base: All (n=247 for wave 1, n=156 for wave 2 registered April 2023 or earlier, n=113 for wave 2 registered May 2023 or later). Note: for brevity, not shown are any options selected by under 10% of respondents; multiple answers possible so figure sums to more than 100%.

The scale of installers' BUS installation activities

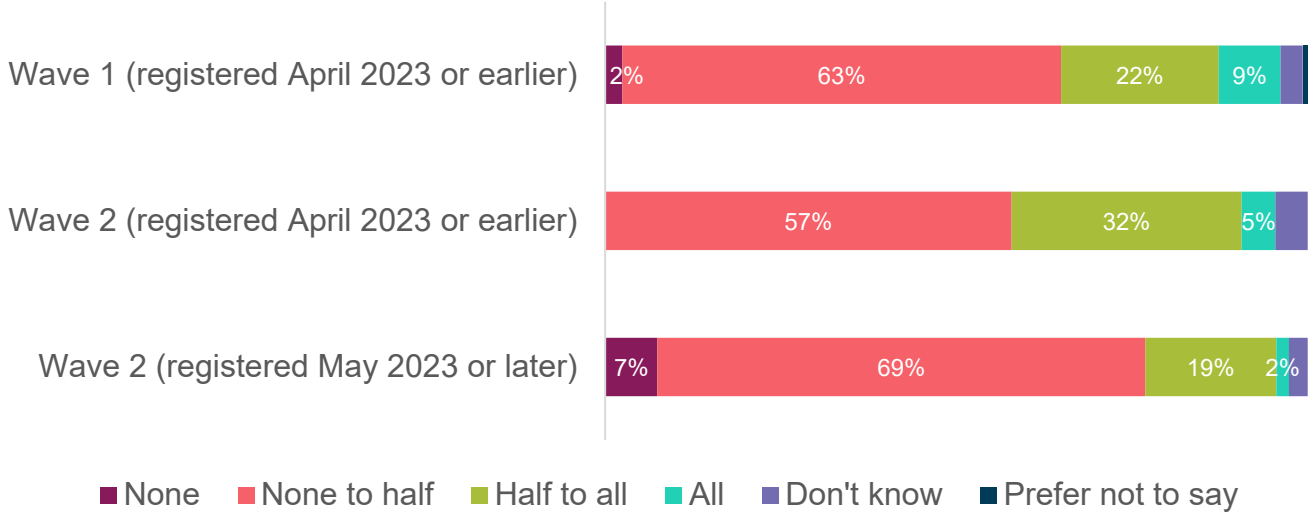
Most BUS-registered companies delivered LCH installations both inside and outside the Scheme. Across both survey waves, just 25% said they were wholly reliant on the BUS for their LCH work. Note that they may also have been delivering non-LCH work, including installing fossil fuel heating systems and/or solar photovoltaics (PV)[45].

As Figure 6 shows, at the time of the wave 1 survey, income from LCH system installations accounted for more than zero and less than a half of annual revenue for 63% of BUS installers. Another 31% generated more than half – and in some cases all – their annual income from LCH system installations. This had changed somewhat by wave 2 of the installer survey. Amongst wave 2 respondents that were registered in April 2023 or earlier – a group comparable to the wave 1 respondents but who answered the survey a year later – 37% generated half or more of their total revenue from LCH system installations, including 5% who

[45] Unweighted base: All respondents (n=516); QA04. Does your business currently install outside of the BUS?

were wholly reliant on such work. The more active BUS installers reported generating the highest shares of their annual income from LCH system installations. Sixty-one percent of those installer companies that had carried out over 50 BUS-funded installations when surveyed said that over half of their total annual income came from LCH system installations, compared to 16% of those that had only carried out 1-5 BUS-funded installations[46]. Over time, therefore, some BUS installers – particularly the most active under the scheme – became more reliant on LCH system installations for their income.

Figure 6: The share of BUS installers' annual revenue sourced from LCH system installations (when they completed the survey)

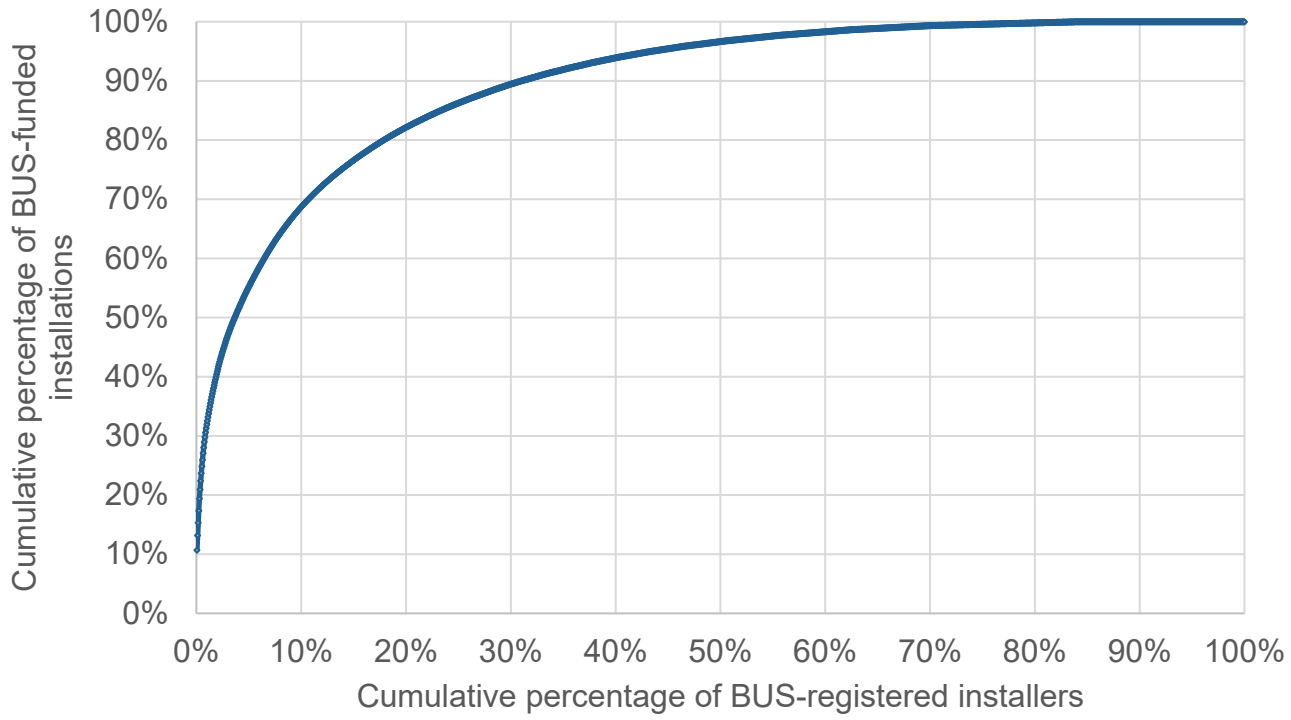


Source: Wave 1 and 2 Installer Survey. QA07(2). Approximately what proportion of your business's revenue is from [LCH system(s) installed] installations? Since you started working on BUS installations. All (n=247 for wave 1, n=156 for wave 2 registered April 2023 or earlier, n=113 for wave 2 registered May 2023 or later).

Turning to the scale of BUS installations delivered by installers, Figure 7 shows the cumulative share of all BUS-funded installations delivered by the 1,710 BUS-registered installers. The data shows that the shape of the BUS installation market is somewhat skewed: 10% of installers delivered 68% of the installations that took place between May 2022 and October 2024. Thirty percent of installers were responsible for 89% of installations[47]. Sixteen percent of registered installers had not completed a single BUS-funded installation (note that whilst it is possible to de-register from the BUS, it is perhaps more likely that inactive companies have not taken the time to remove themselves from the BUS register). The median average number of installations completed by a BUS installer was 7. The mean average was 34, reflecting the fact that some installers had carried out hundreds – and in a few cases thousands – of BUS installations, which brought up the mean average.

[46] n=47 and n=218, respectively.
[47] Such a skew is not unusual – research into the Green Deal found a similar degree of concentration of activity within a relatively small number of market participants. Moreover, the BUS installer market recorded a Herfindahl-Hirschman Index (HHI) score of 160, which indicates a relatively low level of market concentration (a score below 1,500 – out of 10,000 – is generally considered to be low), and thus good levels of consumer choice and competition

Figure 7: The cumulative share of BUS-funded installations delivered by BUS-registered installers (May 2022 to October 2024)#



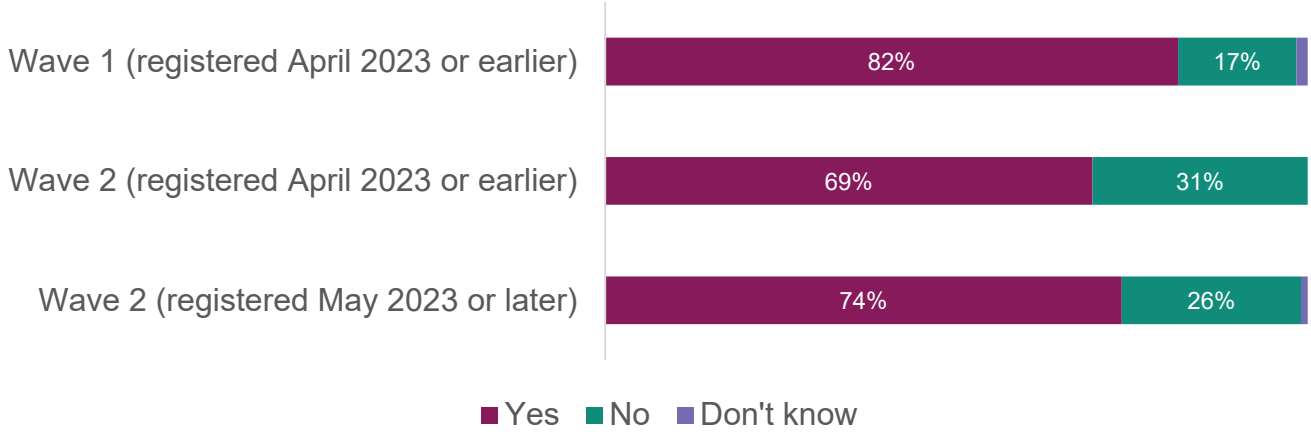
Source: DESNZ (Scheme Monitoring Data); Note: # Cases where the BUS voucher was paid to the installer between 1 May 2022 and 31 October 2024

Factors affecting BUS demand and delivery

Installers' opinions about factors affecting consumer demand

The 2024 Interim Report explored this topic in depth, using evidence from the wave 1 survey and in-depth interviews with installers to understand what, in their experience, affected consumer demand for BUS installations. The wave 2 survey repeated the question, enabling analysis of whether installers' perceptions have changed over time, given the context of increasing numbers of BUS-funded installations (Figure 1). As Figure 8 shows, most installers believed there were factors that limited consumer demand, though the proportion was lower at wave 2 than it was at wave 1. Eighty-two percent of wave 1 survey respondents thought that demand was limited, whereas amongst wave 2 respondents who were registered April 2023 or earlier (i.e. who had a further year's worth of experience of the BUS market), the proportion was 69%. This difference was statistically significant.

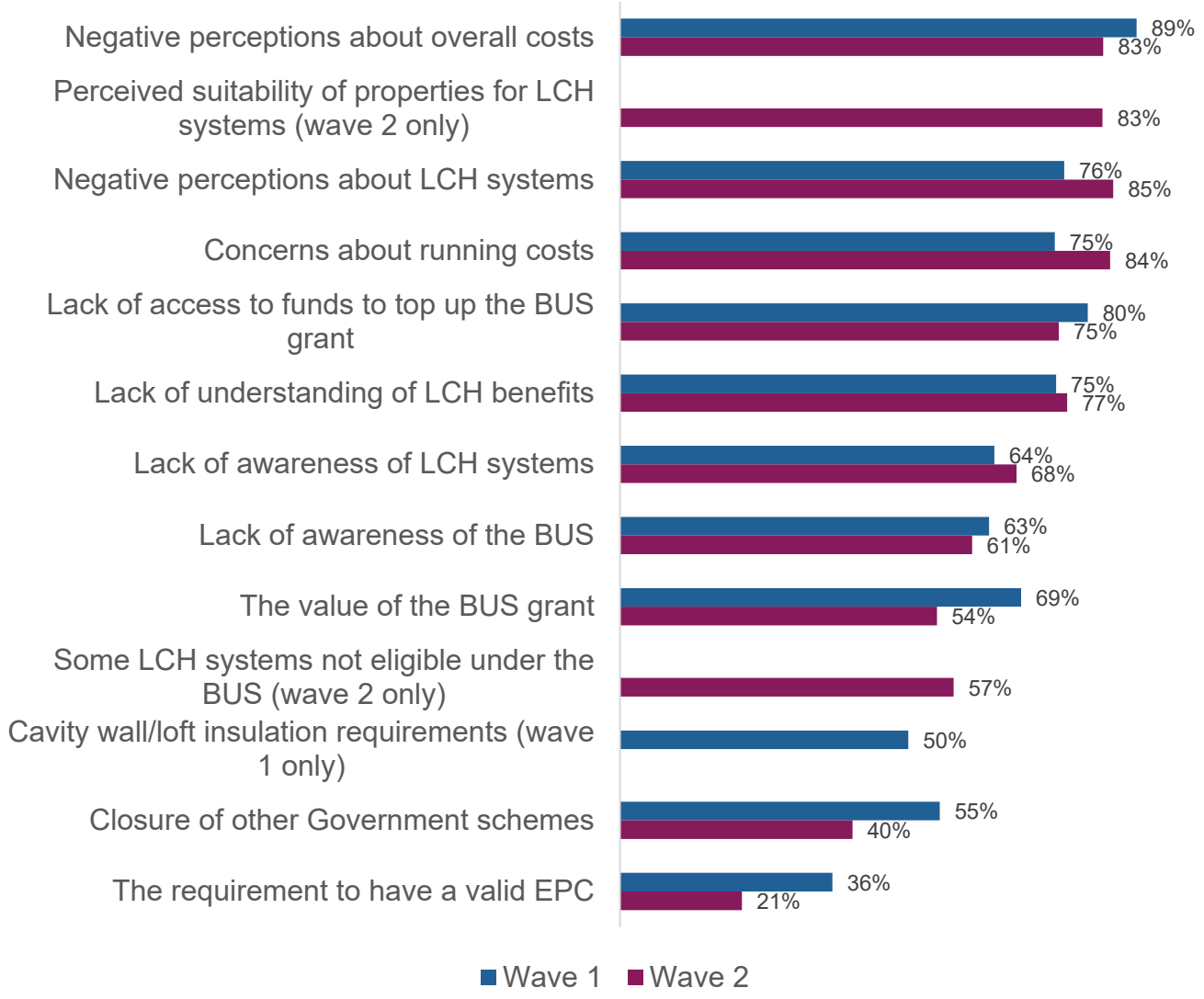
Figure 8: Whether installers thought there was anything limiting consumer demand for BUS installations



Source: Wave 1 and 2 Installer Survey. QC02: Do you believe there is anything that limits demand for BUS installations amongst consumers?? Base: All (n=247 for wave 1, n=156 for wave 2 registered April 2023 or earlier, n=113 for wave 2 registered May 2023 or later).

Those installers that said that there were limiting factors were then asked what these were (Figure 9). Results are disaggregated between survey wave and show the likely impact of the changes to the BUS between the two waves. At wave 1, 69% of this subgroup of installers thought the BUS grant value was limiting Scheme uptake; at wave 2 – after the uplift – the proportion fell to 54%. At wave 1, 50% of the sub-group of installers thought the requirement for property owners to have no outstanding loft or cavity wall insulation requirements was limiting consumer demand – this requirement was removed in May 2024, and so was omitted from the wave 2 survey. Relatedly, whilst properties were – at the time of drafting – still required to have a valid EPC to access the BUS, the share of the sub-group of installers that perceived this to be a barrier fell from 36% at wave 1 to 21% at wave 2.

Figure 9: Factors perceived by installers as limiting BUS demand from consumers



Source: Wave 1 and 2 Installer Survey. QC02a: What do you think limits demand amongst consumers? Base: All that believed there were factors that limited consumer demand (n=202 at wave 1 and n=190 at wave 2). Note: for brevity, not shown are any options selected by under 10% of respondents; multiple answers possible so adds up to more than 100%.

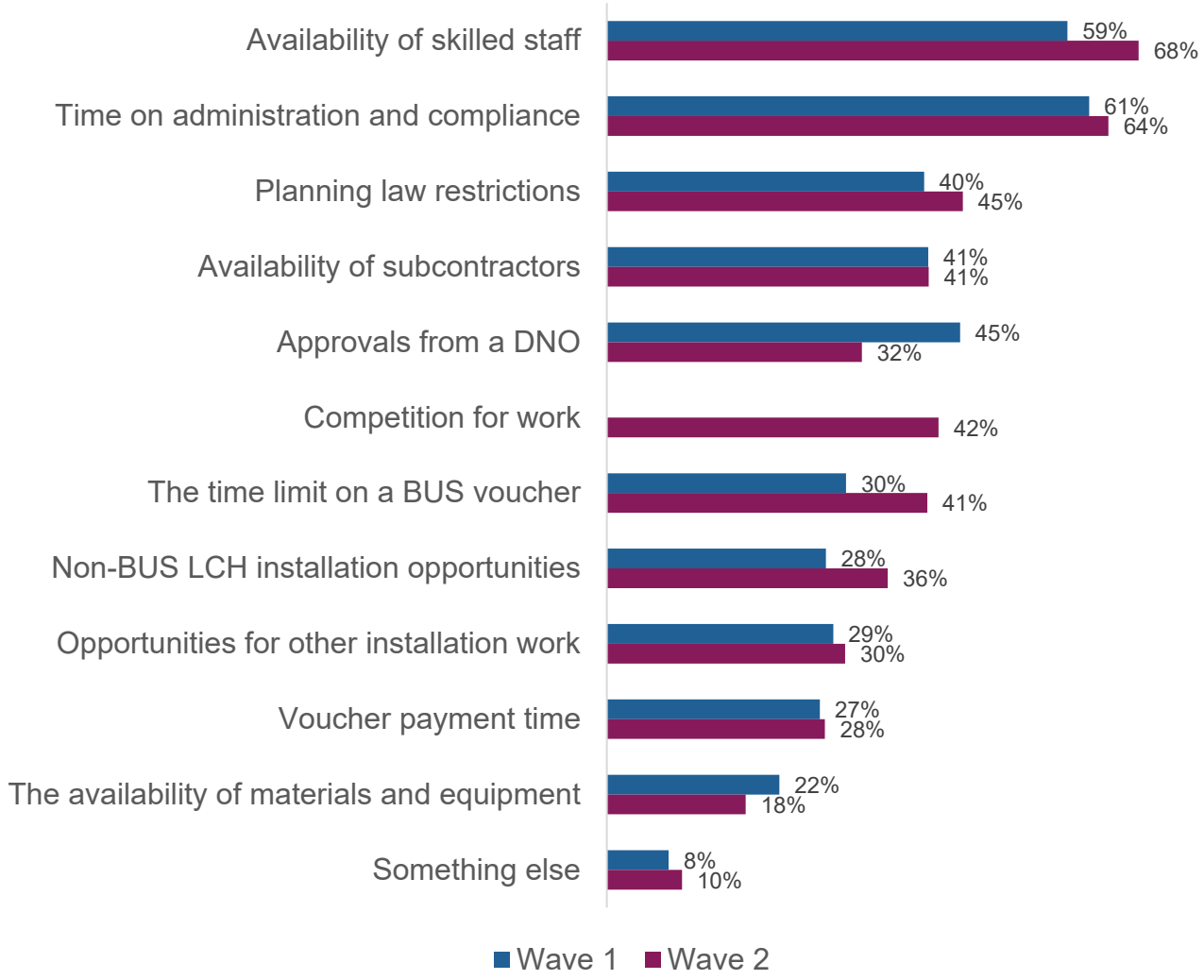
Installers' opinions about factors affecting their delivery under the BUS

As part of the installer survey, installer companies were asked if there was anything that affected the number of installations that they were able to do – excluding the consumer demand-related barriers discussed previously (Section: Factors affecting BUS demand). At wave 1 of the installer survey, 57% of respondents said they did face limitations; by wave 2 this proportion had fallen to 44%, a statistically significant decrease that indicates an improved working environment for LCH system installers[48].

Installer companies that perceived there to be delivery constraints were asked what these were (Figure 10). Between waves 1 and 2 of the installer survey there was a statistically significant increase in the proportion of respondents citing the availability of skilled staff to work on installations as an issue. Note, however, that this was a sub-group of installers consisting of those that said they faced barriers, and that the total proportion of all installers who faced this barrier actually decreased between waves. There was also a statistically significant decrease between survey waves in the proportion of respondents who said they had faced issues getting approvals from a Distribution Network Operator (DNO)[49] (32% of this sub-group of installers at wave 2, down from 45% at wave 1). At wave 2 of the installer survey, respondents that had said they faced issues with DNO approvals were asked about the nature of these issues. Amongst this sub-group of survey respondents, the most common issues were delays getting approval and poor communication from DNOs (mentioned by 84% and 76% of this sub-sample respectively)[50].

[48] Unweighted base: All respondents (n=247 at wave 1 and n=269 at wave 2); QC05. Is there anything that limits the number of BUS installations that your business is able to do? When answering please exclude any issues relating to the scale of demand from consumers.
[49] DNOs control the connection of properties to the National Grid and need to be notified if property owners want major electrical changes to a property (such as installing a heat pump or an electric vehicle charging point). Upgrades to the connection infrastructure may be required, especially if multiple heat pump installations are proposed for a single street.
[50] Unweighted base: All wave 2 respondents that said getting approvals from a DNO limited the number of BUS installations they did (QC05a) (n=38); QC05b. What are the issues you have encountered with DNO approvals, including any works that need to be done to get approval?

Figure 10: Factors limiting installers' ability to complete BUS installations



Source: Wave 1 Installer Survey. QC05a: What limits the number of installations that your business does under the BUS? Again, when answering please exclude any issues relating to the scale of demand from consumers. Base: All that believed there were delivery constraints (n=142). Note: for brevity, not shown are any options selected by under 10% of respondents; multiple responses possible so sums to more than 100%.

Why installers had not registered with the BUS

To provide a more rounded assessment of LCH system installers' engagement with the BUS, 10 interviews were conducted with LCH companies that were not registered with the BUS.

Characteristics of interviewed installers

The interviewed installers were broadly similar in profile to the BUS-registered installers. They were typically small companies. They had a diverse service offering across different systems and technologies. In terms of LCH system installations, most interviewees focused on ASHPs – having typically installed between 11-99 units in 2023. Other services offered by interviewed installers included the installation of fossil fuel heating systems, alternative electric heating systems, solar PV, solar thermal, electric vehicle charging points, and insulation. Most

interviewed non-BUS installers reported that their customer base was typically social housing managers and/or private customers who were able to pay for a LCH system installation without the BUS grant.

Barriers to participation in the BUS

All interviewees were aware of the BUS, and had a good enough understanding of how it worked to be able to articulate what about the Scheme deterred them from participating. Some even had direct experience of the BUS. This included two interviewees whose companies had carried out BUS-funded installations on behalf of BUS-registered companies.

Cashflow risks

A commonly identified barrier to participating in the BUS was a perceived cashflow risk. Depending on installers' billing model, there may be a lag between them carrying out the installation and getting paid the value of the BUS voucher. This could leave them "*out of pocket*" for materials and staff time, in the words of one interviewee. The potential for delays in grant repayment (e.g. due to issues around customer eligibility) exacerbated installers' concerns about cashflow risks. This quote illustrates this point.

> *"I can honestly say what worried me [about the BUS] is the cashflow element… waiting for that £7,500. That is a concern to any company – cashflow is absolutely key for any size company."*

Non-BUS registered installer, interviewed in March 2024

Note that as discussed below (Section: Billing models used by installers), most installers that were delivering installations under the BUS had not experienced any cashflow problems due to the Scheme.

MCS accreditation requirements

BUS-registered installers must be MCS accredited. MCS accredited and non-MCS accredited interviewees had a range of issues with this requirement. They believed that having to do BUS installations following MCS processes would incur, in the words of one interviewee, "*onerous*" paperwork, management, and auditing costs. The few interviewees that were not MCS accredited explained that they did not think they could recoup these costs through any additional installation work they could then access via the BUS.

BUS-related administrative burden

Several installer interviewees identified the administrative burden of participating in the BUS as a barrier. Concerns were raised by interviewees regarding the time and resources they believed would be required to complete BUS paperwork, renew expired vouchers, account for timeframes to get a new EPC completed if a property did not already have one, and check that a property's EPC was less than 10 years old. Some interviewees perceived that the BUS administrative burden was a particular barrier to micro business participation because these companies typically lacked back-office support. Several installers said that they thought that administration costs would likely need to be passed onto the customer (though research with

installer companies delivering installations under the BUS found that this was typically not the case[51]). This quote illustrates how one installer interviewee perceived the impacts of BUS administrative processes, though it should be noted that whilst most BUS registered installers are indeed small companies, they typically install fewer LCH systems.

> *"Companies like this are run by engineers, not accountants and businessmen. We don't have the back office to do it [administration] efficiently. The BUS shuts you out until you are a certain size."*

Non-BUS registered installer, interviewed in April 2024

Plentiful LCH installation work available elsewhere

Around half of the interviewed installers were participating in other Government funded LCH support schemes, which provided them with enough work that they did not need to access the BUS. For many installers, most (and in one case all) of their LCH system installations were funded through the Energy Company Obligation Scheme (ECO4) scheme. This and other Government schemes offered different market opportunities – such as low-income, fuel poor, and/or social housing or ancillary work – than those available through the BUS. These other schemes were also seen as "*better*" by some interviewees, in terms of the volume of work available, the ease of participation, and the likelihood that an installation would go ahead.

> *"We do not really tackle the private sector which is really the main reason we have not registered with the BUS. The social housing sector does not have any of the same issues around eligibility. We know that every job we get passed will go ahead. They are 'source ready' which makes our life easier".*

Non-BUS registered installer, interviewed in March 2024

> *"There is a lot of leg work that needs to go on in the private sector, which, not all the time, but a good 60-70% of the time, does not result in a successful installation. It could be eligibility, that the property is not suitable for ASHP due to insulation, or you might not have the correct incoming electrical supply. I can't afford to carry out surveys and hope that this will convert to work in the end."*

Non-BUS registered installer, interviewed in March 2024

The size of the BUS grant

Installer interviews were undertaken in March/April 2024, after the grant uplift. Even then, many interviewees believed that the BUS grant was still too low to attract consumers. Installers believed that even taking into account the £7,500 grant, many property owners were unable to afford the LCH system costs and the costs of any necessary or recommended changes to their property's fabric (e.g., new insulation, replacement radiators). One installer believed that LCH

[51] E.g. 41% of installer companies said they experienced additional costs due to the BUS but did not pass these on to customers, compared to 27% that experienced additional costs and passed these on. Source: Waves 1 and 2 Installer Survey. QD05: Do you pass on any additional costs associated with delivering [LCH system(s) installed] installations under the BUS when quoting for an installation? Unweighted base: All installers that had submitted at least one BUS application (n=480).

system installation still did not make "*economic sense*" for their customers, in their words. The following quote illustrates these concerns – note that this interview pre-dated the changes to insulation requirements.

> *"We mention the £7,500 from the government, [but] once we have said about the wall insulation and loft insulation, the feedback we have got from our customer care team is that they [the customer] have decided not to go ahead with the installation."*

Non-BUS registered installer, interviewed in March 2024

Delivery of the BUS

This chapter presents analysis of how the BUS delivery model has been experienced by participating installers and property owners, including property owners' post-installation experiences.

Key findings

Most property owners that had a LCH system installed were satisfied with their overall experience of the BUS. Levels of satisfaction increased after the grant uplift – 53% said they were very satisfied before this, compared to 71% afterwards.

By the third property owner survey (wave 3), respondents were most likely to have discovered the BUS through their own – mostly online – research (31%). This contrasted with wave 1, where LCH system installers' outreach was the most common route into the Scheme.

Over time, it became easier for property owners to find an installer to carry out a BUS installation. The percentage of property owners who found it very easy to get a quote increased from 37% (wave 1) to 45% (wave 3).

Property owners often undertook supplementary works to support their LCH system, most commonly installing a new or larger water tank (84% of property owners). They typically carried out these supplementary works at the same time as their LCH installation. Property owners also frequently installed additional energy generation/storage (solar PV, batteries) or energy efficiency (floor insulation) measures alongside their LCH system, often to reduce the running costs.

After the grant uplift, more property owners reported that it was easy to pay for the cost of installation not covered by the BUS grant. The percentage of property owners who found this very/fairly easy increased from 63% to 72%. The types of finance used (mostly savings or investments) did not change significantly following the uplift. Also unchanged were installers' billing models, with most property owners (76%) reporting that their installer had reduced the cost by the value of the BUS grant.

Most installers (69%) said they had not experienced any cashflow problems as a result of the BUS. A larger value grant could have increased the risk to installer companies, due to the time between the completion of an installation and receipt of the BUS grant. Installers that had experienced cashflow problems had most commonly adjusted their workload and scheduling (declining or spacing out work).

Over time, property owners' experiences of having a LCH system installed improved slightly. This was especially true of system handover, where the percentage of property owners who were very satisfied increased from 29% (wave 1) to 40% (wave 3).

A third of property owners (32%) said they had experienced an issue with their LCH system that needed addressing since it was installed. This included instances where LCH systems did not provide heat or hot water and affected heat pump units and ancillary equipment including hot water tanks, radiators, pipework, and smart controls. Issues were typically fixed by the installer that installed the LCH system. A small proportion of property owners (10% of wave 3 survey respondents) had made a formal complaint about their installation experience.

Over half (56%) of property owners said they had serviced their LCH system. Most property owners who had a service were very/fairly satisfied with their experience of finding an engineer (90%).

Over half (58%) of on-grid property owners had disconnected their properties from the gas grid since having their LCH system installed. Another 3% had tried but not (yet) succeeded. If property owners had not tried to disconnect from the gas grid, this was most commonly because they still used gas for cooking (cited by 80% of follow-up property owner survey respondents who had not tried to disconnect).

Overview of property owners' experiences of BUS delivery

Overview of the BUS delivery model

The BUS delivery model is installer-led, rather than consumer-led. Registered installers are responsible for almost all the administrative tasks that are required for property owners to access the BUS grant. This includes submitting grant applications (referred to as 'vouchers') and redeeming the vouchers once a LCH system installation has been completed. Property owners begin their BUS journey by engaging with a registered installer. In most cases, property owners only interact with the Scheme administrator, Ofgem, to confirm that they consent to the voucher application being made on their behalf. The installer then proceeds with the installation of the LCH system. The BUS grant is paid to the installer following installation of the approved LCH system, and installers pass on the grant value to property owners.

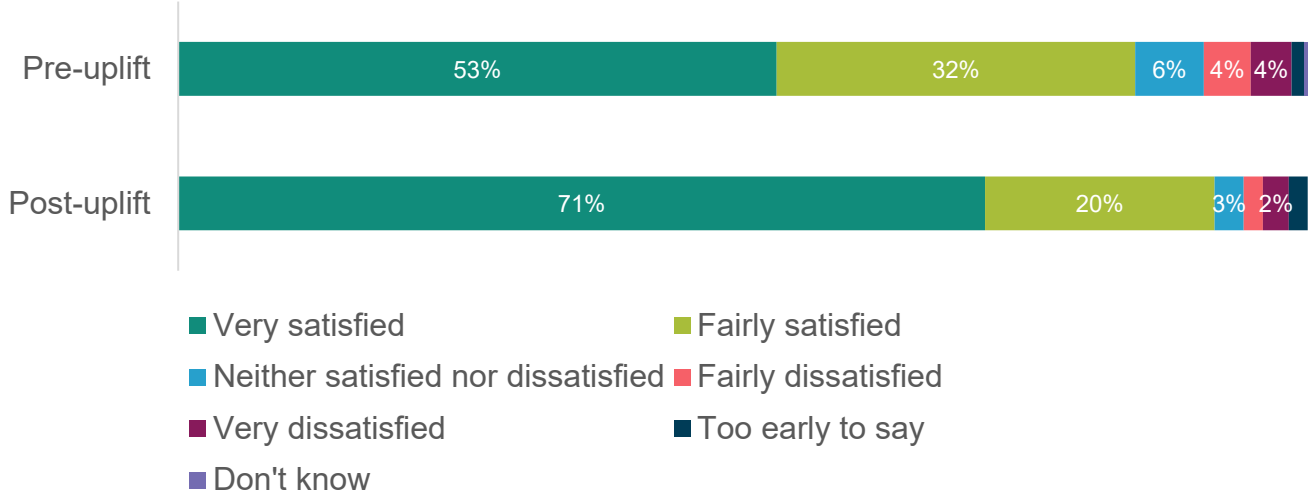
All BUS installations must be completed by a MCS accredited installer and must comply with MCS standards for heat pump and biomass boiler installations. For consumer protection purposes, installers must also be a member of an approved consumer code, which typically requires them to evidence their compliance with a set of requirements about their delivery model (e.g. how they handle complaints). Ofgem manages and administers the Scheme. This includes the production of and updates to Scheme guidance, the operation of the online portal that registered installers can use to manage vouchers, the processing and payment of vouchers, and audits to identify possible cases of non-compliance and fraud.

Property owners' overall assessment of their BUS experience

The 2024 Interim Report found that most property owners were satisfied with their overall experience of the BUS. The uplift of the BUS grant seems to have increased levels of

satisfaction even further, as Figure 11 indicates. Before the uplift, 53% of property owners were very satisfied with their experience. After the uplift this share increased to 71%.

Figure 11: Property owners' satisfaction with their BUS experience



Source: Wave 1, 2 and 3 Property owner survey. QE05. Taking everything into account, how satisfied or dissatisfied are you with your experience of the BUS overall? Unweighted base: All respondents (n=2,591 for pre-uplift and n=1,284 for post-uplift).

Initial engagement with the BUS by property owners

In the 2024 Interim Report it was reported that the most common way that property owners learned about the BUS was from an installer of renewable heating systems (i.e. directly from the organisations that would install LCH systems). By the time of the wave 3 survey this was no longer the case, and instead the most common way that people discovered the BUS was via their own – typically online – research. This accounted for 31% of wave 3 respondents, compared to 16% of respondents who heard about the BUS from an installer of renewable heating systems[52]. Though a minority, 6% of wave 3 respondents said they heard about the BUS from their energy supplier, up from 0% at wave 1. This likely the growing involvement of some energy suppliers in the BUS installation market.

The BUS has been promoted/marketed to property owners by various stakeholders and through multiple channels. Since the BUS is installer-led, the onus has largely been on installers to promote the Scheme to generate demand. The Government has also promoted the BUS through public announcements, a small-scale targeted digital marketing campaign that ran from January to March 2023, and through the nationwide multi-channel Welcome Home to Energy Efficiency Campaign that ran from October 2023 to March 2024. Waves 2 and 3 of the property owner survey asked selected respondents whether they had heard of the

[52] Unweighted base: All respondents (n=1,310 at wave 1 and n=1,305 at wave 3). QB01. How did you first hear about the BUS?

BUS through Government advertising, including the latter campaign[53]. Just 2% of all wave 2 respondents and 1% of all wave 3 respondents recalled that they had learned about the BUS through Government advertising, including the Welcome Home campaign. However, the Welcome Home campaign was only visible through selected communication channels, so these figures do not provide a fair reflection of the reach of the campaign. At wave 2 (when the campaign utilised TV/radio, billboards, print media and social media), 19% of survey respondents who said they heard about the BUS through these channels recalled that it was the Welcome Home campaign that they had seen. By wave 3 the campaign was digital-only, and 31% of wave 3 respondents who heard about the BUS via a social media notification or advert recalled seeing the campaign[54].

The wave 2 survey of installer companies also found that relatively few were aware of the Welcome Home campaign. Just 17% said they recalled the campaign, though it should be noted that they were asked in August/September 2024 – many months after it had run[55].

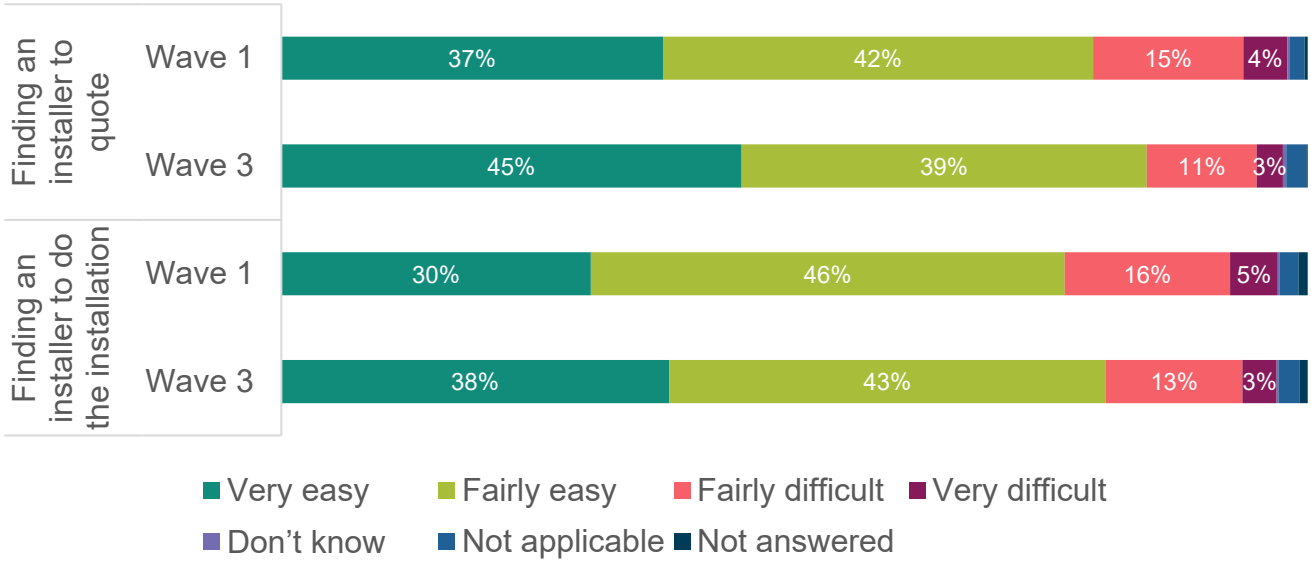
[53] Since the Welcome Home campaign used selected communication channels, this question was only asked to respondents who selected specific options when asked how they first heard of the BUS. At wave 2 this was social media notification or advert, TV/radio, printed newspaper/magazine, or billboard/outdoor advertising. By the time of the wave 3 survey the campaign was digital-only, so only individuals who selected social media notification or advert were asked. To calculate overall prevalence, however, the denominator used is everyone - unweighted base: All respondents (n=1,298 at wave 2 and n=1,305 at wave 3). QB01b. Did you hear about the Boiler Upgrade Scheme through official government advertising, such as the examples below? (Note – images, audio and video clips from the campaign were embedded in the questionnaire to jog respondents' memories).
[54] Unweighted bases: All wave 2 respondents that heard of the BUS via social media notification or advert, TV/radio, printed newspaper/magazine, or billboard/outdoor advertising (n=158) and all wave 3 respondents that heard of the BUS via social media notification or advert (n=31).
[55] Unweighted base: All wave 2 respondents (n=269). QC04. The government ran a nationwide marketing campaign between October 2023 and March 2024 called Welcome Home to Energy Efficiency which promoted the Boiler Upgrade Scheme. Are you aware of this campaign?

Organising a BUS installation

Finding an installer and getting a quote(s)

Property owners must use a BUS registered installer to install a LCH system if they wish to access the BUS grant. The 2024 Interim Report reported that most property owners found it very/fairly easy to find a BUS-registered installer willing to provide them with a quote, and willing to do the LCH installation when they wanted it done. Survey evidence shows that this process has become even easier for property owners. As Figure 12 shows, at wave 1 of the survey, 37% of property owners said it had been very easy to get a quote. This increased to 45% at wave 3, which was a statistically significant change. Likewise, the proportion of property owners who said it had been very easy to get an installer to do the works when they wanted grew from 30% at wave 1 to 38% at wave 3. This trend coincided with a notable increase in the volume of BUS installations (Figure 1), suggesting that the expansion of installer capacity (see Section: The number of BUS registered installers) improved the extent to which the sector met the rising demand for LCH system installations.

Figure 12: Property owners' assessment of the ease/difficulty of finding an installer



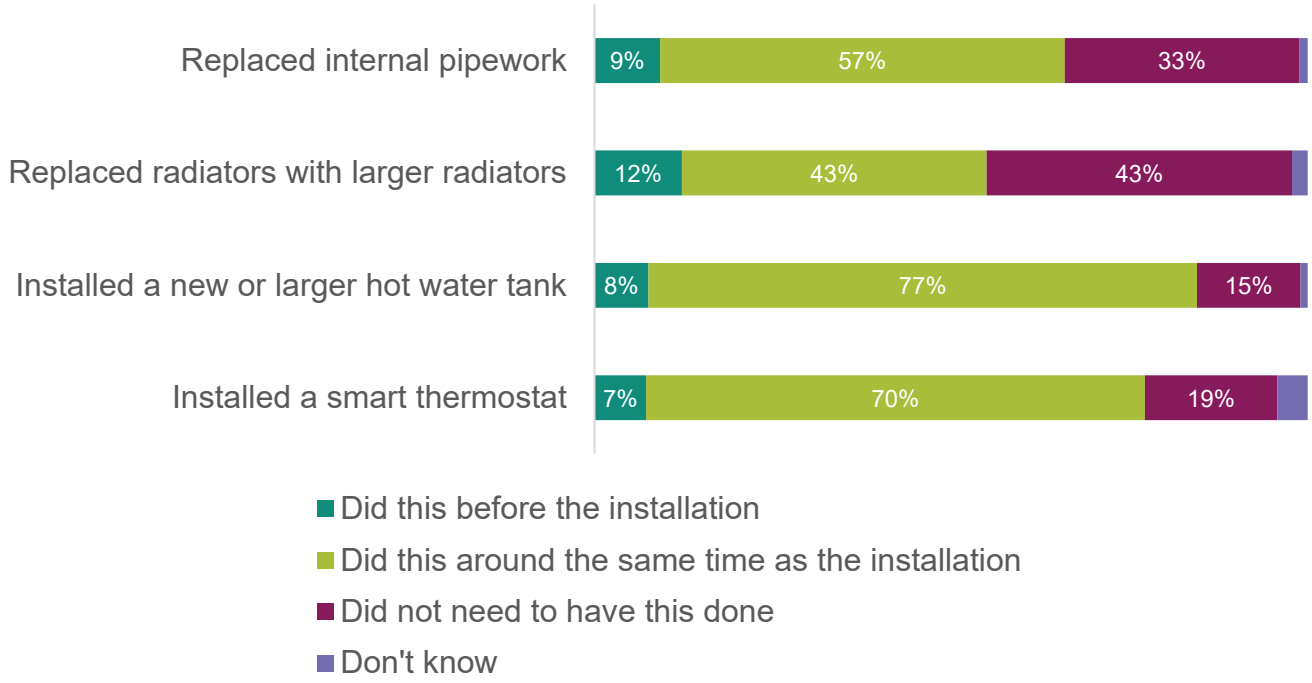
Source: Wave 1 and 3 Property owner survey. QB07. How easy or difficult did you find the following steps in participating in the BUS? Unweighted base: All (n=1,310 for wave 1 and n=1,305 for wave 3).

Carrying out supplementary and additional works to the property

As Figure 13 shows, property owners often had to undertake supplementary works to ensure their ancillary central heating and hot water equipment – radiators, hot water tank – was compatible with their new LCH system. These works were typically carried out at the same time as the installation of the LCH system, rather than in advance. The most commonly reported change was the installation of a new or larger hot water tank, which 84% of property owners reported making. The type of previous heating system influenced the extent of the supplementary works needed. Property owners in properties that had natural gas-fuelled systems were the least likely to undertake the changes listed in Figure 13, with the exception of the hot water tank installation. The age of the property also played a significant role in

determining the amount of supplementary work required. For instance, 70% of homes built before 1900 required internal pipework replacement, compared to just 34% of homes built since 2012, highlighting that more modern houses typically needed fewer supplementary works.

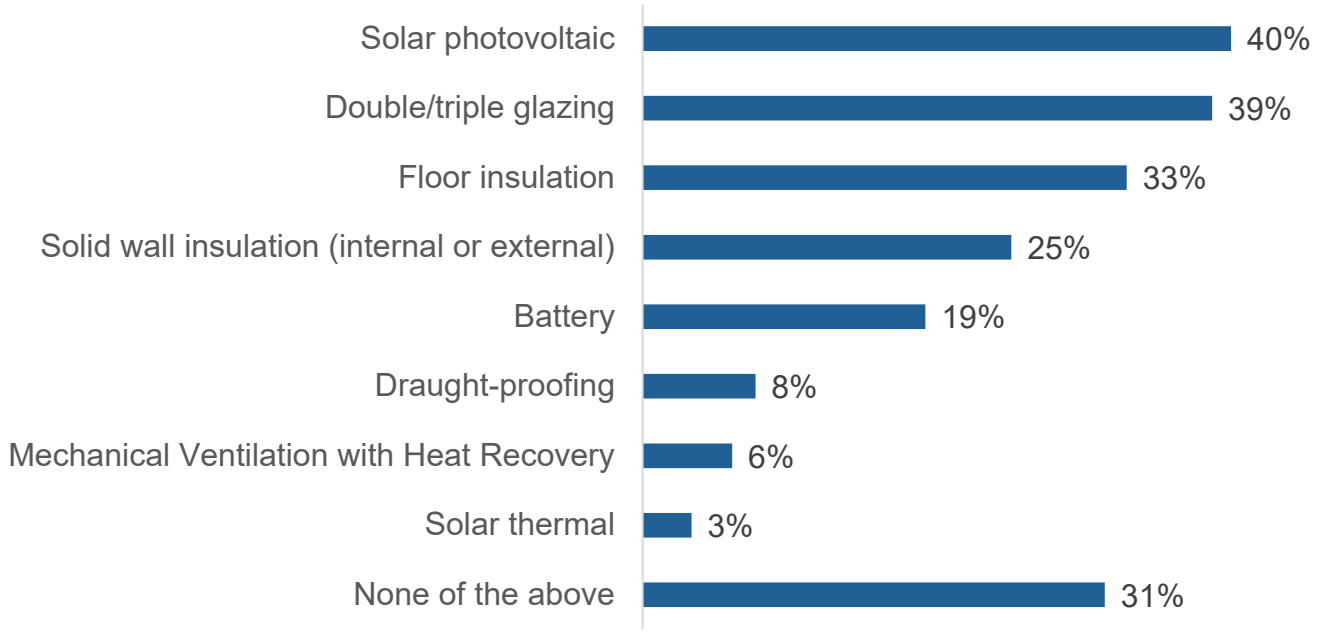
Figure 13: Whether and when property owners had supplementary works done



Source: Wave 3 Property owner survey. QD03. Did you do any of the following in addition to having [LCH system installed] installed? Unweighted base: All (n=1,305).

At waves 2 and 3 of the survey, property owners were asked if they had installed any additional energy-related technologies within their property around the same time as having their LCH system installed. As Figure 14 shows, it was common for property owners to make additional changes – 31% said they did not install any of the technologies shown to them. Property owners installed a mixture of energy generation/storage and energy efficiency measures alongside their LCH systems. Solar photovoltaic (PV) systems (solar panels that generate electricity) were the most common, with 40% of property owners reporting that they installed them at the same time as their LCH systems. As discussed below (Section: Energy bills), the ability to generate electricity was seen by many property owners as an important way to keep energy bills low.

Figure 14: Whether property owners installed additional energy-related technologies at the same time as installing their LCH system



Source: Waves 2 and 3 Property owner survey. QB06b. Did you have any of the following installed around the same time as the [LCH system installed]? Unweighted base: All (n=2,603). Note: multiple answers possible so figure sums to more than 100%; for brevity, something else and don't know are not shown (both <=1%).

Not shown in Figure 14 is the share of property owners who reported they installed loft or cavity wall insulation at the same time as having their LCH system installed. When the BUS was launched, to be eligible for the grant properties had to have a valid EPC that was less than 10 years old, with no outstanding recommendations for loft or cavity wall insulation. From May 2024 onwards the loft or cavity wall insulation requirement was dropped. Each wave of the property owner survey took place when the requirement was still in place – across the three waves 21% of property owners said they had installed loft insulation and 10% said they had installed cavity wall insulation[56].

Billing and payment for BUS installations

Billing models used by installers

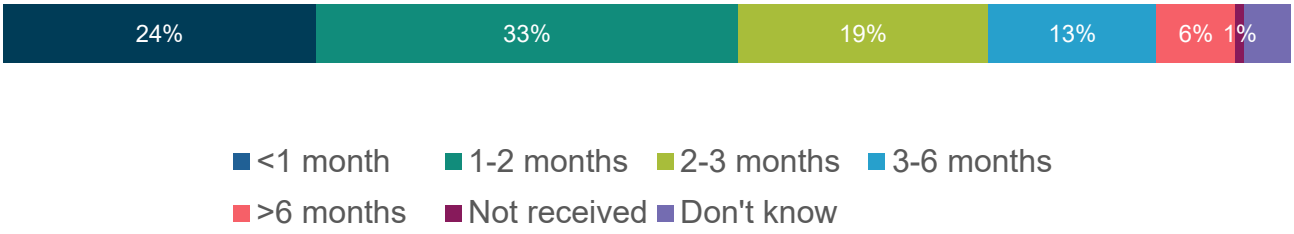
BUS installers are encouraged to reduce the bill paid by consumers by the value of the BUS voucher, though they can determine their own billing model. Most property owners (76%) reported that their LCH system installer had reduced the upfront cost of the system by the value of the BUS grant[57]. This proportion remained consistent across the survey waves,

[56] Unweighted base: All respondents (n=3,913). QB06. To access a Boiler Upgrade Scheme grant your property must have a valid Energy Performance Certificate (EPC) with no outstanding recommendations for loft or cavity wall insulation. Did you need to do any of the following to access the Boiler Upgrade Scheme grant?
[57] Unweighted base: All respondents (n=3,913). QC02. How did your installer bill you for the [LCH system installed]?

indicating that the way installers apply the BUS grant to their billing remained largely unchanged over time, even after the grant uplift.

Another 21% of property owners said they were billed the full cost of the installation and reimbursed the value of the BUS grant once the installer had redeemed the BUS voucher and been paid by Ofgem. In waves 2 and 3 of the survey this sub-group of property owners was asked how soon after the installation was completed they received the refund (Figure 15). A quarter of property owners (24%) received the refund within a month, and another third (33%) received it after 1-2 months. Six per cent of respondents said it had taken over six months, and 1% had not received a refund when they completed the survey (which ranged from 3-9 months after the installation was completed).

Figure 15: How quickly property owners received a refund from their installer



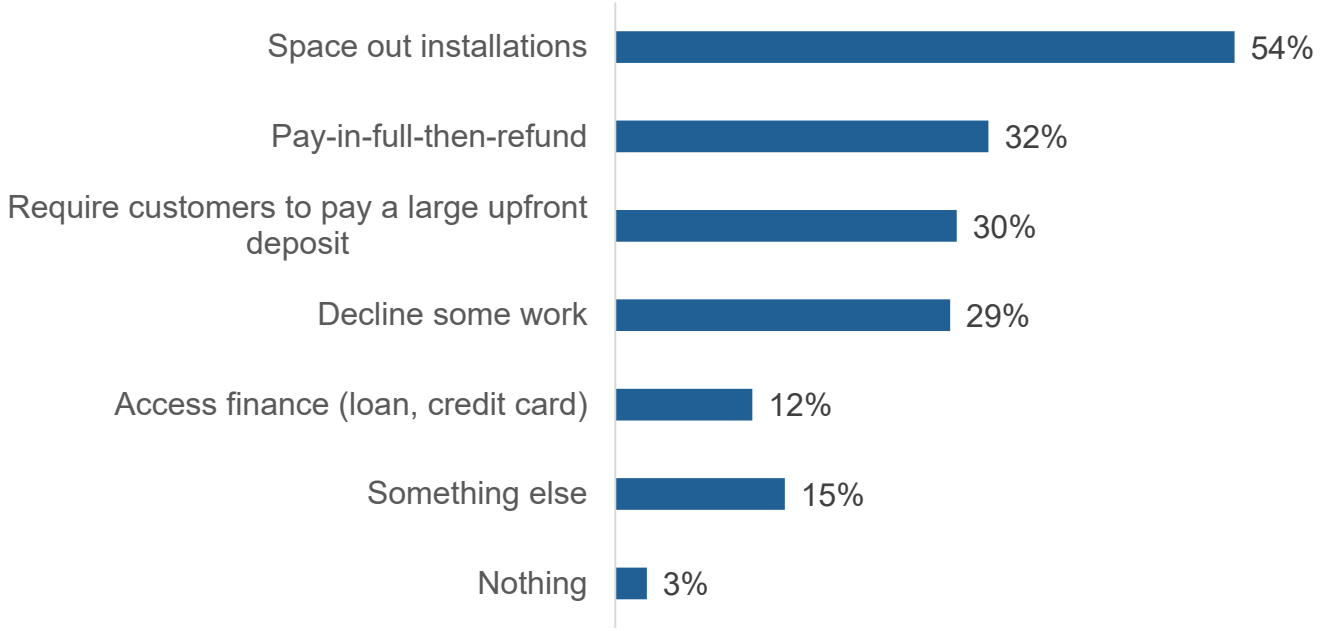
Source: Wave 2 & 3 Property owner survey. QC02b. How long after the installation was completed were you refunded the value of the Boiler Upgrade Scheme grant? Unweighted base: All wave 2 and 3 respondents who paid for the new system in full (n=460).

As reported in the 2024 Interim Report, some installers used the pay-in-full-then-refund billing model because of the risk that the redemption application may not be successful, and because the time between completion of works and voucher payment could pose cashflow difficulties. In wave 2 of the installer survey, respondents were asked whether they had ever experienced cashflow problems due to the BUS. Most installer companies (69%) said that they had not had a cashflow problem, whilst 29% indicated that they had[58]. Company size had an impact on cashflow risk – 5% of installer companies with 50 or more employees reported that they had experienced a cashflow problem, compared to 43% of sole traders[59].

Installer companies that had experienced a cashflow problem due to the BUS were asked how they minimised the risk (Figure 16). Amongst this sub-set of installer companies, 32% explained that this was why they used the pay-in-full-then-refund model, which is consistent with the findings reported in the 2024 Interim Report. Installers also managed their work programme either through spacing out installations or declining some work. Twelve percent of installers said they accessed finance (e.g. using a credit card or accessing a loan) to cover cashflow shortfalls whilst waiting for voucher payments.

[58] Unweighted base: All wave 2 respondents (n=261). QC07. Has your business ever experienced cashflow problems caused by lags between doing an installation and getting paid the Boiler Upgrade Scheme voucher?
[59] n=18 and n=15. Note that the small base size means these results should be treated with caution, though the difference was statistically significant.

Figure 16: How those installers who experienced cashflow problems minimised the risk



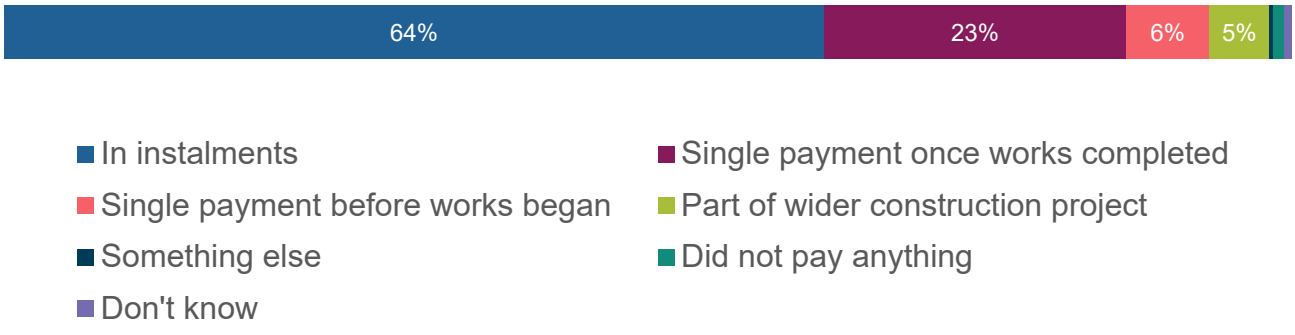
Source: Wave 2 Installer survey. QC07a. Do you do any of the following to minimise cashflow problems?
Unweighted base: All wave 2 respondents who experienced cashflow problems due to the BUS (n=77).

How property owners paid for their LCH system

The BUS was intended to partially pay for the costs of installing a LCH system. The 2024 Interim Report found that most property owners paid the outstanding balance using their savings, investments, or regular income from their current account. This was still the case in the wave 3 property owner survey, and the grant uplift had no statistically significant effect on the source(s) of finance that property owners used.

Property owners were also asked about how their installer billed them for the cost of their LCH system installation (Figure 17). Property owners most commonly paid for their LCH system in instalments (64% of property owners), though 6% paid in full upfront. As Figure 16 indicated, some installers managed the cashflow risk of carrying out BUS installations by asking for a large upfront deposit. Another quarter (23%) of property owners said they paid in full once the works were completed.

Figure 17: How property owners paid the bill for their LCH system installation

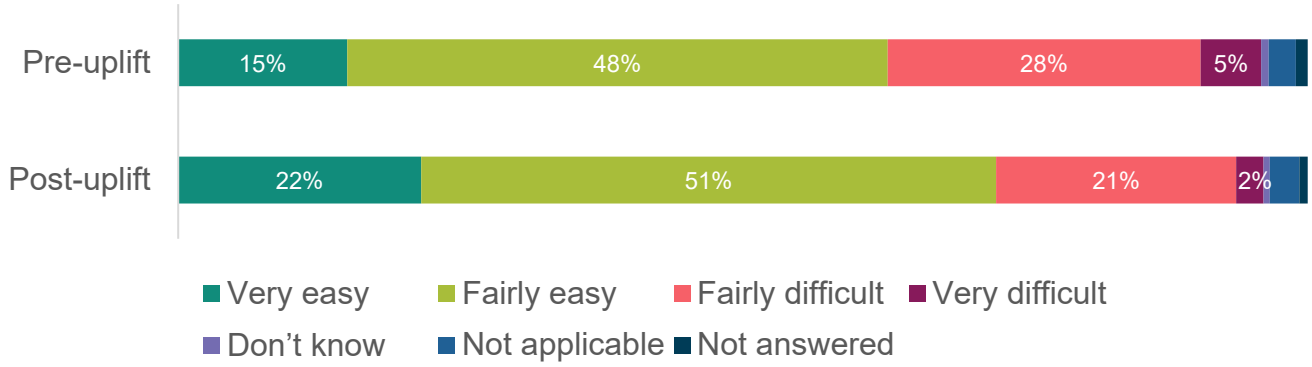


Source: Waves 2 and 3 Property owner survey. QC02a. How did you pay the bill for the [LCH system installed]? Unweighted base: All (n=2,603).

As part of the property owner survey, respondents were asked how easy or difficult they found it to pay for the cost of their LCH system that was not covered by the BUS grant. The results are shown in Figure 18, broken down by whether the respondents received the pre-uplift or post-uplift grant value. There was a statistically significant increase in the proportion of property owners who said they found it very/fairly easy to pay the outstanding balance after the grant value was uplifted. Specifically, 72% of those who received the higher post-uplift grant found it easy to pay, compared to 63% of those who received the lower pre-uplift grant.

Additionally, property owners who had a GSHP installed under the BUS were significantly more likely to report that paying the outstanding balance was very/fairly easy after the uplift. The proportion of the respondents who found payment easy rose from 40% pre-uplift to 67% post-uplift, a statistically significant difference[60]. This change is notable, especially considering that the uplift added only £1,500 to the BUS grant for GSHPs, and GSHPs typically have a much higher installation cost compared to ASHPs. The reported average cost of a GSHP under the BUS was £28,072, compared to £13,161 for an ASHP[61].

Figure 18: How easy/difficult property owners found it to pay for their LCH system



Source: Wave 1,2 & 3 Property owner survey. QB07. How easy or difficult did you find the following steps in participating in the BUS: Paying for the costs of the installation that were not covered by the BUS grant? Unweighted base: All respondents (n=2,591 for pre-uplift and n=1,284 for post-uplift).

Having a LCH system installed under the BUS

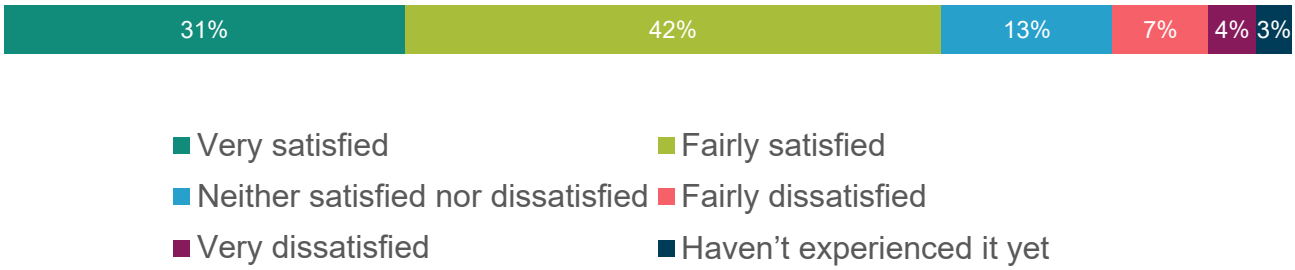
Applying for and redeeming a BUS voucher

The BUS is installer-led, and so it is primarily installer companies who interact with the Scheme administrator, Ofgem. As shown in Figure 19, 73% of surveyed installers were either very or

[60] Unweighted base: All respondents (ASHPs: n=2,521 for pre-uplift and n=1,258 for post-uplift; GSHPs: n=69 for pre-uplift and n=26 for post-uplift). The low base size for GSHPs means these results should be treated with caution.
[61] Source: DESNZ (November 2024) Boiler Upgrade Scheme statistics: October 2024

fairly satisfied with Ofgem's administration of the BUS. Figure 19 combines data across both survey waves, and there was no significant difference in levels of satisfaction between the two.

Figure 19: Installers' satisfaction with Ofgem's administration of the BUS



Source: Waves 1 and 2 Installer Survey. QD01: Overall, how satisfied or dissatisfied are you with Ofgem's administration of the BUS? Unweighted base: All (n=516).

The installer survey also asked about respondents' satisfaction with specific elements of Ofgem's administrative model. The 2024 Interim Report found that most installers were very/fairly satisfied with the BUS processes for applying for, tracking, and redeeming a BUS voucher, and the speed with which they were paid. This remained the case at wave 2 of the installer survey, with high levels of installer satisfaction with all the BUS systems. For example, at wave 1, 81% of installers were very/fairly satisfied with their experience of the system for applying for BUS vouchers. By Wave 2, this figure had increased slightly to 83%.

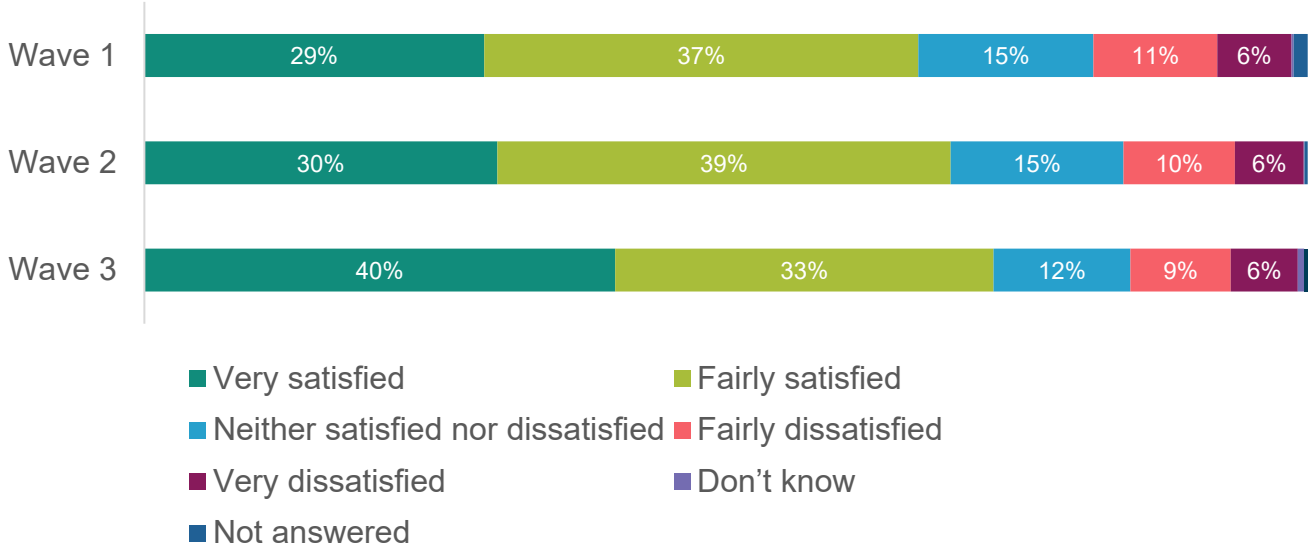
Property owners' installation experience

The 2024 Interim Report reported high levels of property owner satisfaction with their experience of having a LCH system installed under the BUS. Rates of satisfaction increased slightly between waves for each of the aspects of the installation experience that were explored in the property owner survey. At wave 1, 77% of property owners were very/fairly satisfied with their experience of scheduling an installer to do the works. At wave 3 this had grown to 83%, a statistically significant increase.

There were statistically significant increases between survey waves in the share of property owners who were very/fairly satisfied with any disruption caused by the installation and with the number of days that the installation took to complete. As Figure 20 shows, there was also an increase between survey waves in property owners' satisfaction with the handover of the new LCH system. As discussed below (Section: Confidence controlling the LCH system), poor handover experiences sometimes left property owners unsure how to use their new systems and what to do if anything went wrong.

The increases between survey waves in property owners' satisfaction with their experiences of LCH system installation may be due to an improvement in the quality of installers' service offer, for example as they become more experienced. It may also be related to the increase in property owners' familiarity with LCH systems (Section: Characteristics of property owners and their properties), meaning they were more informed customers and knew what to expect.

Figure 20: Property owners' satisfaction/dissatisfaction with the handover of their LCH system



Source: Waves 1, 2 and 3 Property owner survey. QD01. How satisfied or dissatisfied were you with the following: The handover of the system to you once the installation was complete (e.g. providing system documentation)? Unweighted base: All respondents (n=1,310 for wave 1, n=1298 for wave 2, and n=1,305 for wave 3).

The post-installation experience

Faults with LCH systems

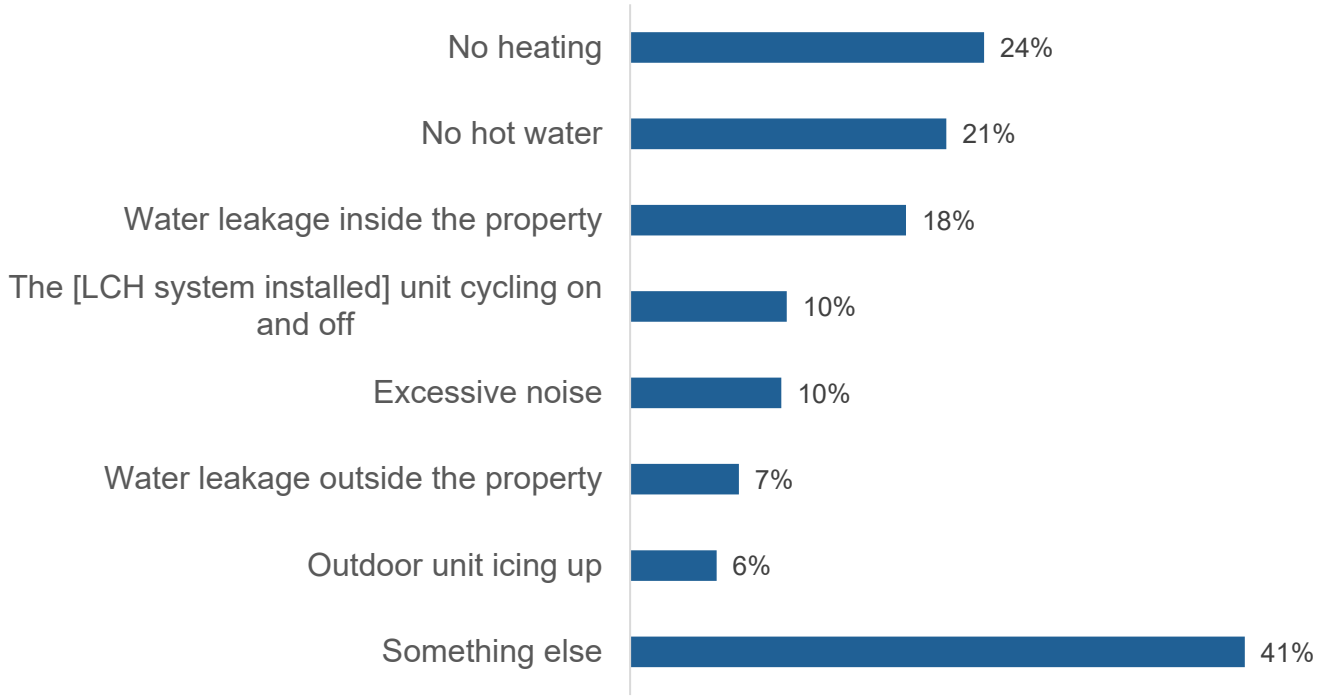
The follow-up survey of property owners explored whether they had experienced any faults with their LCH system (and ancillary equipment such as the hot water tank) since it was installed[62]. Respondents were asked to focus on faults and operational problems rather than general dissatisfaction with running costs or the temperature of their property (unless these were related to a fault). Overall, 32% of survey respondents said their LCH system had experienced a fault, and 68% said it had not[63]. Note that these are self-reported incidents of faults and have not been verified by the evaluation team. There were no significant differences in the frequency with which property owners said they had experienced faults depending on the property type (detached house etc.) or the number of BUS installations that their installer had completed (i.e. a measure of installers' level of BUS experience).

[62] QB03. Has the [LCH system installed] system (including equipment installed at the same time such as pipework, a new hot water tank or new radiators) had any faults since it was installed? We ask about running costs, whether the property is warm enough and whether the hot water is warm enough later, so please focus here on faults and operational problems.

[63] As discussed below (Section: Satisfaction with LCH systems), most individuals who completed the follow-up survey said that they were very or fairly satisfied with their LCH system. Property owners who said they had experienced a fault with their LCH system were less likely than those who had not had a fault to say they were very satisfied with their LCH system (47% compared to 70%: n=533 and n=1,099 respectively). However the share saying they were very/fairly dissatisfied was similar between the two groups (10% and 3% respectively), which suggests that most people who experienced a fault did not develop a negative view of their LCH system as a result (potentially because for most that fault was satisfactorily fixed).

Property owners who said they had experienced a fault with their LCH system were asked to indicate the nature of this fault (Figure 21). These are self-reported fault descriptions, and respondents were asked to select from a set of response options which focused on the symptoms they experienced (e.g. no heating) rather than the technical cause of the fault[64]. No space heating (reported by 24% of survey respondents who had experienced a fault with their LCH systems) and/or no hot water (21%) were the two most common faults.

Figure 21: LCH system faults experienced by property owners



Source: Property owner follow-up survey. QB03a. What was the nature of the fault(s)? Unweighted base: All respondents that selected Yes at QB03 (n=533). Note: multiple answers possible so figure sums to more than 100%; for brevity, not shown are any options selected by under 5% of respondents.

Forty-one percent of property owners who experienced a system fault said that it involved something other than one of response options they were given in the survey. They were asked to explain further, and the results were analysed qualitatively. Various faults were attributed by e survey respondents to a poor quality installation (e.g. a horizontal hot water tank that was installed the wrong way up, no insulation on external pipework, and water inlet and outlet connections that were installed the wrong way round). Installation problems included plumbing and electrical wiring issues. Other property owners had experienced heat pump model-specific hardware and software problems, some of which turned out to be common issues. Faults reportedly affected heat pump units and ancillary equipment, including hot water tanks, radiators, pipework, and smart controls. Some faults reportedly required parts to be repaired or replaced, and in some cases whole heat pump units had been removed and replaced. Fault rectification works were typically carried out or organised by the installer responsible for the

[64] There was also an open text box where respondents could add information about other faults they had experienced. A very high proportion of respondents selected 'other'. Given the technical nature and ambiguity in the open text descriptions they provided, these other responses were not coded to existing or new response options.

LCH system installation, though in some cases this was a protracted process involving repeat visits by the installer to diagnose and fix faults.

Frequency and resolution of complaints

LCH system installations are complex and there can be post-installation problems. All BUS installations must be completed by installers that are MCS accredited and a member of a consumer code, which ensures property owners have various routes of recourse available. The 2024 Interim Report concluded that most BUS participants had not faced substantive problems, since only 11% had made a formal complaint about their LCH system installation. In wave 3 of the survey only 10% of property owners had made a formal complaint[65], meaning that there was no significant change over time in the frequency with which complaints were made. The low incidence of complaints indicates that most system faults experienced by property owners (Section: Faults with LCH systems) were satisfactorily resolved without need for escalation. There were no significant changes over time in who property owners complained to – for the most part complaints were made directly to the installer that had completed the works (9% of all survey respondents at wave 3, compared to 10% at wave 1). Very few property owners had complained to the MCS or made use of the consumer codes.

Having the LCH system serviced

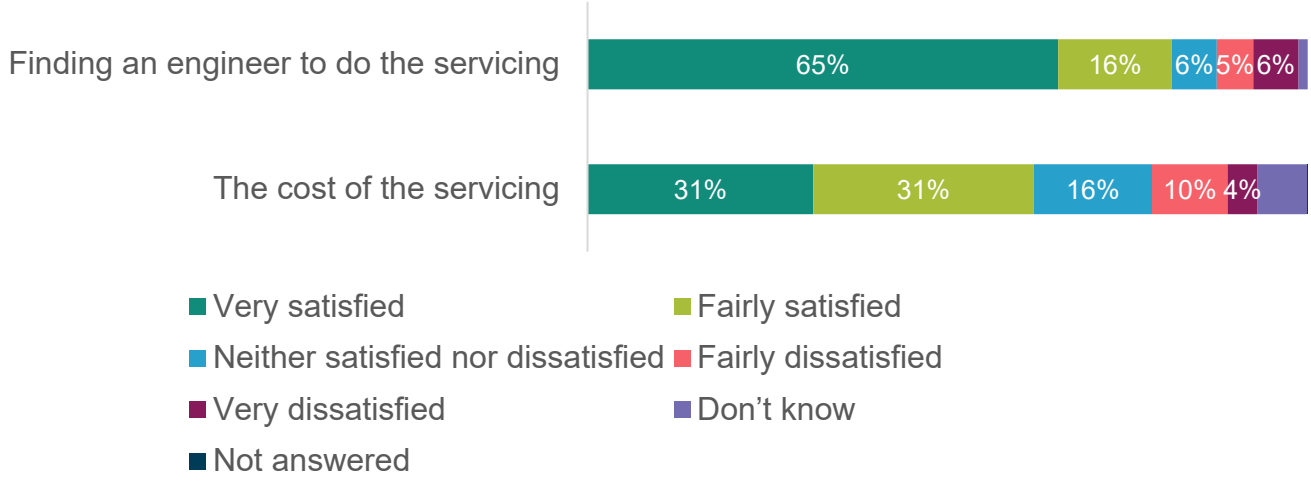
As with fossil fuel heating systems, LCH systems need periodic servicing to check the system is working correctly and address any potential problems. An annual service may be required to ensure the validity of a warranty. By the time of the follow-up survey – which was between 9 and 21 months after the installation took place – most property owners (56%) had serviced their LCH system. Another 7% had tried but not been able (at that point in time) to have their system serviced, whilst 37% had not tried.

Amongst property owners who had tried to have their LCH serviced, most (65%) were very satisfied with the ease with which they had been able to find an engineer (Figure 22). Satisfaction was slightly lower regarding the cost of servicing where 31% were very satisfied, and 15% were very/fairly dissatisfied.

Satisfaction levels varied significantly depending on the outcome, however (i.e. whether they had been able to complete the servicing). Amongst those 7% of individuals who had tried but not been able to have their system serviced[66], 64% were very/fairly dissatisfied with their experience of trying to find an engineer to do the servicing. This suggests that some property owners experienced issues with the availability of servicing engineers.

[65] n=1,310 for wave 1 and n=1,305 for wave 3. QE02. Have you made any formal complaints about the [LCH system installed] installation to any of the following organisations?
[66] n=104

Figure 22: Property owners' satisfaction with selected aspects of having a LCH system serviced

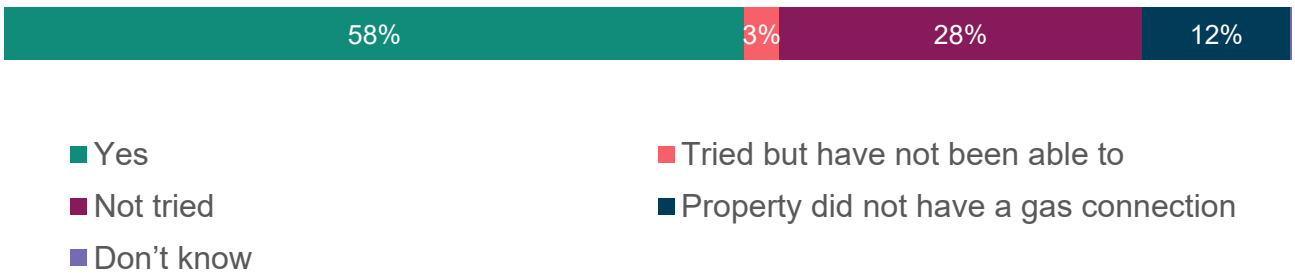


Source: Property owner follow-up survey. QB02a. How satisfied or dissatisfied were you with the following: finding an engineer; the cost of the servicing. Unweighted base: All respondents that selected Yes or No, tried but haven't been able to have it serviced at QB02 (n=1,060).

Disconnecting from the gas grid

BUS statistics[67] indicate that around 56% of properties with a BUS-funded installation are connected to the gas grid, so there is a large pool of properties that could potentially disconnect from the gas grid following their switch to a LCH system[68]. As part of the follow-up survey, property owners from on-grid properties were asked if they had disconnected from the gas grid (Figure 23). At the time of the survey, 58% had successfully done so, and another 3% had tried but had not (at the time) been able to.

Figure 23: Whether property owners had disconnected from the gas grid



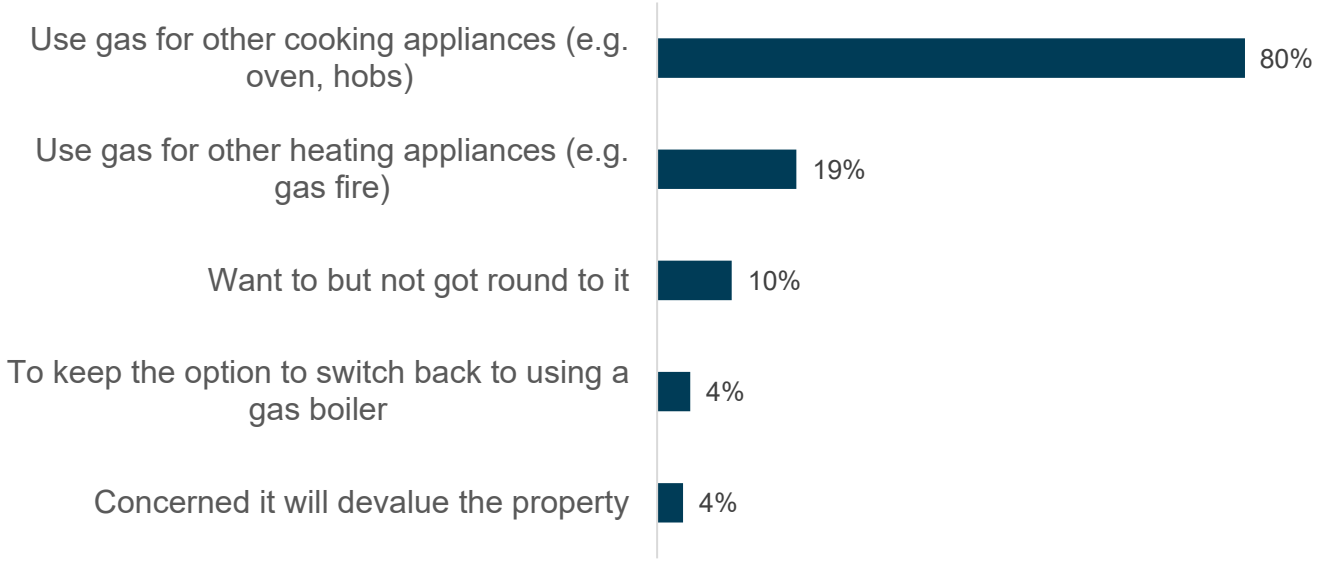
[67] DESNZ (August 2024) Boiler Upgrade Scheme statistics: July 2024

[68] Disconnecting from the gas grid involves removing the gas meter and capping the gas supply to the property. It may ultimately also involve disconnecting the gas pipe from the property to the mains gas network. Disconnecting from the gas grid means that property owners no longer have to pay the gas standing charge.

Source: Property owner follow-up survey. QB04. Since you had [LCH system installed] installed, have you disconnected the property from the gas grid? By this we mean that you have ended your gas supply contract and had your gas meter removed? Unweighted base: All property owners from on-grid properties (n=1,040).

Property owners who had not tried to disconnect from the gas grid were asked why (Figure 24). By far the most common reason was that property owners used gas for cooking appliances (80% of respondents who had not tried to disconnect from the gas grid). Also notable was that 19% of this sub-group of respondents had not wanted to disconnect because they still used gas for other heating appliances. The use of supplementary heating is discussed further in Section: Use of supplementary heating.

Figure 24: Why property owners had not tried to disconnect from the gas grid



Source: Property owner follow-up survey. QB04a. Why have you not tried to disconnect the property from the gas grid? Unweighted base: All property owners from on-grid properties who had not tried to disconnect from the gas grid (n=301). Note: multiple answers possible so figure sums to more than 100%; for brevity, not shown are any options selected by under 4% of respondents.

Lived Experiences of LCH Systems

This chapter discusses property owners' experiences using their LCH system, including their satisfaction with the temperature of their property and their hot water, and satisfaction with the noise their system produced. It also discusses changes in property owners' energy bills, and the energy bill tariffs that they use. It finishes by discussing property owners' perceptions of their LCH systems.

Key findings

Most property owners were satisfied with the temperature of their properties when using their LCH system. They usually described the temperature of their properties as about right, whether overall (93%) or on the coldest mornings or coldest evenings (both 86%).

Property owners were typically satisfied with other aspects of the lived experience of space heating using a LCH system. Most (70%) survey respondents were very/fairly satisfied with how quickly their property was heated, and 83% were very/fairly satisfied with how evenly their property was heated. Some survey respondents explained that the heat produced by their LCH system was more constant and gentler than the heat produced by their previous fossil fuel system.

Just under half (44%) of property owners used at least one type of supplementary heating over the winter, in addition to their LCH system. An open fire or stove that burned wood or coal was the most used method; other research has found that supplementary heating is used to increase comfort in high use rooms (e.g. a lounge).

Most property owners (94%) thought the temperature of their hot water was about right when heated using their LCH system. They were largely happy with how quickly their hot water heated up (86% were very/fairly satisfied) and how much hot water there was (89% were very/fairly satisfied).

Property owners were typically satisfied with the noise produced by their LCH system. This was true even on cold days when their system was working much harder than normal (85% said they were very/fairly satisfied with the noise on the coldest days).

Property owners' confidence that they understood how to use their LCH system controls was mixed. Many reported gaps in their knowledge: 32% said they were slightly or not at all confident they knew how to control their system to minimise running costs.

Property owners had mixed experiences with their total energy bills since installing their LCH systems, though most commonly they reported that their bills had decreased (37% of survey respondents). Various factors influenced the direction of change of energy bills, including their confidence using their system and whether they had solar PV and battery storage installed (several property owners thought this was what kept electricity bills low).

A third (35%) of survey respondents had changed their energy tariff since having their LCH system installed. Switching was fairly common amongst BUS participants, typically prompted by a desire to reduce energy bills. Looking at the type of tariffs that people were on (regardless of whether they had switched), half (50%) had standard fixed/variable tariffs at the time of the follow-up survey, but many were on time of use (35%) or special heat pump tariffs (11%). Often, they had switched to these latter two tariffs in response to having their LCH installed, to bring down costs.

Overall, most property owners (89%) were very/fairly satisfied with their LCH system. Just 3% of property owners were very/fairly dissatisfied. Follow-up survey respondents were also asked the same question in the wave 1 and 2 survey, and the general trend was that property owners became more satisfied with their LCH system between surveys.

Most property owners (57%) already had or definitely would recommend their LCH system to friends. Nine percent definitely/probably would not recommend it. This question was also asked in the wave 1 and 2 survey, and the proportion of property owners who would or would not recommend a LCH system was broadly similar in that survey and the follow-up survey. It seems likely that most property owners made up their minds about their LCH system soon after it was installed.

Experiences of space heating

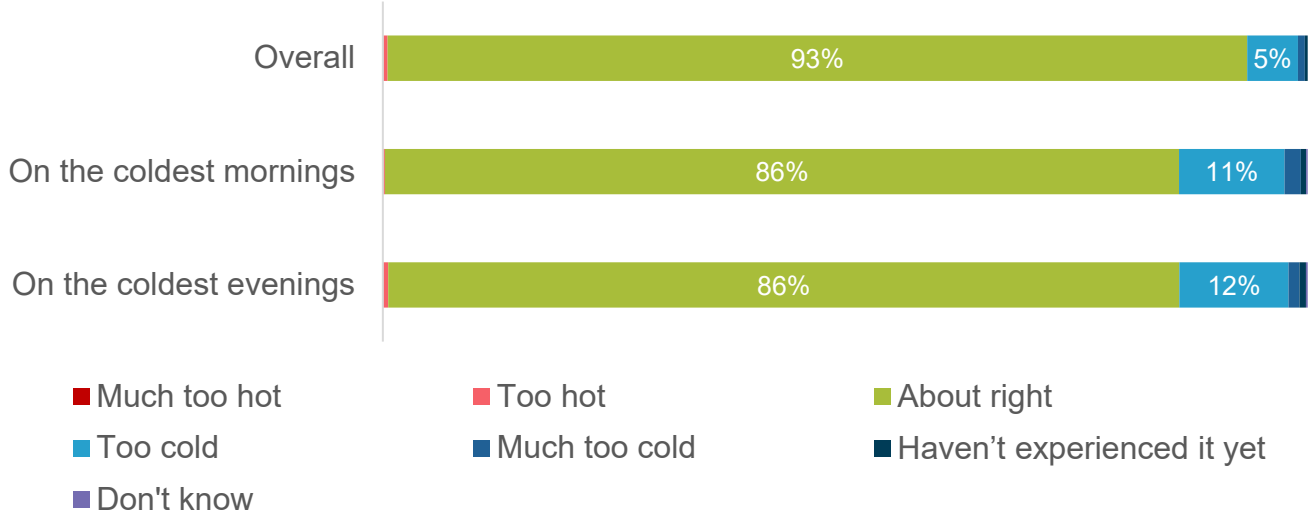
Data on property owners' satisfaction with using their LCH to heat their property are from a follow-up survey of individuals who responded to waves 1 or 2 of the property owner survey. The follow-up survey took place in July and August 2024, by which point all respondents had used their LCH system for at least one heating season. As Figure 25 shows, most property owners reported that the temperature of their home was about right, whether overall (93% of respondents) or during the coldest spells (86% for both the coldest mornings and coldest evenings). On the coldest mornings, 12% of respondents thought their property was too cold and 1% said it was much too cold. The survey also asked property owners about their satisfaction with how quickly and evenly their LCH system heated up their property, since the warmth produced by lower temperature heating systems can feel different to that produced by higher temperature fossil fuel systems.

Most survey respondents (70%) were very/fairly satisfied with how quickly their LCH system heated up their property. Just 9% were very/fairly dissatisfied. Similarly, most survey respondents (83%) were very/fairly satisfied with how evenly their system heated rooms in their property[69]. The lived experience of space heating was explored in detail during the case studies, most of whom had replaced a gas boiler with an ASHP. Several case study property owners explained that they preferred the heat generated by their ASHP to that of their previous

[69] Unweighted base: All respondents that have experience of using their LCH system (Yes at QR03) (n=1,594). QC02. How satisfied are you with the following: how quickly the [LCH system installed] heats up the property, how evenly the [LCH system installed] heats up the rooms within the property?

system. They felt that the heat was gentler, more consistent, and more evenly distributed within rooms and throughout their properties.

Figure 25: Property owners' satisfaction with the temperature of the property



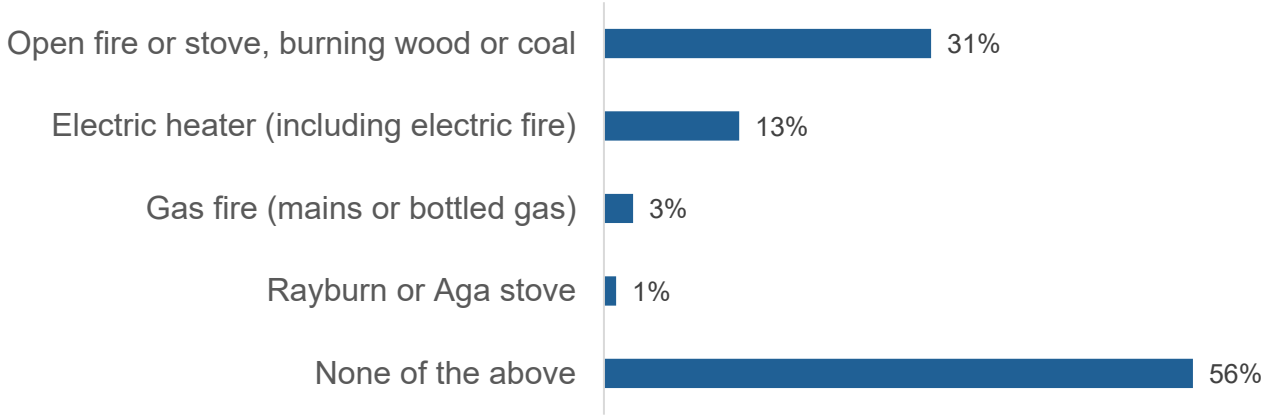
Source: Property owner follow-up survey. QC01/1a. Overall, which of the following describes the internal temperature achieved in the property by the [LCH system installed] – overall; on the coldest mornings; on the coldest evenings? Unweighted base: All respondents that have experience of using their LCH system (Yes at QR03) (n=1,594).

Use of supplementary heating

As Figure 26 shows, over half (56%) of property owners said they had not used any supplementary heating over the previous winter; 44% had used at least one method. If they had, an open fire or stove burning wood or coal was the most common method (used by 31% of property owners). Three percent used a gas fire – the survey did not differentiate between whether this used bottled or mains gas[70]. Unsurprisingly, usage of supplementary heating varied depending on property owners' perceptions of how warm their properties were. Individuals who had found that, on the coldest evenings, their property was too cold/much too cold were more likely to use supplementary heating (76% had done so, compared to 39% of individuals who felt the temperature was about right[71]). Whilst some used open fires for aesthetic reasons, many more used supplementary heating because they were sometimes not warm enough.

[70] To be eligible for the BUS grant the new LCH system must meet the full space heating and hot water heating demands of the property. Whilst some heat generating components of the preceding heating system can be retained (e.g. supplementary electric heaters and wood burning stoves), others cannot – including gas fires using mains gas. The survey did not ask respondents to specify the type of gas fire.
[71] n=212 and n=1,361 respectively

Figure 26: Whether property owners used supplementary heating over the winter



Source: Property owner follow-up survey. QC03. Over the past winter, did you regularly use any of the following to heat some or all of the property in addition to the [LCH system installed]? Unweighted base: All respondents that have experience of using their LCH system (Yes at QR03) (n=1,594). Note: multiple answers possible so figure sums to more than 100%; for brevity, not shown are any options selected by under 1% of respondents (which includes an 'other' option where respondents were invited to specify their supplementary heating system).

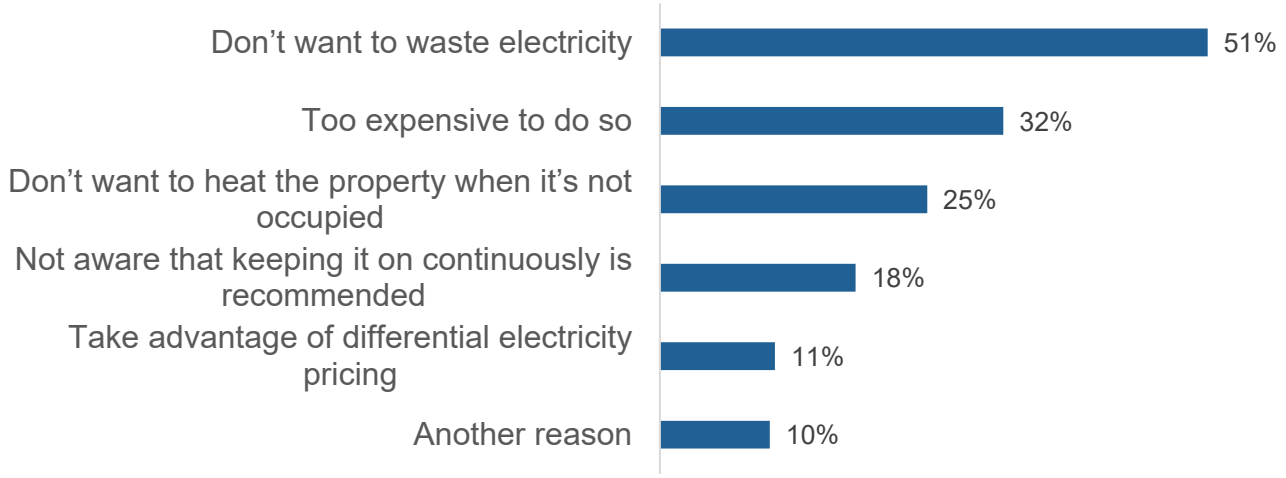
Keeping heat pumps on continuously

Advice with heat pumps[72] is that they should be left on continuously rather than programmed to only turn on at certain times of the day. This is because it typically takes a heat pump longer to heat up a colder property than would be the case for a fossil fuel system, so it is better to leave the heat pump on but to 'set-back' the thermostat when a lower temperature is preferred (e.g. overnight or when the property is empty).

To explore whether property owners were following this advice, the survey asked whether they kept their ASHP or GSHP on continuously during the days that they used it[73]. Eighty-seven percent of survey respondents said that they did keep it on continuously, and 13% said that they did not. Those individuals who said they did not keep their heat pump on continuously were asked why they chose not to (Figure 27). Just over half (51%) of respondents explained that they did not want to waste electricity, whilst 32% believed that it was too expensive to keep it on continuously. Only 18% said they did not know that this was recommended, so for most property owners this is not an awareness issue. As discussed below (Section: Energy bills), some property owners found their energy bills increased after they had a LCH system installed, and some of these individuals believed that they could reduce their energy bills by not keeping their system on continuously.

[72] E.g. Energy Saving Trust How to improve your heat pump's efficiency
[73] Unweighted base: All respondents that have experience of using their LCH system (Yes at QR03) and had either an ASHP or GSHP installed (n=1,579). QC05. Do you keep the heat pump on continuously during the days you are using it to heat the property? By keeping it on continuously we mean the system is programmed to always provide heat, though you may set the thermostat at a lower temperature at some points in the day.

Figure 27: Why property owners did not keep their heat pump on continuously



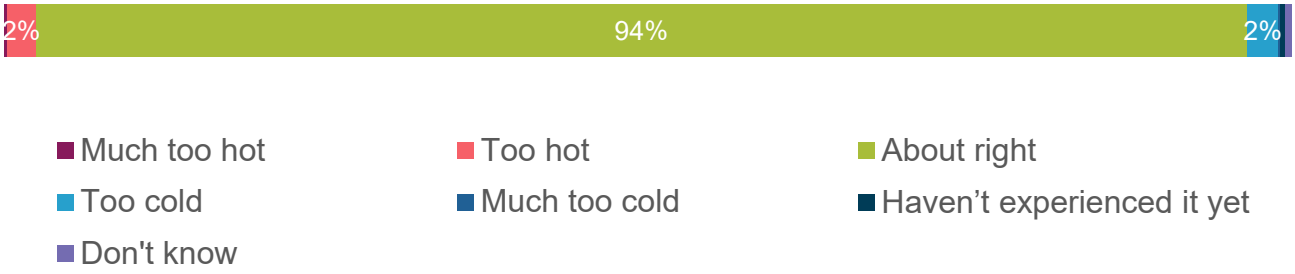
Source: Property owner follow-up survey. QC05a. Why do you not keep the heat pump on continuously? Unweighted base: All respondents that did not keep their heat pump on continuously (No at QC05) (n=200). Note: multiple answers possible so figure sums to more than 100%; for brevity, not shown are any options selected by under 10% of respondents.

Experiences of hot water heating

As Figure 28 shows, most (94%) survey respondents felt the temperature of their hot water was about right; just 2% thought it was too hot and 2% thought it was too cold. There were no notable differences in responses between sub-groups. Property owners were also asked how satisfied they were with the speed with which their LCH system heated their hot water and the amount of hot water that was provided[74]. Rates of satisfaction were high for both characteristics. Fifty-seven percent of survey respondents said they were very satisfied with how quickly their hot water heated up, and another 29% were fairly satisfied. Just 3% were very/fairly dissatisfied. Likewise, 63% of respondents were very satisfied with how much hot water their system provided, and another 26% were fairly satisfied (again, just 3% were very/fairly dissatisfied). Property-owners' experiences of hot water heating were explored in detail as part of the case studies. Overall they were very satisfied with the temperature of their hot water and had mostly found that there was enough hot water to meet their households' needs without having to adjust their behaviour (e.g. when they took showers).

[74] Unweighted base: All respondents that have experience of using their LCH system (Yes at QR03) (n=1,594). QC07. How satisfied are you with the following: how quickly the [LCH system installed] heats up water, how much hot water the [LCH system installed] provides?

Figure 28: Property owners' satisfaction with the temperature of the hot water

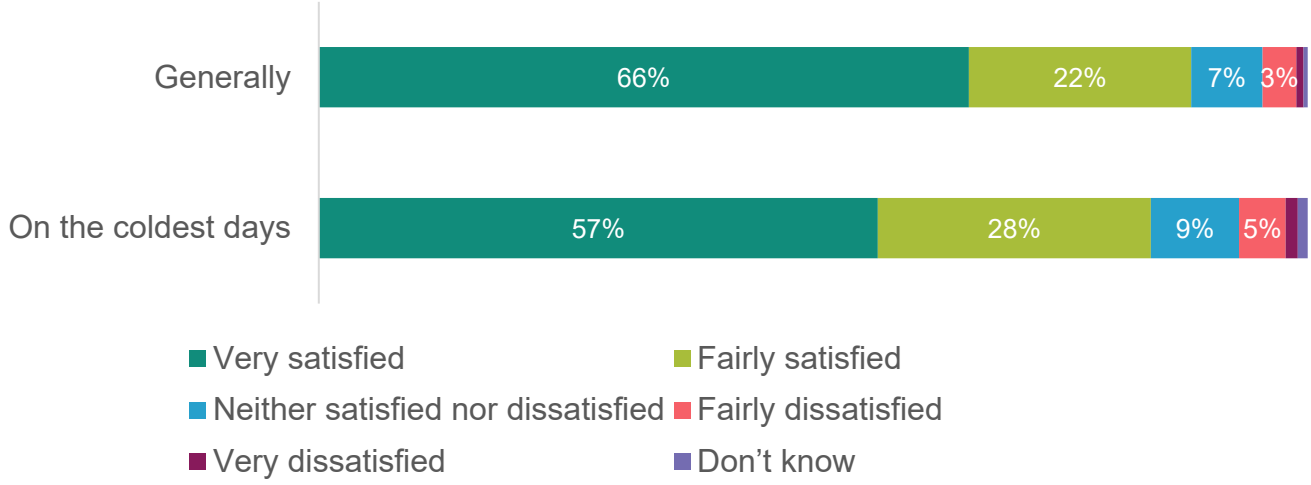


Source: Property owner follow-up survey. QC06. Which of the following describes the water temperature achieved in the property by the [LCH system installed]? Unweighted base: All respondents that have experience of using their LCH system (Yes at QR03) (n=1,594).

Experiences of the noise produced by the system

As Figure 29 shows, most property owners were satisfied with the noise level of their LCH system, even on the coldest days when heat pumps can be louder (e.g. due to colder air temperatures or the need for system defrost cycles). Overall, 88% of property owners were very/fairly satisfied with the noise level generally, and 84% were very/fairly satisfied with the noise level on the coldest days. Case studies of property owners that had a LCH installed found that most had found their new system to be quiet and unobtrusive, though the positioning of the unit was an important consideration. One case study property owner had installed an ASHP on a flat roof and had found that the system produced mild reverberations through the ceiling of the room below (they had installed sound dampeners to reduce the noise to an acceptable level).

Figure 29: Property owners' satisfaction with the noisiness of their LCH system



Source: Property owner follow-up survey. QE01. How satisfied are you with the noise level of the [LCH system installed]: generally, on the coldest days? Unweighted base: All respondents that still have their BUS-funded installation (Yes at QA01) (n=1,640).

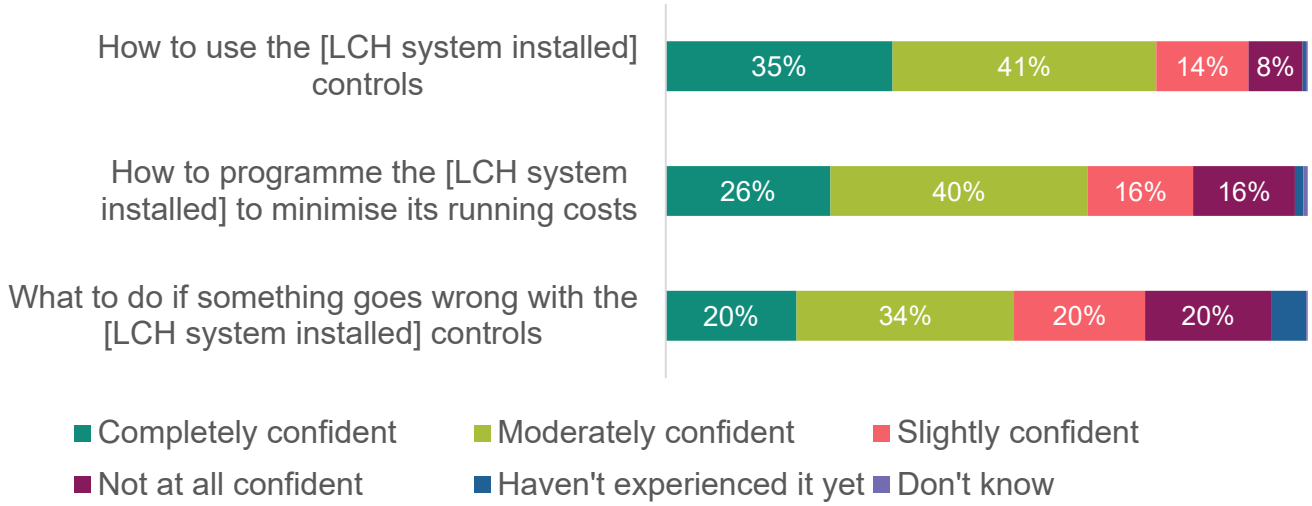
Confidence controlling the LCH system

Waves 1 and 2 of the property owner survey found that the handover of LCH systems was not always done to the satisfaction of property owners (e.g. 16% of respondents to the two surveys were very/fairly dissatisfied with their handover experience[75]). Follow-up interviews with BUS participants found that some property owners thought the information they were given was too technical and had left them with insufficient understanding of how to control their new LCH system[76]. Individuals had needed to recontact their installer, sometimes on multiple occasions, to ask questions about how to use and programme their LCH system efficiently.

The follow-up survey asked property owners to assess their confidence with three aspects of their system controls (Figure 30). A minority of respondents rated themselves as completely confident that they knew how to use the controls. Instead, most property owners said they were moderately or slightly confident, indicating that there remained gaps in their knowledge even after having used their LCH system for at least one winter heating season[77]. Some property owners reiterated that the handover of their system had been inadequate, leaving them to learn how to use controls through trial and error and by watching online videos. Confidence was particularly low in relation to what to do if something goes wrong with the controls (40% said they were either slightly confident or not at all confident). The property owner case studies also found examples where individuals had a mixed experience of the handover that left them unsure of how to programme their system or deal with unexpected problems (e.g. a lack of wi-fi connectivity). Case study property owners who had a technical or engineering background found it simpler to understand the information they were given or told, ask the right questions, and source answers themselves if they did not get a satisfactory response from their installer. Less technically minded individuals found it harder and consequently felt less confident that they knew how to use their new ASHP.

[75] n=2,608. Rates of dissatisfaction with the handover fell slightly between waves, from 17% very/fairly dissatisfied at wave 1 to 14% very/fairly dissatisfied at wave 3.
[76] See DESNZ (January 2025) Evaluation of the Boiler Upgrade Scheme: 2024 Interim Report
[77] As discussed later (Section: Satisfaction with LCH systems), most follow-up survey respondents were reportedly very or fairly satisfied with their LCH system. Evidence suggests that the degree of satisfaction was influenced by how confident property owners were using their LCH system. Amongst those who said they were completely confident how to use the LCH system controls, 82% were very satisfied and just 2% were very/fairly dissatisfied with their LCH system (n=576). Amongst those who were not at all confident, just 20% were very satisfied and 13% were very/fairly dissatisfied (n=124).

Figure 30: Property owners' confidence they understand how to use the LCH system controls

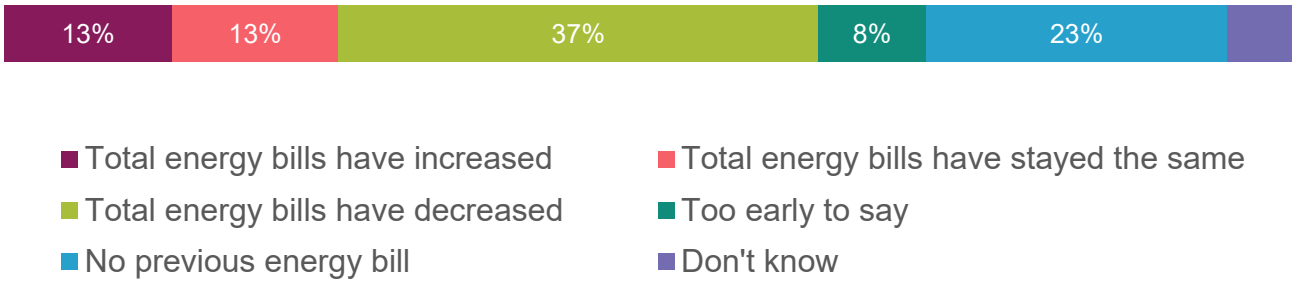


Source: Property owner follow-up survey. QC08. How confident or unconfident are you that you understand the following – how to use the [LCH system installed] controls; how to programme the [LCH system installed] to minimise its running costs; what to do if something goes wrong with the [LCH system installed] controls? Unweighted base: All respondents that have experience of using their LCH system (Yes at QR03) (n=1,594).

Energy bills

The following section discusses property owners' experiences of energy bills as they transitioned to a LCH system. Note that these data are all self-reported by respondents, and property owners were not asked to quantify changes in energy use and bills in kilowatt hours (kWh) or pounds. Follow-up survey respondents were asked how their total energy bills (i.e. electricity plus whatever other fuel they may have paid for) had changed since they had their LCH system installed (Figure 31). The most common response (37% of property owners) was that total bills had decreased, whilst 13% said that bills had increased. Just under a quarter of respondents (23%) had no previous energy bill at the property, reflecting the high proportion of self-builds and the extent to which people moved into a new property and had a LCH installed as they did so (meaning they did not have a comparable reference point).

Figure 31: Change in total energy bills reported by property owners



Source: Property owner follow-up survey. QD01. Thinking about the overall bills for energy (total for electricity, gas and/or other fuels) have you noticed a change since the [LCH system installed] was installed? Unweighted base: All respondents that still have their BUS-funded installation (Yes at QA01) (n=1,640).

Property owners who had previously used direct electric heating systems were significantly more likely to report that their total energy bills had decreased (56%), whereas property owners who had previously used oil-fuelled heating systems were most likely to report an increase in their bills (22%) – though even then it was still more common that they had seen a bill decrease (36%)[78]. Another factor affecting the share of property owners reporting a decrease in their energy bills was their self-assessed confidence about how to use their system's controls. As discussed above (Section: Confidence controlling the LCH system), confidence varied widely, especially in relation to how to programme LCH systems to reduce running costs. Amongst those individuals who said they were completely confident about how to do this, 53% also said their energy bills had decreased; amongst individuals who said they were not at all confident how to reduce running costs, 14% reported their bills had decreased.

Whether property owners installed solar PV around the same time as a LCH system – which as Figure 14 indicates was reasonably common – also affected reported change in energy bills. Forty-four percent of survey respondents who said they also installed solar PV reported that their energy bills had decreased, compared to 32% of those who did not install solar PV[79]. The potential impact on energy bills of parallel installation of solar PV and an electric battery storage system was highlighted by one of the case study properties. Alongside their ASHP this property owner had installed a large solar panel array in their garden, with batteries, and found that by using this plus time-of-use-tariffs (see below) their energy bill for the coldest month of the year had been under £50.

Energy bill tariffs and the extent of switching

Figure 32 uses a Sankey chart to show how property owners' usage of different types of energy tariff changed once they had a LCH system installed. The left side of the chart shows the distribution of tariffs prior to the BUS-funded installation and indicates that just over half (52%) of survey respondents had a standard variable/fixed tariff (including dual fuel, capped tariff, and tracker tariffs). Another 20% had some kind of time of use tariff where the unit price paid varied by time of day (e.g. an electric vehicle (EV) tariff, or Economy 7 or 10). The right side of the chart shows the situation after the LCH was installed. Standard variable/fixed tariffs were still the most commonly used (50% of property owners), but time of use tariffs accounted for 35% of property owners, and 11% were using a special heat pump tariff[80].

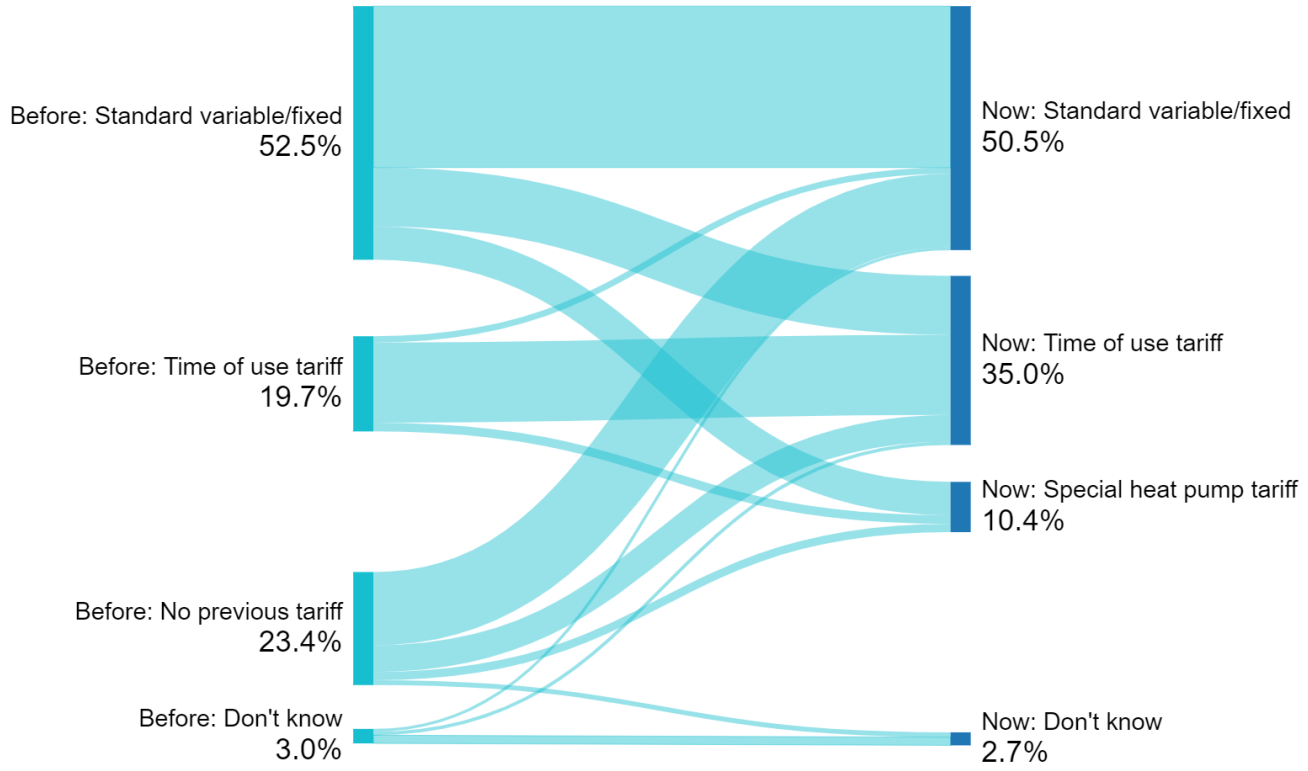
The tariff that property owners were on influenced how their energy bills changed after having a LCH system installed (see above). Amongst those individuals who were on a time of use tariff when surveyed, 50% said their energy bills had decreased since having their LCH system

[78] n=105 and n=343 respectively
[79] n=683 and n=959 respectively
[80] These are relatively new tariff types and are not offered by all energy suppliers. Those presently on the market are typically similar to time of use tariffs in that they offer discounted electricity prices during off-peak periods, or they provide an all-day discount tied to the use of a particular heat pump model/energy supplier.

installed. Amongst those on a standard variable/fixed tariff, 27% reported a decrease (47% of those on a special heat pump tariff said their bills had decreased). As noted above, in addition to tariffs there were various other factors that affected the direction of change in energy bills.

Sankey charts show the magnitude of flows over time, and Figure 32 indicates that many property owners switched from a standard variable/fixed tariff to either a time of use or a special heat pump tariff once they had their LCH system installed. Standard variable/fixed tariffs remained the most common because many property owners who had not previously had an energy tariff (e.g. because their property was a self-build) chose that tariff over the other tariff types.

Figure 32: Property owners' energy tariffs prior to the LCH system installation ('before', left side) and at the time of the survey ('now', right side)



Source: Property owner follow-up survey. Left side - QD03. Have you changed your electricity tariff since the [LCH system installed] was installed and QD03a. What electricity tariff were you on before you switched? Right side - QD02. What electricity tariff are you currently on? Unweighted base: All respondents that still have their BUS-funded installation (Yes at QA01) (n=1,640). Note: not shown are any categories under 1% so may not sum to 100%.

Overall, 35% of property owners indicated that they had switched energy tariff since having their LCH system installed, and 40% said they had not (most of the remainder had no previous energy bill – e.g. because their current property was a self-build)[81]. As Figure 33 indicated, most of these 'non-switchers' (67%) simply remained on their standard variable/fixed energy tariff. Responses to the open text boxes in this follow-up survey highlighted that some people are also unaware of time of use tariffs and heat pump tariffs in particular. A few survey

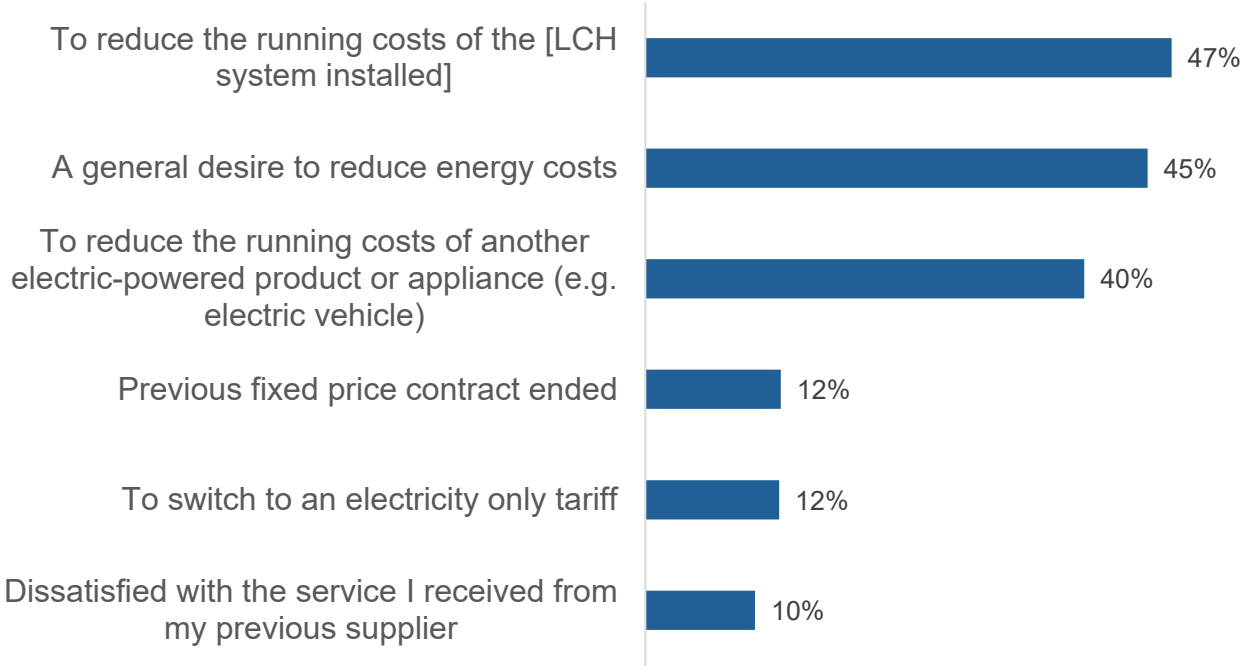
[81] Unweighted base: All respondents that still have their BUS-funded installation (Yes at QA01) (n=1,640). QD03. Have you changed your electricity tariff since [LCH system installed] was installed?

respondents explained that they had been unable to get a smart meter installed (e.g. due to the fabric of their property), which limited the range of tariffs available to them.

Thirty percent of property owners who had not switched were already on a time of use tariff when they installed their LCH system. This was typically because they already had solar PV installed and/or already had an electric vehicle. They were thus already on an optimal energy tariff and/or did not see added value in moving to a heat pump specific tariff.

Respondents who had switched energy tariff were asked why they had done so (Figure 33). Just under half (47%) of respondents switched tariff to reduce the running costs of the LCH system they had installed. Some respondents noted they reduced their electricity bills significantly by switching to a tariff that was designed for their new LCH system. Property owners were also motivated to switch by a general desire to reduce energy costs and specifically to reduce the running costs of another electricity-powered product or appliance (e.g. an electric vehicle).

Figure 33: Why property owners had switched energy tariff since the LCH system installation



Source: Property owner follow-up survey. QD03b. Why did you change your electricity tariff? Unweighted base: All respondents that had changed tariff (Yes at QD03) (n=671). Note: multiple answers possible so figure sums to more than 100%; for brevity, not shown are any options selected by under 2% of respondents.

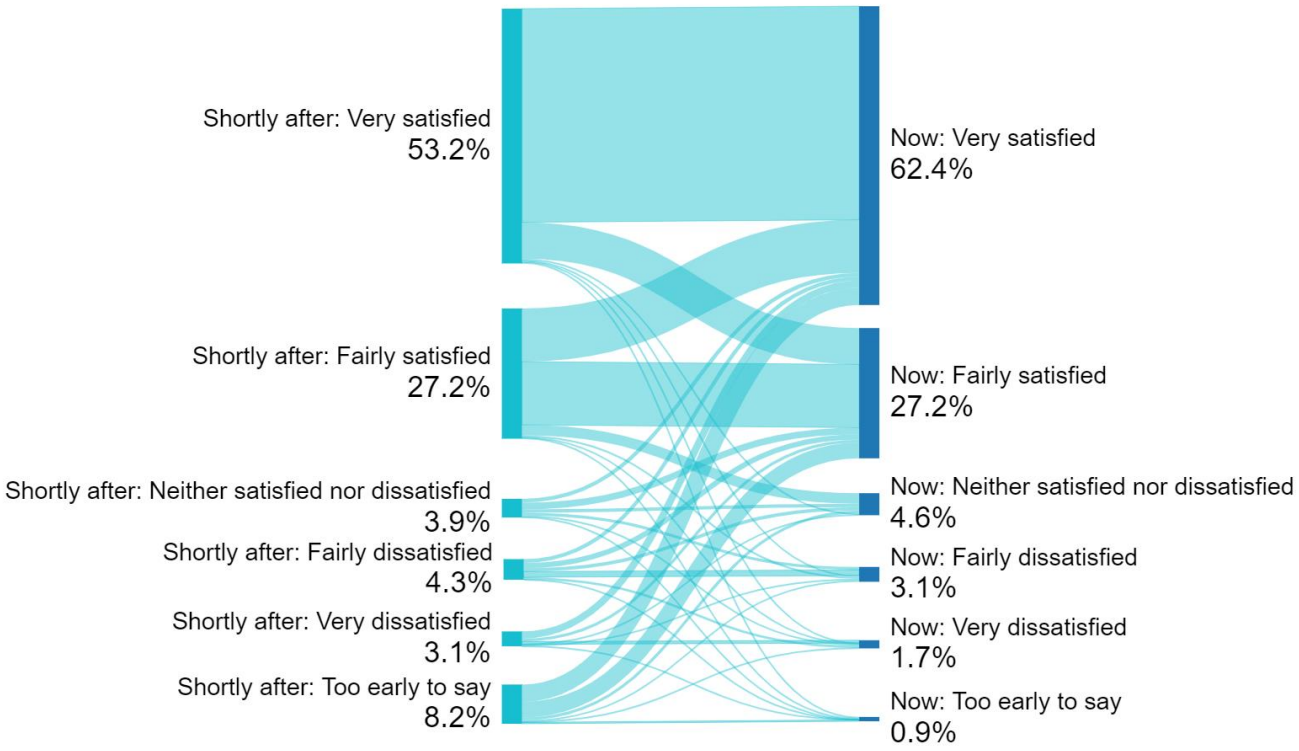
Property owners' perceptions of their LCH system

Satisfaction with LCH systems

As part of the follow-up survey, property owners were asked how satisfied they were overall with their new LCH system. This question was also asked during the wave 1 and 2 property

owner surveys (i.e. shortly after LCH systems were installed), enabling analysis of if and how their sentiment changed over time as they became more familiar with using their LCH system. Figure 34 uses a Sankey chart to show how property owners assessed their satisfaction at the two points in time, and if and how they changed their minds between these two points. At the time of the follow-up survey (the right of the chart), 62% of property owners were very satisfied with their LCH system, an increase from the 53% who were very satisfied when they completed the wave 1 or 2 property owner survey (the left of the chart). Rates of satisfaction with LCH systems increased over time as people made up their minds when they were previously unsure or had to overcome initial concerns. Just 5% of follow-up survey respondents were either very/fairly dissatisfied with their LCH system (down slightly from 7% at the time of the wave 1 or 2 survey).

Figure 34: Property owners' satisfaction with their LCH system at the wave 1 or 2 survey ('shortly after' installation, left side) and at the follow-up survey ('now', right side)



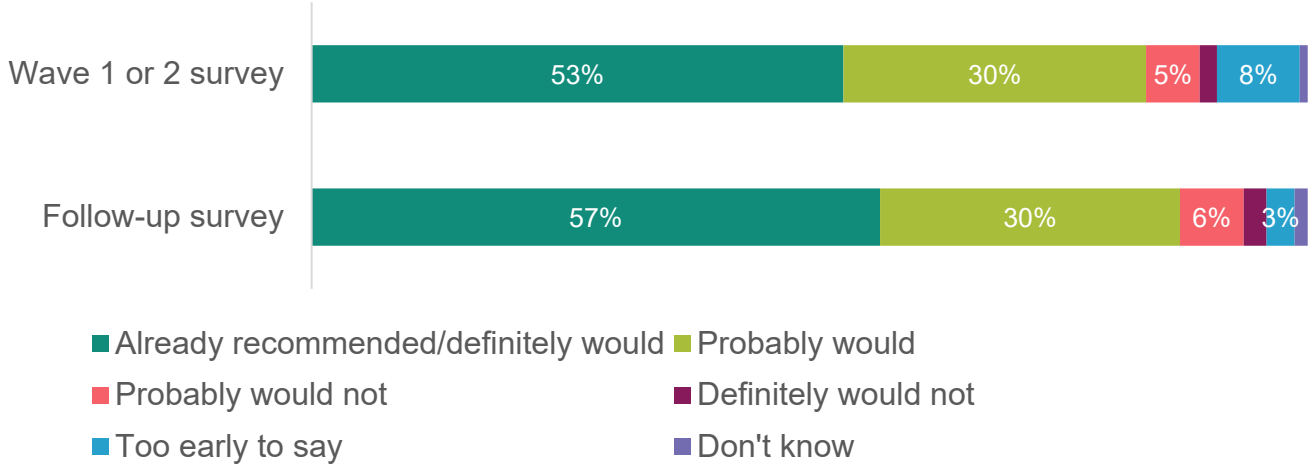
Source: Wave 1 and 2 property owner survey and property owner follow-up survey. QE03. Taking everything into account, how satisfied or dissatisfied are you with your [LCH system installed] overall? Unweighted base: All respondents that still have their BUS-funded installation at the follow-up survey (Yes at QA01) (n=1,640). Note: not shown are any categories under 0.5% so may not sum to 100%.

Whether property owners had/would recommend their LCH system

As Figure 35 shows, at the time of the follow-up survey (the lower bar in Figure 35), 57% of property owners said they already had/definitely would recommend their LCH system to friends. Another 30% said their probably would. Nine percent said they definitely/probably would not recommend it. The upper bar in Figure 35 shows the distribution of responses for this sub-group of individuals when asked the same question at the wave 1 or 2 survey (i.e. soon after the installation was completed). The share of people who already had/definitely would recommend their system increased slightly (from 53% to 57%), as did the share of

people who definitely/probably would not recommend it (from 7% to 9%). The changes were relatively small, however, and it appears that most people had already made up their mind as to whether they would recommend a LCH system to friends soon after it was installed.

Figure 35: Whether property owners would recommend their LCH system



Source: Wave 1 and 2 property owner survey and property owner follow-up survey. QE04. Based on your experience to date would you recommend a [LCH system installed] to friends? Unweighted base: All respondents that still have their BUS-funded installation at the follow-up survey (Yes at QA01) (n=1,640).

Interim Conclusions

This final chapter presents some interim conclusions from the evaluation. During the scoping phase of the evaluation, the team agreed with the Department 16 process, impact and economic evaluation questions that guide the evaluation. The 2024 Interim Report included preliminary answers to the process evaluation questions. In this report we present early answers to some of the impact evaluation questions. A comprehensive set of responses to the 16 evaluation questions will be included in the final evaluation report.

Why have property owners chosen to participate or not participate in the BUS, and how has this varied between different groups of property owners?

Evidence on why property owners have chosen to participate in the BUS comes from three waves of a survey of individuals who had a BUS-funded LCH system installation. The environmental benefits were consistently the most cited motivation to switch to a LCH system – with 85% of survey respondents wanting to reduce their carbon emissions and 77% wanting to reduce their reliance on fossil fuels. The availability of the BUS grant was the most common trigger for property owners to act when they did (69% of property owners cited this), even more so after the uplift in the grant value. They had also often installed a LCH system as part of a wider refurbishment or building upgrade – including a self-build project – since this provided an opportune moment to upgrade their heating system.

Evidence on why property owners have chosen not to participate in the BUS comes from 30 interviews undertaken with homeowners who, whilst aware of LCH systems, had not submitted a BUS application. Despite holding many similar views to participant property owners (that LCH systems were environmentally friendly), they had been deterred by a range of concerns. Typically they perceived that a LCH system would not be appropriate for their circumstances. This was because they thought that living in older and/or poorly insulated properties would mean a LCH system would not keep them warm enough, and because they were concerned that a LCH system might have high running costs or would be disruptive to install. Many interviewees had still taken steps to install a LCH system but had stopped due to trouble getting installers to provide a quote, delays to supporting works (e.g. insulation installation), and because they did not trust the installer(s) that provided a quote.

Why have installers chosen to participate or not participate in the BUS, and how has this varied between different groups of installers?

Evidence on why installers have chosen to participate in the BUS comes from two waves of a survey of installer companies that registered with the Scheme. Installer companies that registered with the BUS in the months after it launched were typically experienced LCH system installers looking to sustain or expand their activities, having previously delivered under the RHI and other government initiatives. Since then the Scheme has attracted a greater share of installers that are new to LCH installations and/or have worked in adjacent sectors, including installing fossil fuel heating systems or other renewable energy technologies (e.g. solar PV). Installers have joined the BUS because they thought it would be very difficult to work within the

private owner-occupier market without being able to offer the grant, because they would not be able to compete on price with BUS-registered installers.

Evidence as to why installers have not participated in the BUS came from 10 interviews carried out with LCH system installer companies that had not registered with the Scheme. They were deterred by a range of concerns about the Scheme, including the potential cashflow risk due to the time between completing installations and being paid the BUS voucher, MCS accreditation requirements, and BUS-related administrative requirements. Non-participating installers noted that there was plentiful LCH installation work available in other markets (e.g. social housing, supported by ECO4), and did not feel the benefits of joining BUS outweighed the downsides.

How satisfied are property owners with the installation and use of their LCH system, and would they recommend one?

The property owner survey differentiated between the main aspects of the installation experience, including scheduling, disruptiveness, duration, and the handover at the end. Most property owners were satisfied with each of these considerations, and satisfaction levels increased between survey waves. For example, the proportion of property owners who were very/fairly satisfied with their experience of scheduling an installer to do the works increased from 77% at wave 1 to 83% at wave 3. Increasing satisfaction rates may reflect improvements to installers' service offers as they became more experienced or might be because BUS property owners are becoming more knowledgeable consumers and better understand what to expect from an installation (see Section: Property owners' installation experience).

Evidence about levels of satisfaction with LCH system use comes from the follow-up survey of property owners, which was carried out after they had used their new system for at least one heating season. Most property owners reported that the temperature of their home was about right, whether overall (93% of respondents) or during the coldest spells (86% for both the coldest mornings and coldest evenings). Most (70%) survey respondents were very/fairly satisfied with how quickly their property was heated, and 83% were very/fairly satisfied with how evenly their property was heated. Most property owners (94%) thought the temperature of their hot water was about right when heated using their LCH system. They were largely happy with how quickly their hot water heated up (86% were very/fairly satisfied) and how much hot water there was (89% were very/fairly satisfied).

Evidence from the follow-up survey of property owners indicated that most property owners (57%) already had or definitely would recommend their LCH system to friends. Nine percent definitely/probably would not recommend it. This question was also asked in the wave 1 and 2 survey, and the proportion of property owners who would or would not recommend a LCH system was broadly similar in that survey and the follow-up survey. It seems likely that most property owners made up their minds about their LCH system soon after it was installed.

To what extent have property owners changed their energy and heating use as a result of having a LCH system installed? Has BUS caused property owners to make other energy-related changes?

Whilst property owners were largely happy with the temperature of their property when using their LCH system, evidence from the follow-up survey indicates that just under half (44%) used at least one type of supplementary heating over the winter. This was typically an open fire or stove that burned wood or coal – this may have been to increase comfort in high use rooms (e.g. a lounge), and was also likely to have had an aesthetic value (see Section: Use of supplementary heating). In response to having a LCH system installed, some property owners switched energy tariff. A third (35%) of follow-up survey respondents had changed their energy tariff, typically with the intention of reducing energy bills. By the time of the follow-up survey, a third (35%) of survey respondents were on time of use tariffs, whilst 11% were on a special heat pump tariff.

Evidence from the property owner survey indicates that many property owners installed other energy-related technologies alongside their LCH system – just 31% said they did not install any of the technologies shown to them in the survey. Property owners installed a mixture of energy generation/storage and energy efficiency measures alongside their LCH systems, notably solar PV systems (installed by 40% of property owners). They did so to reduce their energy bills (see Section: Carrying out supplementary and additional works to the property).

This publication is available from: www.gov.uk/government/publications/evaluation-of-the-boiler-upgrade-scheme-2025

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