Heating and Cooling Installer Study (HaCIS):

Main Report

January 2023

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Executive Summary

Heat in buildings is responsible for over a fifth of UK greenhouse gas emissions.[1] These emissions will need to reduce to virtually zero to meet the UK's legally-binding target of Net Zero emissions by 2050. Over the next decade, heat pumps will be the primary means of decarbonising heat in buildings, and Government expects 600,000 heat pumps to be installed per year by 2028.[2]

Heating and cooling installers will play a critical role in this transition away from fossil fuels to clean heat alternatives. This study set out to improve understanding of the current characteristics, activities and attitudes of the heating and cooling installer workforce in England. This information will inform future Government policy on training provision, barriers to diversity, the quality of heat pump installation, and mechanisms to encourage installers and businesses to transition to low carbon heating. The research was commissioned in 2021 by the Department for Business, Energy and Industrial Strategy (BEIS) and conducted by IFF Research (IFF) and ACE Research (ACE-R).

Installer Archetypes

Installers were segmented into five archetypes based on their attitudes and experiences regarding heat pump installation.[3] One aim of the archetypes was to help ensure that future policy interventions and communications can be targeted effectively to maximise impact. The archetypes are summarised in Figure 1, organised in order of likelihood to install or be upskilled to install heat pumps. Those in the 'Retirees' and 'Disengaged' archetypes are less likely to transition/upskill, whilst those in the 'Demand influenced' and 'Keen to learn' archetypes are much more open to engaging with and installing heat pumps.

Figure 1. The five archetype segments

[1] Department for Business, Energy & Industrial Strategy (2021), Final UK greenhouse gas emissions national statistics 1990-2020, emissions categories included: 'Commercial and miscellaneous combustion and electricity', 'Public' and 'Residential' Final UK greenhouse gas emissions national statistics: 1990 to 2020 - GOV.UK (www.gov.uk)

[2] HM Government (2020), The Ten Point Plan for a Green Industrial Revolution: https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution

[3] This was based on 154 installer responses to the workforce survey on willingness to install heat pumps, and the upskilling required to do so. More information about the archetype approach can be found in the Technical Report.

Key barriers and motivations

The key barriers and motivations to transitioning/upskilling differed across the archetypes, although customer demand was regularly cited as both a barrier and motivator to installing heat pumps[4]:

- **Demand influenced installers:** Demand led installers were most likely to say that increased consumer demand and government support would increase the number of heat pumps they would install. Key barriers to transitioning were that installers have sufficient work without heat pumps, and customer demand for heat pumps is seen as low, compared with demand for fossil fuel heating. The cost of heat pump installation training was also noted as a key barrier to upskilling.
- **Keen to learn installers:** These installers are motivated (relative to other archetypes) by a desire to learn new skills, including those related to heating and/or cooling technologies. They are also more likely than others to say climate change is the most important issue facing the UK. As the name suggests, these installers are keen to train, but as they are more likely to be employees, they may be dependent on their employer to provide access to training. These installers also mentioned perceptions of demand for heat pumps as a barrier.
- **Current heat pump installers**: Key motivators include the influence of customer demand to install the technology: 65% reported their customers were asking for heat pumps and 45% said they thought heat pumps were a good solution for their customers' needs. Wanting to work on low carbon technologies was also a motivator.

Capacity to install heat pumps in future

Due to the size of the sample, it is not possible to precisely estimate the proportion of installers who fall into each archetype. However, the results of the research as a whole suggest that around three quarters of existing installers either already install heat pumps or could train to install heat pumps in the long term. 69% of installers surveyed indicated that they have an interest in receiving heat pump training.

Characteristics of heating and cooling employers and their workforce

Installer characteristics

The heating and cooling installer workforce is predominantly male and white. Literature, surveys and stakeholder feedback all showed that the installer population is ageing, in line with the wider UK workforce[5]. For example, the employer survey estimated that two-thirds of the installer workforce were aged 45 years or older and just over a third were aged 55 years or older.

[4] Barriers and motivations specific to the Retirees and Disengaged archetypes have not been presented due to low base sizes.

[5] State of Ageing in 2020, Centre for Better Aging (2020) https://ageing-better.org.uk/work-state-ageing-2020#:~:text=The%20workforce%20is%20ageing%3A%20a,unemployment%20crisis%20for%20older%20workers

Amongst surveyed installers, two-fifths were planning to leave the industry in the next ten years (mostly to retire), with the suggestion from the in-depth interviews that smaller firms would then cease trading. This, combined with the ageing workforce, raises concerns that expertise will be lost from the sector, but also suggests that the existing workforce will need to be supplemented with new entrants (e.g. new apprentices) to meet the required target of 600,000 heat pump installations per year by 2028.

When asked about diversity, installers reported that they found it more important to find people who were good at the job rather than focus on their ethnicity, gender, age or socio-economic background. However, increasing the number of young people entering the sector was an area most installers agreed was important, due to the ageing workforce. Those who were more optimistic (Current heat pump installers and Keen to learn archetypes) about the future of heat pumps were more likely to say the sector was appealing to young people.

Younger installers (aged under 45) were typically based at larger firms, as well as at employers who provided heat pump installation services. Therefore, targeting larger organisations is more likely to ensure the Government can access those who are at the earlier stages of their career.

Business size

The heating and cooling sector is dominated by small-sized businesses, with 95% sole traders or micro sized firms (fewer than 10 employees) and 5% small businesses (10- 49 employees) in the sector[6]. This was corroborated by the employer survey results. The literature identified challenges to the growth of smaller firms, one of which is that small and medium sized enterprises (SMEs) can be cautious and risk-averse, preferring to work with known technologies and techniques rather than innovate. The employer survey showed that currently larger businesses are more likely to install heat pumps.

Market specialisms

The vast majority (89%) of employers worked on existing domestic buildings, but most firms typically worked across other types of projects. For example, 95% of those working on *new* domestic buildings also worked on *existing* domestic buildings, and 77% of those working on *existing* commercial buildings also worked on *existing* domestic buildings. Seven percent of employers worked solely on commercial buildings, and only 1% worked solely on new builds (commercial or domestic).

Larger firms were more likely to work on commercial buildings. Businesses that installed heat pumps were more likely than other firms to work on new or existing commercial buildings or new domestic buildings.

Almost two-thirds of employers offer both new installations and maintenance of existing systems, with most of the remainder offering maintenance only.

F-gas skills and experience

F-gas skills are required to install some (but not most) types of heat pumps. Seventeen per cent of employers said their business was certified to work with F-gases. Those offering (any)

[6] Source: UK business: activity, size and location, ONS, 2021. Figures based on a snapshot of the Inter-Departmental Business Register (IDBR) taken on 12 March 2021 for 'Plumbing, heat and air-conditioning installation' enterprises. Less than 1% (0.6%) of the sector is comprised of medium (50-249 employees) or large (250 or more employees) firms, with the remainder classed as micro (fewer than 10) or small (10-49).

heat pump installation services were more likely to be certified to work with F-gases (46% compared to 8% of employers not offering heat pump installation).

Experience of and attitudes towards heat pump installation

Involvement in heat pump installation

A quarter of all employers surveyed offered heat pump installation services to their customers, with a further 21% reporting that while they did not currently install heat pumps they expected to in the future. Larger firms were more likely to provide heat pump installation services (68% of those with 10+ installers). In total, 60% of current installers work for businesses which either already offer heat pump installations or expect to do so in the future.

One-fifth of the installers surveyed reported that they had installed a heat pump in the last two years, with an additional 14% saying they had not installed a heat pump in the past two years but that they have received training to do so.

Most of the installers who had installed a heat pump in the last two years spend the majority of their time installing other technologies; just under half had spent less than 5% of their time installing heat pumps. Only 15% spent over half of their time installing heat pumps. The depth interviews revealed that installers attributed this to demand for the relevant technologies. However, a majority of heat pump installers in the workforce survey expected the amount of time they spent on heat pumps would increase, 45% by ‘a lot’ and 29% by ‘a little’. Existing employers expected the number of installers working on heat pumps to approximately double by 2028.

Customer demand as a barrier

Lack of customer demand was seen as a key barrier to installing heat pumps for those who did not already install them (regardless of whether they had received related training). Indeed, 43% of employers who don’t currently offer heat pump installation said they would need to see an increase in customer demand for this to change. However, depth interviews suggested that many installers felt that appetite for low carbon heating solutions, including heat pumps, would likely increase, as the technology improves, and costs reduce. Specific improvements referenced included heat pumps being less noisy, being able to heat less well insulated homes, or being more affordable to run.

Future skills needed for heat pumps

Employers stated that the most commonly required skills for any transition to heat pumps would be installation skills (85%), followed by customer service skills (71%), understanding the suitability of an installation (67%), and maintenance (63%).

Barriers to the up-take of heat pumps

Employers and installers perceived cost and affordability as key barriers to consumer up-take of heat pumps, with one common suggestion in the surveys being the need for Government support to incentivise customers. In the depth interviews, installers called for general awareness raising about the low carbon transition and heat pumps by Government but also for the heating and cooling industry to do more to promote heat pumps, and to provide better training to increase take-up.

Trusted communication

In general, installers were more likely to seek out and trust information shared via trade magazines and their peers, as opposed to the Government. Manufacturers were also seen as a trusted source, with an acceptance that sometimes they have a vested interest in certain technologies.

Training, apprenticeships and future skills

Overall approach to training

Seven in ten employers had provided some form of training to their installers in the previous two years. The most common types of training offered by employers included installation and maintenance training, while communication, project management, sales and gas qualifications were least common.

Amongst employers that did not offer training, the most common barriers to training provision were staff being too busy to train and a lack of available funding.

Perceptions of current heat pump training

Most heat pump training was reportedly provided via day long manufacturer's courses. However, many installers were dissatisfied with the training available. The lack of "hands-on" learning meant they did not feel confident installing heat pumps. As noted in the literature review, new training courses have recently been launched which may address this. However, installers also raised concerns that they did not install regularly enough to retain the knowledge they learned through training.

Attitudes to future heat pump training

A large proportion of installers (69%) would like to receive heat pump training in the future, but their willingness and ability to upskill would be affected by their own lack of interest in attending training on heat pumps (16%), prohibitive cost (15%), and uncertainty about where to access training (15%).

Apprenticeships

One in five employers currently have heating and cooling apprentices, with apprenticeships more common among larger employers. Those offering apprenticeships said that it was a good way of getting skilled staff (58%), and to support young people to enter the industry. At the same time, all installers in the focus groups agreed that retention was an issue, with apprentices often leaving shortly after their apprenticeship completes.

Standards and accreditation

Competent Person Schemes

The vast majority of employers were signed up to Competent Person Schemes, with Gas Safe most common (81%). Around a quarter (28%) were signed up to Competent Person Schemes which include heat pumps within their scope (although it is possible they were certified for other technologies only).

Microgeneration Certification Scheme

Only 17% of employers that offered heat pump installation services were members of the Microgeneration Certification Scheme (MCS). Amongst those who offer heat pump services, 31% of employers with 10+ installers were certified by the MCS.

The key reason for becoming MCS certified was so that the customer could take advantage of associated Government schemes which made the installation affordable to the consumer.

The vast majority (88%) of employers agreed that it was important to self-certify that work complies with Building Regulations e.g., through a Competent Person Scheme. However, some focus group participants felt that the Government incorrectly focused on how employers become MCS accredited, without looking into how enforcement of the standards was being upheld. Some raised the issue that certification is the same cost for sole traders as it is for larger businesses whilst others reported that they would not know what to consider when looking into heat pump certification.

Methodology

Each of the five research strands, described below, aimed at answering a sub-set of the research objectives.[7]

1. Literature review (including stakeholder engagement);
2. Employer online survey (with 687 respondents from the heating and cooling employer population) and a workforce online survey (with 154 individual heating and cooling installers);
3. In-depth interviews with 50 heating and cooling installers;
4. Stakeholder workshops with i) trade associations and the energy industry, ii) skills, standards and academic experts and iii) policy specialists and analysts from BEIS;
5. Focus groups with heating and cooling installers and employers.

Limitations of the research

The lack of a sampling frame or a straightforward route to contact installers meant that the overall response rates were lower than anticipated for both the employer and workforce surveys. While the achieved response rate of the employer survey was sufficient to provide representative findings for the employer population, findings from the workforce survey should be treated as indicative of the types of experiences of the different installers interviewed rather than generalisable to the whole installer population. Although expert stakeholders believed the installer archetypes to be reflective of the industry, the small sample size means that these also cannot be considered representative of the installer population.

[7] Appendix A shows which research questions were designed to be answered within which project strand.

1. Introduction and Methodology

This section provides a short summary of the rationale for the research and the methodology for each of the research strands. More detailed information on the methodology can be found in the Technical Report.

Project rationale

To meet its commitments to reducing greenhouse gases, the UK will need to move away from fossil fuel boilers towards lower carbon alternatives. Heat pumps are an alternative technology that is expected to play a major role in achieving this. The Government's 10 Point Plan for a Green Industrial Revolution and December 2020 Energy White Paper set out an ambition to grow the clean heat market to 600,000 heat pump installations per year by 2028[8].

For the UK to meet this 2028 target, the number of trained heat pump installers will need to increase significantly[9]. Some of these additional installers will be new entrants to the sector, trained via apprenticeships and T-levels, whilst others will be cooling installers with experience in air-conditioning or refrigeration. However, many will be existing fossil fuel boiler installers who require additional training.

It is therefore vital for the Government to understand the current heating and cooling installer workforce, in order to support them adequately during this expansion of the heat pump sector and the upskilling required.

The Department for Business, Energy and Industrial Strategy (BEIS) commissioned IFF Research (IFF) and ACE Research (ACE-R) to conduct a research study to develop a comprehensive understanding of the current characteristics, activities and attitudes of the existing heating and cooling installer workforce in England.

The research was designed to achieve the following five objectives:

- **Objective 1**: To develop a comprehensive understanding of the characteristics and activities of the heating and cooling installer workforce.
- **Objective 2:** To segment the heating and cooling installer workforce into distinct archetypes which can be used to inform strategies to support and encourage installers through the low carbon heating transition (this is referred to as the archetype analysis within here and in other project reports).
- **Objective 3:** To understand the extent to which heating, and cooling installers can be upskilled to work on heat pumps in the future.
- **Objective 4:** To explore heating and cooling installers' attitudes towards standards and accreditation for low carbon heating and identify what factors influence these views.

[8] HM Government (2020), The Ten Point Plan for a Green Industrial Revolution: www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution
[9] From 4,900 trained heat pump installers in 2022 to 33,700 by 2028, based on projections from the Heat Pump Association (Heat Pump Association, 2022: www.heatpumps.org.uk/about/installers/)

- **Objective 5:** To understand how installer business models may need to adapt in the future to effectively install heat pumps and explore potential challenges arising from these changes.

Research outputs

This report contains the collated findings from the project. It is accompanied by a series of additional outputs that provide more details on each element of the work:

- Literature Review
- Data tables from the Employer Survey
- Data tables from the Workforce Survey
- Technical Report (including Appendices)

Methodology

The research objectives set out above were translated into a series of Research Questions, each with a set of more detailed sub-questions. Each strand of the project, described below, was aimed at answering a sub-set of these questions. Appendix A shows which research questions were designed to be answered within which project strand and the full list of research questions are included in the Technical Report.

Strand 1: Literature review

As the first phase of the project, the literature review performed two key functions for the project:

- Provided a context for the study and ensured readers of the report have an accessible summary of existing publications exploring heat pump skills development.
- Informed the content of the primary fieldwork, particularly by assessing where there were gaps in existing literature and research.

Evidence gathering for the literature review was undertaken through a parallel approach of desk-based research and stakeholder engagement. The latter identified and secured additional and emerging evidence and data and sought to provide initial commentary on the research questions and project scope.

References are made to findings from this strand within this report, but the literature review report acts primarily as a standalone document.

Strand 2a: Employer survey

Heating and cooling installers were sampled based on their 5-digit ONS Standard Industrial Classification (SIC) code and contact details sourced from Market Location (a provider of B2B wholesale business data). Employers were invited to take part in the online employer survey via a postal letter. This letter detailed why the study was being conducted, why taking part in the survey was important and provided a link to the online survey (and a unique access code) for each business. This push-to-web approach was supported by telephone chasing and email reminders to employers who had provided a contact email address via telephone chasing.

A total of 22,460 heating and cooling employers were invited to participate between mid-October 2021 and mid-January 2022, with telephone chasing taking place from late October 2021. In total, 687 employers completed the employer survey out of a sample of 22,460 (a response rate of 3%)[10]. At an overall level, the achieved response rate of the Employer survey was sufficient (n=687) but much smaller than the original target of 3,600.

For the analysis of the employer survey, two weights were created based on:

- The size of the businesses (employer weight)
- The estimated employment population (employment weight)

The employer weight was applied to the majority of the employer survey questions. The employment weight was applied for analysis of the demographic questions so that the gender, age, ethnicity, disability status and length of time spent working in the industry of the overall workforce could be better estimated.

Strand 2b: Workforce survey

To conduct the workforce survey, email invites were sent to employers who had completed the employer survey. Those with at least one employee were asked to share the survey link with their workforce, while sole traders were asked to complete the workforce survey themselves.

Fieldwork ran between mid-November 2021 to the end of January 2022, with telephone chasing taking place from late November 2021.

In total 385 of the 687 employers who took part agreed to be re-contacted. This generated 154 completed responses. A target of 2,500 workforce survey completes was originally anticipated based on assumed employer (to the employer survey) and installer (to the workforce survey) response rates. No weighting was applied to the data. Limited sub-group analysis was possible within this report because the achieved response rate was relatively small. A number of actions were taken to try and boost the response rate, each of which are outlined in more detail within the Technical report.

The workforce survey data were used to segment the installer workforce into five distinct archetypes. These are discussed more in the Archetype model chapter.

Strand 3: Installer interviews

At the end of the workforce survey, installers were asked whether they agreed to be re-contacted to take part in either an in-depth interview or focus group. In total, 97 of the 154 installers (63%) agreed to be re-contacted.

Fifty in-depth interviews were conducted via Zoom, Microsoft Teams or telephone, lasting around 60 minutes each. These interviews aimed to expand and triangulate evidence from survey findings, regarding the characteristics, activities, attitudes and experiences of heating and cooling installers. They were an opportunity to inform understanding of enablers and barriers to upskilling to install (more) heat pumps and other low-carbon systems.

[10] The survey originally aimed to receive a total of 3,600 responses from employers.

Strand 4: Stakeholder workshops

Three stakeholder workshops were conducted to share emerging findings and gather feedback on the draft installer archetypes and specific project research questions. The three workshops were organised as follows:

- Workshop 1: Trade Associations and Energy Industry
- Workshop 2: Skills, Standards and Academics
- Workshop 3: BEIS

Strand 5: Focus groups

Installer focus groups were conducted with the Keen to learn and the Demand led installer archetype segments. These segments had more positive attitudes towards the transition to heat pumps, but with a lack of current experience and skills to install and maintain them.

The limited number of installers who took part in the workforce survey and agreed to be re-contacted regarding the focus groups, also informed the sampling. Consequently, two focus groups with employers (both micro and small businesses) were also recruited via the employer survey.

Analysis within this report

This report summarises the analysis of, and key findings from all of the above project strands, including how findings align to those from the literature review.

Only statistically significant differences within the employer and workforce survey have been referred to in this report. Significant differences are indicated in the charts in the report with an asterisk and explained within the source information underneath each chart. Employer survey charts are in blue, whilst workforce survey charts are in red.

For multi-response questions, the sum of the total responses may exceed 100%. This is because a respondent could provide more than one response, and responses are not mutually exclusive. For single-response questions, the sum of all responses may not add up to 100% due to rounding.

Throughout the report, qualitative findings from the installer interviews, stakeholder workshops and focus groups have been referenced. Where quotes illustrate findings, the archetype and business size is given for installer depth interviews and focus groups. For workshops, the audience of that workshop is given as the attribution e.g. “(Stakeholder workshop #2: Skills, Standards and Academics)”.

Readers should assume that ‘heat pumps’ refer to ‘all’ heat pumps unless otherwise specified e.g. air-to-air heat pumps or hydronic heat pumps.

Limitations

While every effort has been taken to ensure that the findings presented in this report are as accurate and reliable as possible, it is important to note some limitations of the research:

- Installers who are more engaged or interested in heat pump technology, or conversely more opposed or critical, may have been more motivated to take part in the research versus those with more 'neutral' views.

Surveys

- The number of medium and large firms who took part in the employer survey (n=19) limited the amount of sub-group analysis that could be conducted by employer size. With only one large (heating) employer responding, the views of large cooling employers are not represented.
- Due to a low response rate for the workforce survey (n=154), findings should not be treated as representative of the installer population. Furthermore, the workforce survey data were not weighted to be representative of the wider installer population.
- The installer archetypes should be considered indicative rather than statistically representative of the installer population because of the small sample size which was used to create them.

Qualitative strands

- Across the relatively small number of interviews and focus groups conducted, we were able to ensure a broad range of installers, across the different archetypes, took part, but were not able to ensure they also represented all the different demographic groups e.g. ages and regions.
- Focus groups were conducted with micro (<9 employees) and small (10-49 employees) employers only.

Full details of these limitations and the methodology used can be found within the Technical Report.

2. Archetype model

Using the responses from the workforce survey, installers were grouped (using statistical modelling) based on their attitudes and experiences regarding heat pump installation. This segmented the workforce and created five ‘archetypes’ of installers. This chapter briefly explains how these archetypes were created, a summary of them and what attitudes and experiences drive and underpin them.

The approach

IFF (in partnership with the statistical consultancy The Stats People) developed installer archetypes to help ensure that future policy interventions and communications can be targeted effectively to maximise impact.

The Stats People team used a Latent Class (LC) Analysis approach to segment the installer workforce into different ‘types’ of installers. This was based on the 154 installer responses in the workforce survey regarding their willingness to install heat pumps, and the upskilling required to do so. Data from the employer survey, in-depth interviews and expert stakeholder workshops was drawn on to strengthen the evidence base for these archetypes.

It should be noted that (Retirees and Disengaged) archetypes with under 30 cases will be subject to a larger sampling error, and so caution should be given when interpreting these findings. However, their profiles can be taken as a strong indication of their differences with other segments. The smallest segment is Retirees which has only 11 installers, out of a total of 154 (7%), however the profile of this group is extremely strong and distinct, so is likely to exist in the full population despite the low base size.

More information about the archetype approach can be found in the Technical Report.

The archetypes

Overview

The LC Analysis resulted in the creation of five archetype segments, based on the attitudes and experiences of installers reported in the workforce survey. Each archetype was then profiled to explore demographic characteristics.

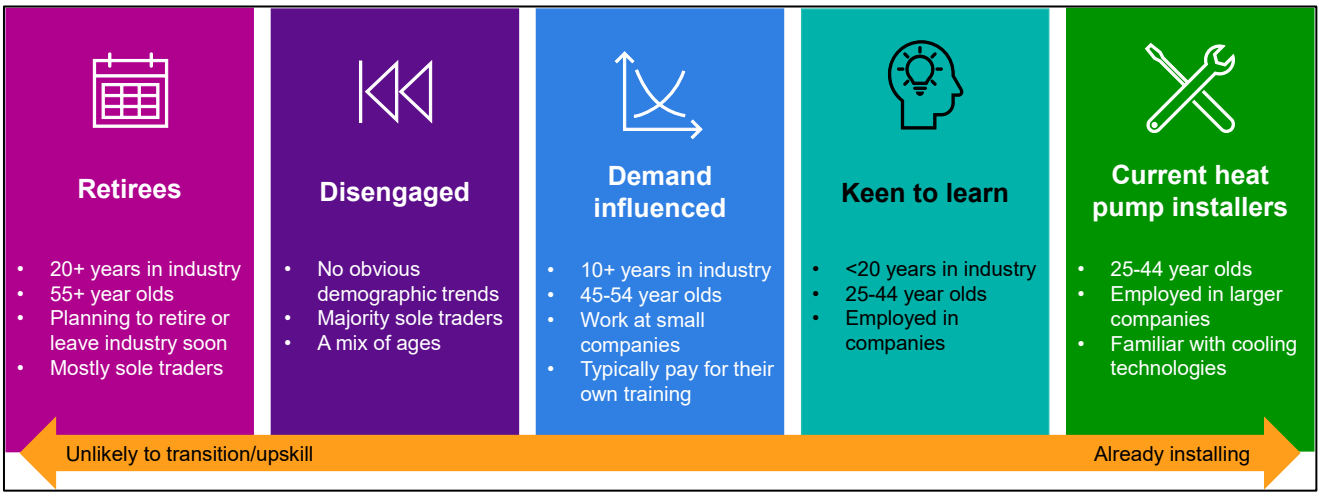
Figure 2 shows the five archetypes and the typical demographics of installers within these segments. Any demographic trends illustrated indicate that installers within that archetype were more likely to have such characteristics e.g. those in the Retirees archetype were more likely to be aged 55+. It shouldn’t be interpreted to mean that all installers fitting that profile will belong to that archetype e.g. not all installers aged 55+ will be in the Retirees archetype.

The rest of the chapter highlights the key attitudinal differences (amongst installers) that helped determine the archetypes formed and what this might mean for future growth of the heat pump sector.

The archetypes are organised in order of likelihood to install or be upskilled to install heat pumps. Those in the Retirees and Disengaged archetypes are unlikely to transition/upskill,

whilst those in the Demand influenced and Keen to learn archetypes are much more open to engaging with and installing heat pumps. The final archetype is those who are currently installing heat pumps. Note that all installers were somewhat influenced by demand, or open to learning new skills – but the archetypes highlight where this is a more defining motivation which may outweigh other considerations more strongly.

Figure 2. Characteristics of the five archetype segments



Size of the archetypes and scope to upskill

As a result of the archetype model being created using a relatively small base size (154 workforce responses), it has not been possible to estimate the proportion of the population or number of installers who fall into each of the five archetypes. However, we have drawn on the employer survey within the research to provide an indication of proportions where possible.

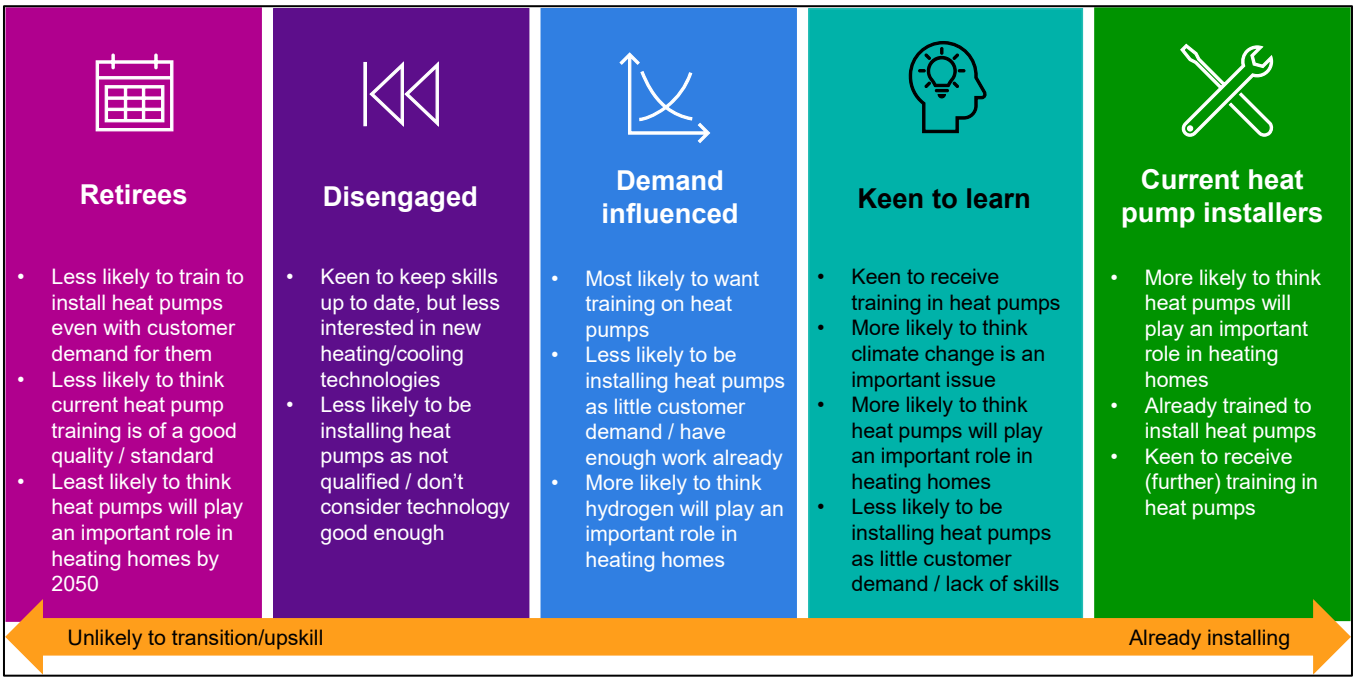
For the 'Retirees' group: employers reported around one in ten of their workforce was aged 65+. We expect that the vast majority of this group will retire within the next five years and therefore not upskill. Furthermore, 7% of installers aged under 65 reported in the workforce survey that they are likely to leave the industry in the next 10 years. With a high proportion of the industry aged 55-64 we estimate that 10-20% of installers belong to the Retiree group. At the other end of the scale, we have estimated from the employer survey that the proportion of current heat pump installers is approximately 20-25% of the heating and cooling workforce.

The middle three archetypes are harder to estimate, as they are determined more by individual installer attitudes than demographic information. Whilst we are not able to use this study to estimate the size of these archetypes individually, we can estimate that up to 40% of installers sit within the retirees or current installers archetypes. This leaves approximately 60% who could be influenced to upskill. Some of these installers will fall into the Disengaged group who are much less likely to transition to installing heat pumps. We would therefore estimate that around a half of installers could be influenced to upskill. Combining this with existing installers, in total over two-thirds of the current workforce either currently install heat pumps or could be convinced to learn to install heat pumps in future.

Attitudes across the archetypes

The archetypes also reflect differences in key attitudes, as shown in Figure 3 below.

Figure 3. Attitudes of the five archetype segments



Whilst the majority of those in the Disengaged archetype were keen to keep their skills up to date, they were less likely to enjoy learning about new heating and cooling technologies and hence less likely to be motivated by this to upskill to install heat pumps.

Compared to all installers, those who were 'Keen to learn' were more likely to agree that climate change is the most important issue facing the UK. This could suggest climate change may be a motivating factor in encouraging these individuals to upskill to heat pump installation.

Those who are current heat pump installers or are Keen to learn are more likely to agree that heat pumps will play an important role in heating homes by 2050. Meanwhile, those in the Demand influenced archetype were more likely to consider that hydrogen will play an important role in heating homes by 2050, compared to other archetypes. Unlike heat pumps, hydrogen heating is not yet an option for domestic homes, and the UK Government has indicated that it will take strategic decisions on the role of hydrogen in heating by 2026[11].

When asked which technologies they would like to receive training on, those in the Demand influenced archetype were most likely to select heat pumps, despite only 42% of them having reported that 'heat pumps will play an important role in heating homes by 2050'. Training in heat pumps was important for both those Keen to learn and Current heat pump installers.

Installers gave a range of reasons why they were not currently installing heat pumps.

- Those in the Disengaged archetype (versus other installers) were more likely to not be installing heat pumps because they aren't qualified or do not think the technology is currently good enough.

[11] www.gov.uk/government/publications/heat-and-buildings-strategy

- Demand influenced installers reported that they had enough work without heat pumps or that their customers were not asking for them / customer demand is low. This mirrored reasons given by employers for why they were unlikely to begin installing heat pumps in the future – see Installer barriers to heat pump installation section. This implies that if customer demand were to increase or their current work was reduced, they would be more likely to consider installing heat pumps.
- Among Keen to learn installers, a lack of customer demand and lack of skills were the key barriers to installing heat pumps mentioned.

The different archetypes were also determined by the factors that might increase the number of heat pumps they install. The three more engaged archetypes were more likely to want increased consumer demand and increased Government support. **Table 1** shows a summary of the five archetypes and their likelihood to upskill.

Table 1. Summary of archetypes

	Retirees	Disengaged	Demand influenced	Keen to learn	Current heat pump installers
Characteristics (more likely to be / have)	20+ years in industry 55+ Planning to retire or leave industry soon Mostly sole traders	No obvious demographic trends Majority sole traders A mix of ages	10+ years' experience 45-54 year olds Work at small companies Typically pay for their own training	20 years in industry 25-44 year olds Employed in companies	25-44 year olds Employed in larger companies Familiar with cooling technologies
Likelihood to upskill	Unlikely	Unlikely without change in attitudes	Likely if convinced of demand	Likely	Already have
Motivations to upskill	None – close to retirement	None – not interested in training, wider climate concerns or the technology	If there were increased consumer demand Increased government support A desire to develop new skills (although not just in heat pumps)	A desire to learn new skills and about heating and/or cooling technologies. View climate change as important.	Not applicable

Feedback on archetypes from stakeholders

One aim of the stakeholder workshops was to gather feedback on the draft installer archetypes. Participants from all three workshops (1: Trade Associations and Energy Industry, 2: Skills, Standards and Academics and 3: BEIS) considered that the draft archetypes presented by the team were sensible and in line with their experience of the workforce.

There was broad agreement that the archetypes represented a realistic description of the workforce, with the Disengaged and Retirees archetypes being particularly relatable.

Participants from workshops 1 and 2 shared feedback on how the archetypes could be improved, including:

- A differentiation between domestic and non-domestic installers
- Linkages between each archetype and manufacturers
- Further details on the qualifications for each archetype
- Estimates of the number of installers per archetype

Participants also correctly identified that the draft archetypes presented did not include new entrants into the workforce, such as apprentices or members of other industries with transferable skills (e.g. electricians or the cooling workforce).

Several stakeholders suggested that geographical segmentation of installer archetypes would also be a useful characteristic to include since demand for heat pumps can vary significantly between regions, especially those that include local area planning suitable for alternative low carbon heating options.

Participants from workshop three considered how engagement may vary based on the archetypes e.g. training and continued support could be made available to those who are Keen to learn. Current heat pump installers could be used as case studies or positive stories to communicate the benefits of heat pump installation (for them and their customers) to the sector and explain ways to gain more experience of installation. It was felt that it should not be a priority to promote upskilling to those nearing retirement.

These recommendations could be considered in future installer communications and interventions, but also might benefit from further investigation and future iterations of the archetypes. For example, during the inception phase for this research, it was decided that the differentiation between domestic and non-domestic installers was outside the scope for this project. However, it could be a useful indicator in future research into the archetypes.

3. Characteristics of heating and cooling employers and their workforce

This chapter explores the characteristics of heating and cooling employers and their workforce. This includes demographic information, current skills and qualifications of installers, business models as well as the type of work undertaken. Findings have been informed from both surveys as well as the installer interviews and focus groups.

Demographics and backgrounds

Overall profile of the workforce

Respondents in the employer survey were asked what number of installers they employed, and, for each installer, their gender, age, disability status, ethnicity, and time in the industry. In this way we were able to produce indicative characteristics for the installer workforce, as shown in Table 2 (more information on how this was calculated is included in the Technical Report). Note that this information should not be treated as official estimates of the installer population due to the method by which the information was obtained, but rather a broad profile of this grouping.

The workforce is predominantly male and White, typically older, with the majority having been in the industry for at least 20 years.

There were few differences between the demographic profiles of those working on heating or cooling technologies, except those who worked on any cooling technologies[12] who typically had less years' experience. Forty eight percent of cooling installers had worked in the industry for 20+ years (compared to 54% of those who worked on any heating technologies).

Gender

Estimates from the employer survey evidenced that the installer workforce was predominantly (95%) male. There was little subgroup variation, although employers providing heat pumps typically had fewer female installers (3% of their workforce was female compared to 5% of employers who do not provide heat pumps).

The literature review suggests that the sector may be slightly less diverse than these numbers imply. For example, in 2017, 99.6% of heating engineers on the Gas Safe Register were men, and a 2021 nationwide survey of installers reported that less than 2% of plumbers and heating engineers are women.[13]

From the employer survey, around eight in ten (81%) employers employed male installers, although this reduced to 67% among those with 10+ installers.

[12] Any cooling technologies defined as those whose workforce work on either air conditioning, refrigeration, mechanical ventilation with heat recovery or heat pumps.

[13] Home Improvement Trend Report, Rated People (2022) www.ratedpeople.com/blog/home-improvement-trends-report

All installers and employers in the focus groups agreed that the sector was not diverse in terms of gender. There was broad agreement that more female installers were needed to meet general growth in consumer demand (see installer views on diversity section).

Table 2. Characteristics of the heating and cooling installer workforce population

Category	Characteristic	% of pop.	Category	Characteristic	% of pop.
Gender	Female	5%	**Ethnicity**	Asian or Asian British	2%
Gender	Male	95%	**Ethnicity**	Black, African, Caribbean or Black British	2%
Gender	Other	0%	**Ethnicity**	Mixed or Multiple ethnic groups	1%
Age	16-24	7%	**Ethnicity**	White	95%
Age	25-34	13%	**Ethnicity**	Other ethnic background	1%
Age	35-44	17%	**Years in industry**	Less than 2 years	5%
Age	45-54	26%	**Years in industry**	2-4 years	6%
Age	55-64	28%	**Years in industry**	5-9 years	9%
Age	65+	9%	**Years in industry**	10-19 years	26%
Disability status	Disabled	7%	**Years in industry**	20+ years	54%
Disability status	Not disabled	93%			

Source: Employer Survey. A3. Roughly, how long have your heating and cooling installer employees worked in the industry? A4. Roughly what age is your heating and cooling installation workforce? E1. What proportion of your heating and cooling installation workforce is female / male / other gender identity? E2. In what proportion are the following ethnicities represented in your heating and cooling installation workforce? E3. What percentage of your heating and cooling installation workforce has a disability? Base: All employers (687). Those answering 'Don't know' or 'Prefer not to say' excluded from calculations.

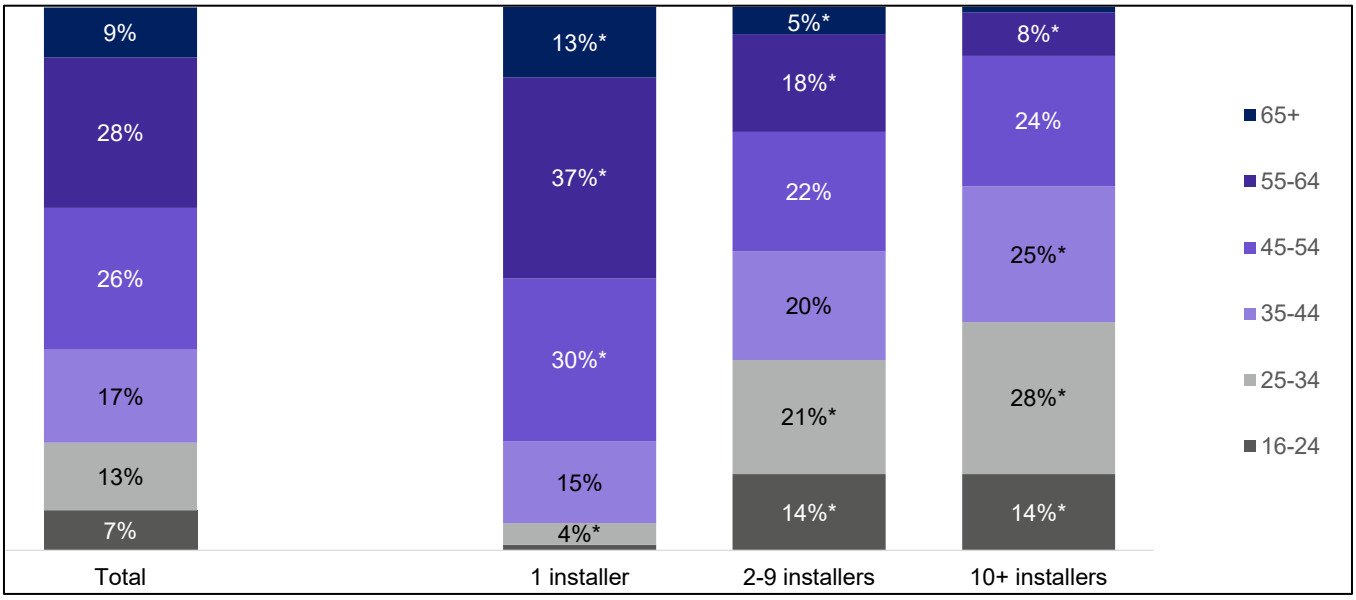
Age and time in industry

Estimates from the employer survey demonstrated that heating and cooling installers are a relatively ageing population, corroborating evidence cited in the literature review, which identified that the industry suffers from a shortage of younger engineers and installers. Employer survey results suggest that two-thirds (63%) of the installer workforce were aged 45 years or older and just over a third (37%) were aged 55 years or older. BEIS unpublished

analysis of data from the Gas Safe Register suggests 37 per cent of installers involved in domestic heating are aged 55 and over. This is not unique to this sector: the entire UK workforce is ageing with a third of all workers currently aged 50 or over[14].

As shown in Figure 4, the workforce employed by larger firms was typically younger.

Figure 4. Age of heating and cooling workforce, by number of heating and cooling installers



Source: Employer survey. A4. Roughly what age is your heating and cooling installation workforce? All employers excluding those who stated don't know or prefer not to say at A1, A2 or A4: (n=653), 1 installer (n=284), 2-9 installers (n=301), 10+ installers (n=68). *Denote significant differences between different sized employers and all employers.

Although there was very little regional variation, the employer survey indicated some employer characteristics where a younger workforce was more likely. This included:

- Employers offering heat pump installations typically had a younger workforce: 49% of their workforce were over 45, compared to 63% for all employers
- Employers who focused on non-domestic projects in new buildings (47% of the workforce aged 45+)
- Employers who (mostly or solely) focused on the installation of new systems (40%)
- Employers who worked on cooling systems (52%)

According to the employer survey just over half (54%) of the installer workforce had been in the industry for 20 years or more, although there was considerable variation by size of employer. Employees at smaller businesses were more likely to have been in the industry longer than those at larger business. Only 24% of the workforce amongst employers with 10+ installers had been in the industry for 20+ years, compared to 42% of the workforce for employers with 2-9 installers and 66% for employers with one installer.

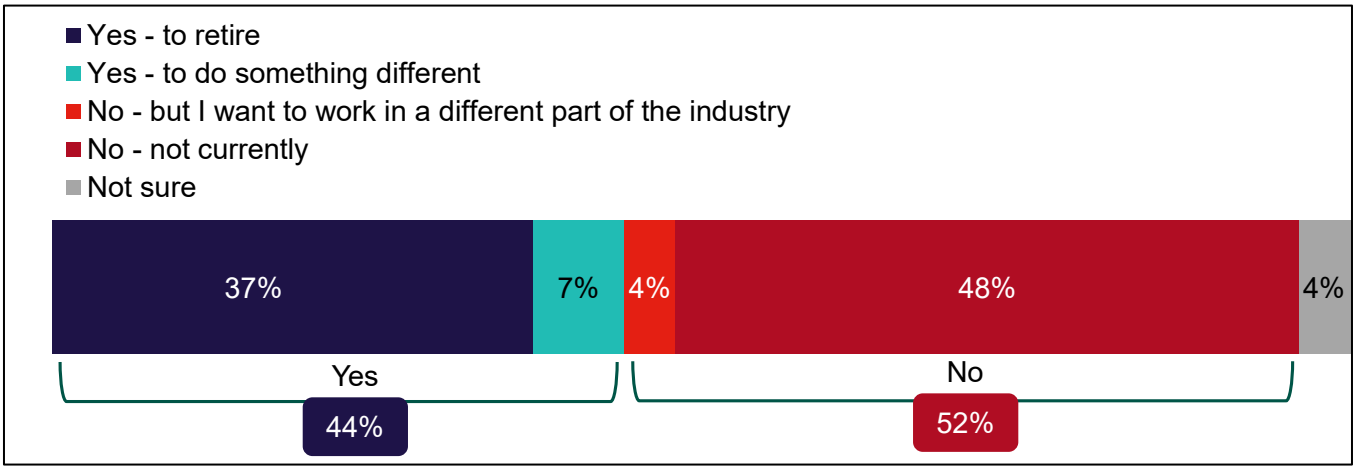
[14] State of Ageing in 2020, Centre for Better Aging (2020) https://ageing-better.org.uk/work-state-ageing-2020#:~:text=The%20workforce%20is%20ageing%3A%20a,unemployment%20crisis%20for%20older%20workers.

There was also evidence that some employers were relying on a more experienced workforce and not seeking to broaden the workforce base: only 13% of employers reported they had any installers with less than 2 years' experience (rising to 59% among those with 10+ installers), and 17% reported that they had installers with 2-4 years' experience (69% among those with 10+ installers).

Focus group participants thought that the sector was currently diverse in age, but they expressed concerns that there were not enough young people entering the industry.

As shown in Figure 5, the workforce survey indicated that a sizeable proportion of installers (44%) were planning to leave the industry in the next ten years (mostly to retire, but some considering doing something different).

Figure 5. Plans for leaving the industry in the next ten years



Source: Workforce survey. E10. Do you have any plans to leave the industry, either to retire or to do something different in the next 10 years? All installers (n=154).

Those installers who planned to leave the industry were asked when they intend to do so. A fifth planned to leave in the next 1-2 years (21%), and just over half planned to leave within the next five years (52%).

Some installers interviewed from the Retirees archetype provided detail about what they planned to do with their businesses when they retired. A few said they had not thought about this. There was a sense they would 'cross that bridge' when they came to it. A few said they did not plan to pass on their business to anyone. One installer said his son had his own business already, implying that passing on his business to his son was something he might have considered otherwise.

Ethnicity

As shown in the data from the employer survey in Table 2, the vast majority of the installer workforce was White (95%). In fact, eight in ten (80%) employers reported that all of their staff were White, while only 9% said they employ at least some Black Asian and Minority Ethnic (BAME) installers (11% said they either did not know or preferred not to say).

For larger employers, the ethnic profile of their workforce was more mixed: 49% of those with 10+ installers reported all their staff were White, compared with 79% of those with 2-9 installers and 84% with 1 installer. Those offering heat pump installation services were slightly more likely to employ BAME installers than those who did not (13% compared with 8%).

Installers and employers participating in the focus groups had differing opinions on ethnicity within the workforce. Two participants stated that the workforce is not diverse in terms of ethnicity, however others felt that their companies were multicultural, and that diversity was not an issue. Employers generally felt that the sector was not racially diverse, but several mentioned that this was reflective of the geographical areas that they operated in.

Disability status

According to employer survey estimates, 7% of the installer workforce had a disability. Around three-quarters (77%) of employers reported that they did not have any disabled installers working for them, although this was considerably lower among those with 10+ installers (60%). There was no difference between companies that provided heat pump services and those that did not. There is limited literature on disability statistics within the industry and so there is no alternative data to compare these findings to.

Focus group participants noted that people with dyslexia and autism have been hired by the organisations they work for or operate. No other specific disabilities were mentioned during these sessions.

Installer views on diversity

The topic of diversity was not top of mind for installers. Many did not understand why they were being asked about this (in the depth interviews and focus groups) and were unsure how to answer. There was a sense that it was more important to find people who were good at the job; it didn't matter who they were or what background they were from, as one remarked in a depth interview:

> *"I don't care what colour they are, or what gender they are. If they can do the job, they can do the job." (Keen to learn, 2-9 employees)*

Gender

The fact that women do work in the sector, but usually in administrative support roles, was discussed in one of the installer focus groups. One female installer participating in the focus groups, who was a member of the Women Installers Together (WIT) group, remarked that someone in the industry told her she should not be in the industry, whilst another focus group participant felt that the industry does not engage actively enough with female engineers.

There were a few comments about female installers not being as capable as male installers because of the physical demands of the job, such as being able to lift a gas boiler or heat pump. However, there was general consensus across focus groups and interviews that getting more women into the sector as installers would bring a range of benefits.

Some described how there is growing customer appetite for female installers:

> *"Customers like it… people like seeing somebody different." (Demand influenced, 2-9 employees)*

Age

Getting more young people into the sector was an area most installers agreed was important. This was motivated by concerns about the lack of young people coming in to replace retirees leaving the sector, rather than wanting to have a diverse workforce in terms of age.

There was concern expressed in the focus groups that there would be no opportunity for experienced installers to pass on their knowledge and expertise to new entrants before they retire.

Most installers interviewed felt the industry wasn't appealing to young people. There was a sense that young people want to do something more glamourous than becoming a heating or cooling installer. A few installers mentioned how the trades could be 'dirty', 'cold', 'dangerous' and involved working outside. All of which were felt to be unappealing, particularly to young people. This position was more likely amongst the Retirees.

> *"It's hard and dirty work… a lot of people fall by the wayside... they want to sit on their computers." (Retiree, Sole trader)*

In the depth interviews, respondents from the Current heat pump and Keen to learn archetypes, were more likely to say the sector was appealing to young people. Although opinions were mixed in both cases. Those who did feel the sector had appeal, highlighted aspects such as:

- The variety of tasks and work
- Good working conditions (but it was noted this is dependent on who you work for)
- Potential earnings
- There being 'a job for life' and that there will 'always be work'.

There were also a few comments about how the focus on renewable energy and playing a part in mitigating climate change could be appealing.

> *"They have the chance to make a difference." (Current heat pump installer, 250+ employees)*

Installers felt more could be done to raise awareness of these positive aspects. Reaching young people at school was the most common suggestion for how to do this, as well as financial incentives such as grants to train.

Ethnicity

In the depth interviews, some installers also pushed back on the idea that the industry lacked ethnic diversity. They either felt that they did come across engineers who were people of colour or from Eastern Europe, or that the level of diversity in smaller communities was reflective of their populations.

> *"Well there's a 13-15% ethnic community [in the UK] … so it is probably about right if you look at the ethnicity of the population as a whole". (Disengaged, 2-9 employees)*

There were a few installers who were more invested in the importance of diversity in the industry. For example, one installer from a BAME background and another who had immigrant heritage, were keen to see more ethnic diversity in the sector.

> *"[It's] critically important to how we move forward as an industry… we need to embody the diversity we have in society… I'm the grandson of an immigrant, I understand what he and my parents went through." (Keen to Learn, 2-9 employees)*

Building on the finding (in the employer survey) that larger employers were more likely to have a more mixed ethnic profile amongst their workforce, a few installers noted that some progress had already been made regarding ethnicity at larger companies.

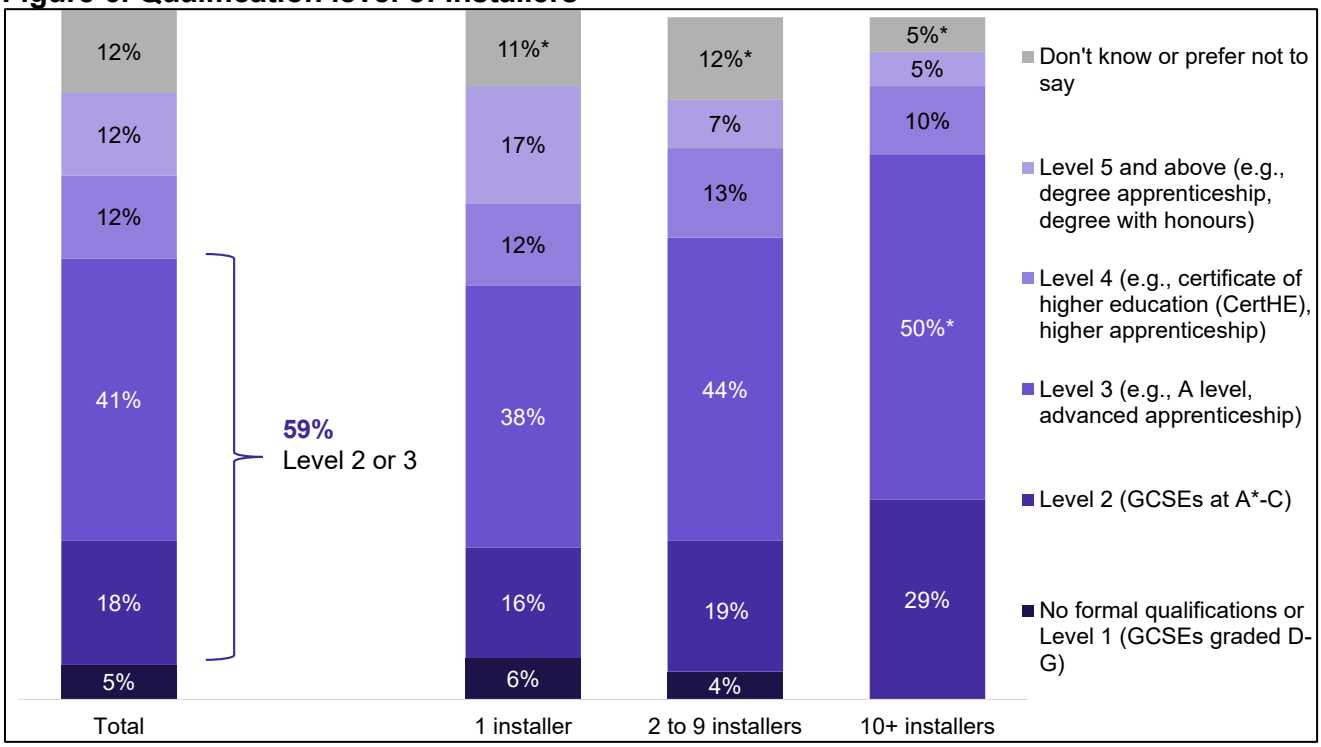
> *"[Company] is very good at promoting [diversity] and has no boundaries." (Current installer, 250+ employees)*

Current skills, specialisms, experience and qualifications

Qualifications

Estimates from the employer survey show that most installers were educated to either a level 2 or level 3 qualification: 59% of employers reported that these were the most common qualification levels among their installers. This equates to a GCSE, A level or NVQ level 2 or 3 qualification. There was some association between employer size and qualification levels; as Figure 6 shows, smaller employers typically reported their installers held higher level qualifications. Businesses with 10 or more installers were more likely to have level 2 qualified employees (28%) compared to those with 2-9 installers (18%) and those with 1 installer (15%).

Figure 6. Qualification level of installers



Source: Employer survey. A5. Typically, what is the most common qualification level of your heating and cooling

installers? All employers (687), 1 installer (n=291), 2-9 installers (n=309), 10+ installers (n=71). *Denote significant differences between different sized employers and all employers.

Those offering heating and cooling apprenticeships were more likely to have level 3 qualified installers (54%) than those without (36%). Employers that offered internal training were more likely to have level 2 qualified employees (22%, compared with 15% of those who didn't offer internal training), and those who offered external training were more likely to have level 3 qualified employees (45%, compared with 34% of those who didn't offer external training).

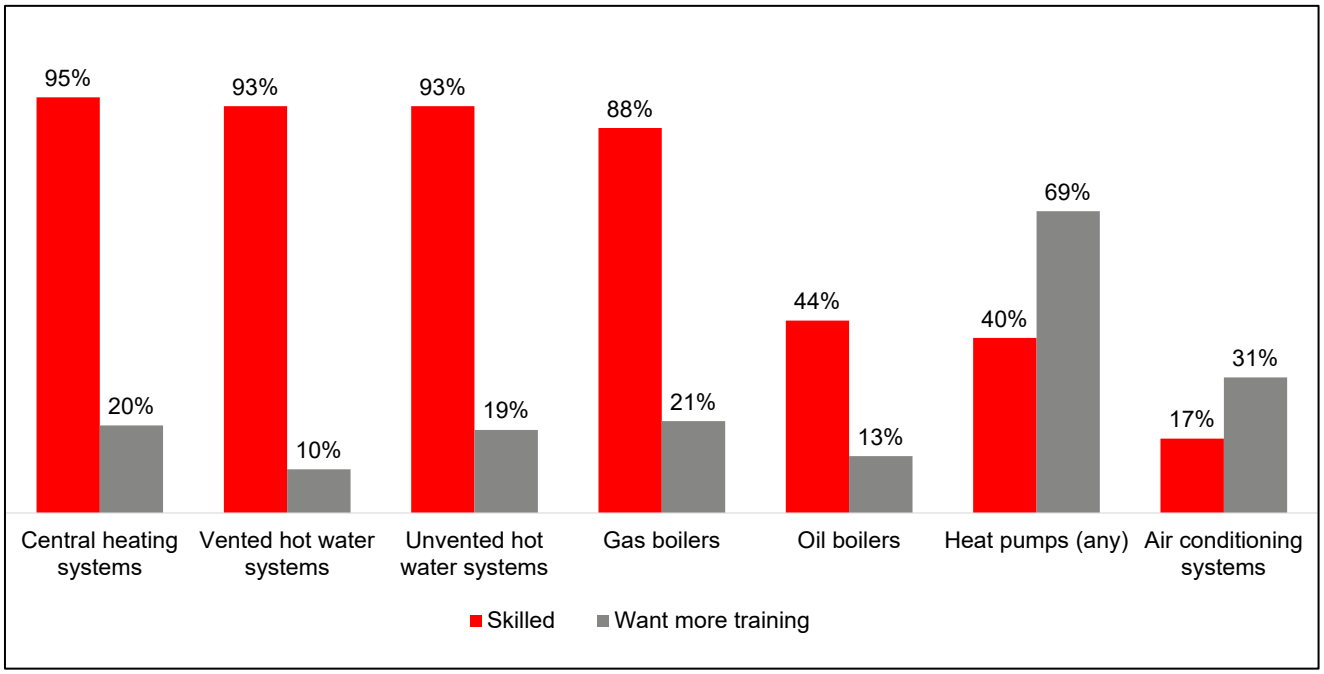
Technological skills and experience

As shown in **Figure 7**, almost all installers in the workforce survey reported that they were skilled in central heating technologies (95%), central hot water systems (93%) and unvented hot water systems (93%). Two-fifths of installers felt they were skilled in heat pump technologies (40%) and one-fifth felt skilled in air conditioning systems (17%).

One in ten installers (11%) reported being skilled in both central heating and air conditioning, and 14% skilled in both heat pumps and air conditioning.

Also shown in the chart is the proportion who wish to receive more training in these areas (this is explored in more detail in the Training chapter).

Figure 7. Extent to which installers feel they have skills in particular technologies



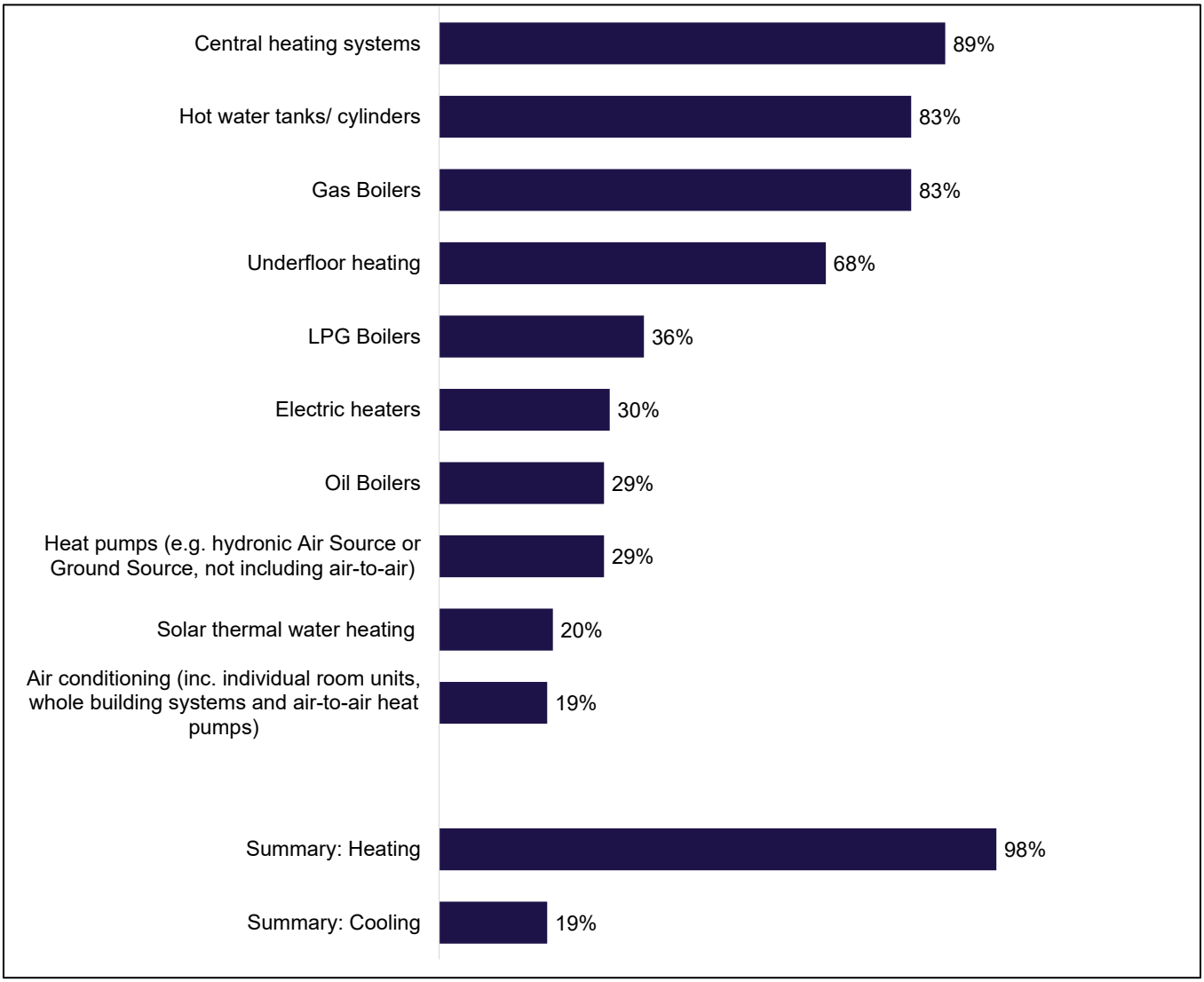
Source: Workforce survey. B1_X. How skilled, if at all, would you say you are in the following technologies; B2. Which of the following technologies, if any, would you like to receive more training on? All installers (n=154).

Current heat pump installers of any type of heat pump were typically less likely than average to report being skilled at installing central heating systems (84% compared with 95%), vented hot water systems (77% compared with 93%) and gas boilers (61% compared with 88%) but were much more likely to be skilled in installing air conditioning systems (48% compared with 17%), and of course heat pumps (97% compared with 40%).

Demand influenced installers were far less likely to be skilled in heat pump installation (14%), and air conditioning systems (2%), than all installers. This highlights that while they may be open to transitioning to heat pumps, there is a long way to go in terms of developing sufficient skills.

Similar proportions were seen in the employer survey, where businesses were asked what types of technologies their business had experience working with. Nearly all worked on heating technologies. As shown in **Figure 8**, the most common technologies were central heating systems (89%), hot water systems (83%), and gas boilers (83%). Meanwhile around two-fifths (38%) worked on cooling technologies such as air conditioning (19%). Around three-quarters (76%) of businesses working on cooling technologies had experience of working on any type of heat pumps.

Figure 8. Business experience with different heating and cooling technologies



Source: Employer survey. C3. Which of the following areas relating to heating and cooling does your business have experience working with? All employers (n=687). (Respondents could select more than one answer, therefore percentages do not total 100%).

There was a high level of crossover in technology experience amongst employers. Almost half (49%) of employers with experience in hydronic heat pump installation also had experience in air conditioning and air-to-air heat pumps. In addition, over half (58%) of employers with

experience in air conditioning and air-to-air heat pump installations also had experience in hydronic heat pumps.

Just under one in five (17%) employers were certified to work with F-gases, rising to 46% among those that offer heat pump installation services. Those whose business offered air conditioning services were also more likely to be certified (75%), as were those offering mechanical ventilation with heat recovery (55%).

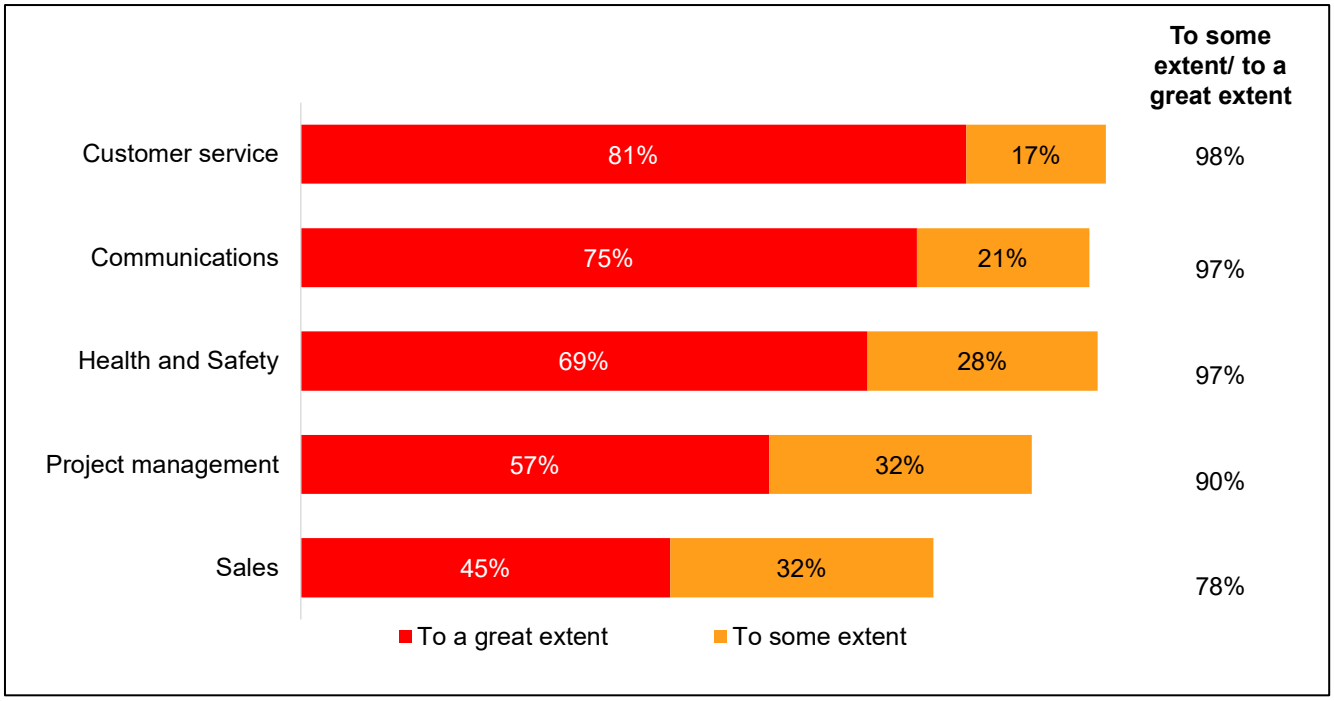
In the depth interviews, there were a few comments about how air conditioning installers have the most closely matched skillset to be able to install heat pumps, so are more familiar and supportive of them.

> *"It's not alien technology to us [air conditioning industry]." (Current installer, 2-9 employees)*

Non-technical skills

When installers were asked about non-technical skills in the workforce survey, almost all installers said they feel they have sufficient customer service skills (98%), communications (97%), and health and safety skills (97%) as shown in Figure 9. Although still a fairly high proportion, installers were least likely to report they had sufficient sales skills (78% said this to some extent/to a great extent). This might provide a barrier when looking to enlist the skills of installers to promote heat pumps or other sustainable technologies. It is important to note that these data are subjective, 'self-reported' skills.

Figure 9. Extent to which installers feel they have specific non-technical skills



Source: Workforce survey. B4: To what extent, do you feel you have sufficient skills in the following to do your job effectively? All installers (n=154).

By archetype, current heat pump installers were slightly less likely to say that they were skilled to a great extent in customer service skills (65% compared with an average of 81%) and communications (61% compared with 75%), perhaps reflecting that – as a typically younger workforce – they might lead less on communications.

Business models

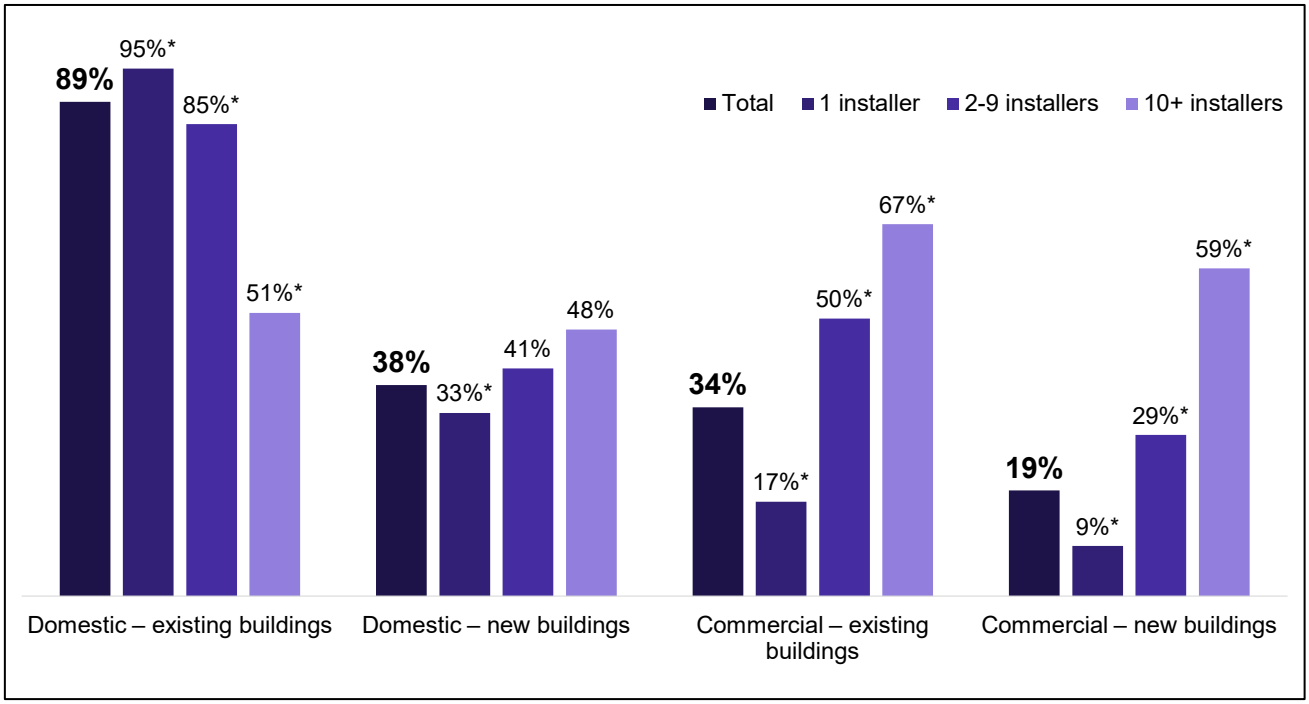
The heating and cooling sector is dominated by small-sized businesses. Less than 1% of the sector is comprised of medium or large firms, whereas 95% are micro (1-9 employees) and 5% are small (10-49 employees)[15]. The literature identified challenges to the growth of smaller firms including that small and medium sized enterprises (SMEs) can be cautious and risk-averse, preferring to work with known technologies and techniques rather than innovate.

Types of building projects

In order to understand typical business models within the industry, employers were asked which types of heating and cooling projects they tended to work on (they could select more than one answer). The vast majority (89%) worked on existing domestic buildings, i.e. on retrofit procedures. A much smaller proportion – less than half – worked on new domestic buildings (38%), existing commercial buildings (34%), and new commercial buildings (19%), as shown in Figure 10.

Larger firms were more likely to work on commercial projects, while domestic projects in existing buildings were far more common for smaller employers.

Figure 10. Proportion of employers whose installers work on different types of buildings, by number of heating and cooling installers



Source: Employer survey. C1. What types of projects do your heating and cooling installers typically work on? (Respondents could select more than one answer, therefore percentages do not total 100%). All employers (n= 687), 1 installer (n=291), 2-9 installers (n=309), 10+ installers (n=71). *Denote significant differences between subgroups. Other and prefer not to say percentages total less than 3% so have not been shown here.

[15] Source: UK business: activity, size and location, ONS, 2021. Figures based on a snapshot of the Inter-Departmental Business Register (IDBR) taken on 12 March 2021 for enterprises with a SIC code of 43220 "Plumbing, heat and air-conditioning installation". The sector is comprised of 0.5% medium (50-249 employees) and 0.1% large (250 or more employees) firms, with the remainder classed as micro (fewer than 10) or small (10-49).

There were considerable differences between the types of projects worked on by businesses that offered heat pump installation services and those that did not. Businesses who installed heat pumps were considerably more likely than those who do not install them to work on new domestic buildings (56% versus 31%), existing commercial buildings (59% versus 25%) and new commercial buildings (41% versus 12%).

Businesses that worked with cooling technologies, compared to heating technologies, were less likely to work on existing domestic buildings (80% versus 90%), but more likely to work on all other building types (52% worked on new domestic buildings, 58% on existing commercial buildings, and 38% on new commercial buildings). This is to an extent explained by businesses working on cooling technologies generally being larger than the average business.

For example 95% of employers that worked on new domestic projects also worked on existing domestic buildings.

Table 3 provides more detail on the proportions of employers working across different projects. The columns to the right list the types of projects employers work on, with subsequent rows to the left defining the proportion that also work on other project types. For example 95% of employers that worked on new domestic projects also worked on existing domestic buildings.

Table 3. Types of building projects firms typically worked on

…Also work on:	The proportion who work on… Domestic – existing buildings	The proportion who work on… Domestic – new buildings	The proportion who work on… Commercial – existing buildings	The proportion who work on… Commercial – new buildings
Domestic – existing buildings	n/a	95%*	77%*	75%*
Domestic – new buildings	40%*	n/a	43%*	59%*
Commercial – existing buildings	29%*	39%*	n/a	91%*
Commercial – new buildings	16%*	30%*	52%*	n/a

Source: Employer survey. C1. What types of projects do your heating and cooling installers typically work on? (Respondents could select more than one answer, therefore percentages do not total 100%). All employers (n= 687), Domestic – existing (n=579), Domestic – new (n=268), Commercial – existing (n=265), Commercial – new (n=166). *Denote significant differences between subgroups.

Seven percent of employers worked solely on commercial buildings, and only 1% worked solely on new builds (commercial or domestic).

New or existing systems

Overall, almost two-thirds of employers (64%) worked on both the installation of new systems, and the refurbishment or maintenance of old systems; 30% mostly or solely worked on refurbishment or maintenance, and 5% mostly or solely on new systems. There was some notable variation by subgroup:

- Smaller employers were more likely to solely focus on refurbishment or maintenance (1 installer: 38%; 2-9 installers: 23%) compared to employers with 10+ installers (7%).
- In contrast, larger employers were more likely to solely focus on the installation of new systems (10+ installers: 31%, compared with 7% of those with 2-9 installers and 2% of those with 1 installer).
- Those offering heating and cooling apprenticeships were more likely to focus on installation of new systems (11%), compared with those not offering them (4%).
- Those who install heat pumps were more likely to offer a bit of both (70%) or installation of new systems only (14%) and less – than average – on existing systems (16%).

Other systems

Installers who participated in the workforce survey were also asked whether they work on any systems other than heating and cooling systems. Most reported that they worked regularly on other plumbing work (85%), with a minority working on other energy efficiency systems (27%) and other ventilation systems (19%). Current heat pump installers were much more likely to work on other ventilation systems (42% compared with 19% average).

Nine out of the 11 installers who participated in the focus groups spent most of their time working on gas systems; doing the design, install, servicing and maintenance. Two employers said they did not get involved with maintenance or repairs of installations others have done, because often the installation was faulty from the beginning and there was a reluctance to be associated with poor quality work.

Working with other professions

Installers in the depth interviews said the other professions they most regularly worked with were plumbers and electricians. Other professions worked with less frequently included: builders, joiners, plasterers, architects and designers. A few installers commented that architects and designers were likely to need their advice when working together on property projects, for example, seeking advice on underfloor heating, or which kind of heat system would fit a property.

For all types of professions, these were usually external to the installers' organisations or sole trader set-up, although some larger organisations had multi-profession teams including in-house electricians.

Working with other professions usually went smoothly. Indeed, some installers said they liked doing this, as it gave some variety and a social aspect to their work. Installers reported that a few aspects of working with other professions could be challenging sometimes, for example, coordinating different parts of a job to timescale, or communication.

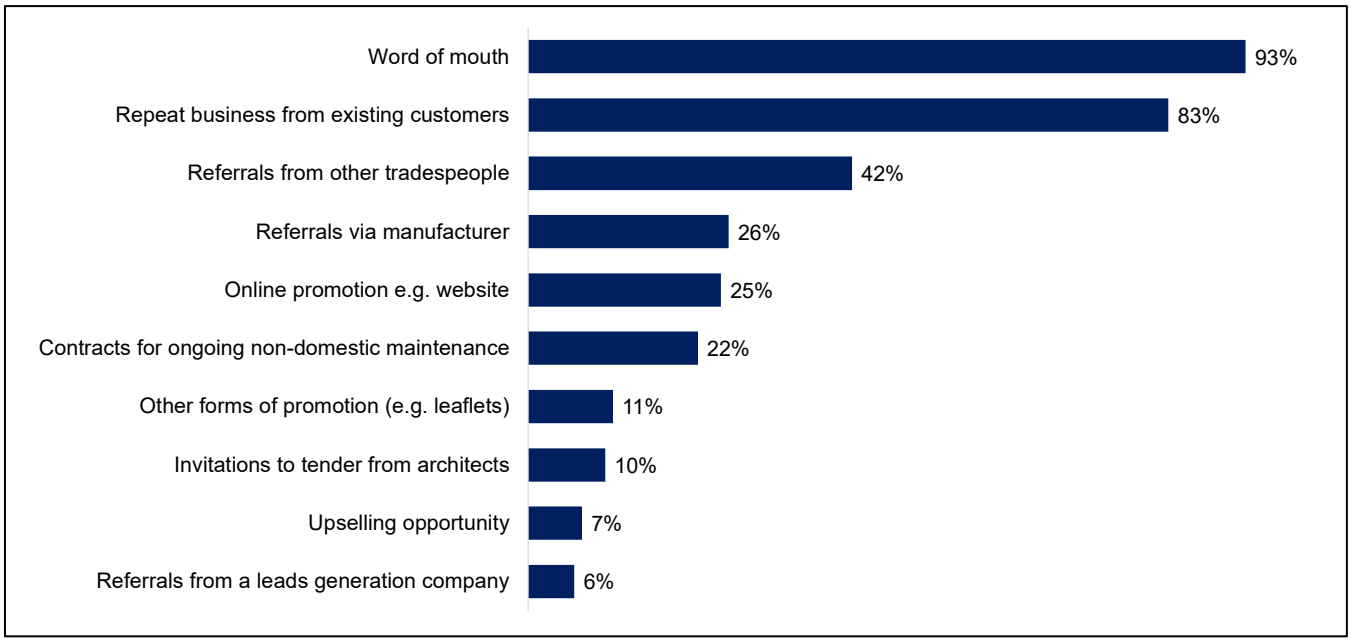
Financing options

The vast majority (89%) of employers reported that their business did not offer different financing options for its heating and cooling services. Employers with one installer were much more likely to say this (95%, compared with 84% of employers with 2-9 installers, and 76% with 10+ installers). Additionally, those who worked on projects in existing commercial buildings were more likely to say that they offered different financing options (14%) than the average (10%). Those who offered heat pump installation services were also more likely to offer financing options (14%) than those who did not offer heat pump installation services (8%).

Generating business

The majority of employers reported that they typically generated business through personal connections. As shown in Figure 11, almost all (93%) relied on word of mouth (e.g. from previous customers) or received repeat business from existing customers (83%). Forty-two per cent said they generated business via referrals from other trades people. Only one in four harnessed online promotion (25%).

Figure 11. Means of generating new business



Source: Employer survey. C9. How do you typically generate business? All employers (n=687). (Respondents could select more than one answer, therefore percentages do not total 100%). Showing results above 5%.

Larger employers were less likely to rely on word-of-mouth referrals (77% of those with 10+ installers reported this, compared with an average of 93%) and instead much more likely than smaller employers to cite contracts for ongoing non-domestic maintenance (52%, compared with a 22% average) and invitations to tender from architects (49%, compared with a 10% average).

Employers offering heat pump installation services were more likely than those who did not offer heat pumps to report the following as sources of new business:

- repeat business from existing customers (88%, compared with 81%)
- manufacturer referrals (34%, compared with 23%)

- online promotion (33%, compared with 23%)
- contracts for ongoing maintenance (38%, compared with 16%)
- architect tenders (24%, compared with 5%)

Those focussing on cooling technologies typically used a wider number of business generation techniques, most notably utilising manufacturer referrals (39%, compared with an average of 26%). This can be in part explained by these businesses being typically larger than the average installer business.

Findings from focus groups supported the idea that existing customers and word of mouth were the main sources of business for both installers and employers. Installers mentioned repeat custom through boiler maintenance, servicing and repairs. Several employers explained that they do not sell themselves; rather they are approached and then they give a quote.

Changes to business models and the challenges faced

The literature review identified challenges that affect the growth of the heat pump market, including perceived lack of demand or sufficient work installing other types of heating. Those in the stakeholder workshops and focus groups also summarised challenges for growth as a 'lack of market'. Some installers do not see a clear market for heat pumps when the demand for gas boilers is so high. One employer mentioned that they are "stuck in our business model and the routine of how we operate: we have done the same thing for so long". They explained that when they have a quieter period, or when the consumer demand for gas boilers decreases, then they will look to transition to installing heat pumps.

Another issue raised during focus groups was the lack of a stable policy framework to support business planning. One employer running a biomass, heat pump and solar PV business described how they were overwhelmed by the demand for installations but were struggling to expand. This one employer described "ever-changing grants offerings" and inconsistent policies as making it difficult for business planning. They talked about their experience of the Green Homes Grant [Voucher scheme] where they found the "the pressure to be enormous. I had to stop answering the phone" due to such increased demand from consumers. They delivered £100,000 worth of solar installs and then, when the grant ended, the demand dropped off. They thought that if they were to expand their business, they would need more consistency and that in the current climate transitional business planning would be impossible.

Challenges specific to employer size are explored in more detail in the next chapter.

4. Experiences of and attitudes towards heat pump technology

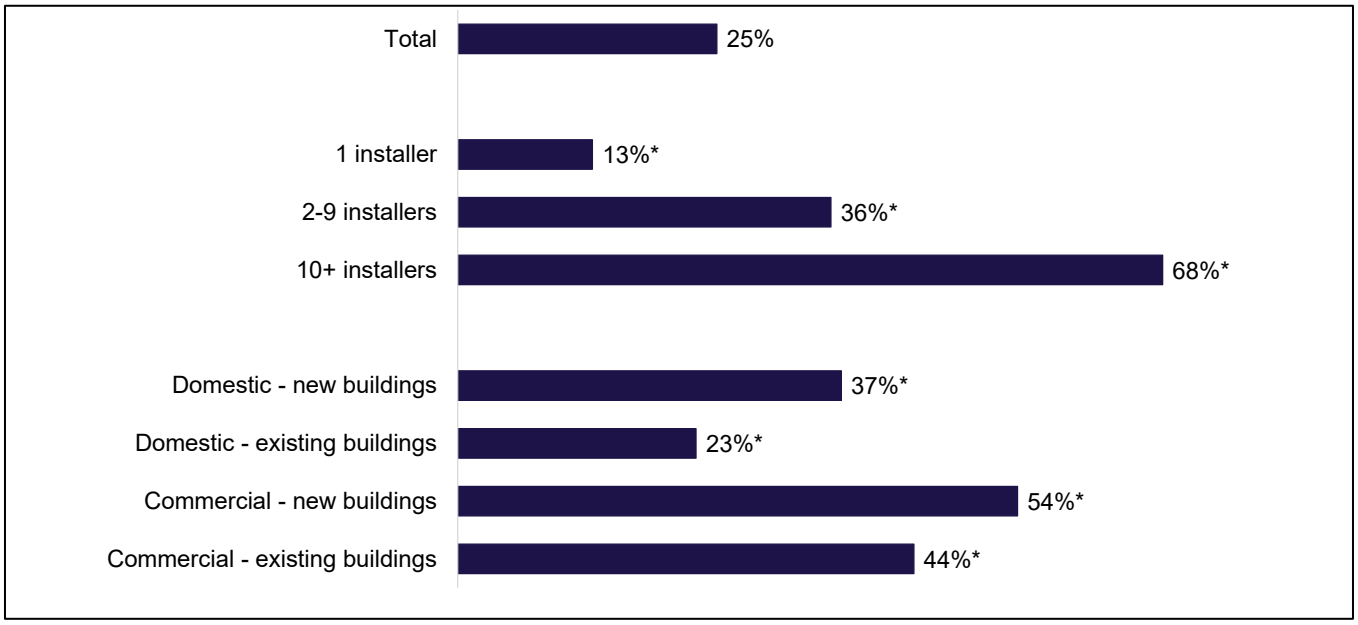
This chapter covers the experience and attitudes towards heat pumps of both employers and installers. It examines the proportion installing heat pumps currently, the reasons why they do or do not install, and the barriers to starting or increasing heat pump installation. Additionally, it explores how far installers travel to undertake work and the information sources that installers rely upon.

Current experience and attitudes towards heat pump installation

Employers offering heat pump installation services

As shown in **Figure 12,** a quarter (25%) of all employers surveyed offered heat pump installation services to their customers, although this varied considerably by the size of the business. The proportion of employers who offered installation for Air Source or Ground Source wet systems (i.e. “hydronic” not including air-to-air) was 23%. Only 13% of employers with 1 installer were offering these services compared to 36% of businesses with 2-9 installers, and 68% of businesses with 10 or more installers.

Figure 12. Proportion of businesses that offer heat pump installation services by number of heating and cooling installers, and types of buildings worked on



Source: Employer Survey. D1: Does your company offer heat pump installation services? Base: All employers (687): Number of installers: 1 installer (291), 2-9 installers (309), 10+ installers (71). Business models: Domestic projects in new buildings (268), Domestic projects in existing buildings (579), Commercial/ non-domestic projects in new buildings (166), Commercial/ non-domestic projects in existing buildings (265). *Indicates figures are significantly higher or lower than total figure. ‘Don’t know’ responses not shown.

Findings from the depth interviews provide some detail on why this was the case. Smaller businesses, including sole traders, feared there would not be sufficient customer demand for heat pumps, and that the financial risk was too great to invest in the necessary training.

> *"I have enough work coming in as it is, so I haven't had the financial need to think about changing anything. Plus it seems to be a very unstable market to go into." (Demand influenced, Sole trader)*

Furthermore, many sole traders felt they simply did not have the capacity to install heat pumps. They felt the actual installation process required between two and four installers. Additionally they thought it would take more than one person to carry a heat pump, and that there was a lack of space in their vans. These concerns were echoed in the stakeholder workshops, but participants also added a skills dimension with concerns about the design element being more than a one-person job. Taking on an apprentice was seen as a potential solution to the heat pump size problem but might also present its own challenges (discussed in Chapter 5).

As noted in the previous chapter, the employer survey asked which other heating and cooling technologies businesses had experience of working with. Among businesses who offered heat pump installation services the pattern was similar to that seen at the overall level. However there were noticeable differences, including:

- Heat pump installing businesses were much more likely to have experience of cooling technologies such as air conditioning (48% compared with 19% average).
- Heat pump installing businesses were more likely to have experience of working with Photovoltaics (14%) and Solar Thermal (37%) compared to those businesses that did not install heat pumps (2% and 14% respectively).
- While they were still the most common technologies, slightly fewer heat pump installing businesses had experience working in central heating systems (77% compared with 89% average), hot water tanks (74% compared with 83%), and gas boilers (67% compared with 83%).

The latter difference is partly explained by installers who offer only air-to-air heat pumps. When looking at businesses which offer hydronic heat pumps; 82% had experience working in central heating systems and 78% with hot water tanks.

Installer attitudes and approach to heat pump installation

In the workforce survey, all installers were asked if they have installed a heat pump in the last two years. One-fifth (20%) reported that they had installed a heat pump, with an additional 14% saying they had not installed a heat pump but that they had received training to do so. Furthermore, of those who had not received training to install heat pumps, just under a third (31%) felt confident they could install one and two-thirds (66%) did not feel confident that they would be able to. There was a small cohort (5%) of installers who reported being skilled in heat pump installation and confident in installing a heat pump, despite not having received heat pump training.

Nine in ten (90%) of those who stated they had installed a heat pump in the last two years said that they had received heat pump training. Of those who had not installed a heat pump in the last two years, only 28% said that they had received heat pump training.

Heat pump installers were asked which type of heat pumps they have installed in the last two years. The most popular type of heat pump was air source (84%), followed by air-to-air (35%),

ground source (26%) and hybrid systems (16%). Water source heat pumps were least common (6%).

These heat pump installers had been in the industry a varied amount of time, with two-thirds (68%) having been installing for fewer than 10 years and 29% for more than 10 years.

Heat pump installers were asked what proportion of their work over the previous two years had been spent installing heat pumps. Most installers who had installed a heat pump in the last two years spend the majority of their time installing other technologies; just under half (48%) said less than 5% of their time and around a sixth (15%) spent over half of their time installing heat pumps. The depth interviews revealed that installers attributed this to demand for the relevant technologies.

Although based on small sample sizes, the survey suggests that most heat pump installers expected the proportion of their work coming from these installations would increase in the next five years, with 45% saying it would increase a lot and 29% saying it would increase a little. Just under a quarter (23%) thought it would stay the same and only 3% thought it would decrease (a lot). Findings from the depth interviews add some context here. Many installers felt that appetite for low carbon heating solutions, including heat pumps, would likely increase as the technology improves and costs come down.

Installer motivations and barriers to heat pump installation

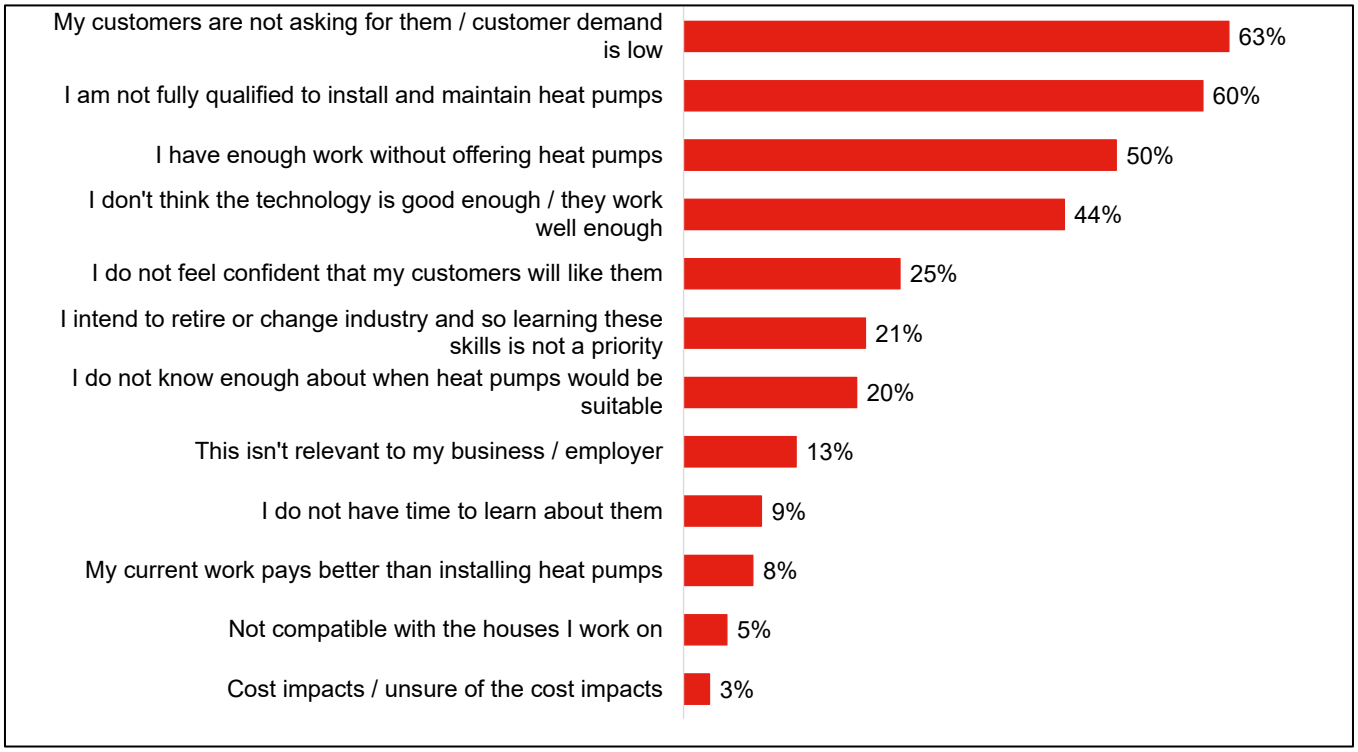
Installer motivations to install heat pumps were partly driven by customer demand, with around two-thirds (65%) saying this was why they currently install heat pumps. This mirrors findings from the literature review and depth interviews which highlighted that the decision to retrain for heat pump installation was driven by demand from customers.

The desire to work with low carbon technologies was the second most common reason given (58%), although it was not identified in the literature review as being a primary motivation.

Installers in the workforce survey who do not install heat pumps were asked why. The most common reasons for not installing heat pumps were a lack of customer demand (63%), not being fully qualified (60%), having enough work with other technology (50%), and doubts about the ability of the technology to work well as an alternative (44%), as shown in Figure 13.

Installers indicated that there were multiple barriers to current heat pump installation. On average installers selected 3 reasons for why they do not currently install heat pumps, with 43% selecting more than four reasons.

Figure 13. Reason provided by installers for not installing heat pumps



Source: Workforce Survey. C6. Why do you not currently install heat pumps? Base: Those who don't currently provide heat pump installation services (120) (Respondents could select more than one answer, therefore percentages do not total 100%).

Installers across the archetypes, including a small number of current heat pump installers, questioned how suitable heat pumps were for some property types. Some commented that the UK's cooler climate and housing stock, the majority of which is comprised of older, less well-insulated properties, makes it less well suited for heat pumps:

> *"They're not attuned to the British climate. One of the reasons we rarely recommend heat pumps is because they rely on under-floor heating... [they're] required to run continuously to obtain the most cost-efficient operation. In Britain, you get all seasons in one day! The use of a gas boiler in particular ... with fairly instantaneous heating, is much more appropriate for the British climate." (Keen to Learn, 2-9 employees)*

The literature review and focus groups also found that installer and employer concerns about the suitability of heat pumps for some properties was a barrier for installers deciding to install them. However, recent Government research from the Electrification of Heat Demonstration Project has demonstrated that heat pumps perform well in the UK climate, are widely suitable across the UK housing stock and there are no particular home archetypes that are technically "unsuitable" for heat pumps[16].

In the depth interviews, some installers felt the problem was not the heat pumps, but rather, their installation and particularly their aftercare. 'Cowboy' installers were referred to, who may install a heat pump that doesn't work with the heating system of the property as a whole.

[16] ICF, The Electrification of Heat Demonstration (EoH) project. (2022) Can be accessed at: https://es.catapult.org.uk/news/electrification-of-heat-trial-finds-heat-pumps-suitable-for-all-housing-types/

Additionally, a few installers stated that they did not want to have to maintain heat pumps they did not install themselves. They anticipated this would be more difficult due to the heat pump not being installed properly in the first place. For example:

> *"…they fire these things [heat pumps] into people's houses and then they go off, winter comes around, and everyone's sitting around shivering because they can't turn their heating up high enough… Designing, planning the specifications, that's the most important thing because you've got to be willing to turn around and say 'Unless you're willing to improve this in your house...this is not a system that is going to work for you.'" (Demand influenced, 2-9 employees)*

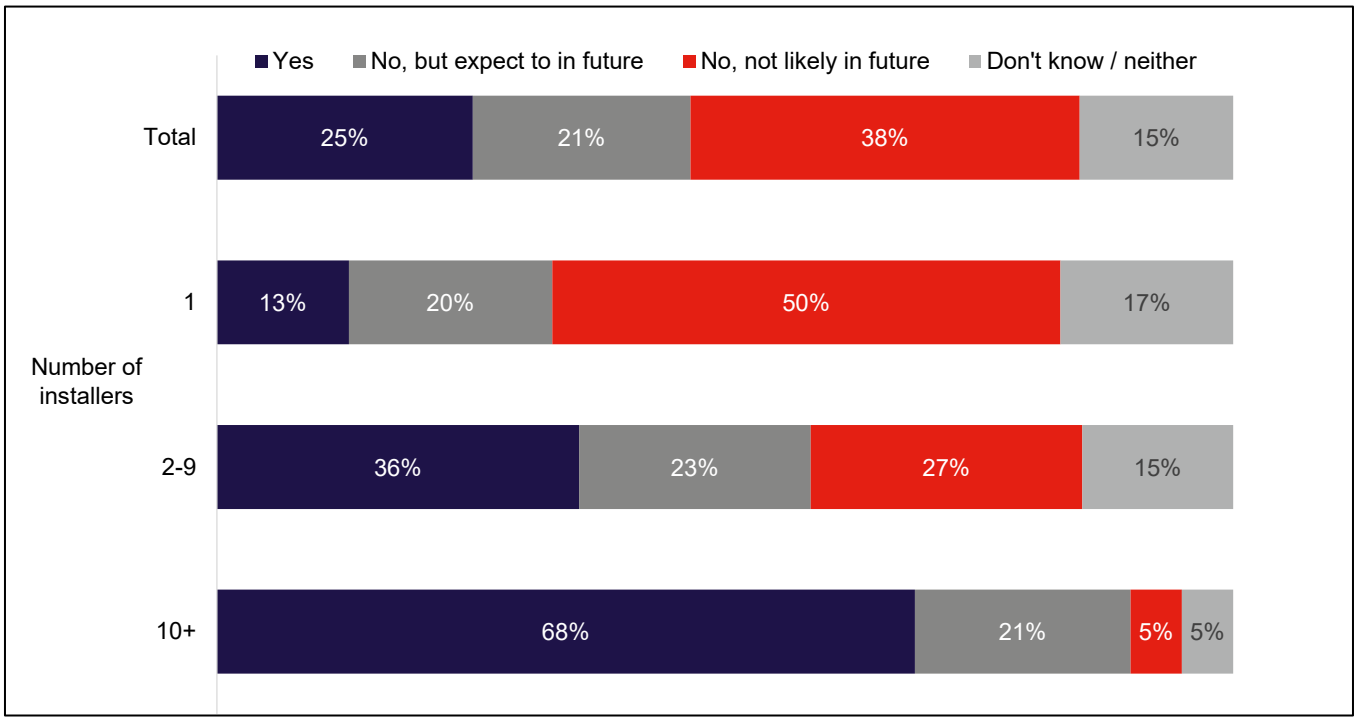
A few also mentioned they would need to ensure they had the necessary parts to be able to repair or maintain a particular heat pump. Without these, the quality of the system could be compromised.

Expectations for future heat pump installation

As shown in Figure 14, 25% of all the employers surveyed currently offered heat pump installation services and a further 21% expected to in the future. Four in ten (38%) did not consider it likely that they will install heat pumps in future.

Once again, there was a considerable difference by size of business. Larger employers were much more likely to currently offer heat pump installation services (68% among those with 10+ installers, compared with 36% with 2-9 installers and 13% with 1 installer). However there was relatively little difference by size in terms of the proportions planning to offer heat pump installation in future who do not currently offer heat pump installation services.

Figure 14. Whether employers offer heat pump installation services / are likely to offer this in future, by number of heating and cooling installers

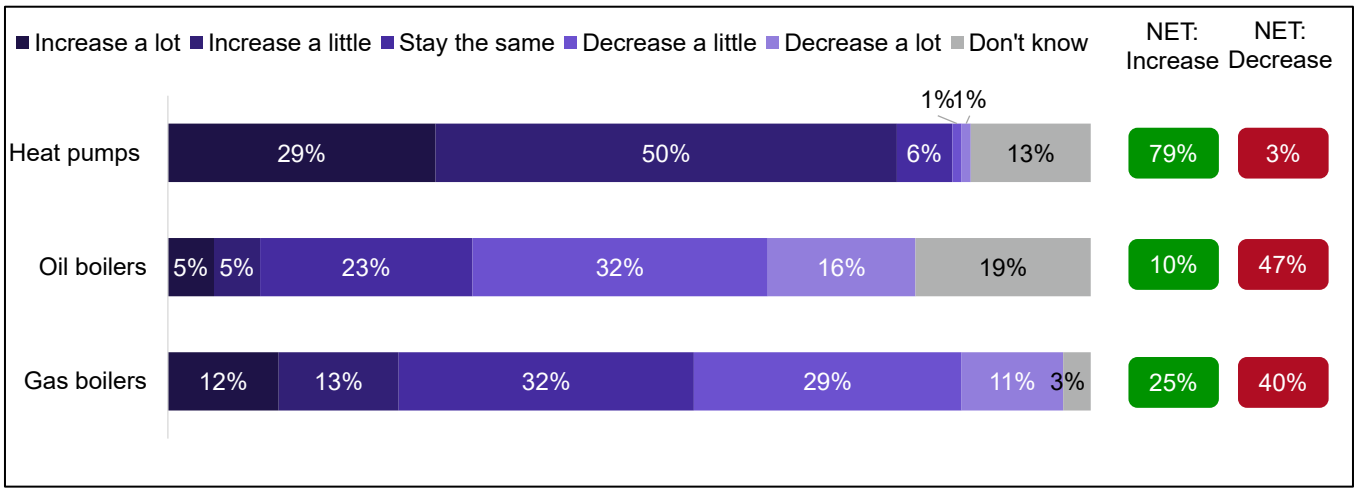


Source: Employer Survey. D1: Does your company offer heat pump installation services? And D2. How likely is your company to begin offering heat pumps installation services in the future? Base: All employers (687): Number of installers: 1 installer (291), 2-9 installers (309), 10+ installers (71). 'Don't know' responses not shown.

Businesses who installed heat pumps and businesses who considered themselves likely to install in future were asked how many staff they would expect to have installing heat pumps in 2023, 2025, and 2028. Existing employers expected the number of installers working on heat pumps to increase by approximately double by 2028.

Installers who participated in the workforce survey were asked whether they think that the number of gas boilers, oil boilers and heat pumps sold would increase or decrease in the next 10 years (Figure 15). It is encouraging to note that 79% of installers thought that the number of heat pump installations would increase with only 3% expecting that they would not. However, outlook on the future of gas was much more mixed with 25% considering that demand for gas boilers would increase, while 32% thought demand would stay the same and 40% thought it would decrease. This is in line with both the employer and workforce surveys as well as qualitative elements. These found that employers and installers consider that levels of demand for gas heating technology options will remain or increase in future which is why some are not considering training to install other heating technology options. The heating and cooling industry's outlook on oil heating was more in line with Government policy, with just under half (47%) considering that demand will decrease within the next 10 years.

Figure 15. Projected levels of installation in 10 years compared to current levels for different types of heating technology



Source: Workforce Survey. C13. Do you expect the number of units sold in the UK, of the following technologies, to increase or decrease in the next 10 years? Gas boilers, air source heat pumps, and oil boilers. (Respondents could select more than one answer, therefore percentages do not total 100%). Base: All installers (154)

In the workforce survey, those in the 'current heat pump installer' archetype were considerably more likely to expect a decrease in gas boilers (58%) and oil boiler installation (68%) in the next ten years, when compared to the average (40% and 47% respectively).

Note that in the focus group, hydrogen boilers were also mentioned as a technology that installers would be working with in the future.

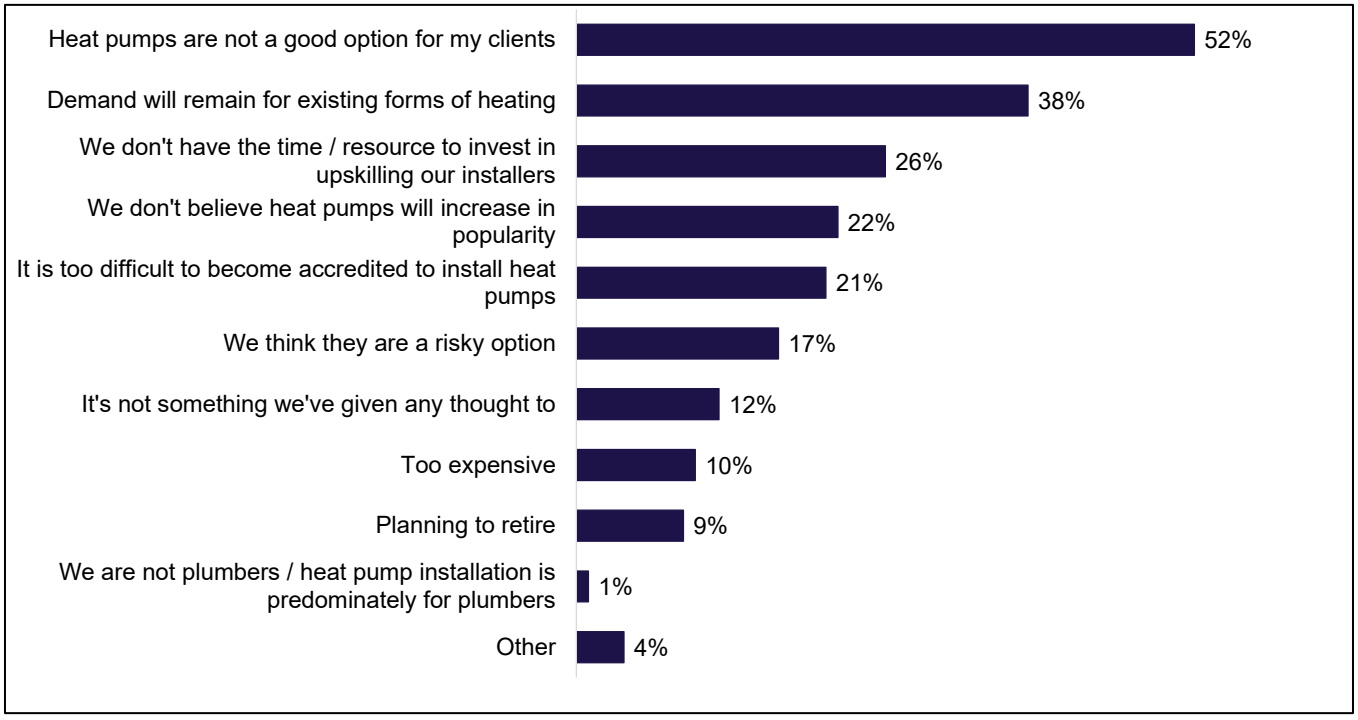
Barriers to heat pump installation

Employers' views on the barriers to heat pump installation

In the employer survey, those businesses who believed they were unlikely to install heat pumps in future were asked why this was the case. As shown in Figure 16, most commonly they considered that heat pumps were not a good option for their clients (52%) and that

demand would remain for the technology they currently install (38%). Operational difficulties such as a lack of training, lack of time, or difficulties becoming accredited were deemed less of a barrier.

Figure 16. Employers' reasons for low likelihood of installing heat pumps in future



Source: Employer Survey. D3. Why is your company unlikely to begin installing heat pumps in future? Base: Those who are unlikely to install heat pumps (n = 233) 'Don't know' responses not shown.

Employers who work on projects in existing commercial buildings (23%) were less likely to say that demand would remain for the technology they install currently than those with other business models (36%).

Just over a quarter (26%) of all employers stated they lacked the time / resource to upskill their installers. Those who currently offered training internally and externally were more likely to state this than those who did not offer internal or external training (38% of those that offer internal training compared to 23% that do not and 35% of those who offer external training compared to 15% that do not).

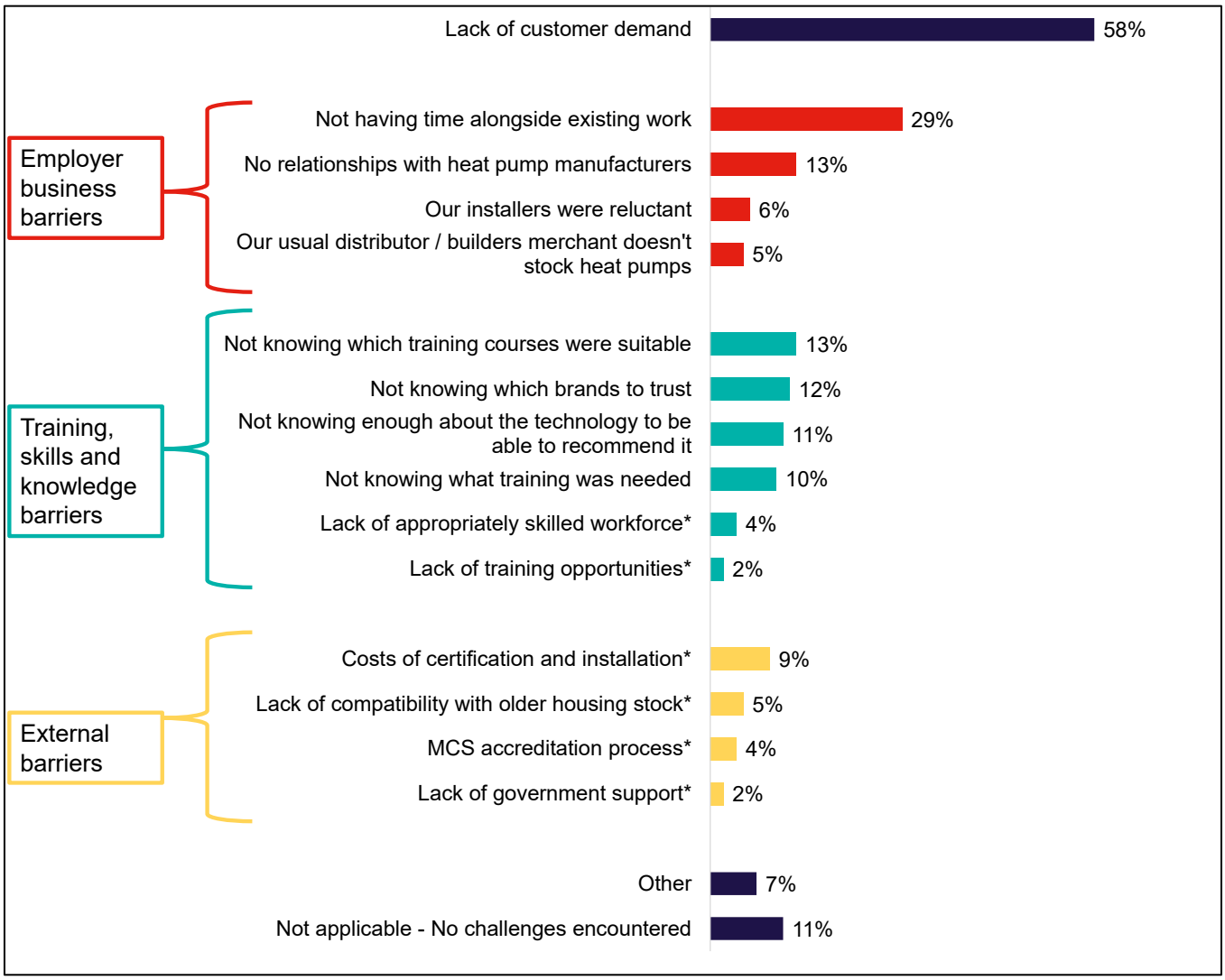
The lack of customer demand barrier was also expressed in the qualitative elements with three employers in the focus group stating that they didn't think that the level of customer demand expected by Government and industry will actually materialise and hence they are not convinced that they should transition their businesses to heat pumps yet. One employer felt that investment into heat pumps should have started 15 years ago so that the market was ready for today.

> *"With there not being so much demand for them it's a big ask for me to invest so much money for the training right now, when I don't have that much demand from my customers. I can see it going that way but at the minute there's not the demand there to justify it." (Demand influenced, Sole trader)'.*

Businesses who already install heat pumps were asked in the employer survey what challenges they had faced in developing their capacity for installing heat pumps. As shown in Figure 17, the greatest challenge for current heat pump installers has been a lack of consumer

demand (58%) – reflecting the reasons described above, why installers do and do not install. Almost a third of employers (29%) also felt they had lacked the time to develop the capacity to install heat pumps as they were busy with their existing work. It is also worth noting that 11% of employers stated that they had not faced any challenges.

Figure 17. Challenges faced when developing the capacity for installing heat pumps



Source: Employer Survey D9. What challenges, if any, has your company faced in developing capacity for installing heat pumps? Base: All heat pump installing employers (172) (Respondents could select more than one answer, therefore percentages do not total 100%). 'Don't know' responses not shown. * Indicates responses that were spontaneously mentioned in the 'other (please specify)' category.

There were also differences by business size and number of installers. Firstly, those with one installer were more likely to say that there was a lack of consumer demand, with 73% stating this compared to those with 2-9 (54%) and 10+ installers (53%).

Those with 10 or more installers were more likely to report that they did not know enough about the technology to be able to recommend it (21%) compared to those with 2-9 installers (12%) and those with one installer (5%).

Installers' views on barriers to heat pump installation

Lack of customer demand was explored further in the depth interviews and in the focus groups. Although some installers were already installing heat pumps and others were keen to start,

customer demand was needed for market growth. Most installers reported not seeing sufficient, or indeed any, demand to make heat pump installation a viable part of their business.

Installers felt that low customer demand for heat pumps was because of:

- Low awareness amongst the public
- High installation and running costs (customers and installers questioned whether heat pump installation was 'worth it' in the long-term)
- Lack of clarity about electricity costs. Many installers didn't have a clear grasp on electricity tariffs for heat pumps, or how to explain this to customers
- Consumer preference to spend money on other home improvements, such as a new kitchen or bathroom.

A few also mentioned physical barriers such as:

- Customer concerns
    - Customers not wanting large radiators in their home.
    - Customers wanting their homes heated to a higher temperature than would be delivered by a heat pump.
    - Risk that heat pumps external to a property could be stolen for metal or parts.
- Increased difficulty in the logistics of installation
- Suitability within UK properties versus alternatives
    - Properties not having the space for large radiators, underfloor heating or heat pumps and associated kit (e.g. hot water tanks).
    - Properties having no garden (e.g. for ground source heat pumps).
    - Properties with low energy efficiency performance standards, including single glazed windows and lack of insulation.

In the depth interviews, most installers (across all segments except Retirees), said they would train to be able to install heat pumps if there was more customer demand for them.

Demand for heat pump installations had some geographic and demographic barriers/enablers as well. Areas with high elderly populations were seen as less likely to want to install them for example, as they did not anticipate making savings in the long-term. Appetite from younger people was noted, but customers needed to have sufficient resources and space to be able to install them.

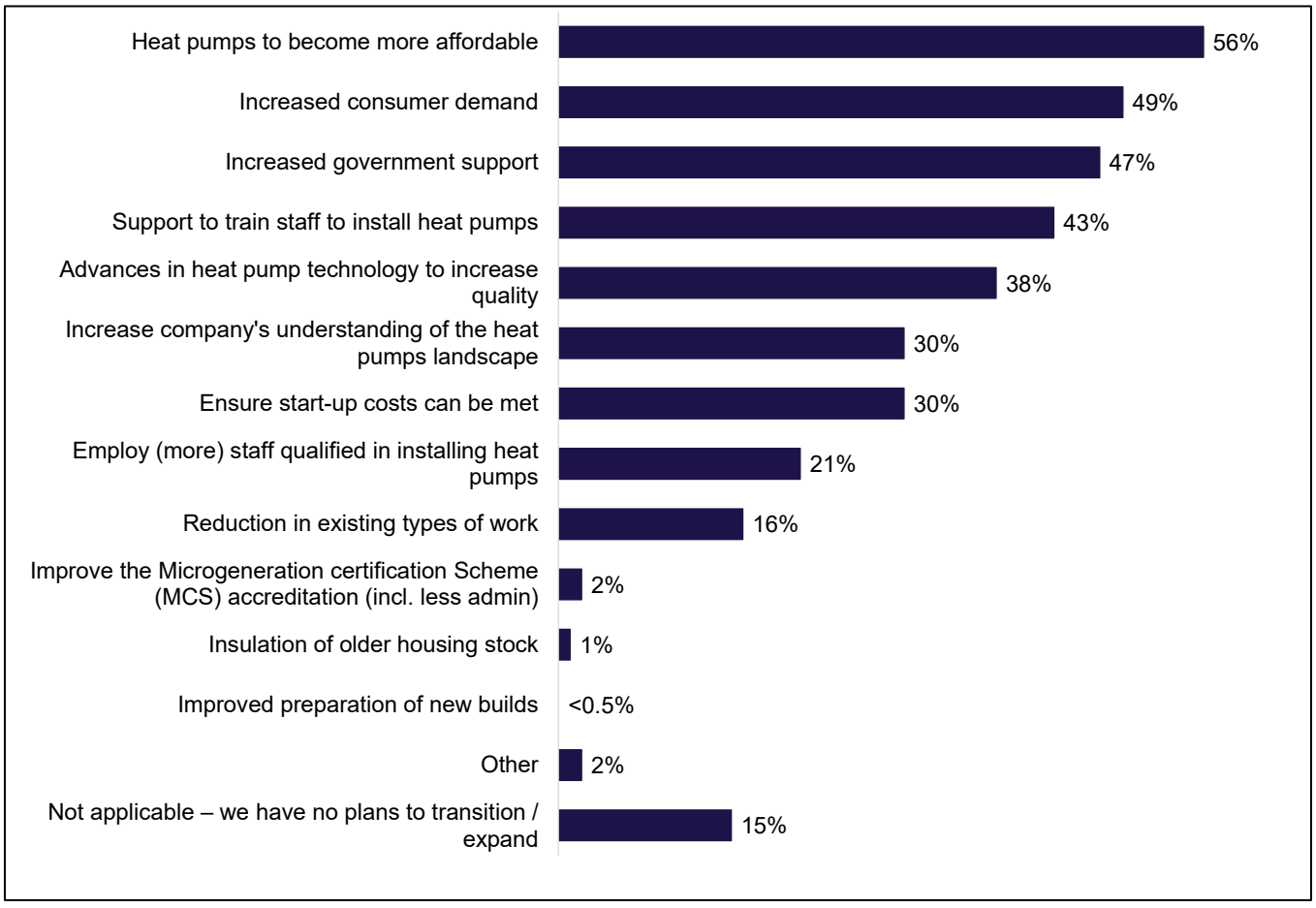
> *"[Who's interested in heat pumps?] Young couples… people into sustainability… professional people who've sat down for a couple of hours and done some research… weighed up the pros and cons." (Current installer, 10-49 employees)*

Enablers to heat pump installation

Employers' views on enablers to heat pump installation

All employers were asked what would need to happen for them to transition into or expand their existing heat pump installation services (Figure 18). For just over half of employers, heat pumps would need to become more affordable (56%) before they started or expanded heat pump installation services. The need for increased consumer demand (49%), increased Government support (47%) and support to train staff to install heat pumps (43%) were also commonly stated prerequisites.

Figure 18. What would need to happen for employers to be able to expand or transition into heat pump installation services

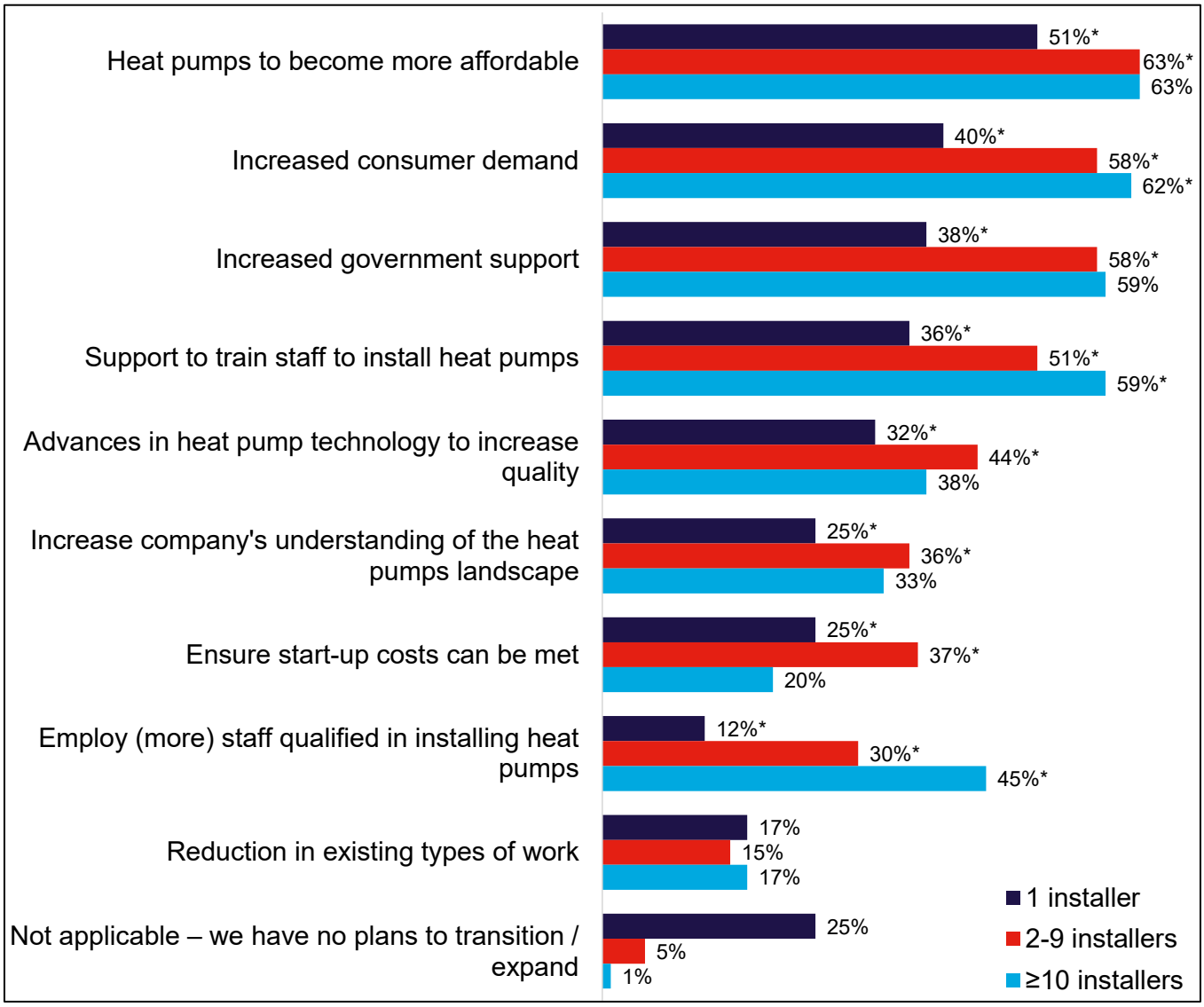


Source: Employer Survey D8. What would need to happen for you to transition into, or expand your existing, heat pump installation services? Base: All employers (687) (Respondents could select more than one answer, therefore percentages do not total 100%). 'Don't know' responses not shown.

Employers who already offered heat pumps were more likely to say that they needed heat pumps to become more affordable (69%), increased consumer demand (65%), increased Government support (62%) and to employ more staff qualified in heat pump installation (32%) than those who did not offer heat pump installation services (51%, 43%, 42%, and 16% respectively).

As shown in Figure 19, businesses with one installer were more likely to have no plans to transition or expand regardless of the landscape, compared to 5% of businesses with 2-9 installers and 1% of businesses with 10 installers or more.

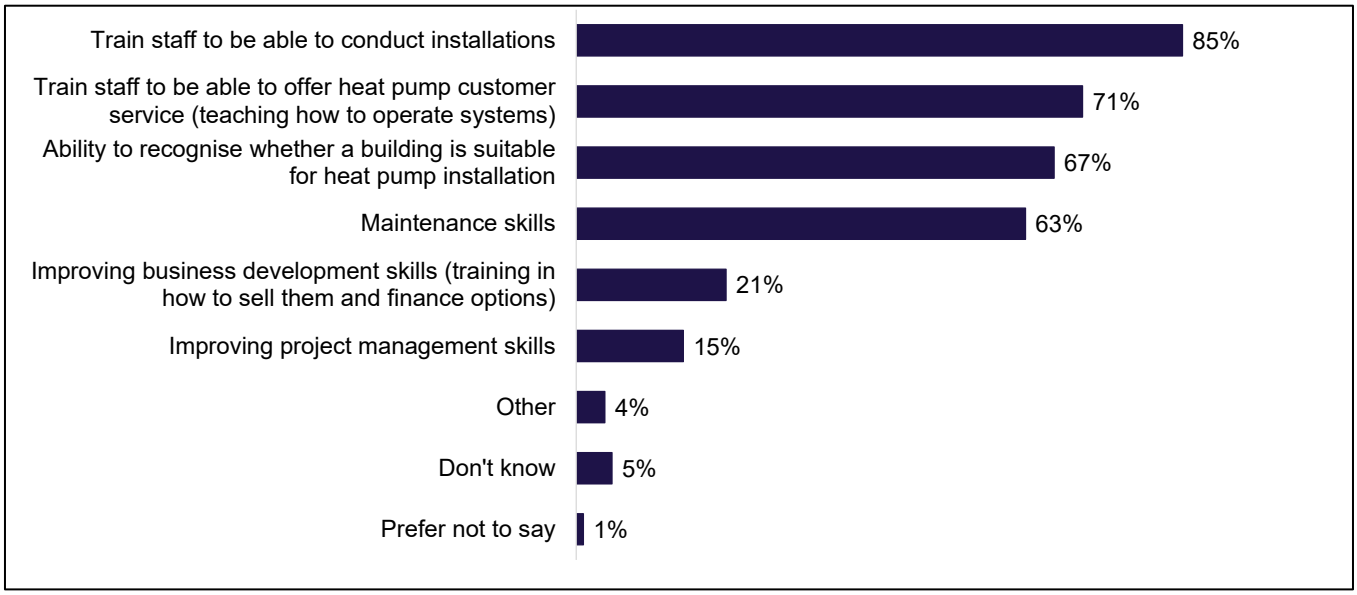
Figure 19. What would need to happen for employers to be able to expand or transition into heat pump installation services, by number of heating and cooling installers



Source: Employer Survey. D8. What would need to happen for you to transition into, or expand your existing, heat pump installation services? Base: All employers (687); 1 installer (291), 2-9 installers (309), 10 or more installers (71). *Indicates figures are significantly higher or lower than total figure. (Respondents could select more than one answer, therefore percentages do not total 100%). 'Don't know' responses not shown.

Employers who stated they were likely to begin installing heat pumps in future were also asked what skills their existing workforce would need to develop to be able to offer heat pump installation services. A range of interventions were necessary, as can be seen in Figure 20. Most (85%) naturally needed to train their staff to be able to conduct installations. Beyond this, 71% felt they needed to train their staff to be able to offer heat pump customer service, while scoping feasibility (67%) and maintenance (63%) were also important skills to develop. Business development (21%) and project management (15%) skills were considered less important in the transition to heat pump installation.

Figure 20. Skills existing workforce needs to develop to be able to transition into heat pump installation services



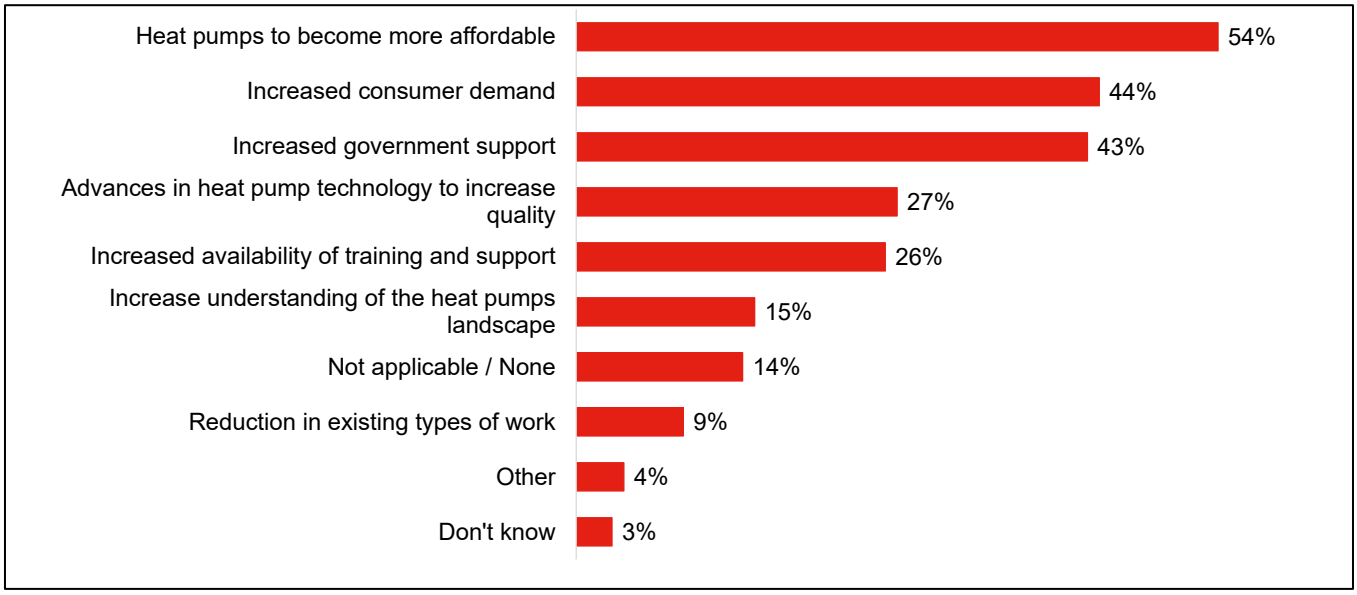
Source: Employer Survey D7. What new skills would your existing workforce need to develop to be able to transition into heat pump installation services? Base: All employers likely to begin installing heat pumps (139). (Respondents could select more than one answer, therefore percentages do not total 100%).

There were no significant differences in skills development needs by business size, installer number or types of buildings worked on.

Installers' views on enablers to heat pump installation

Installers who participated in the workforce survey were also asked what would increase the number of heat pumps they install. The top three responses were the same as found in the employer survey, with 54% reporting heat pumps needed to become more affordable, 44% needing an increase in consumer demand and 43% needing increased Government support, as shown in Figure 21.

Figure 21. What would need to happen for installers to be able to increase the number of heat pumps they install



Source: Workforce Survey. C10. Which of the following, if any, would increase the number of heat pumps you install? Select up to three options. Base: All installers (154) (Respondents could select more than one answer, therefore percentages do not total 100%).

In the depth interviews, installers suggested that Government grants would incentivise customers to install heat pumps, as cost was the main consideration for most.

> *"Cost is the biggest driver of anything. At the moment, it is very expensive to have an air-source heat pump fitted to a property." (Current heat pump installer, 10+ employees)*

General awareness raising about the low carbon transition and heat pumps was seen as necessary in the depth interviews. Installers felt this should come from Government primarily, for example promoting heat pumps, their benefits and potential energy savings, as well as any grants available for installation (as cost was the biggest barrier for most). Installers also felt the heating and cooling industry could do more to promote heat pumps, and to provide better training leading to their take-up. Some installers stressed that financial incentives needed to be available on a consistent basis, to avoid a 'boom and bust' way of working.

Making heat pumps more affordable would likely increase customer demand but there were other ways to achieve this according to the installers interviewed, including clearer messaging from Government. This would help customers feel confident about the direction of travel regarding the low carbon transition, as well as reassure installers about how they should be making decisions about their business (e.g. training, adjustments required to be able to install heat pumps) in the future.

In the depth interviews, installers reported having confidence in the quality of the heat pumps themselves. They felt that heat pump efficiency would improve over time as the technology develops, and that costs would come down. However, installers do not see heat pumps as a new technology but know that they haven't been taken up and felt there was a lack of clear strategy being communicated by Government. Many were unaware of changes to legislation. For example, the banning of gas boilers in new builds due to come into effect from 2025. There was also felt to be some difference between the Government's drive for heat pumps, and industry's focus on hydrogen, as was mentioned in one of the workshops.

> *"There has to be a clear message on the Government's stance of domestic hydrogen boilers as installers believe that boilers are still the way forward. The number of installed boilers per annum support their views." (Stakeholder workshop #2: Skills, Standards and Academics)*

Legislation was also mentioned in the focus groups, as a way to increase the number of heat pumps being installed. For example, by introducing low emissions zones, or ensuring new commercial buildings have higher standards regarding the heating systems they install.

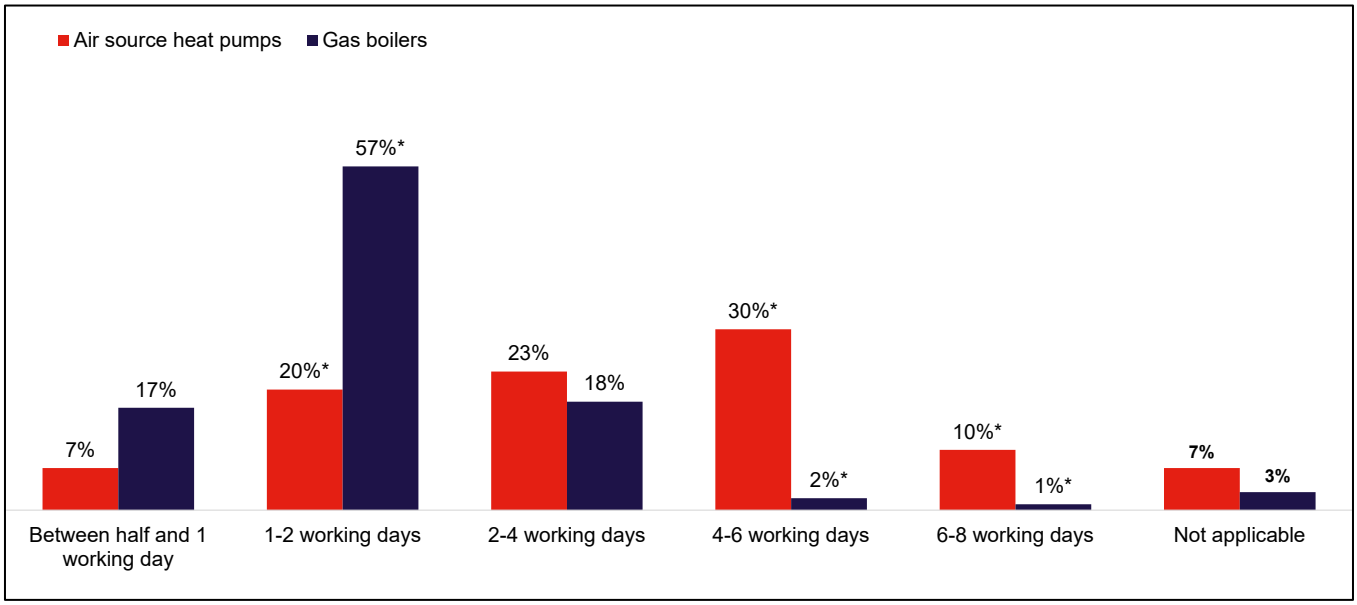
Practicalities of heat pump installation

Time required to install heat pumps and other technologies

The workforce survey explored installer views on the length of time needed to install technologies. As shown in Figure 22, installers who worked on installing domestic air source heat pumps reported longer average timings for installing these (median: 2-4 working days) than those that installed domestic gas boilers (median: 1-2 working days). This mirrors findings

in the Government's recent Electrification of Heat Demonstration project which found that on average, heat pump installations took 2-4 days to complete by a team of two installers and one electrician[17]. Please note that the wide range in times stated on both technologies could reflect the varying level of experience different installers have with the technology at this point in time and that some homes will also require changes to radiators whilst others will not.

Figure 22. Average length of time taken to install different types of heating technology

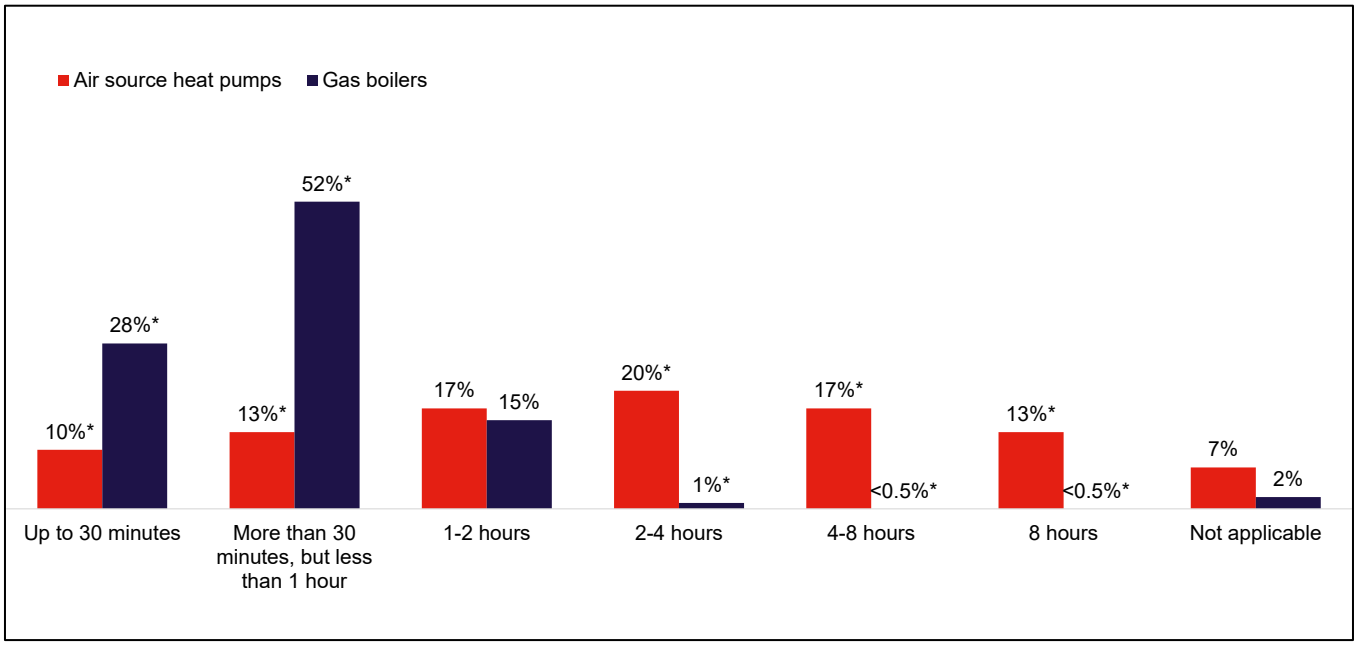


Source: Workforce Survey. C11A/B. Roughly, how long on average does it take to install Domestic Air source heat pumps/ Domestic Gas boilers? Base: Air source heat pump installers (30), Gas boiler installers (87). 'Don't know' responses not shown.

Installers of these technologies in domestic settings were also asked how long it takes to complete the paperwork associated with a typical installation. A similar pattern can be observed in Figure 23 to that shown in Figure 22 with most installers agreeing that gas boiler paperwork takes less than an hour (80%) whereas those that install air source heat pumps were much more varied in their answers.

[17] ICF, The Electrification of Heat Demonstration (EoH) project. (2022) Can be accessed at: https://es.catapult.org.uk/news/electrification-of-heat-trial-finds-heat-pumps-suitable-for-all-housing-types/

Figure 23. Average length of time taken to complete paperwork associated with the installation of different types of heating technology



Source: Workforce Survey. C12A/B. How long on average does it take to complete the paperwork associated with a typical Domestic Air source heat pump/ Domestic Gas boiler installation? Base: Air source heat pump installers (30), Gas boiler installers (87). 'Don't know' responses not shown.

Travel requirements

In the workforce survey, installers were asked how long it took them on average to travel to where they undertake work or between jobs. Just over three-quarters spent less than an hour travelling. Very few installers spent more than an hour, with 9% spending between 1 and 2 hours on average and only 1% spending more than 2 hours. A small proportion (14%) stated that their work was too varied to provide an average.

Installers were asked what the maximum travel time was they would be comfortable with when travelling to and between jobs. The majority (52%) were willing to travel between 30 minutes and 1 hour with just under a quarter (22%) being willing to travel between 1 and 2 hours regularly and 8% willing to travel more than two hours.

Installers who offered heat pump installation services were much more likely to take longer to travel between jobs and be willing to travel for longer than those who do not currently install which perhaps indicates that heat pump demand might may contribute to the need to travel further. The disengaged and the keen to learn archetypes spent the most time travelling and were more willing to travel for a greater length of time than the other non-heat pump installers.

Focus group participants highlighted that the distances travelled by installers varied with local levels of demand. Installers based in London tended not to leave a small cluster of boroughs and some installers outside of London operated within a 15-mile radius. In both cases this was because of adequate demand within this catchment. However, installers in rural/remote areas tended to accept that they would have to travel further for work.

One employer mentioned that their sole installer usually did not travel more than 15-20 minutes but sometimes had to travel up to an hour and increased their installation costs accordingly. One, based in a rural area, travels between half an hour and 40 minutes but questions anything further afield than that. This employer also focused on certain areas and undertaking

several jobs in one area at a time to save travel costs. One employer did subcontracting work for a large nationwide energy supplier to support heat pump installations and they travel up to two hours away. The employers with larger businesses (between 16-25 employees) reported travel areas of 50 miles or 100 miles and, in one case, across the whole of the UK with these businesses being involved in maintenance and operation of commercial building portfolios.

Experience recommending heat pumps to customers

The depth interviews provided some detail about installers' experiences recommending heat pumps to customers. Generally, there was a low level of confidence about this, which was driven by installers lacking sufficient knowledge on the specifics of heat pump installation.

> *"I wouldn't feel very confident [recommending heat pumps]… I don't know enough." [Demand influenced, 2-9 employees]*

The 'specifics' installers referred to included:

- the system of different types of heat pumps
- their suitability for different property types
- knowing what the appropriate electricity tariffs for customers are
- knowing relevant qualifications for installing and maintaining heat pumps

In the workforce survey, four in five (81%) installers from the Keen to learn archetype said they knew how a heat pump works, and the types of building it is suitable for. This finding was reflected in the depth interviews, where installers from the Keen to learn archetype said they had sufficient knowledge to be able to explain heat pumps to customers.

> *"I feel quite confident because I've got a reasonable amount of knowledge of the technologies and their performance." [Keen to learn, Sole trader]*

However, less than half (40%) of the Keen to learn group reported that they were skilled in heat pump installation. Again, this finding was reflected in the depth interviews, where many Keen to learn installers had received training on heat pump installation but lacked confidence about the installation itself.

Installers from the Disengaged archetype felt they understood heat pump technology well and had more confidence than other groups in advising customers on how to reduce their energy usage. However, they were less likely than those from other segments to recommend heat pumps to customers.

> *"I would probably be more negative of heat pumps because I know lots of negative things [about them]… and I haven't found anything positive. I know they go on telly and say, 'it's going to save the world', but we haven't got enough information really, to make a decision". [Disengaged, Sole trader]*

Lacking knowledge about the type of heat pump most suitable for a particular property was a barrier to making recommendations to customers about heat pumps. This related to the importance of training on system design, mentioned by some of the installers with more experience of heat pump installation and discussed elsewhere in this report.

Limited understanding and knowledge about heat pump technology among customers was a source of additional pressure for installers. Some commented that they needed to both educate and recommend the most appropriate types for the customers. This led to some anxiety about potentially being held responsible should any problems arise. Consequently, installers wanted to see Government doing more to educate the public on heat pump technology.

> *"It would be good to have an independent source of information that could signpost all of this information" [Keen to Learn, Sole trader]*

> *"As the technology comes more into the mainstream, then people's ideas and perceptions will change, but at the moment there's not enough of the technology about for people to get their head around it." [Current installer, Sole trader]*

Some installers wanted heat pump technology to improve before they would feel comfortable recommending them to customers. For example, they would like to see heat pumps with lower electricity demand, which would be more affordable for customers. They would also like to see smaller heat pumps which take up less space, are easier to use, and are more attractive.

> *"The thing that puts people off is the price of [heat pumps], the installation, commissioning and the running costs." (Current installer, 2-9 employees)*

Installers from the 'Retiree' archetype were generally confident explaining the processes to customers. They were less confident and interested in informing customers of the specific heat pump appropriate for their properties. There was particular emphasis on there not being a unified source of information.

> *"People need to seek it out and look at more than one source to get a broader picture, because there's a lot of misinformation out there." (Retiree, Sole trader)*

''In the focus groups there were widely varying views on the responsibility of installers to advise their customers. Some felt that it was the responsibility of all installers, manufacturers, Government and wider industry to explain to customers what heat pumps were and how they work, and that messaging should be harmonious. Others felt that it was primarily their own role to give this advice as they had a loyal customer base and wanted to give the best possible advice, particularly relating to technical information such as heat loss calculations.

However, there was some acknowledgement that installers may be incentivised to recommend heat pumps when they are not suitable for the property in question. In addition, two employers highlighted that an installer would not take a whole building approach in their assessment of the suitability of a heat pump. However, this is fundamental in order to determine the most effective approach to decarbonise buildings (e.g. ensuring that there was adequate insulation in the property or that the property was suitable for underfloor heating or large radiators before installing the heat pump).

Most employers felt that it was up to the Government to be educating people as employers do not have the time to do this. There was broad agreement that installers would not encourage consumers to purchase heat pumps until it is clear that the technology is backed by Government, especially as heat pumps are considerably more expensive than conventional gas boilers without government support.

Sources of information that installers trust

In the depth interviews, installers were asked which sources of information they were aware of and pay attention to, to ascertain potential sources of knowledge, trust and influence. Having a clear sense about effective communication channels will help disseminate information about heat pumps and the transition to low carbon, including opportunities for training and financial incentives for installers in the future. The most common sources referenced by the installers interviewed were as follows; there were no differences by archetype:

- Trade magazines
- Manufacturer websites
- Google
- Merchants

Trade magazines were viewed as the most reliable sources of information and were well regarded as being easily accessible. Installers were usually already signed up to receive these regularly. Trade magazines mentioned were:

- ACR magazine for Refrigeration
- Gas installer Monthly
- Heating and Ventilating Magazine
- Association of Plumbing and Heating Contractors (APHC (website))
- Chartered Institute of Plumbing & Heating Engineering (CIPHE)
- Building Engineering Services Association (BESA)
- Renewable Energy Consumer Code (RECC)
- REFCOM. (the Register of Companies Competent to Manage Refrigerants- ‘Refrigerant Companies’)

However, installers were aware that many articles in trade magazines were written by manufacturers with their own agendas.

> *“I have to be a bit careful reading the heating and plumbing press, because there will be some articles in there written from a particular slant from a particular lobbying group.” [Demand influenced, Sole trader]*

Gas Safe magazine and its website was also mentioned as a ‘go-to’ source of information for updates and insights about the industry. However, a few installers expressed disappointment with the level of detail provided by Gas Safe given their high membership fees.

A few installers mentioned trade shows such as the PHEX – the plumbing, heating and ventilation show in London which happens twice a year, as well as the Electrical & Tool show.

Another key source of information for installers was through word of mouth. Speaking to other installers, engaging with other professions, and seeking advice from experienced installers, were described as valuable ways to exchange knowledge.

> *“‘I’m more likely to listen to somebody that I know, than not.” (Demand influenced, 2-9 employees)*

Many installers used social media as well e.g. joining industry specific Facebook groups to exchange information or watching YouTube videos to learn new skills and hear a range of opinions, something that was echoed in the focus groups. Although social media was not referenced as being the most trusted source, it was certainly considered a more accessible and useful source than most. Indeed, a few of the more experienced heat pump installers felt this was the most current and up to date source of information on heat pumps and new technology.

Alternative sources of knowledge which were used but generally considered less trustworthy were manufacturer websites and emails, as well as gov.uk. Manufacturer websites, such as Mitsubishi and Grant UK, were useful for information but there was concern expressed in the interviews and the focus groups around their overall intention and whether their goal was to inform installers or to promote their products. Gov.uk was considered the least trusted source of information with installers feeling it lacked authenticity and relatability.

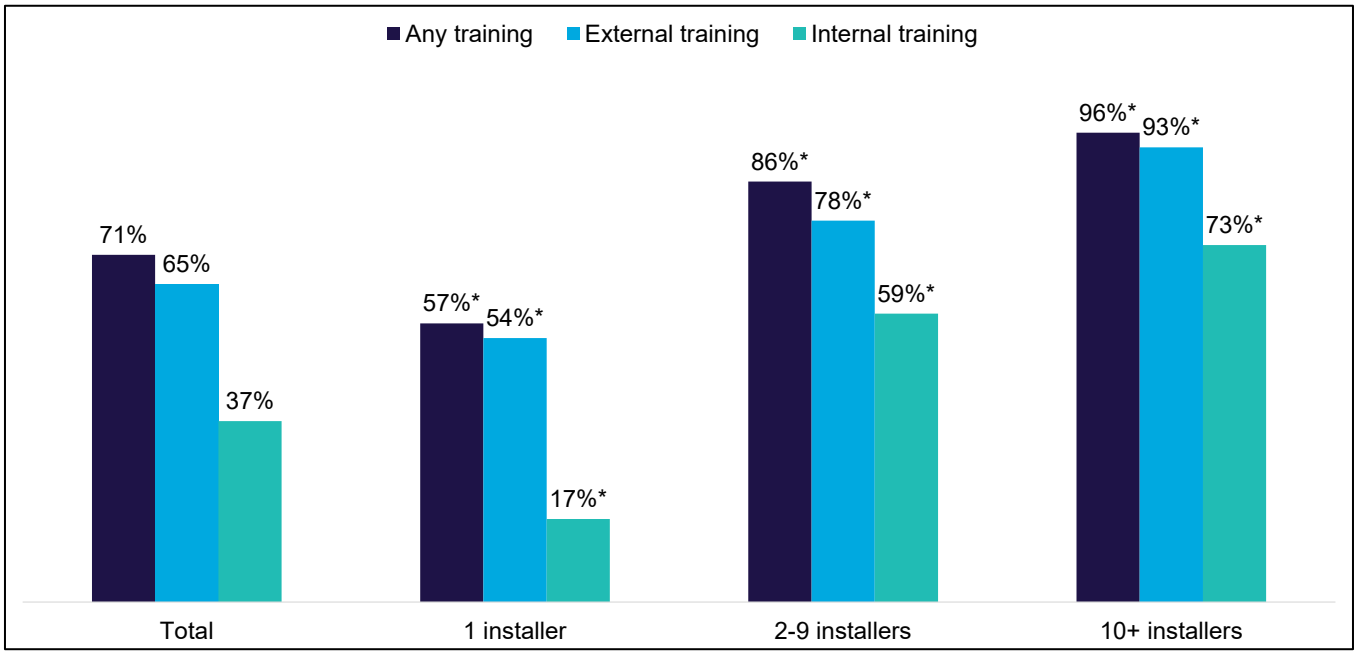
5. Training, apprenticeships and future skills

This chapter explores heating and cooling employers' and installers' attitudes towards, and experiences of, training and apprenticeships, as well as considering future skills needs. It covers current training offered by employers for heat pumps and related skill sets, barriers faced in providing training for installers, and future training ambitions.

Current training (in general)

Employers and installers were invited to give their views about training provision. In the employer survey, around seven in ten (71%) employers had provided some form of training to their installers in the previous two years. A total of 28% did not provide any training at all, while one per cent were unsure. Levels of training varied considerably according to size of employer as shown in Figure 24. For around two-thirds (65%) of employers, training was delivered externally, while just over a third (37%) delivered training internally, again with considerable variation by size.

Figure 24. Proportion of employers offering training to their installers, by number of heating and cooling installers



Source: Employer Survey. B1: Has your establishment provided any INTERNAL training for your heating and cooling workforce in the past 24 months? B2: Has your establishment provided any EXTERNAL training for your heating and cooling workforce in the past 24 months? Base: All employers (n=687), 1 installer (n= 291), 2-9 installers (n= 309), 10+ installers (n=71). *Indicates figures are significantly higher or lower than total figure. (Respondents could select more than one answer, therefore percentages do not total 100%). 'Don't know' responses not shown.

Employers that did not offer training to their installers identified in the employer survey several barriers to offering and delivering training. As shown in Figure 25, time and prioritisation were a clear issue: three in ten (30%) cited that their staff were too busy to go on training, while a further 12% reported they lacked the time to organise training. A further 19% cited budget

constraints as inhibiting their ability to offer training. Meanwhile around a third (33%) reported that they considered their staff were already fully trained.

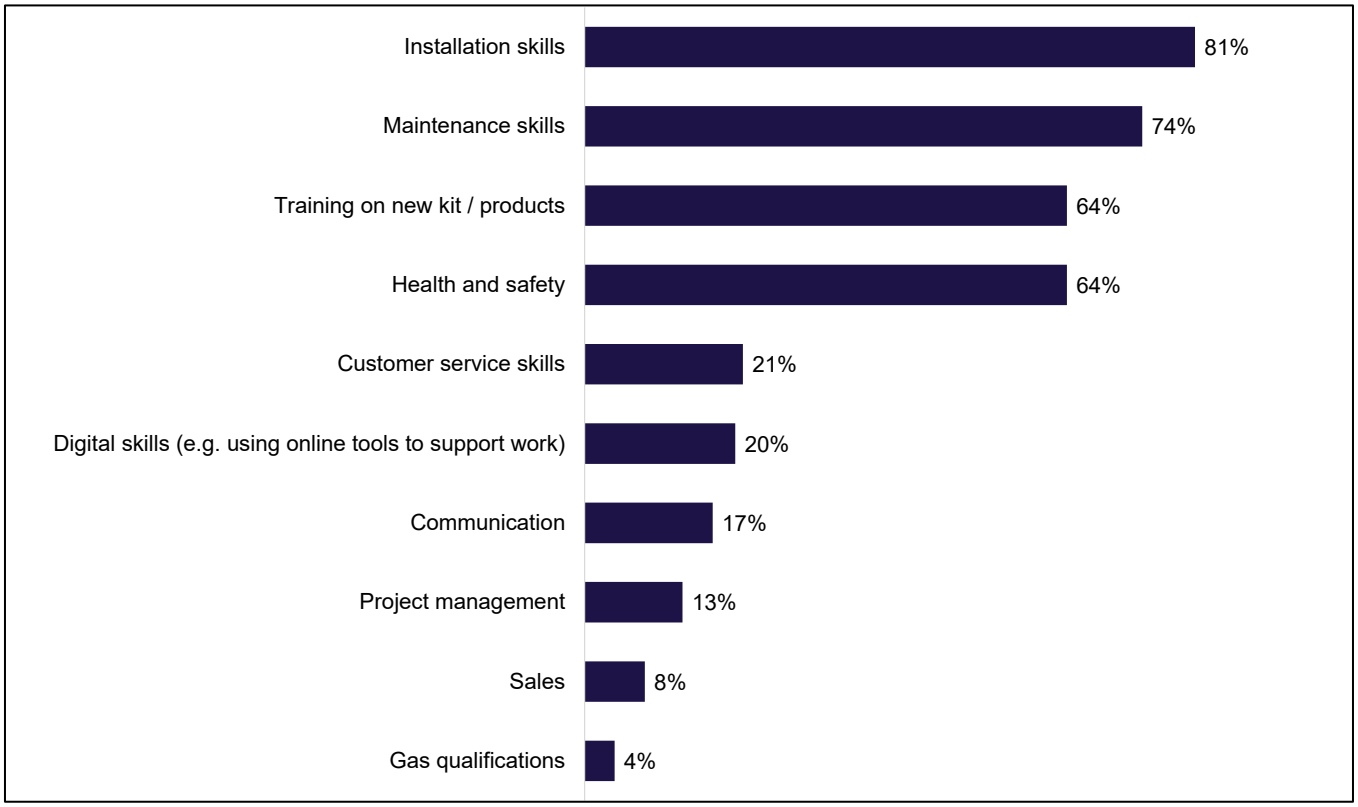
Figure 25. Employer barriers to offering training

Source: Employer Survey. B3: What are the barriers to offering training to your heating and cooling installers in the past 24 months? Base: Employers who do not offer training (n= 160). Answers of <4% not shown. (Respondents could select more than one answer, therefore percentages do not total 100%).

Employers who did provide training sought to develop a range of skills among their installers. As shown in Figure 26, installation (81%) and maintenance (74%) were most common, while around two-thirds sought to develop health & safety (64%) and new kit/product skills (64%). Only a minority offered training in broader skills such as customer service, project management and sales skills (reflecting the views installers have of their skills set).

A greater proportion of large employers (90%) offered more specific heat pump installation training than smaller employers (75%). Similarly, larger employers were also more likely to report including digital and health and safety training as part of their training offer.

Figure 26. Types of training offered by employers



Source: Employer Survey. B4: What aspects of the heating and cooling installer's job role does this training cover? Base: Employers who provide training (n=511). Answers of <3% not shown. (Respondents could select more than one answer, therefore percentages do not total 100%). 'Don't know' responses not shown.

Cost of training was another area explored in the workforce survey. Seven in 10 (71%) installers employed by an organisation reported that their employer paid for training. This left a quarter (24%) who paid for training themselves and 4% who reported that they share the cost of training with their employer. Furthermore, around three-quarters (76%) reported getting paid time to receive training. These figures exclude sole traders who would have to pay for their training themselves.

Current training (heat pump specific)

Type of heat pump training

Two in five (40%) installers, in the workforce survey, had received specialist training on installing heat pumps. Heat pump training was much more common amongst current heat pump installers (90%), although that still left 10% of heat pump installers who had not received training on heat pump installation.

Installers in the workforce survey mentioned a range of options for receiving training on heat pump installation. Most commonly, they cited attending Mitsubishi's Ecodan air source heat pump training (15%). Other delivery partners mentioned included the British Plumbing Employers Council (BPEC), the Building Engineering Services Association (BESA), Grant UK, Daikin, Dimplex and Vaillant. However, as noted above in the sources of information that installers trust section, installers in the focus groups criticised the training courses run by manufacturers and felt that the training was more of a product sales pitch. As reported in the

literature review, however, the Heat Pump Association recently sought to address historic concerns with the quality of heat pump training, launching a new course in 2021.

The depth interviews and focus groups revealed that many installers sought specific training because it was free, quick and would ensure they could meet growing customer demand. Some organisations offered free online training with the promise of a certificate at the end, and this therefore felt like a low-risk opportunity to take up. However, the installers in the focus groups criticised the quality of the free courses as they were not accredited and consequently the installers could not self-certify the heat pump installations.

One installer mentioned that the Chartered Institute of Plumbing & Heating Engineering were offering a low temperature heating course about the design of heat pumps, but this did not include installation. It should however be noted that this course is being offered by training providers in conjunction with heat pump installation training.

Quality of heat pump training

In the depth interviews, for those who had received training on heat pump installation, this had mostly been via manufacturers' courses, which tended to last one day. These courses allowed the installers to understand a particular heat pump but did not provide them with a fuller appreciation for how it would fit into the heat system of the property as a whole. Some installers had been on more specialist heat pump or low carbon technology courses which tended to be three to five days long.

Within the focus groups, installers clearly had a mix of training experiences, highlighting the lack of consistency within the industry:

- One participant was trained in solar PV, and the course included some information on installing heat pumps.
- Two had installed heat pumps but had not received any formal training.
- Four had been offered or received heat pump training from manufacturers but described these training sessions as a sales pitch.
- Two participants had attended a free heat pump training course, but this course did not result in a qualification that would be recognised by a competent person scheme (CPS) or MCS.

Air source and ground source heat pumps were the most common types of technology that installers in the depth interviews had been trained on. A few mentioned how the installation costs for ground source were higher, and they required sufficient land outside the property, so demand for this type had been lower. Installers were also led by the types of heat pumps offered by manufacturers:

> *"I'm only interested in air source… the cost and infrastructure to put a ground-source pump in is massive, most people would shy away from that … Manufacturers invest more in R&D for air source, as that's what most people are interested in." (Current installers, 250+ employees)*

In the focus groups, installers who had attended training courses did report positive experiences:

- One installer felt that manufacturers offered good training on their respective pieces of equipment

- One installer suggested training courses allowed them to understand the state of the heat pump market and that “the amount of money we can make, is phenomenal" after learning more about heat pumps.
- One employer, although feeling the current training provision was not of high quality, recognised the opportunities and access to a new market that training facilitates.

Installers have high expectations from the training they receive (to ensure they can install heat pumps efficiently and maintain their businesses reputation). In the focus groups, installers who had attended training courses reported several negative experiences which may indicate potential areas for improvement:

- One employer had sent their installer on a couple of heat pump training courses and was “appalled” by the quality.
- One installer was informed she could train on heat pumps in one day but was concerned this would not give them adequate knowledge and that the course “offered nothing on flushing, balancing or controls.”
- Another participant stated that there needed to be a mathematical element to the heat pump training course, as the calculations would affect the performance of heat pumps, which in turn could lead to poor installations and poor customer satisfaction. Installers felt that this was currently missing from training courses.
- One also felt that low demand for training courses meant that colleges did not have an incentive to deliver high quality courses.

In the depth interviews, some installers had been trained on heat pumps but felt their skills had not been put to use as they had not had the opportunity to install one recently. This was sometimes compounded by MCS certificates having expired and the installer not feeling it would be worth the time and expense to renew.

Installers were also keen to point out that training and standards were an important part of ensuring that heat pump installations, repair and maintenance are carried out effectively. Some commented that training would need to encompass system design, not just how to install the heat pump itself. This would give installers in-depth understanding of how the heat pump would work in a particular property, taking into account aspects such as: how well insulated the property was; the pipes and radiators already in place (how big, if new ones would be required); and the electricity requirements.

Barriers to heat pump training

Installers in the workforce survey who had not attended heat pump installation training were asked their reasons for this:

- **No interest in heat pumps was the most common response**, cited by 16% of installers. The next most reported barriers were that the cost was prohibitive (15%), that they were unsure where to access training (15%), that they were busy enough already working on other technologies (14%), and that there was a lack of customer demand for heat pump installation (13%).
- Half (53%) of installers, who had not received or attended heat pump training, only provided one barrier as a reason for this.[18]

[18] This question was an open text question.

Other barriers identified within the qualitative research included:

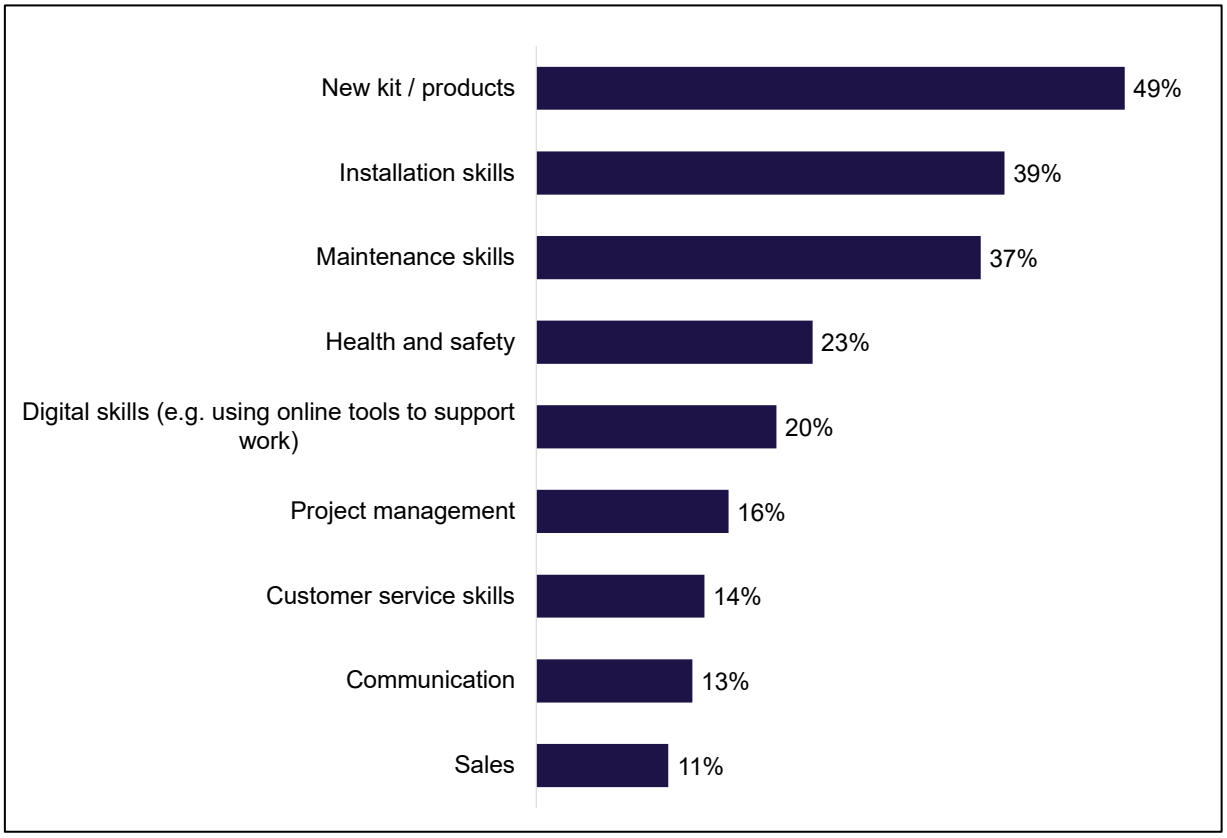
- Installers based in rural areas felt that **training location and duration was a key factor in determining whether they would sign up**, as many in-person training opportunities are not local to where they live and require additional considerations such as transport, overnight accommodation and the income lost from taking time off work.
- **Challenges deciding which heat pump training would best suit them**. Installers in the depth interviews felt overwhelmed by the many aspects of heat pump installation to consider, and which kind of training would be optimum. There was also a question mark for installers generally, about whether they should train to be able to install heat pumps, due to low customer demand, and confusion about whether heat pumps were the way forward for the sector.
- **More reassurance that investment in training is worthwhile.** In the focus groups, all installers wanted to see clearer messaging from Government around the pros and cons of heat pumps and a specific outline of why heat pump installations are the way forward before they would be willing to upskill to install them. They noted the uncertainty created by short-lived policies such as the Green Homes Grant and the Green Deal, which discouraged them from spending time and money on training to install heat pumps in the absence of long-term policy support. Employers echoed the concern that a Government scheme that takes months to prepare for and invest in can suddenly be pulled, causing financial losses for their businesses. One noted that strategies are not effective without supportive funding or infrastructure investments. It is the latter that will influence whether or not they will invest in upskilling their installers.

Training in the future (general)

Employer perspectives on future training needs

While at present, installation and maintenance training are most commonly provided by employers, in future they want to focus more on specific new kits and products (49% cited this – the most common of all options), as shown in Figure 27. Once again, only a small minority were interested in developing interpersonal skills such as communication, customer service and sales.

Figure 27. Future training employers would like to offer



Source: Employers Survey. B5: What (other) training would you like to offer to your heating and cooling workforce in future? Base: All employers (n= 687). 'Other' (2%), 'None' (23%) and Prefer not to say (2%) answers not shown. (Respondents could select more than one answer, therefore percentages do not total 100%).

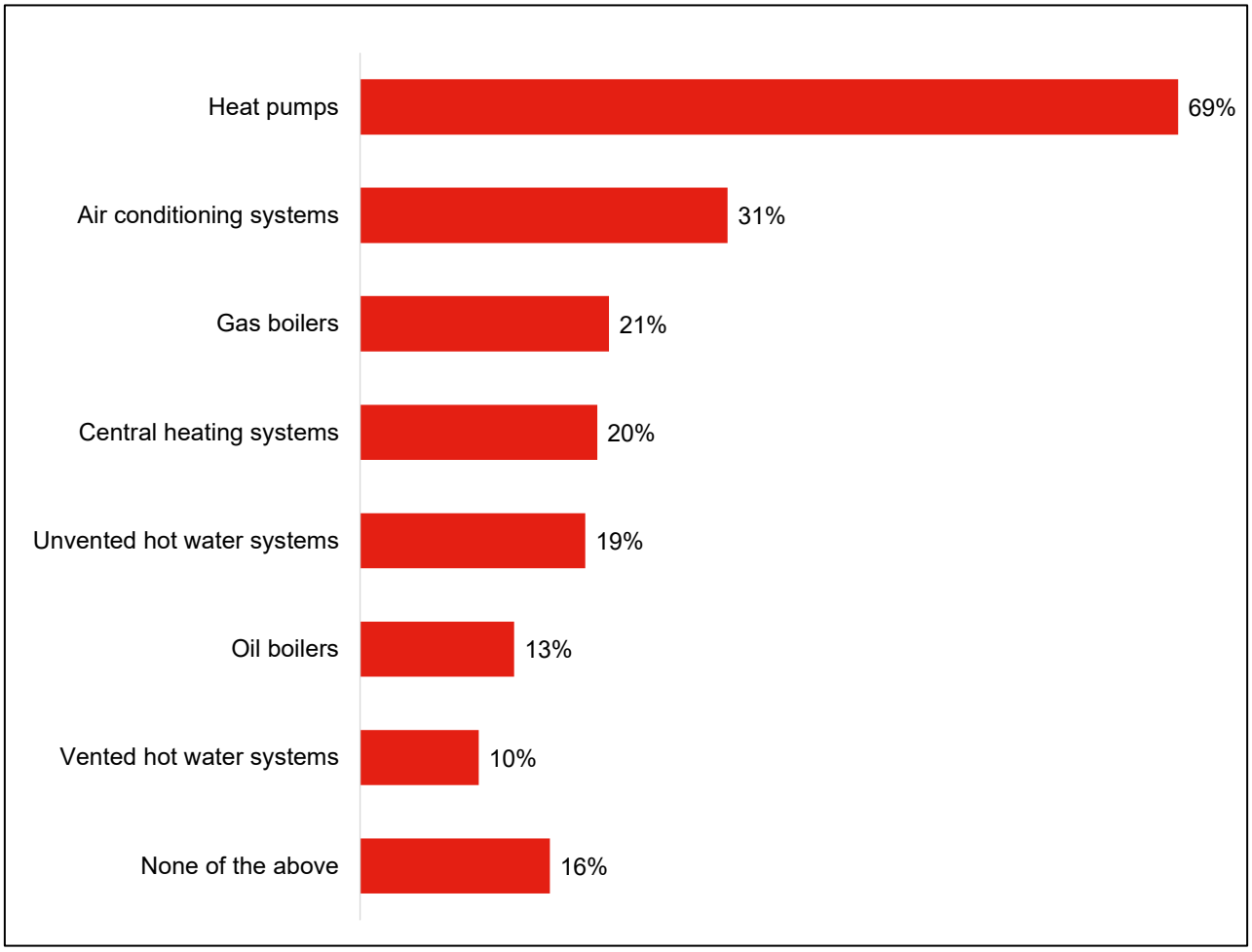
There were a number of notable subgroup differences, by size of employer and type of technology they worked on:

- One in ten (10%) employers with 10+ heating and cooling installers said there was no training they would like to offer their workforce (compared to 23% of all employers). In addition, larger employers were more likely to want to offer training specifically on health and safety (40% compared with 23% average), digital skills (41% compared with 20%), project management (39% compared with 16%), communication (35% compared with 13%) and sales (19% compared with 11%).
- Employers offering heat pump installation services were also typically more likely to cite most forms of training; the most notable differences related to non-technical skills, namely project management (30% compared with 16% average), customer service (20% compared with 14%), and communication (19% compared with 13%).
- Those working on cooling technologies were more likely to cite all forms of training. As seen before this might be related to the fact that these businesses were typically larger than average.

Installer demand for future training

Installers in the workforce survey were asked which specific technologies they would welcome more training on. Heat pump training was the most popular (69% reported they would like to receive more training on this). A sizeable minority wanted more training on air-conditioning systems, gas boilers, central heating systems and unvented hot water systems as shown in Figure 28.

Figure 28. Technologies installers would like to receive more training on



Source: Workforce Survey. B2: Which of the following technologies, if any, would you like to receive more training on? Base: All installers (n=154). (Respondents could select more than one answer, therefore percentages do not total 100%). Answers of <3% not shown.

Those in the Demand influenced archetype were more likely than the other segments to want to receive heat pump training (86% compared with 69% of all installers) although they were also less likely to have already received heat pump training (13% compared with 40% of all installers). The Demand influenced archetype was also less likely to want training on air conditioning systems (19% compared with 31%). Those in the Keen to learn archetype were more likely to want to receive training on air conditioning systems (49% compared with 31%).

In the installer depth interviews, installers expressed the need for training which addressed the full range of processes and steps required for installing and maintaining heat pumps. There was concern, specifically amongst those in the Keen to learn archetype, that by not seeing the entire installation process, including design and handover, they would not be equipped to do an installation themselves. Installers therefore highlighted the need for more practical, hands-on training, so that they could practise installing and maintaining a heat pump themselves.

There was a particular divide by age. In the depth interviews, amongst installers from the 'Retiree' archetype, many felt that the training was not of a high enough standard and would not recommend the training to younger installers. This concern was reflected by their lack of confidence in the trainers, who they viewed as inexperienced and unsuitable, which was echoed across the installer focus groups.

Some installers were keen for in-person training, to benefit from being able to practise technical skills. However, there was also a need for online training for installers in less accessible locations.

Demand influenced installers thought the following would increase heat pump training uptake:

- Practical training which provides installers with the opportunity to install and maintain a heat pump
- Training specific to new technologies in the market that installers should be aware of
- Dealing with a range of customers when explaining heat pump technology – and discussion of what information is the highest and lowest priority
- Advice on how to install heat pumps as a sole trader: a few sole trader installers mentioned the challenge of handling such large devices by themselves and being able to do all stages of the installation
- Guidance on the ideal training for each 'type' of installer with certain qualifications

Those attending Stakeholder workshops for Trade Associations and Energy Industry, and Skills, Standards and Academics felt that heat pump training needed to include design, installation, commissioning, and handover. Heating installers had the necessary skills to retrain and install heat pumps, but it had to be clear to them that heat pumps require more than just installation.

Apprenticeships

Employer demand for apprentices

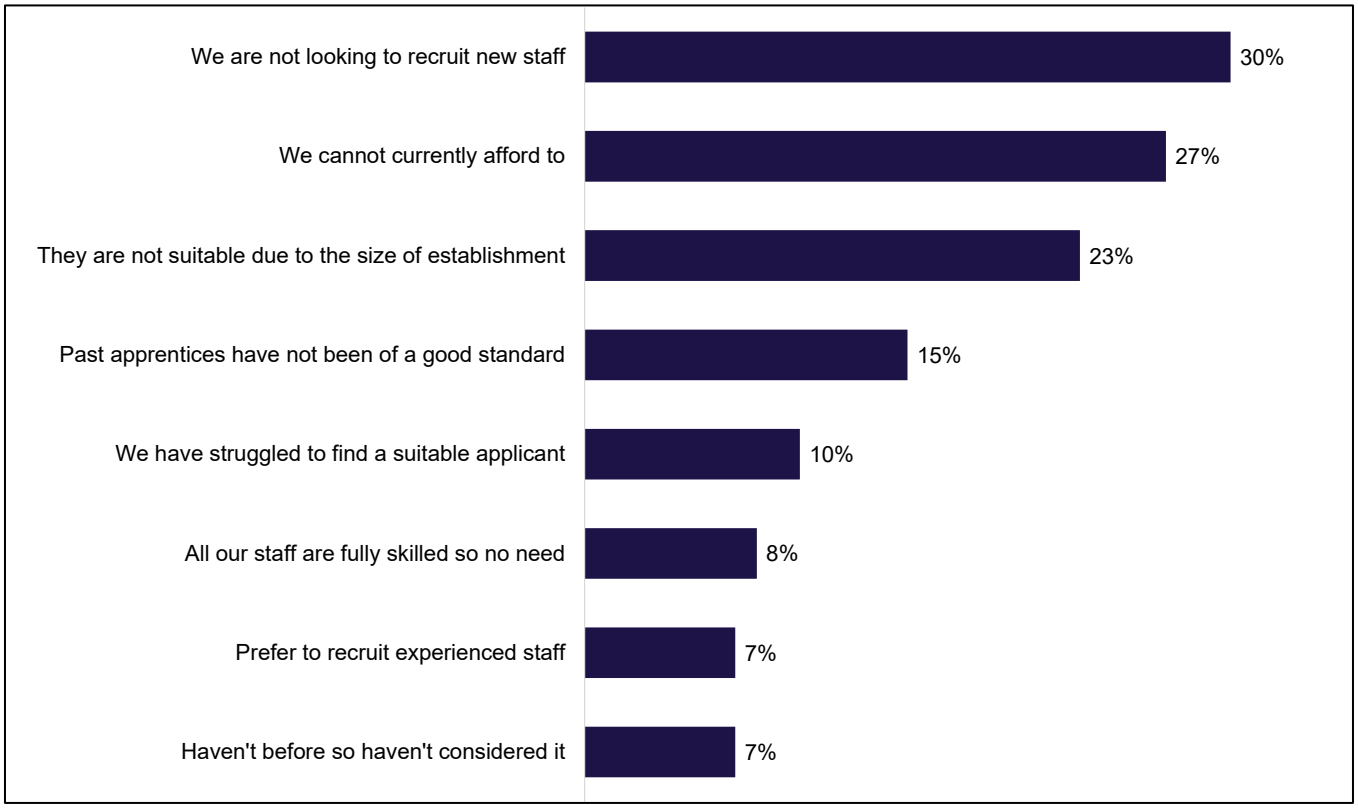
Employers and installers were invited to provide their views about apprenticeships in the industry. In the employer survey, one in five (21%) employers currently had heating and cooling installers undertaking apprenticeships. This was much higher among the larger employers (83% with 10+ installers) compared to those with 2-9 installers (37%). Typically, employers offering apprenticeships had just one installer at their site on an apprenticeship: 63% reported they had one, while 31% had 2-4. Only 3% had more than 5 installer apprentices. Naturally, the larger the employer the more apprentices they typically had.

Two reasons were consistently given by employers with apprentices for offering apprenticeships; that it was a good way of getting skilled staff (58%), and to support young people to enter the industry (57%, rising to 79% among larger employers). This is of particular relevance given the typical age profile of the installer workforce, as discussed in the section: Age and time in industry.

Barriers to offering apprenticeships

As shown in Figure 29, the top reasons given by employers for not using apprenticeships included that they were not looking for new recruits at the time (30%), or that they were unable to afford them (27%).

Figure 29. Reasons employers do not offer apprenticeships



Source: Employer Survey. B9: Why does your establishment not currently have apprentices? Base: All employers that do not have apprentices (n=484). (Respondents could select more than one answer, therefore percentages do not total 100%). Answers of <7% not shown.

Industry views of apprenticeships

Installers in the workforce survey had mixed attitudes towards apprenticeships within their industry. Three in ten (29%) felt positively towards them, while a similar proportion (31%) had a more negative view (34% felt ‘neither positive nor negative’). There was no clear difference by archetype.

Such views were reflected in responses when asked whether their business should take on more apprentices. Two fifths (44%) reported that they were already mentoring or would be interested in mentoring new apprentices. That said, only 20% considered their business should take on more apprentices each year.

One employer in the focus groups would ideally like one apprentice per installer, but only if there was financial support from Government and also a clause requiring that the apprentice stay in the business for a number of years after qualifying.

A perception that apprentices often have a poor work ethic or lack drive and ambition to work in the industry, was a key reason all installers gave for not having an apprentice (a theme that did not come through as strongly in the employer survey). As a result, taking on an apprentice was seen as a risk to many, because the benefits outweighed the costs (money and time).

> *"[There are] Lots of reasons [for not taking on an apprentice]...Slowing you down, not turning up, making mistakes that you have to go back and fix for free." (Disengaged, sole trader)*

> *“Employing an apprentice is a risk because you never know what kind of drive the youngster is going to have.” (Current heat pump installer, sole trader)*

> *“Showing someone how to do something – and do it well – takes twice as long. I had to drop the apprentice off and then go back out to work to make more money to ensure all wages can be paid.” (Keen to learn, micro employer)*

Installers thought the low pay of an apprenticeship made it less likely apprentices would do a good job as they lacked the financial reward for doing so.

> *"You have to make being an apprentice in this industry a well-paid, worthwhile job." (Disengaged, sole trader)*

> *“Most 25-year-olds can't do an apprenticeship because they have already started leaving home and have a family.” (Demand influenced, sole trader)*

Employers in the focus groups typically concurred that new apprentices did not have the right mentality compared to the apprentices they have had historically, as their personal lives were more important than their work life. Participants complained that apprentices lacked the drive necessary and that they were “lazy” and “often distracted by their mobile phones.” One participant also discussed the “unrealistic” expectations of young people entering a market where they wanted “a quick route” to becoming qualified rather than wanting to pursue the level 3 or level 4 qualifications that are required to become a competent, specialised installer. Three employers in the focus groups felt that older apprentices (26 and above) were more worthwhile in terms of their enthusiasm and quality of work produced but noted that they were more expensive to pay.

Of those who did take on apprentices, attitude and motivation were seen to be key features to look for in candidates. Employers in the focus groups also mentioned that it was not solely the qualifications and skillset that they looked for in an apprentice but mainly their enthusiasm and willingness to learn. This was often based on bad experiences where they had to let apprentices go because they did not try hard enough at their learning or day-to-day tasks.

> *“What motivates them to go to work and turn up on time and be enthused about learning the job.” (Demand influenced, 2-9 employees)*

> *"I'm looking for good attitude, willingness to learn, a bit of humbleness - something hard to find in young people now, they don't know the meaning of the word 'no!'” (Current heat pump installer, 10-49 employees)*

For sole traders, there was also a perception that apprenticeships were an option designed for larger businesses as it made more financial sense for them to take on apprentices than smaller businesses.

> *"The money you're expected to pay to the apprentice is fine if you've got a big company and can claim it back on taxes, but if you're just a small firm, you're not going to take an apprentice on." (Keen to learn - sole trader)*

Findings from this research revealed a perception that there was a lack of suitable apprentices who would meet the needs of installers and prove an efficient and worthwhile investment.

Where installers did employ apprentices, this was typically from local training colleges where generally there was a large pool of potential apprentices. Other methods for taking on

apprentices were mentioned by a few; this included through family connections and mutual friends. In a few cases this happened via online advertising on job sites or social media.

All eleven installers in the focus groups agreed that retention was an issue where apprentices leave and then become a direct competitor to those who have invested in their training. One stated that unless they could get an apprentice to sign up for a certain amount of time after qualifying, there was little point in training them. One employer echoed the concerns over retention with anecdotal evidence of an apprentice who stayed and got their qualifications with the company, before leaving after three weeks.

6. Standards and accreditation

This chapter explores employer and installer accreditation body membership, why installers join specific schemes, as well as broader views on the quality of work within the industry.

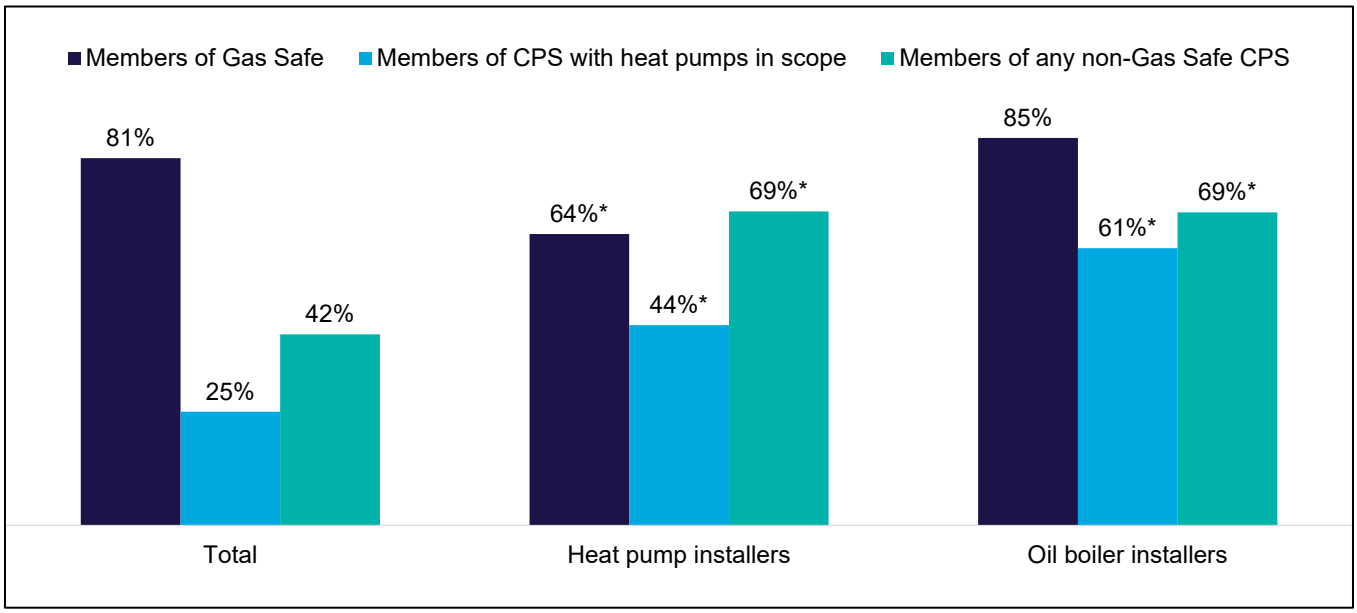
Membership and views of quality schemes

Competent Person Schemes

Competent Person Schemes (CPS) allow tradespeople to self-certify that work complies with building regulations, avoiding the need for inspections by a building control body. These schemes require installers to demonstrate appropriate competence and ensure that their work meets expected standards.

Participants in the employer survey were asked if they had membership of any CPS. The vast majority of employers were signed up to a CPS, with Gas Safe being most common (81%). Around a quarter (25%) were signed up to a CPS with heat pumps within their scope, including those administered by the Oil Firing Technical Association (OFTEC), the Association of Plumbers and Heating Contractors (APHC), NAPIT and Certsure. Four in five (80%) of these employers were also signed up to Gas Safe.

Figure 30. Membership of certification schemes



Source: Employer Survey. C5: Is your business a member of any of the following Competent Person Schemes? Base: All employers (n=687), heat pump installers (n=215), Oil boiler installers (n=214). (Respondents could select more than one answer, therefore percentages do not total 100%). *Indicates figures are significantly higher or lower than total figure.

Employers providing heat pump installation services were less likely to have Gas Safe membership (64% compared with 86% of those who did not install heat pumps), but more likely to be registered to another CPS (46% compared with 22%). This is to be expected as many businesses offering heat pump installation services were not working on gas (as highlighted in the Technological skills and experience section).

From the focus groups, all the employers' companies were Gas Safe and OFTEC registered. The companies represented had a range of other registrations and accreditations:

- To demonstrate standards for work done in the home (two were Trustmark accredited)
- To demonstrate competence and quality in installing renewable energy or heating technologies
- To demonstrate wider health and safety standards (two were part of the Safe Contractor scheme and another mentioned a health and safety scheme but did not specify which)

Microgeneration Certification Scheme

The Microgeneration Certification Scheme (MCS) is a quality assurance scheme that is nationally recognised. Government grant schemes such as the Boiler Upgrade Scheme require installers to be MCS certified. The scheme aims to give customers confidence in the standard of work being conducted by installers.

Participants in the employer survey were asked if they had MCS membership. Unsurprisingly, given that MCS only relates to low-carbon heating, most (90%) employers did not have MCS membership. Only 4% of all employers were MCS certified to install heat pumps, while 2% were MCS certified on other technologies; together this equated to 5% of all employers being MCS certified (some who were certified to install heat pumps were also certified to install other technologies). The small number who were MCS certified but not for heat pumps are likely to offer other types of renewable technologies and are potentially candidates to install heat pumps in future.

Other subgroup differences included amongst all employers included:

- Those working on commercial new builds were most likely to be certified by MCS to install heat pumps (11%), while those working on domestic existing buildings were least likely (5%).
- The proportion certified by MCS to install heat pumps also rose to 10% among those working on cooling technologies.

Of those employers that offered heat pump installation services, 17% were MCS certified to install heat pumps. This rises to 31% amongst employers (offering heat pump installation) with 10+ installers.

PAS2035 and PAS2038

Employers were also asked if their business was able to deliver either the PAS 2035 or PAS 2038 'whole house' retrofit standards. These standards relate to installation of energy efficiency measures, which only 27% of heating and cooling businesses said was a service they offer. Only 5% of heating and cooling businesses were able to deliver to either PAS 2035 or PAS 2038.

Those with 10+ installers were more likely to offer both (13%) when compared to those with 2-9 installers (7%), and those with one installer (3%). Businesses able to deliver either the PAS 2035 or PAS 2038 retrofit were more likely to work on domestic new buildings (59% compared with 34% who could deliver neither/ not applicable), commercial existing buildings (59% compared with 30%) and commercial new buildings (38% compared with 17%) than those who could not deliver to those standards.

Factors influencing decisions to join/not join specific schemes

In the depth interviews, installers were asked how they decide upon whether and which certification is right for them. Firstly, several installers who worked for businesses (rather than being self-employed), stated that many of the questions were "*above [their] pay grade*". Many only knew that they needed to ensure they were Gas Safe certified but assumed other certifications are a matter for their employer.

Amongst those who felt they could answer, the main theme was that installers needed to be convinced by the accreditation body that, in obtaining the accreditation, they would gain more worthwhile and well-paid work.

> *"It's got to be worth it, no point in getting an accreditation if no work is going to come from that side." (Keen to learn, 10-49 employees)*

> *"I can spend £600 but if no demand, lot of money to lose." (Keen to learn, Sole trader)*

Using the knowledge and expertise that the accreditation body could offer was seen as a key consideration to ensure that they could support their customers and help them with any problems they encountered.

> *"Provide support and backup, problem-solving." (Demand influenced, 2-9 employees)*

> *"That we can fit the right system for our clients and that we don't get any call-backs or any problems with the system." (Keen to learn, 2-9 employees)*

> *"I feel like if I wasn't a member, I would be a bit lost." (Demand influenced, sole trader)*

Installers in the qualitative interviews also considered the relevance of the accreditation to their specific job function. For those with an MCS accreditation, a key reason for becoming accredited was that it was required so that the customer could take advantage of the associated Government schemes which made the installation profitable for them. There was also a similar reason for a biomass boiler installer with HETAS in that they needed accreditation so that they could sign off the work which made each job quicker. These accreditations were therefore more likely to be sought in order to win work, as opposed to add to the quality of their work by enhancing the installer's knowledge and skills.

In the focus groups, one employer stated the reason for being part of MCS and Trustmark was the customer assurance that stems from the scheme, with their company looking more reputable compared to a company that did not belong to the scheme. One employer who was part of the Safe Contractor scheme joined because there was an expectation from their industrial clients for them to do this. The employers who were NIC registered joined because it validated the work that they do. However, this was by no means a universal perspective. For example, another employer stated that they complied with legal accreditation requirements but were not members of any other schemes. They considered other schemes to be a paper exercise and thought reputations were built on recognition of the quality of work done, as opposed to any accreditations supporting this.

Some installers in non-gas industries believed that installers and employers in their industry were unlikely to voluntarily join certification schemes in areas which were not mandatory by law

This was not supported by the survey results, which found that 61% of employers offering oil installations were certified by a relevant CPS, as were 43% of those offering heat pump installations. Views were mixed on whether certification should be required, with some suggesting that certification from anybody other than Gas Safe was not a necessity, whilst others thought the lack of certification elsewhere harmed the industry. It should be noted that all installers in England are required to comply with building regulations and should obtain building control approval where appropriate if unable to self-certify via a CPS. 88% of employers surveyed agreed that self-certification was important.

Where a business decided that certification was desirable, a key consideration was on the reputation and recognition of the accreditation body and the value of having the certification. Reputation was generally said to be spread by word of mouth and there was also mention of online reviews too.

> *"How long has the provider been in the industry … reviews … also do some background checks." (Keen to learn, 2-9 employees)*

> *"I think it's about customer trust, and when you advertise you can use their logos to show that you are Gas Safe registered/qualified, and I think that that is the most important thing for a customer." (Demand influenced, sole trader)*

Most installers were positive about certification schemes, especially concerning their standards and the capacity to provide trust to their customers.

> *"As a benchmark, it has a very high qualification standard. Well implemented by commercial operations who deliver training related to it. Very good sense of professionalism within training companies." (Keen to learn, 2-9 employees)*

> *"They're all good. It's just confidence building for your customer." (Retiree, sole trader)*

> *"[Quality schemes] are alright if the public know about them, like Gas Safe, most people know that if you want your boiler fixed then you'll get someone who's Gas Safe registered, so that works because you're unlikely to go for someone who isn't registered...they've already proved competence before they've done the job." (Disengaged, sole trader)*

However, several improvements were identified. The main theme of improvements to the certification schemes was based upon concerns surrounding training providers. Many installers considered these providers as being more concerned with profit rather than ensuring quality education and training.

> *"It is more the way they are financed rather than the day to day running of them or instructors. Being financed by a private company they're out to make money. If they start failing people everywhere they won't get any customers." (Retiree, sole trader)*

> *"I do think that they are more geared around making money then the safety aspect…it's just an impression I get." (Disengaged, sole trader)*

The concerns around training quality were based on how the courses provided were too short and that they were more focused on making sure participants passed the exam rather than testing whether they possessed the knowledge and skills to undertake the work to a high

quality. There were also concerns with online courses, which provided no vocational experience.

Other training concerns centred around the fluctuation in different types of courses and different standards. Outside of training, there was concern at the level of inspections being done by some certification schemes.

In the focus groups, there was broad agreement amongst installers that certifications were bureaucratic and did not seem to genuinely test the work that installers do. Three employers noted the difficulties of becoming MCS certified. They were not certified, because they found the process “exceptionally long winded” and the administrative element too difficult to complete. However, it is of note that participants did not give an indication of how recently they had applied to MCS which could have been before the implementation of the application process which MCS introduced in 2021. Many installers who decided that access to Government grant schemes was not sufficient incentive to become MCS certified indicated that they already had enough work at present from other customers.

The issue of certification being the same cost for sole traders as it is for larger businesses was also raised. Installers in the focus groups called for distinctions in cost based on business size. One sole trader stated that they had built the cost of Gas Safe into their pricing but were now losing out on customers due to their price as it was the same cost to be MCS Certified for a sole trader than it is a larger business.

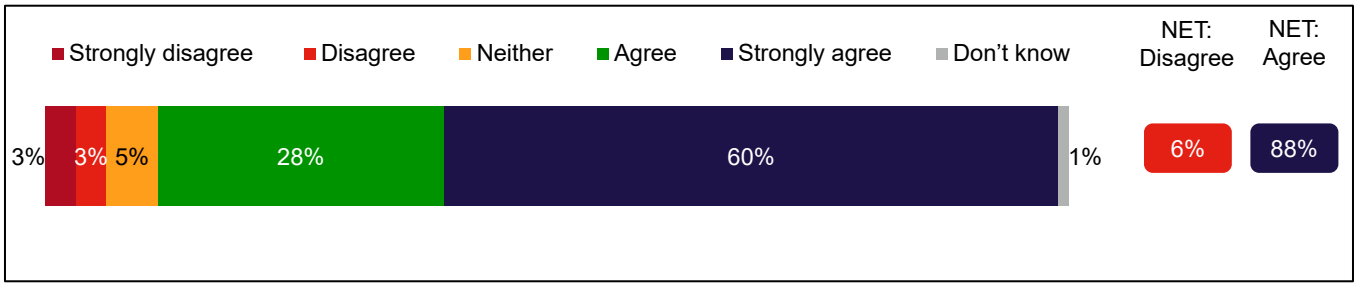
Lastly, there were some installers who would not know where to begin and what to consider when looking into heat pump certification beyond Gas Safe accreditation. These installers had not had experience working with certifications e.g. Competent Person Scheme.

> *"I don't know how much it costs. I don't have any basic knowledge of it at all…. would anyone want to invest in me with only two years until I retire?" (Retiree, Sole trader)*

Standards

Installers in the workforce survey were asked for their reflections on the standards and quality of work within the industry. Broadly, installers felt that it was important for their work to comply with regulatory standards, although they perhaps felt there was room for workmanship improvements across the industry. As shown in Figure 31, the vast majority (88%) agreed that it was important to self-certify that work complies with Building Regulations e.g. through a Competent Person Scheme. Indeed, 60% strongly agreed with this statement, while only 6% disagreed. Almost all installers (97%) reported being aware of how current Building Regulations apply to their work.

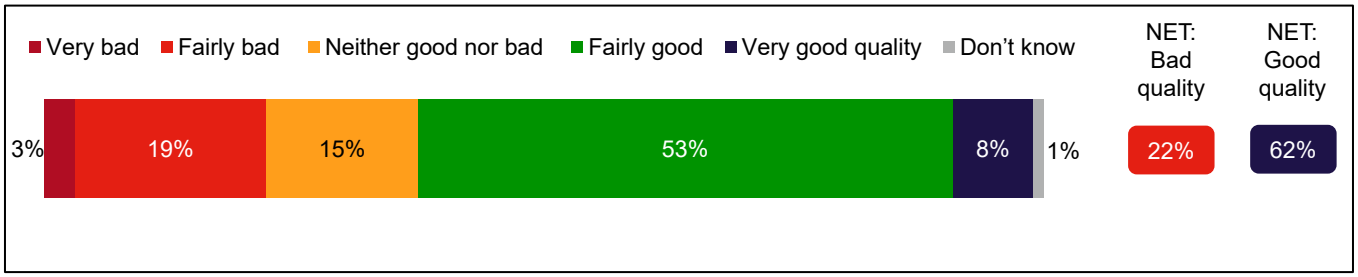
Figure 31. Proportion of installers who agree or disagree it's important to comply with Building Regulations



Source: Workforce Survey. D1: To what extent do you agree or disagree with the following statement: I think it is important to self-certify that work complies with Building Regulations e.g. through a Competent Person Scheme. Base: All installers (n=154)

Installers thought work across the industry was done to a good quality (62%), although only 8% felt it was completed to a 'very' good quality, as shown in Figure 32. Over one fifth (22%) however felt that the standard of work was typically of bad quality.

Figure 32. Installers views on quality of work done within their industry



Source: Workforce Survey. D3. Thinking about the industry as a whole, do you think work is generally done to...? Base: All installers (n=154)

Understanding the reasons why installers thought the sector had good or poor levels of quality was explored more within the qualitative strands of the project.

Focusing firstly on those who thought work was done to a generally good quality, installers working in gas installation were more positive about quality in their industry than other industries. These installers felt that Gas Safe successfully regulates standards in the industry and has proportionate penalties to discourage non-compliance and bad practice.

> *"To work on gas, you have to be Gas Safe qualified and that keeps the quality high." (Retiree, sole trader)*
>
> *"The regulations in the gas industry … firstly, you have to be qualified. You have to be Gas Safe registered, so not everyone can touch gas … most people are competent and follow the rules … you have cowboys from time to time." (Keen to learn, 2-9 employees)*
>
> *"If that [Gas Safe] wasn't there... I think standards would really drop." (Demand influenced, 2-9 employees)*

There were also plenty of comments that reflected well on the general attitude of most installers in the industry with some considering standards to have improved in the past few years, largely due to the information readily available on the internet to assist installers in carrying out their job effectively.

> *"When I started in the industry, I had to ask someone to explain how to do something. Now, you go on YouTube and everything's on there." (Demand influenced, Sole trader)*

> *"Majority of engineers do good installs … people take pride in their work and give customers value for money." (Current heat pump installer, 250+ employees)*

> *“Guys and girls are keen to make their work as up to standard and tidy as possible. There is a sense of pride there.” (Keen to learn, sole trader)*

However, very few thought quality was exceptional. Installers often saw that those working in the industry lacked the financial incentive to do a job to the best standard possible. There was a feeling that plenty of installers bought more inexpensive, worse quality or, in extreme cases, non-compliant parts to increase profit margins, which undermined overall quality within the sector.

> *"If I fit parts that comply to the right regulations, I am being undercut by people who are less scrupulous about what they're fitting. The cheaper you can get the parts the more profit you're going to make.” (Demand influenced, sole trader)*

> *“'The quality of workmanship is what you would expect for that money.” (Keen to learn, sole trader)*

> *"Overall, everyone strives to get to a high standard, but when you work for a big company, they will test their parameters on what you can do because they're only interested in money." (Current heat pump installer, sole trader)*

> *"It's about money. People are interested in profit margins; they're not interested in the quality of the work." (Demand influenced, sole trader)*

A few installers were also concerned about the way in which standards are applied between industries, with the Gas Safe registration model clearly being preferred over other types of heating and cooling certification schemes. Some installers (albeit a minority) suggested that implementing a system like Gas Safe for heat pumps and liquefied petroleum gas (LPG), where individuals have to be individually registered, was needed to drive improvements. These installers felt this would help prevent mistakes being made that could be difficult or impossible to address, and to maintain and improve the reputation of heat pumps, to help promote their take-up.

> *"Companies send one person to become qualified [to install heat pumps] and then use the cover of the qualification to send other people from the company to do the installation. They piggy-back on the qualification." (Keen to learn, 2-9 employees)*

> *"We are overseen quite closely by Gas Safe. However, that's not the case with LPG - there are a lot of DIY installers, who aren't following the regulations." (Disengaged, sole traders)*

Additionally, as mentioned previously in the section on accreditation, installers were also concerned about the quality of the training on offer and how it was not comprehensive enough to improve standards in the industry.

> *"Every five years I go back for training it seems to become less and less that you're learning but more and more that they're telling you that you need to know*

> *'this' to pass the exam...rather than get down to the nuts and bolts of why we're doing something and why it works it's 'you're going to be asked about this, this is how you answer it." (Demand influenced, sole trader)*

> *"They're not getting the work experience that they need...they're just pushing them through these courses, passing the exam. There needs to be more focus on the vocational side of it...you can do the training but then if you go out with a company for a couple of weeks and you can be more hands on before people are given the full qualification." (Demand influenced, sole trader)*

> *"Ever since they abolished the proper apprenticeship, and I mean a proper apprenticeship [City + Guilds] not NVQ, quality has gone down." (Demand influenced, 2-9 employees)*

This concern about training also applied to heat pump installers. These installers wanted a more holistic approach to the training that made sure all involved in the installation understood the system as a whole, not just their specific function.

> *"Rather than having three trades involved [plumbers, electricians, cooling] we need some sort of training … that isn't a two day or week course … you need to understand the whole system, not just parts of it." (Current heat pump installer, 2-9 employees)*

Lastly one installer raised the point that installers working in maintenance might have a more negative perception than others, as typically their work consists of navigating issues that might be related to the original installation; they rarely see cases where installation was carried out correctly and to a high standard.

> *"I do come across a fair bit of bad workmanship but that might just be because that's the sort of market that I'm in, I get called when something isn't working so I only see the stuff that the previous installer has abandoned or won't go back and service." (Demand influenced, sole trader)*

7. Conclusions

This multi-strand project sought to improve understanding of the current heating and cooling installer workforce in England. This information will be used to inform future Government policy on training provision, barriers to diversity, the quality of heat pump installation, and mechanisms to encourage installers and businesses to transition to low carbon heating.

Below we summarise the main conclusions the research has come to.

1. What are the characteristics and activities of heating and cooling installers?

There is an ageing workforce

The research confirmed that the heating and cooling installer workforce is a relatively ageing population and has a shortage of younger engineers and installers. This was a concern for installers and employers alike because of the skills and experience that could be lost once this older cohort retire (according to our archetype estimates approximately 10%-20% belong to our 'Retiree' segment, who have little desire to transition to heat pump installation as they are due to retire in the next five to ten years). In addition, the employer survey estimated 28% of installers are aged 55-64, indicating they are relatively close to retirement. This suggests that the existing workforce will need to be supplemented with new entrants (e.g. new apprentices, and engineers with transferrable skills like those in the cooling sector or electricians) to meet clean heat market targets.

The sector lacks both ethnic and gender diversity

The installer workforce is predominantly male and White, and only a minority were concerned about this lack of diversity. Most expressed that it was more important to find people who were good at the job rather than focus on their ethnicity, gender, age or socio-economic background. If the same recruitment practices and promotional activities continue within the sector, the pool of potential employees recruited to grow the sector may be restricted and the lack of diversity may persist.

Heat pumps do not currently form a large proportion of installers' work

The research has estimated that 20-25% of heating and cooling installers currently install heat pumps, but only 15% of them spend over half of their time doing so – highlighting the current dominance of other technologies. Three quarters did expect this time to increase in the next 5 years though.

Employers commonly work across different project types

95% of those working on new domestic buildings also worked on existing domestic buildings, and 77% of those working on existing commercial buildings also worked on existing domestic buildings. Seven percent of employers worked solely on commercial buildings, and only 1% worked solely on new builds (commercial or domestic).

2. How can installers be categorised into distinct archetypes based on their willingness to install heat pumps, and upskilling required to do so?

We have identified five distinct archetypes based on their willingness to install heat pumps:

We estimate around a half of installers could be influenced to upskill

We can estimate that up to 40% of installers sit within the two extremes of engagement (up to 25% of which are already installing), leaving approximately 60% who could be influenced to upskill. However, some of these installers will fall into the Disengaged group who are much less likely to transition to installing heat pumps.

The key barriers and motivations to transitioning/ upskilling differed across the archetypes, although customer demand was regularly cited as both a barrier and motivation to installing heat pumps:

- For the Demand influenced installers, the key barriers to transitioning were that they had sufficient work without heat pumps and customer demand for them was seen as low. The cost of heat pump installation training was also noted as a key barrier. Demand led installers were more likely to say that increased consumer demand and government support would increase the number of heat pumps they install.
- Among Keen to learn installers, a lack of customer demand and lack of skills were the key barriers to installing heat pumps mentioned. They were more motivated, than other installers, by a desire to learn new skills and learn about new heating and/or cooling technologies. They were also more like to say climate change is the most important issue facing the UK.
- Customer demand was the main reason current heat pump installers were installing the technology: 65% reported their customers are asking for heat pumps and 45% said they thought heat pumps were a good solution for their customers' needs. Wanting to work on low carbon technologies was also a motivator.

3. To what extent can heating and cooling installers be upskilled to work on heat pumps?

Some installers are already skilled in heat pump technology, but the majority are not

Two in five installers currently consider themselves skilled in heat pump technology, compared to 95% who consider themselves skilled in central heating systems for example.

Current barriers to increasing the proportion who are skilled / installing are:

- **Installers have a lack of in-person training/experience:** Installers emphasized the need for a blended offer of both online heat pump training and in-person practical experience to be readily available. The current lack of practical experience is leaving many installers unconfident despite receiving the theoretical knowledge from training courses. As noted in the literature review, new training courses have recently been launched which may address this. Separately, installers also raised concerns that they did not install regularly enough to retain their training.
- **Installers need training not just on installation:** Whilst many had received training on installation, most felt they were lacking broader information (that would increase their confidence) on elements like explaining the technology (and how to operate it) to customers, how to repair and maintain heat pumps, and which qualities a property should have to be considered appropriate for heat pump installation. For the successful growth of the sector, training courses, including those undertaken by apprentices, need to cover all elements of heat pump installation, operation and maintenance.
- **Non-technical skills also need to be taught:** Literature and stakeholder interviews highlighted the importance of soft skills. The workforce feels confident in their soft skill abilities (e.g. customer service, communications and health and safety) but there are reservations as to whether new apprentices and young people will develop these skills if they are not taught or transferred by the existing workforce.
- **Installers lack confidence in the current levels of customer demand for heat pumps: I**nstallers, especially those in the Demand led archetype, are not attending training on or installing heat pumps because they do believe there is sufficient customer demand.
- **Installers do not see the promotion of heat pumps and other low carbon technologies (to help address climate change) as their responsibility.** Many are hesitant or resistant to recommend heat pump technology to their existing customer base. Unless this changes, current installers will not provide a significant driver to increase the market.
- **Lack of confidence in the future of sector:** Currently, many installers do not have confidence and trust that the growth of the heat pump sector will remain a long-term goal for the Government, and this is not giving the sector the confidence it needs to invest their time and money into heat pump training and changes to business models. Government may need to consider messaging on this subject and the most appropriate ambassador to deliver this.
- **Communications via trade magazines, peers and social media would be more trusted and accessible:** Installers (across the different archetypes) reflected that they were more likely to seek out and trust information shared via trade magazines, their peers as well as

social media. Manufacturers were also seen as a trusted source, with an acceptance that sometimes they have a vested interest in certain technologies.

4. What are heating and cooling installers' attitudes towards standards and accreditation for low carbon heating and what factors influence these views?

The vast majority of employers were signed up to Competent Person Schemes

Gas Safe was the most common, but over a quarter were signed up to a different scheme which include heat pumps within their scope. Membership to the MCS (which relates to low carbon) was less common, but a fifth of those that offered heat pumps were MCS certified. The key reason for becoming MCS certified was that it was required so that customers could take advantage of associated Government schemes which made the installation profitable for them.

Installers believed that overall standards in the industry were high

The majority thought work was done to a good quality, that industry standards had improved, and that Gas Safe successfully regulate standards in the industry. A very small minority felt the quality was not exceptional though and that the industry lacked the financial incentive to do a job to the best standard possible.

While Gas Safe is highly regarded there is no mandatory equivalent standard in heat pumps, which contributes to potential or perceived poor quality in heat pump installation. Given the desire to expand the sector rapidly in the next 5-10 years, ensuring quality of installations will be paramount to provide consumer confidence and ensure the long-term success of the expansion.

5. How might installer business models need to change to effectively install heat pumps, and what challenges could this pose for installers?

Sole traders and smaller firms face unique challenges to upskilling

The literature identified challenges to the growth of smaller firms including that small and medium sized enterprises (SMEs) can be cautious and risk-averse, preferring to work with known technologies and techniques rather than innovate. In addition, many sole traders faced practical barriers such as needing two to four installers (to install a heat pump) and not having adequate space in their vans to store the technology. Sole traders were also more likely to report not attending heat pump training because they have no interest in doing so. These barriers are important given that almost all businesses in the heating and cooling sector have less than 10 employees.

Larger firms will play a more substantial role in the expansion of the sector (in the short-term)

Larger businesses are much more likely to offer heat pump installation than small businesses. Large businesses are also more likely to work on commercial projects, which in turn are also more likely to offer heat pump installation.

Appendix A: High level research questions and associated project strands

Table 4. High level research questions and associated project strands

Research question	1. Literature review	2a. Employer survey	2b. Workforce survey	3. In-depth interviews	4. Stakeholder workshops	5. Focus groups
1: What are the characteristics and activities of heating and cooling installers?	Yes	Yes				
2: How can installers be categorised into distinct archetypes based on their willingness to install heat pumps, and upskilling required to do so?			Yes			
3: To what extent can heating and cooling installers be upskilled to work on heat pumps?	Yes	Yes	Yes	Yes	Yes	Yes
4: What are heating and cooling installers' attitudes towards standards and accreditation for low carbon heating and what factors influence these views?	Yes	Yes		Yes	Yes	
5: How might installer business models need to change to effectively install heat pumps, and what challenges could this pose for installers?		Yes				Yes

A list of all of the detailed research questions addressed in this project can be found in the Technical Report.

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