

Installing for time?

New evidence on the attitudes of home heat installers towards decarbonisation and heat pumps

Amy Norman
Niamh O Regan

SMF

**Social Market
Foundation**

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Kindly supported by



European
Climate
Foundation

FIRST PUBLISHED BY

The Social Market Foundation, February 2022
11 Tufton Street, London SW1P 3QB
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ACKNOWLEDGEMENTS

The SMF is grateful to the European Climate Foundation (ECF) for sponsoring this research. The Social Market Foundation retains full editorial independence with respect to its research.

The authors are grateful to all those who participated in the in-depth interviews and engaged with the research as part of the work.

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EXECUTIVE SUMMARY

Decarbonising home heat is critical to meeting the UK's net zero goals by 2050. It will require physical modifications to millions of homes, including the installation of heat pumps as a lower-carbon alternative to gas-burning boilers. The Government has set a target that 600,000 heat pump installations will be needed every year by 2028, a figure that is likely to be an underestimate based on the Committee for Climate Change's (CCC) recommendations.

Meeting these targets depends on a skills transformation among home heat workers. Installing a heat pump requires training in significantly different techniques from those involved in fitting and maintaining a gas boiler. Yet we know relatively little about the existing population of home heat workers, their views and experiences, and how prepared and capable they are for this dramatic transition, which will be so crucial to achieving net zero.

This report addresses that gap, presenting new evidence from interviews with workers from across the home heat workforce, exploring in depth their attitudes on the net zero transition and the outlook for their industry and work. Details on the research methods are outlined in Chapter One.

Our findings suggest several attitudinal and structural barriers to home heat workers gaining the skills needed for heat pump installation. Given the vital importance of those skills, overcoming such barriers should be a high priority for policymakers. If the home heat workforce lacks the skills needed to decarbonise home heat and the obstacles to developing those skills are not addressed, the net zero agenda could be left resting on a fragile foundation.

The state of the workforce

There are currently 147,800 plumbing, heating and ventilation engineers in the UK. 130,000 engineers are Gas Safe registered, meaning the vast majority of the workforce likely works on gas heating systems. This workforce may face challenges in transitioning to a new skillset:

- The majority (51%) of the 147,800 plumbing, heating and ventilation engineers employed in the UK are self-employed. Among the gas industry more specifically, this figure is estimated to be as high as 77%. Self-employed or sole trader workers face significant opportunity costs from time spent on retraining, a barrier to the uptake of new skills and one which is not addressed in the Government's Heat and Buildings Strategy.
- The installer base is a relatively older workforce compared to the average UK worker. A Heat Pump Association survey from 2019 found that 58% of respondents were over 51 years of age. In comparison, for the same year, ONS data shows just 32% of UK workers were over the age of 50.
- Industry data on retirement trends suggests that a significant proportion of the current workforce may be nearing retirement and therefore may lack motivation to retrain – as highlighted in the Heat and Buildings Strategy. Gas Safe Register's Decade Review in 2019 finds that gas engineers begin to retire at

around 55 years old, with peaks at 60 and 65. However, the average age of retirement for a plumber, installer, or gas and heating engineer is unclear in official data.

- The size of the plumbing, heating and gas workforce is declining having seen a 4.19% decline from 2004/05 to 2019/20. Stakeholders we engaged with also spoke of challenges in recruiting of young apprenticeship starts in the industry.
- There is concern among interviewees about industry attractiveness and satisfaction of existing workers.
- SMF analysis of ONS data shows that installers experienced a 7% decrease in gross annual pay from £32,406 in 2011 (2020 prices) to £30,124 in 2021 (2020 prices) compared to the 1% decrease of all employees from £26,299 in 2011 (2020 prices) to £25,971 in 2021 (2020 prices).
- Looking ahead to a future workforce, the Heat Pump Association estimates that the UK will need 50,200 heat pump installers by 2030 to meet 1 million installations. Currently, it is unknown how many installers are trained to carry out this work.

Attitudes of installers

Our interview findings indicate that installers are generally willing to train to acquire new skills, at least in principle. However, there are significant barriers to acting on that willingness.

Willingness to change

- Installers have a generally positive attitude to phasing out fossil-fuel heating as a response to climate change; installers, in line with the general population, are concerned about the climate. Both gas and heat pump interviewees acknowledge that home heating is a contributor to UK emissions, albeit with varying views on its significance.
- Across all interviewees, there is support for heat pumps in new build homes. Those who are unfamiliar with fitting heat pumps are more sceptical of their suitability for existing homes, though interviewees with heat pump experience are more confident.
- For some installers, the motivation for retraining stems from environmental concern. However, for the majority of interviewees, any desire to retrain is commercial – some see it as a business opportunity within an emerging market, while others believe it's necessary for job stability.
- Despite the scale of the transformation being mooted, installers have few concerns about the security of their work, both because of the opportunity from low-carbon heating, but also because they believe there will be continued demand for their existing skillset for gas work and general plumbing.
- As highly trusted tradespeople, many of whom are aware of and interested in climate action, the installer base could be a means for spreading the argument for low-carbon heating. To use them effectively, policymakers will need to mobilise the workforce with greater information and training on low-carbon heating technologies and anticipated regulatory changes.

Barriers to training: Demand and costs

- The most significant barrier for interviewees to retrain (particularly in the near-future) is low consumer demand for low-carbon heating systems, especially heat pumps.
- Primarily, interviewees believe that given the financial cost of retraining, it would not be prudent – or for some, even viable – to invest in reskilling when the prospect of heat pump work is currently low.
- Sole trader interviewees reported that the loss of earnings from attending training courses is perhaps an even greater barrier than the direct cost of training courses.
- Interviewees also believe that there would be little skill value in undertaking a training course to learn new skills that they would not regularly practice. Some interviewees have concerns over forgetting what they had learned, “*losing the skill*”, or not utilising a hypothetical heat pump qualification before it was up for renewalⁱ.

Wider challenges: Doubts about policy

- Despite their support for climate action and reducing home heat emissions, installers lack confidence in the Government’s net zero policy agenda and believe a transformation to low-carbon heat will not be achieved by 2050.
- The lack of government clarity on the future of domestic gas boilers is holding installers back from investing in heat pump skills. This lack of a clear phase-out plan for gas boilers has two key effects: *inertia* and *frustration*.
- *Inertia*: Some interviewees say they are unlikely to consider training until there is greater certainty on the future of gas. Until then, they believe that with 24.5 million homes heated by natural gas, there will be enough demand for gas work to sustain their livelihoods. This suggests that some parts of the workforce may be slower to transition than others.
- *Frustration*: other interviewees are frustrated with the lack of accessible information available for installers, given their willingness to retrain and the significance that a phase-out policy would have on the industry and skills demands if introduced.
- Installers’ past experiences of retraining for other low-carbon heating technologies may also serve as a potential barrier for the take up of heat pump training. The end of the Feed In Tariff for solar power has left some installers wary of committing time and resources to future policy-led changes in their work and training.

Wider challenges: Doubts about technology

- Many interviewees express doubts about the viability of heat pump technology as a mass-market approach to decarbonising home heat, though none said they would not participate in training for that reason.

ⁱ MCS Registration is required for installers where homeowners are claiming government grants for heat pump installation, such as the Renewable Heat Incentive or the incoming Boiler Upgrade Scheme. MCS Registration requires annual renewal.

- Some interviewees believe heat pumps are not suitable for low temperatures. This is despite government-published evidence that heat pumps “*are able to comfortably operate at or below zero degrees Celsius*”.

Wider challenges: Hydrogen uncertainty

- Uncertainty about hydrogen contributes to hesitancy about heat pumps. Many interviews see the future of heat as a binary choice between heat pumps and hydrogen. There is greater attraction to hydrogen, as installers believe it to be similar to natural gas, which they presume will mean less reskilling for themselves and the wider workforce, as well as less disruption to the home or existing energy infrastructure.
- The spectre of hydrogen suggests some installers will wait for further signals from the government before retraining, risking delays to the development of the market for heat pump installation.
- Additionally, where some consumers are already asking interviewees about the future of gas, there is a risk that these attitudes could be passed onto consumers, impacting the uptake of heat pumps.

Policy recommendations

Policymakers should give installers confidence to retrain for heat pump installation by stimulating consumer demand through a boosted Boiler Upgrade Scheme, including a committed ringfenced pot for lower-income homeowners.

- Low consumer demand is the biggest barrier for installers to retrain. The current funding pot for the Boiler Upgrade Scheme is unlikely to stimulate consumer demand sufficiently to incentivise retraining and meet installation targets. There is an estimated funding gap of up to £850 million pounds.
- Low-income homeowners will face disproportionate installation costs, which will not be sufficiently covered by current funding plans.

Policymakers should launch a clear national information campaign on the phasing out fossil fuel heating for installers and consumers.

- A lack of clear messaging from Government on the phase-out of fossil fuel heating is causing confusion among consumers and installers, making it difficult for them to plan for the future. This risks a low uptake of low-carbon technologies and potential for other actors to become key sources of information.
- A national information campaign should be delivered by trusted messengers such as consumer bodies and environmental charities including evidenced information on home heating emissions; low-carbon heating options and their costs; key policy dates and available funding. Such a campaign should be built on lessons learned from previous national information campaigns which focused on behavioural and technological changes, such as public health campaigns (e.g. COVID-19) and previous energy-related campaigns (e.g. smart meters or the 1960s town gas transition).

Policymakers should consider providing vocational tax relief for the loss of earnings of sole trader and self-employed SME installers when training for new green skills.

- The loss of earnings from the time required to retrain is a barrier for many sole trader and self-employed installers. Tax relief on training currently only applies to existing skills.
- Expanding vocational tax credits and ringfencing them for green skills training may provide an incentive for installers to retrain sooner, while consumer demand gradually picks up.

Policymakers should set out clear training standards and an accreditation badge for all heat pump training providers and installers.

- The current landscape for heat pump training varies in its mode of delivery and standard, with limited existing official standards for training providers and installers comparable with becoming a gas engineer.
- Introducing an official training standard and accreditation badge would instil greater confidence in a developing heat pump market for both installers (that investing in training will provide them with sufficient skills) and consumers (that heat pumps will be installed to a high standard).
- Such training and accreditation should be designed with relevant government departments (e.g. Department for Business, Energy and Industrial Strategy, Department for Education, and Department for Levelling Up, Housing and Communities) industry stakeholders, FE colleges, councils and experienced installers in order to harness the currently fragmented standards and technology expertise.
- In future, policymakers may look to establish such an accreditation scheme as a legal requirement for all heat pump installers as with gas-related certifications. However, this should only be considered after a thorough review of the scheme in consultation with industry stakeholders and installers themselves.

Policymakers should launch an engaging and attractive Climate Heroes recruitment campaign for new heat pump installers using lessons from other sectors.

- Government needs to actively recognise the high social value of heating engineers. As they are vital in achieving net zero, their importance cannot be understated and this should be recognised in celebrating the workforce as Climate Heroes.
- Government should harness the training motivations expressed by installers in order to capture new talent; not only is a career in heat installation an excellent business opportunity but a chance to be a key player in reducing UK emissions and promoting climate action.
- Government can learn from recruitment campaigns in other sectors which have used altruism and personal development, such as DfE's "Get into Teaching", to draw in applications from those who want to make a tangible difference on a daily basis.

CHAPTER ONE – INTRODUCTION

Decarbonising home heat is critical to meeting the UK’s net zero goals by 2050. Moving away from fossil fuel heating and installing low-carbon alternatives presents both opportunities and challenges for homeowners, industry and the Government. A key component of the delivery of this transition will rest on the workers – plumbers, installers, heating and gas engineers – who would carry out the millions of installations required. As a result, addressing the challenges they face in reskilling and retraining will be critical to the success of one of the more challenging parts of the net zero agenda.

In comparison to other sectors such as power and transport, the transition to low-carbon home heating systems has proved slow on demand, supply, and policy. Natural gas is still the predominant heating source for an estimated 85% of British homes.¹ As a result, heating residential buildings accounts for a considerable amount (13-14%) of the UK’s total carbon emissions.² The Government’s legislated net zero targets mean that over the coming decades carbon-intensive heating, such as natural gas and oil, will need to be replaced with a low-carbon, renewable alternative.

Low-carbon heating solutions are far from homogenous – across the UK different heat sources and technologies are likely to be deployed dependent on local asset infrastructure, housing stock, and geography. As part of this, electric heat pumps (air-source and ground-source) are expected to play a key role in the decarbonisation of home heat, as highlighted by the Committee for Climate Change (CCC) in its Balanced Pathway and the Government in its recent Net Zero Strategy (NZZ) and Heat and Buildings Strategy (HBS) publications.³ These strategies provides the beginning of a roadmap for how this transition will take place, through an ambition to phase-out fossil fuel domestic heating starting this decadeⁱⁱ and a target for installing 600,000 heat pumps a year by 2028ⁱⁱⁱ. This target is referred to in the HBS as a ‘no-and-low-regrets’ action, meaning that the Government intends to achieve this target irrespective of innovation and developments of other low-carbon fuels.

The SMF’s report *Boiler alert* published last year highlighted the challenges facing both consumers and industry in the decarbonisation of home heat.⁴ Over the last year, a body of literature has been published on the demand-side challenges and consumer attitudes towards heat pumps and a phase-out of gas boilers. On the supply side, the attitudes of the workforce and the challenges for reskilling and retraining have been less explored in the literature. Social research from the Department of Business, Energy and Industrial Strategy (BEIS) published in May 2021 explored the attitudes of

ⁱⁱ The Heat and Buildings Strategy proposes introducing a phase-out date for off-gas-grid homes from 2026, which the Department for Business Energy and Industrial Strategy (BEIS) will consult on, and sets an ambition to phase-out gas boilers from existing homes (on the gas grid) from 2035.

ⁱⁱⁱ The target for 600,000 heat pump installations a year by 2028 was announced prior to the Net Zero Strategy in the Prime Minister’s Ten Point Plan for a Green Industrial Revolution published in November 2020.

workers in England and Wales, although this focused on installers in off-gas-grid areas only.⁵

Policy proposals in the HBS indicates that the Government expects to introduce low-carbon heating through new builds and off-gas-grid properties starting in the mid-2020s, with an ambition to phase-out new gas boilers from 2035 – as highlighted in the SMF’s latest briefing paper.⁶ The Government anticipates that approximately 200,000 of the 600,000 target will come from new build domestic properties, but it is unclear what proportions of the remaining 400,000 are expected to be deployed in on-gas-grid or off-gas-grid homes.⁷ SMF analysis of the Heat Pump Association’s estimates for a similar potential trajectory of heat pump deployment published in 2019 suggests that around half of this target could be installed in existing on-gas-grid homes and around 10% could be deployed in off-gas-grid homes.⁸ As a result, existing installers working in both on-gas and off-gas areas will likely play a critical role in the decarbonisation of home heat this decade.

Installing a heat pump from start to finish requires multiple skillsets that would not necessarily be used by plumbing and heating installers working on existing gas-heated homes. While elements of a new low-carbon heating system would operate similarly, installing heat pumps requires skills such as system design (room by room heat loss calculations, hydraulic balancing, and radiator sizing), installation (plumbing in and connecting the electric unit), and commissioning the electricians for running the unit.⁹ As a result, the skill demands of this workforce are expected to see a significant transformation.

But how do those directly employed in home heat installation feel about this transition? Are they supportive? And what are the barriers they face in retraining? Central to this report, we seek to understand the experiences of installers and their attitudes towards the decarbonisation of home heat, and reskilling and retraining for heat pump installation. Additionally, we explore the role of industry representatives and stakeholders in supporting this transformation. Based on this understanding, we identify policy areas that policymakers should consider to better support the installation workforce to retrain.

This research is particularly important for understanding the wider political challenges around the net zero transition. Already, this summer saw the emergence of an organised political opposition to decarbonising home heat, by way of an MP-led media push-back against the phase-out of gas boilers.¹⁰ This backlash also raised apparent concerns about heat pump technology more specifically.¹¹ Lessons from previous structural economic transitions, such as deindustrialisation, provide a clear warning for how a failure to support the reskilling of workers from jobs with reduced demand to those with increased demand can have lasting economic, social and political implications. Additionally, providing support for green skills will be a crucial part of the COVID-19 pandemic recovery as the Government looks to build back better.

Methods

This research is informed by extensive qualitative research with installers as well as engagement with businesses and other stakeholders involved in the heating and plumbing industry.

Over the course of August 2021, we conducted 20 in-depth interviews with members of the workforce who had installed heat pumps and/or gas boilers in off-gas and/or on-gas homes. These interviews were conducted prior to the publication of the Heat and Buildings Strategy in October 2021. We asked them to reflect on their own attitudes towards retraining and reskilling for low-carbon heating installation, as well as the decarbonisation of home heat more broadly. Qualitative research enabled us to gather deep and rich evidence on these topics and highlight conflicting views.

Participants were sourced to represent a mix of work experiences, including different heating systems, career length, and employer size. The sample is therefore not directly representative of the workforce. However, we believe our findings to provide meaningful and novel insight into the attitudes of workers that will be relied upon for a key part of the net zero strategy. 11 participants reported that they have only installed gas boilers, while 9 have installed both gas boilers and heat pumps. Participants' experiences of installing heat pumps varied significantly, ranging from installing one heat pump ever, through to 12-13 years' experience of heat pump installation and maintenance.

The majority (11) of participants are self-employed sole traders. 3 participants worked for a small sized company (30 employees), 2 for a medium sized company (30-100 employees), and 4 for a large company (over 100 employees). Participants also tended to be in their mid-career (with 10-20 years of working experience): 4 participants had 5-9 years' experience, 3 had 10-15 years' experience, 7 had 15-20 years' experience, and 6 had 20+ years' experience. The average age of the installers interviewed as part of this research project is 40 years old.

The report summarises the chapters as follows:

- **Chapter Two** – looks at the industry in its current state and establishes where we are and where we need to be.
- **Chapter Three** – explores the positive attitudes of installers towards decarbonising home heat and retraining.
- **Chapter Four** – examines the direct barriers which may prevent installers from retraining.
- **Chapter Five** – explores wider issues affecting the industry, which could affect retraining and the broader transition to low-carbon heating.
- **Chapter Six** – sets out a number of recommendations to overcome the barriers and support workers to retrain for heat pump installation.

CHAPTER TWO - TRANSFORMING THE WORKFORCE

A key part of delivering the Government's overall net zero strategy depends on the installer workforce, the majority of which are currently trained on gas central-heating systems. Decarbonising home heat will depend on transforming the current workforce to install and maintain low-carbon alternatives, such as heat pumps. This chapter outlines the context of the current workforce and the challenges a future low-carbon heating workforce may face.

Accreditation and standards

Gas Safe Register is only registration body for gas engineers in the UK, since April 2010. Registration with Gas Safe is required by law for an engineer to legally work on gas, and registration can only be obtained through completion of a recognised training and assessment route.¹² Gas engineers are required to renew their safety qualifications every 5 years.

Microgeneration Certification Scheme (MCS) is a UK standards organisation which certifies low-carbon products, installers and installations.¹³ MCS accreditation is not a legal requirement to carry out work on low-carbon technologies.¹⁴ However certification of the product and installer is currently required for claiming funding on government schemes, such as the Renewable Heat Incentive and the incoming Boiler Upgrade Scheme.¹⁵

Competent Persons Scheme (CPS) is an official self-certification scheme offered by the Department for Levelling up, Housing and Communities (formally the Ministry of Housing, Communities and Local Government). The scheme assess installers against Minimum Technical Competencies^{iv}, enabling them to self-certify that their installations meet the Building Regulations.¹⁶ However, a member of a CPS can install a heat pump without being MCS registered or meeting MCS standards. As a result, we refer to the MCS standard as being the primary non-mandatory standard for heat pump installation to date.

The state of play for existing installers

Before considering what a future heat pump workforce may look like, we consider current challenges facing the existing heating and gas installer-base. There are currently 147,800 plumbing, heating and air conditioning engineers in the UK.¹⁷ Over 130,000 engineers are Gas Safe registered, meaning that the workforce is mostly trained to work on gas heating systems.¹⁸ The UK has one of the highest consumption levels of residential gas in Europe¹⁹, with 85% of homes using natural gas for heating.²⁰

^{iv} Minimum Technical Competencies the minimum knowledge, practical skills and experience requirements that will ensure that an organisation or individual has the appropriate skills to undertake work in a Competent Person Scheme designated in Schedule 3 of the Building Regulations.

Decarbonising heat therefore requires transforming the skillset of the vast majority of the workforce, which is a significant endeavour for any industry, but presents even greater challenges for the plumbing and heating industry due to the demographic and employment nature of its workforce.

Pressures of an ageing workforce

As with many industries across the construction sector and economy more broadly, the heating and gas workforce faces potential pressures from an ageing population.²¹ Although, evidence suggests that these pressures may be more pronounced among the installer-base in comparison to the UK workforce as a whole, due to the average age of installers and retirement patterns.

Industry data indicates that the installer-base may be older relative to the average UK worker. The average age of a gas installer in 2016 was found to be around 45 years old, compared to 44 years old for the median UK worker that same year.²² A survey of fossil fuel heating system (gas, oil, and solid fuel) installers carried out in 2019 by the Heat Pump Association found that 58% of respondents were over the age of 51.²³ In comparison, SMF analysis of ONS data finds that in that same year, just 32% of UK workers and 33% of construction workers were over the age of 50 years old.²⁴

Additionally, industry data on retirement trends suggests that a significant proportion of the current workforce may be nearing retirement – as highlighted in the Heat and Buildings Strategy.²⁵ Gas Safe Register's Decade Review in 2019 finds that gas engineers begin to retire at around 55 years old, with peaks at 60 and 65.²⁶ Although, the average age of retirement for a plumber, installer or gas and heating engineer is unclear in official or industry data. For UK workers more broadly, CIPD analysis of DWP data finds that in 2018, the average age of exit from the labour market was 65 years old for men and 64 years old for women.²⁷ It appears there is a lack of data on retirement patterns of this group of workers that should be further explored by policymakers. Based on Gas Safe Register's findings, there is possible risk that much of the workforce required to reskill over the coming decades may be nearing retirement and therefore may be less incentivised to retrain for installing heat pumps.

A workforce in decline

Research from the Skills Training Group indicates that the size of the workforce may be in decline, having seen a 4.19% decrease from 157,400 plumbers, heating and ventilating engineers in 2004/05 to 150,800 in 2019/20.²⁸ In terms of total workforce numbers this ranks 13th out of the 14 skilled trades in decline. The Skills Training Group estimate that by 2050, there could be a 15.75% drop in plumbing and heating engineers if the current trend continues.²⁹ Engaging with industry stakeholders, we also heard of challenges in recruiting young apprentices in plumbing and heating. While Department for Education data on this detailed of a subject are not available, this trend would align with the overall decline in apprenticeship starts since the introduction of the new apprenticeship funding system in 2017.³⁰ As a result, there may be shrinking pipeline of installers to meet future increased heat pump demand.

As part of the HBS, the Government is looking to develop a new Heat Network Skills Programme to increase the recruitment pool for the workforce. At the time of writing,

the detail and scale of this programme remains to be seen. But it is clear that without significant intervention in encouraging new entrants into the workforce, the supply of installers is unlikely to meet the work required to transition almost 24 million homes off of natural gas.³¹ This recruitment challenge is considered further in Chapter Five with policy solutions offered in Chapter Six.

Sole traders

The employment status of installers will also affect how and if this workforce undergoes a significant skills transformation. In the plumbing, heating and gas industry, it is widely recognised that a significant proportion of the workforce are self-employed and/or sole traders. ONS data from October 2020–September 2021 indicates that 51% of plumbers and heating and ventilating engineers are self-employed in comparison to 14% of the UK’s total labour market.³² These installers will face different challenges to employee installers, such as the responsibility for sourcing and funding training themselves as well as opportunity costs from time spent on training.

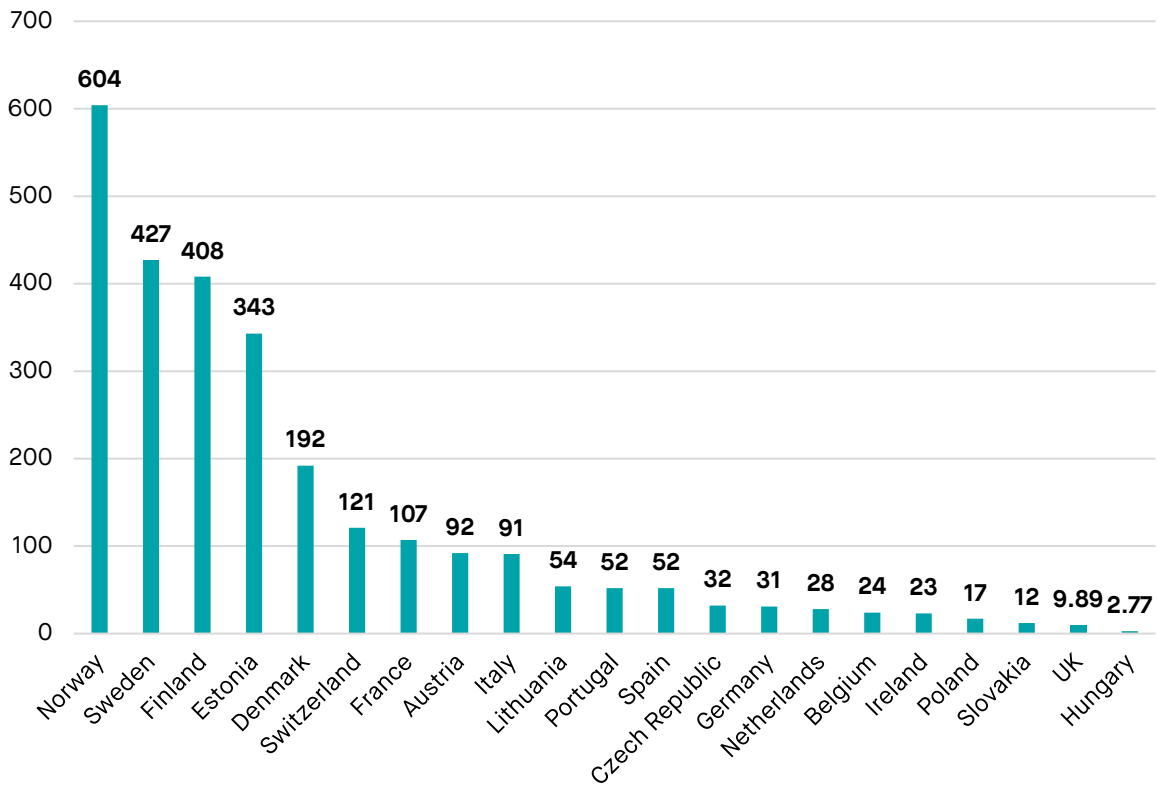
This employment trend is estimated to be similar, if not more pronounced, among the fossil-fuel and gas heating industry more specifically. Heat Pump Association’s survey of fossil fuel heating system installers in 2019 found that nearly 50% of respondents were sole traders.³³ Survey findings of Gas Safe Register engineers in 2016 also found that over three-quarters (77%) of respondents were sole traders.³⁴ Assuming those proportions have remained stable, over 100,000 of the current 130,000 Gas Safe Registered engineers could be sole traders. Eleven of the 20 (55%) installers interviewed as part of this research project are sole traders, and our engagement with stakeholders has further emphasised the point that this is the archetypal employment status for installers. It is therefore surprising that the HBS makes no explicit reference to this demographic of the workforce nor provides tailored support for them – an omission addressed in the recommendations of this report.

Heat pump installer base

To reach net zero, the UK Government has outlined its plans for replacing fossil fuel heating systems with low-carbon alternatives in the HBS, including a target for installing 600,000 heat pumps a year by 2028, described as a ‘low-and-no-regrets’ action.³⁵ The CCC also advises the use of domestic heat pumps as one of the main alternatives to gas boilers and other fossil fuel heating systems. Based on their estimates, the CCC recommends the installation of 19 million heat pumps by 2050 or around 1 million per year by 2030. This is a sharp uptick from current installation rates. In 2020, there were just 32,000 sales of heat pumps in the UK³⁶ in comparison to over 1.5 million gas boilers³⁷. The UKREC found that on the current rate of heat pump deployment in the UK, it would take 700 years to reach the installation levels required for net zero emissions.³⁸

Compared to our European neighbours, the UK lags on heat pump installations with just 10 installations per 1,000 households – as shown in Figure 1. The only country to install less is Hungary with around 3 installations per 1,000 households.

Figure 1: Number of installed heat pumps per 1,000 households by European country, 2021



Source: European Heat Pump Association

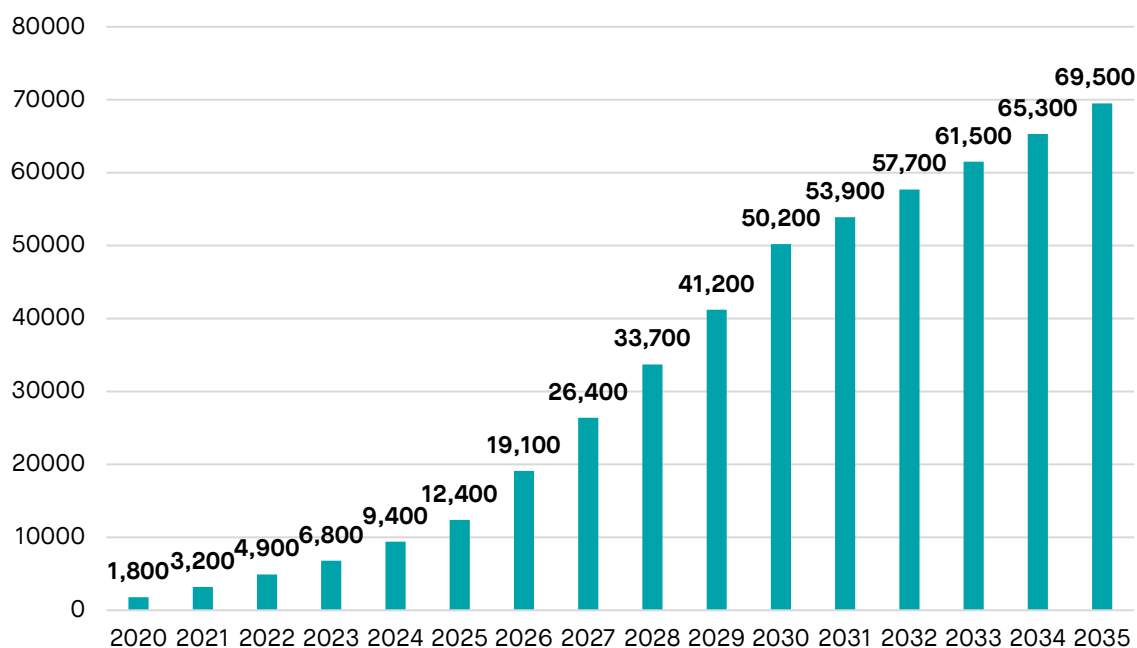
Highly qualified installers are necessary to meet the planned heat pump demand, and are also a key source of information and messaging with consumers, but at present it is unclear how many heat pump installers there are in the UK. Figures reported in Government publications and across the industry vary:

- According to an EY report published in June 2021, there are 1,200 installers.³⁹
- The *Heat Pump Manufacturing Supply Chain Research Project* published by BEIS in 2020 states 1,800 installers.⁴⁰
- The Government’s Net Zero Strategy published in October 2021 quotes 3,000 installers.⁴¹

These numbers however, are largely based on calculations by the Heat Pump Association across two of their reports, published in 2020 and 2021, on the estimated number of installers *needed* to meet CCC heat pump deployment recommendations, rather than the *actual* number of existing installers. Our discussions with MCS and statements in the HBS have confirmed that there are 1,100 accredited heat pump installing companies in the UK.⁴² The makeup of these is ambiguous; it is not known how many individual MCS registered installers there are, or what the average company size is.

The Heat Pump Association has estimated that the UK needs 12,400 heat pump installers by 2025 to reach the 300,000 installations, and 50,200 installers by 2030 to meet 1 million installations – as shown in Figure 2.⁴³ The broad ambition stated in the HBS is that as natural gas is phased out, natural gas engineers, electricians and those with transferable skills in complementary sectors will retrain not just for heat pumps, but for green technologies in key buildings-related sectors more generally.

Figure 2: Estimated total number of heat pumps installers needed in the UK by 2035



Source: Heat Pump Association

Skills for heat pump installation

Multiple skillsets may be required to complete full heat pump installation, as the process involves skills such as room by room heat loss calculations, hydraulic balancing, and commissioning electrics, which would not necessarily be used by plumbing and heating installers when working on existing homes.⁴⁴ Further skills may be needed depending on the type of heat pump. Heat pumps operating on a split system for instance require an installer with F-gas qualifications and familiarity with handling refrigerants.⁴⁵ Training is currently available for installers to reskill for heat pump installation, although, as highlighted in this report, courses vary due to a lack of formal mandatory standards in comparison to the gas industry.

CHAPTER THREE – A POSITIVE OUTLOOK

Transitioning homes away from fossil fuel heating effectively will require a workforce that is motivated and willing to undertake this challenge. This chapter draws on the findings from 20 in-depth interviews with both gas boiler and heat pump installers, from which we identify a number of core positive themes in their attitudes towards retraining for heat pump installation and the decarbonisation of home heat more broadly. Overall, we find interviewees are supportive of climate action, aware of heat pump technology and are confident in learning new skills, irrespective of their current skillset and experience. These findings point to some encouraging initial signs for policymakers and politicians aiming for net zero.

An environmentally and technologically aware workforce

Supportive of climate action

Interviewees largely acknowledge that there is a need to address climate change, and have a broad awareness of the UK's commitment to move to net zero emissions by 2050. Climate action itself is viewed as very important by some interviewees, and requires urgent attention. Some interviewees even express confusion and shock over continuing practices, such as the installation of gas boilers in new properties when low-carbon alternatives are available.

“I think they should be installing heat pumps in new builds now. I don't see the point in waiting till 2025. I disagree with it to be honest. If you've got the technology there now, I don't think you should be building houses connected to gas now.” (32 year old, gas installer)

Both gas and heat pump interviewees acknowledge that home heating is a contributor to UK emissions, albeit with varying views on its significance. While interviewees note improvements to the efficiency of gas boilers in recent years, there is a recognition that home heating emissions could and should be reduced as much as possible. As a result, there is support across interviewees for lower carbon or more efficient technologies to help reduce emissions, including the incorporation of smart home systems and more efficient use of remaining gas. While not necessary, a workforce supportive of climate action may be more engaged with relevant policy developments and more active in earlier retraining. Across interviewees support for climate action and knowledge of home heating emissions tends to be strongest among those with heat pump experience and those more interested in renewable technologies.

“To know that you can help contribute to bringing emissions down and play a part in helping climate change, then that would be a nice thing.” (38 year old, gas installer)

“The weather is changing. It's getting warmer and warmer. This global warming is definitely having an effect.” (46 year old, heat pump and gas installer)

“It's too easy and too comfortable to just turn your heating up by a degree or two, and if everyone does that... it's huge.” (28 year old, gas installer)

Suitability of heat pump technology

Across gas and heat pump interviewees, there is support for the use of heat pumps for reducing emissions and running efficient heating systems. Although this support is most common for new build properties. This is due to a belief that heat pumps would be best suited to properties where they could be incorporated into the fabric, fit and design of the property and heating system from the start.

Those who are unfamiliar with fitting heat pumps are more wary of their suitability for existing homes, due to the possible need for system redesign and building retrofit. However, interviewees with heat pump experience are more confident of their suitability in existing builds, subject to homes having appropriate thermal energy efficiency measures in place.^v Some interviewees confidence in heat pump suitability is reflected in the intention of installing a heat pump in their own home.

“I’ve [installed heat pumps in] terraced [houses], new builds, flats where they’ll mount it on the outside... commercial side where they’ll have big heat pumps on the roof of a block of flats...” (29 year old, heat pump and gas installer)

“You can install one in any property so long as it’s insulated. I’d like to think you would need a mid-to-low range EPC for a heat pump to run well. You don’t need the best insulation but it needs to be decent.” (46 year old, heat pump and gas installer)

The belief in suitability for existing homes broadly matches a study done by Carbon Trust, which looked in large part at heat pump suitability across 12 prevalent domestic property types across London. They found heat pumps to be suitable in some capacity for the majority of building types examined, as long as a C energy rating or above was maintained.⁴⁶ In 2019/20, 61% of socially rented, 38% privately rented and 36% owner occupied English homes were found to have an EER of C or above.⁴⁷ There is therefore scope for immediate heat pump fitting in a large number of homes, however there is clearly a lot of work to be done to bring other homes to this standard.

An industry open to change

In principle, interviewees’ attitudes towards retraining for new skills generally are broadly positive with a favourable outlook for the future of the industry.

Eager to learn

Interviewees generally favour the opportunity to learn something new and diversify their skills portfolio and offer for customers. As a result, many express an interest in participating in training, largely irrespective of the technology or skills required. In regard to heat pump training more specifically, there is at least a surface-level willingness despite the barriers identified in Chapter Four.

^v Suggested energy efficiency measures usually include thicker loft insulation, double glazed windows, and heavier wall insulation. Some properties may have a possible need for larger radiators, or underfloor heating in larger properties.

“If it turned out I could do more training courses and get more qualifications under my belt, then I’d be more than happy to do so... I love to learn.” (28 year old, gas installer)

Additionally, some interviewees express an interest in learning about and understanding how different low-carbon technologies work, such as heat pumps. This is somewhat unsurprising given interviewees are tradespeople who do practical work with technology every day. These interviewees tend to be invested and proactive in keeping updated on changes in the industry. One interviewee in particular, structures his week to include one “reading and knowledge day” with his employer, setting aside working time to research and stay informed of low-carbon heating developments.

As a result, some interviewees with solely gas-based experience have already begun researching training courses online, contacting training providers, and reaching out to manufacturers running free heat pump courses.⁴⁸ Although training tends to vary across providers, interviewees with heat pump installation experience tend to prefer practical experience learned on-site over classroom or webinar-based training. Among those who had received heat pump training previously, there is also a willingness to undertake refresher training to update their knowledge and skills for newer technologies

For some installers, the motivation for retraining stems from a desire to move towards a more sustainable technology. However, for the majority of interviewees, the desire to retrain is commercial – some see it as a business opportunity within an emerging market, while others believe it’s necessary for job stability. In this case, the environmental aspect of learning green skills is a secondary benefit.

“I don’t think we’ve got a choice, either move forward or we go backwards... Either we go with the times or we don’t.” (50 year old, gas installer)

Confidence in reskilling

As noted, installing a heat pump from start to finish requires multiple skillsets that would not necessarily be used by plumbing and heating installers working on existing homes. While elements of a new low-carbon heating system would operate similarly, installing heat pumps requires skills such as system design, installation, and commissioning the electrics for running the unit.⁴⁹ In general, interviewees with heat pump installation experience do not believe reskilling to be challenging. However, this may be due to the fact that interviewees that have installed heat pumps often contract out system design and commissioning tasks to appropriately skilled tradespeople.

Similarly, the concept of reskilling for heat pumps does not appear to be seen as a challenge for interviewees with only gas experience. It is believed that installing heat pumps would require the same underlying principles of plumbing that are needed for current heating installations, and would thus be a manageable transition. While this may be seen as an encouraging sign, it is possible that this attitude is in part the result of a lack of knowledge or misunderstanding of the range specific skills required for heat pump installation.

“I’m pretty sure the principles will be the same – it’s still the same principles of a pump providing heat to your radiators.” (32 year old, gas installer)

“It would be fine once you’d got the training, we work on a wide variety of systems now anyway.. I’m sure I’d be fine working on them.” (39 year old, gas installer)

Business opportunity

Low-carbon heating, including heat pumps, are seen by several interviewees as a potential business opportunity, whereby transitioning millions of homes away from fossil fuel heating would create a significant amount of work. Business opportunity, whether expanding on current services offered or establishing a new specialist company, serves as significantly more of a motivating factor to retrain than climate action, for interviewees.

Sole trader interviewees tend to be more aware of need to retrain, recognising that they are more exposed to changes in the industry without the protection and guidance of an employer, and would therefore need to be prepared for business adaptation. Interviewees who are employees had a similar mindset that their employer would generally want to maximise opportunities, and if that involved heat pumps, they would look to get involved in that part of the market if they have not already.

“From a business point of view, if you are going more green it’s only going to do your profile more good.” (32 year old, gas installer)

“It’s going to provide lots of work and that’s one of the reasons why we’ve got up to speed on it.” (48 year old, heat pump and gas installer)

“I was looking into shares in hydrogen and heat pumps - if you can get into shares early and the company starts making money, then dividends and profits will start to go up.” (38 year old, gas installer)

Those already installing heat pumps are noticing a small increase in heat pump installations and are similarly confident of job security, with the view that as heat pumps become more popular, their business priorities will shift more towards low carbon heating and away from gas.

“I think we’ll all be fine, you change if you have to change with the times. It’s not something I personally worry about.” (38 year old, gas installer)

“Over the last ten years it ’ s slowly gaining pace, for the industry it ’ s quite obvious that this is where it ’ s going.” (31 year old heat pump and gas installer)

One heat pump installer feels that there is a commercial opportunity for heat pumps to have a *“moment in the sun”* and establish a growing market for low-carbon heating options. This because of the ongoing development of other technologies, which currently do not offer comparable levels of certainty. Hydrogen, for example, has received vocal support from across industry stakeholders and government due its perceived potential to replicate natural gas. The GMB union (Britain’s General Union, formally General Municipal Boilermakers) for example has backed the use of hydrogen boilers for millions of UK homes.⁵⁰ Some manufacturers, have endorsed hydrogen in

trade magazines and are involved in hydrogen boiler development^{vi,51} However, to date, hydrogen is not available on the scale required to replace current gas use in domestic properties. Heat pumps are an established technology, having been in widescale domestic use for some time across different countries. This means there is manufacturing capacity for their immediate installation while hydrogen use for home heat purposes is still in development.⁵²

Given the transformation that the heating industry is set to undertake, it would be unsurprising if installers felt some level of concern about the security of their work in future. However, overall, we found low levels of concern across interviewees on this subject. While this is partly due to the business opportunity of the low-carbon heating industry, interviewees are also confident that there will be continued demand for their existing skillset for gas work and general plumbing.

A minority of interviewees, primarily those working for larger gas-focused businesses, are concerned that they may be less of a priority for renewables training, as new apprentices may be trained first. However even in this circumstance there is not great concern for overall job security, for the same reason of continued demand of their existing skills. These findings raise questions about the future of the workforce if installers believe there will be enough demand for their skillset without having to retrain, discussed in Chapter Five.

Trusted by consumers

Heating engineers are generally regarded as some of the most trusted tradespeople.⁵³ As installers and servicing engineers interact with consumers on a daily basis, they could play a crucial role in information dissemination to the public on the future of home heat, but only if installers themselves are well-informed.

Interactions between interviewees and their customers tend to differ on an individual basis. Some of these relationships comprise of greater levels of communication than others, particularly in the case of sole trader interviewees who tend to rely on the same pool of customers. Although, there are some broad similarities across all interviewees.

Customers tend to know what they want installed prior to contacting interviewees, suggesting that installers are unlikely to play a sales role for heating technology. Instead, customers usually ask interviewees for advice on how to be more energy efficient – what time of day to run the heating, how long for and at what temperature – thus reducing their energy bills.

Customers have also started to ask interviewees about the Government's plans for the future of gas and whether they need to consider replacing their gas boiler. Currently, interviewees tend to reply that they do not know enough about the government's plans. Interviewees may also placate customer's concerns by reassuring them that gas will still be around for the rest of the boiler's warranty, meaning customers should not expect to have to 'rip out' their working boiler. Interviewees believe that the public

^{vi} Leading boiler manufacturers Worcester Bosch is a regular contributor to the trade magazine *Registered Gas Engineer*, outlining the benefits hydrogen could bring to the UK heat market

need to have more information and awareness of heat pump technology, warning that current levels of awareness and interest are low.

“[Customers] are seeing clips in the news and asking, they want to know what’s happening with their boiler.” (52 year old, heat pump and gas installer)

“[Customers] will ask but we say, ‘we can wait and see’. I try and sell them the [boiler’s] warranty – you’ve got about 10 years left and we’ll know where we are in another 10 years’ time.” (41 year old, heat pump and gas installer)

“We do get asked a lot ‘will [a boiler ban] happen?’. We say we don’t know. They ask ‘will I be able to get a boiler in 10 years? 9 times out of 10 we say, ‘I reckon so’ because they’re not going to go away.” (42 year old, gas installer)

“We have heard ‘what’s happening with gas boilers?’ But they’re not really concerned because they know their boiler is going to guarantee them 10 years.” (36 year old, heat pump and gas installer)

“People are talking about gas not being installed in a few years. They want to know how many years they have left on their boiler to which I can’t give them a definite answer.” (38 year old, gas installer)

Interviewees with no heat pump training would feel confident discussing products and technology with their customers, provided they had received appropriate training and information. This may present an opportunity for installers to play a wider role in the transformation of heat, beyond delivering installations but being a vital and trusted source of information for consumers too. As a result, it is even more important that policymakers ensure installers receive clear information and adequate training on both heat pumps and other low carbon technologies, and policy updates to kickstart both the supply of skills and demand from consumers.

“I can only be confident in selling a product if I know it works.” (50 year old, gas installer)

“If I had the training, I would feel comfortable talking to customers about their heating options. We’re going to have to.” (32 year old, gas installer)

Implications for policymakers

The positive attitudes and opinions of interviewees has number of implications for policymakers. First, overall support for climate action and a recognition of the emissions from gas boilers is an encouraging sign that the installer base believes reducing emissions from home heat is important. While this does not necessarily provide direct consent for how this happens in practice, it suggests that there is support for decarbonisation in principle, which is at least part of the challenge in encouraging any workforce or industry to transform.

The overall willingness of interviewees to retrain is an encouraging indicator that a competent and confident heat pump installer base can grow from the existing workforce. This should provide some confidence as well as impetus to policymakers and industry to establish and promote a clear retraining framework for existing installers. The support for heat pump roll-out from those who have already installed heat pumps or who are more knowledgeable is a strong indicator of the role reliable, standardised information and training could play in dispelling misconceptions of heat pumps and scepticism of their practicality, some of which is detailed further in Chapter Five.

Installers are likely to be more inclined to retrain because of the business opportunities a low-carbon heating portfolio could bring (subject to a rise in demand). Although climate action may be bonus motivation, the attractiveness of a new emerging market is likely to be a stronger pull and could be used as a selling point to encourage retraining in more hesitant installers.

As highly trusted tradespeople, many of whom are aware of and interested in climate action, the installer base could be a medium for informing consumers of the move to low-carbon heating, but to do so effectively policymakers will need to mobilise the workforce with more high-quality information and training on low-carbon heating technologies and anticipated regulatory changes.

CHAPTER FOUR – BARRIERS FOR INSTALLERS TO RETRAIN

While interviewees show encouraging signs in their attitudes towards climate action and a phase-out of fossil fuel heating, our qualitative research also indicates that installers face a number of obstacles to reskilling and retraining. More broadly, these findings also raise challenges for industry and policymakers in delivering the decarbonisation of home heat and the wider net zero agenda – discussed in Chapter Five.

As noted in Chapter Three, interviewees are broadly willing to retrain for installing low-carbon heating systems, as well as heat pumps more specifically. This is not only the case among interviewees who have worked on solely gas heating systems. Some interviewees with heat pump installation experience also have an interest in participating in additional heat pump training where their previous training had been informal, inadequate, or due for a refresher. However, interviewees largely believe that the current barriers for retraining are greater than the incentives. Low consumer demand, financial costs of retraining, and a lack of a clear roadmap on phase-out timelines are among the most commonly reported obstacles for interviewees.

Low consumer demand

The most significant barrier for interviewees to retrain (particularly in the near future) is low consumer demand for low-carbon heating systems, especially heat pumps. Interviewees believe that participating in a retraining course or learning new skills currently would be of little value, in terms of both financial value and skill value.

Primarily, interviewees believe that given the financial cost of retraining (both the cost of the course and loss of earnings from not working), it would not be prudent – or for some, even viable – to invest in reskilling when the prospect of heat pump work is currently low. Last year, annual deployment rates for heat pump installation reached around 37,000 in comparison to 1.5 million gas boilers. Additionally, the SMF’s previous report on the decarbonisation of home heat published in November 2020, *Boiler alert*, found that less than two in ten were aware of heat pumps (18% for air-source heat pumps vs 19% for ground-source heat pumps).⁵⁴

Even across the group of interviewees with heat pump installation experience, gas installations still comprise the vast majority of their day-to-day work. One interviewee recounted that of their near-90 installations a year, just one or two are heat pumps.

“I am interested in learning about [low-carbon heating systems] because long-term, that is the solution. But at the minute, spending that much time learning about it when 99% of my work still involves natural gas... it’s not financially viable for me.” (32 year old, gas boiler installer)

“It’s alright to pay £600 for a course, but if you only use it twice [in a year] then it’s not paid for itself.” (41 year old, heat pump and gas installer)

Interviewees also believe that there would be little skill value in undertaking a training course to learn new skills that would not be used in practice regularly enough to maintain. Some interviewees have concerns over forgetting what they had learned, “*losing the skill*”, or not utilising a hypothetical heat pump qualification before it was up for renewal^{vii}.

As a largely self-employed and/or sole trader industry, interviewees are accustomed to paying for the cost of training themselves and therefore judging whether there is a business case for such investment. As current low levels of demand mean investing in training is not justifiable, interviewees are supportive of policy interventions that will stimulate demand and instil confidence in the market. These interventions most commonly include supporting the costs of installation, committing to a phase-out date, and providing consumers with more information on heat pumps.

“It’s down to demand, if the demand is there for these systems, employers will move with it, and they’ll move quickly.” (48 year old, heat pump and gas installer)

“The biggest thing they can do for us is help our customers. If you help them, you’re going to help us as an industry. If they’ve got the confidence in the product that’s out there and they want it installed, that kind of looks after us.” (52 year old, heat pump and gas installer)

“Government needs to set a true deadline [for banning gas boilers], as no training will happen before that. A set date would be the only incentive really.” (32 year old, gas installer)

“Educate people – all this talk about ‘is gas going?’ is not helpful, it’s confusing people. Also, offer financial assistance available to those who’ll need it. Don’t make it impossible to register for these schemes either.” (36 year old, gas installer)

Costs of retraining

The financial cost of training as well as the loss of earnings from days spent on courses are also a barrier for the uptake of heat pump training for interviewees. Heat pump training courses vary in price, with interviewees and industry stakeholders indicating that courses offered by training providers range from £500-£800. Courses offered by manufacturers tend to be free and vary in their course content and mode of delivery (e.g. classroom-based or practical).

Employee interviewees expect that the financial cost of training and loss of earnings to be met by their employer. The majority of our interviewee sample that are sole traders expect to have to fund the cost of training themselves, as opposed to being paid for by an employer. This cost alone does not necessarily present as a barrier for self-employed interviewees, as many reported that they are used to funding their own training and qualification renewal fees (such as Gas Safe). However, the challenge of

^{vii} MCS Registration is required for installers where homeowners are claiming government grants for heat pump installation, such as the Renewable Heat Incentive or the incoming Boiler Upgrade Scheme. MCS Registration requires annual renewal.

low consumer demand is said to exacerbate the ability of interviewees to meet training costs, given the return on such an investment would not be guaranteed. Some interviewees believe the cost of training courses may decrease over time as the market for heat pumps develops and will consider training in future when the market develops.

Sole trader interviewees reported that the loss of earnings from attending training courses is perhaps an even greater barrier than the direct cost of training courses.

“I’m all for training... but you’re losing a day’s pay as well.” (41 year old, heat pump and gas installer)

In addition to the actual cost of the training and lost earnings, there is the cost of initial registration with MCS of £750, an annual renewal fee of £618 and certification fees of each pump installed.⁵⁵ All of this is more expensive if compared to the same processes for gas, which has an initial registration cost of £392, an annual renewal of £164 and much lower certification costs.⁵⁶ Training courses also vary in their duration.

Beyond the financial costs of training, some sole trader interviewees indicated that there is also a time barrier to participating in a course, albeit with less significance. Our qualitative findings suggest that the time barrier could be overcome with financial incentives and clear, accessible information. This is demonstrated in the following interviewee excerpts:

“If I had time on my hands then it would be something I would look into, but I’m not really fancying night school at the moment.” (38 year old, gas installer)

“I think I could work out the time barrier if the other [barriers] were taken care of, like costs and if information were readily available.” (38 year old, gas installer)

Lack of a clear roadmap for installers

Interviewees have a varied level of awareness of the government’s plans to decarbonise home heat. Some interviewees were aware of key policy dates in broad terms recalling that, for example, that new builds must have low-carbon heating systems installed from 2025, or the possibility of a phase-out of new gas boilers from 2035^{viii}. Despite this, many interviewees feel that it is not clear how the government’s ambitions translate into an actionable timeline for when installers should consider participating in training. This lack of a clear phase-out plan and information on this seemingly has two key effects on interviewees: *inertia* and *frustration*.

Inertia: some interviewees do not think training for heat pump installation is a priority for the near-future. Low consumer demand and unclear timelines for training mean that some interviewees say they are unlikely to consider training until there is greater certainty. Until then, they believe that with 24.5 million homes heated by natural gas, there will be enough demand for gas work to sustain their livelihoods.

^{viii} Interviews took place prior to the publication of the Heat and Buildings Strategy, which set an ambition for the phase-out of new gas boilers from 2035.

Frustration: other interviewees are frustrated with the lack of accessible information available for installers, given their willingness to retrain and the significance that a phase-out policy would have on the industry and skills demands if introduced. Employee interviewees in particular look to their employers for information on this transition, but find that little is provided. Interviewees recognise that employers themselves may not be the barrier, but rather a symptom of the overall lack of a clear phase-out plan from government.

“We had a meeting and I was asking about when we’re looking to move on to heat pumps and what kind of training we’re going to be having. Nobody knows anything. The managers probably aren’t allowed to say anything if they do know, but they probably don’t.” (38 year old, gas installer)

Scepticism of heat pump technology

Interviewees’ attitudes towards heat pumps as a low-carbon heating solution indicate that the technology itself (or the beliefs about it) may serve as a potential barrier to the uptake of training. While no interviewees explicitly say that they would not participate in training because of their views on heat pumps, many express doubts about the technology as a viable mass-market approach to decarbonising home heat. As a result, their willingness to retrain may be more hesitant than initial responses would suggest.

These attitudes are informed by a range of factors, some of which are the result of a self-reported lack of knowledge or understanding on the topic from interviewees. These factors included the upfront cost to consumers, disruption to the home, availability of space, noise of the unit, and effectiveness in poorly insulated properties. Some interviewees also suggest that heat pumps would not generate enough heat output in colder weather. This is despite government-published evidence that heat pumps *“are able to comfortably operate at or below zero degrees Celsius”*.⁵⁷ Interviewees say that these factors would not necessarily prevent them from retraining, but rather contribute to overall scepticism around the feasibility of decarbonising heat with heat pumps.

The most common belief that interviewees believe would directly impact interviewees’ willingness to retrain is that heat pumps are primarily considered as suitable for new builds, rather than existing builds, as discussed in Chapter Three. As a group of installers who work on existing builds, many interviewees do not think training is a priority for them.

“I see it as a new build technology. I think people involved with that will be subcontractors for new builds.” (55 year old, gas installer)

“[Heat pumps are] best for new builds, which I don’t get involved with.” (38 year old, gas installer)

This is predominantly the case among interviewees with gas-only experience, although interviewees with limited heat pump experience share similar views. Interviewees with more extensive heat pump experience have confidence in the mass deployment of heat pumps in a range of property types, suggesting that improved information and training for installers could dispel some scepticism. As previously

noted, research from the Carbon Trust for the Greater London Authority (GLA) shows that heat pumps are a suitable heat technology in a range of properties, including new and existing builds.⁵⁸

Interviewees also question whether the electrification of heat is a viable path, and express doubts about whether the electricity grid will be able to cope with the increased demand of mass electrified heating. Interviewees confess that they have little knowledge about this, however it remains a key aspect of their hesitant attitude towards heat pumps.

“Not everything can move over to electricity – won’t be able to cope with the demand.” (36 year old, gas installer)

“Is it achievable for the electricity grid? I don’t know about that side.” (38 year old, gas installer)

The HBS indicates that within the decarbonisation of home heat, there is a role for heat pumps, heat networks, and an investment in the innovation of hydrogen with a decision on its future in the home, due in 2026. Yet, many interviewees view low-carbon home heating solutions as something of a binary choice between heat pumps and hydrogen – and there is greater interest in the future of hydrogen as a heating solution. This is primarily because they believe hydrogen to be a similar replacement to natural gas, which they presume will mean less reskilling for themselves and the wider workforce, as well as less disruption to the home or electricity grid – explored further in Chapter Five. Given the investment of money, time, and cognitive engagement that training requires, it is conceivable that interviewees may not consider retraining until a clearer decision on the future of hydrogen has been made.

“Hydrogen for me looks like it’s going to be the replacement.” (36 year old, gas installer)

“I keep hearing about hydrogen which I would have more of an interest in doing, for some reason. I kind of feel like there may be less training involved, I’m not sure why.” (38 year old, gas installer)

“My sole belief is that [heat pumps] won’t happen – hydrogen technology is coming. I can’t see any gas engineer struggling with a transition to hydrogen. There will be training involved still, but all we need to do is a few day’s training, and those skills will [transfer] onto what we already have.” (52 year old, heat pump and gas installer)

Employers are also found to play a role as a barrier to training, beyond the attitudes of individual interviewees. Where employers have a vested interest or an affinity for natural gas, it is thought of as being unlikely that they will invest in training their staff for heat pumps.

“If these companies are making money off of gas, they’re not going to be investing in their staff training [for heat pumps].” (32 year old, gas installer)

“I don’t think [my employer has] truly accepted that things need to move on from gas. They’re not very forthcoming with training.” (38 year old, gas installer)

Past experiences of retraining

Installers' past experiences of retraining for other low-carbon heating technologies may also serve as a potential barrier for the take up of heat pump training. While it is an uncommon experience among the research sample, one interviewee had a negative experience of investing in setting up a renewables-focused installation company, specialising in solar power. As a result, this interviewee is reluctant to trust the Government's plans and invest in retraining. In 2010, the Government introduced the Feed-in-Tariff (FiT) to incentivise the uptake of solar power, whereby homeowners can receive payments for the renewable energy that is generated and exported. This subsidy led to around 800,000 British homes to install solar panels by 2019.⁵⁹ However, cuts to FiT funding in 2011, 2016, and 2019 have created uncertainty in the market with falls in demand and job losses.⁶⁰

"We ploughed a lot of money into [solar installation] but it got pulled. We couldn't make it pay so we had to go back to fitting gas. [...] For engineers, we've heard this all before... we've heard it with solar." (41 year old, heat pump and gas installer)

While just one interviewee experienced this downturn of the solar industry, given the numbers of jobs lost, it is likely that installers across the wider workforce may have also felt let down. The Green Homes Grant also provided the market with an incentive for consumers and workers to invest in energy efficiency measures for the home, only for the scheme to be closed six months later. As a result, it is conceivable that these negative experiences may serve as a barrier for installers to retrain.

CHAPTER FIVE – WIDER WORKFORCE CHALLENGES FOR DECARBONISING HOME HEAT

Beyond the direct barriers for retraining for heat pumps, we also identify a number of wider challenges for the success of decarbonising home heat. Engaging with industry stakeholders and installers as part of the qualitative interviews, we note that positive attitudes towards net zero and retraining rest on fragile foundations, and the structural make-up of the gas and heating industry may pose challenges to the transition.

Confidence in net zero plans

The qualitative findings suggest that the installer base, a key player in the decarbonisation of home heat, may not be entirely bought into the decarbonisation of home heat or the wider net zero agenda, believing it to be largely unachievable.

As highlighted in Chapter Three, the vast majority of interviewees are instinctively supportive of climate action and the need to reduce emissions from home heating. However, these attitudes do not inherently translate into confidence in the government's net zero policy agenda. In some cases, this is due to a perceived lack of planning and information from government for how the phase-out of fossil fuel heating will happen in practice.

“I think the Government put these ideas out there but there’s not much thought of how we’re going to get there. It’s an idea with no plan half the time.” (38 year old gas installer)

“The Government to me have only decided that yes we need to get rid of these fossil fuels, but they haven’t really thought about how we’re going to.” (50 year old, gas installer)

At the time of the interviews (August 2021), the Government had provided limited signals or information to the workforce on how the decarbonisation of home heat will occur. Since then, the HBS (published in October 2021) offers more detail on how this transformation may happen, such as prioritising the phase-out of fossil fuels from new-builds (committed by 2025) and off-gas-grid homes (proposed by 2026), incentivising demand by way of consumer grants, and setting out an approach for skills and training that rests largely on market mechanisms.⁶¹ However, as noted in the SMF's recent analysis of the HBS, the level of support committed provides limited incentives both for the consumer uptake of heat pumps and for installers to retrain.⁶² Additionally, HBS appears to remain unclear on the future of low-carbon heating in existing homes connected to the gas grid. As highlighted in Chapter One of this report, SMF analysis of the Heat Pump Association's potential heat pump deployment estimates suggest that around half of the 600,000 target could be installed in existing on-gas homes, however the HBS remains ambiguous on this, setting only an ambition to phase out gas boilers from 2035 and delaying a decision on the future of hydrogen in the home until 2026.

A small minority of interviewees – predominantly those already working in renewable heating installations – believe that the decarbonisation of home heat will be achieved by 2050, but that it will take far more public investment and leadership than is currently committed or displayed by government. In contrast, the majority of interviewees are sceptical that this endeavour would be successful, citing unrealistic timescales for phasing out fossil fuels, particularly with heat pumps. Interviewees’ main concerns related to the costs and disruption to consumers, a perceived inadequate replacement for natural gas (in terms of heat output), electricity demand, and skills gaps.

“I do think [decarbonising home heat with heat pumps by 2050] is achievable, if government pull their hands out their pockets.” (32 year old, gas installer)

“I’m 32, do I think it will be in the next 30/40 years I’m working? Possibly not.” (32 year old, gas installer)

“You know yourself the logistics aren’t there. 25 million properties you’re going to take off gas... What are you going to do? Even with hydrogen, that’s not going to happen. Every single house is different, and we ain’t got the men for it... where’s the money coming from? Where are the men coming from?” (41 year old, heat pump and gas installer)

Despite expressing a willingness to retrain, interviewees’ belief that a transformation to low-carbon heat will not be achieved by 2050 and that demand for gas work will exist for decades to come, suggests that some parts of the workforce may be slower to transition than others.

These findings indicate that support for climate action may exist among the workforce in principle, but that it rests on fragile foundations. Keeping the installer base onside with net zero ambitions may be vulnerable to at least the perception of an unclear strategy from government and poor delivery of policies around infrastructure, skills and costs.

Gas and heating industry

Across the gas and heating industry, manufacturers, training providers, employers, and wider stakeholders are already playing a critical role in enabling this transition, from innovating to bring down the cost of technologies to developing training programmes and qualifications. However, structural factors within the industry such as the legacy and interests of gas stakeholders, and workforce representation pose challenges for ensuring the installer base is onside and can be mobilised for the decarbonisation of home heat.

Opposing rhetoric on technology

The challenge of decarbonising home heat is often described as having ‘no silver-bullet’ solution, meaning that different factors such as housing stock, local asset infrastructure and geography will determine different heating solutions. However, within the gas and heating industry, there is a rhetoric of holding heat pumps and hydrogen in contentious opposition, whereby different actors suggest prioritising one over the other.⁶³ The Heat and Buildings Strategy seemingly straddles this debate, referring to the target for 600,000 heat pump installations a year by 2028 as a ‘no-and-

low-regrets' action, while also investing in hydrogen and delaying any firm decisions until later this decade. The SMF takes no view on these technologies, but rather explores how the government's own stated ambitions will impact installer jobs and skills.

Ensuring enough installers are trained to deliver 600,000 'no-regrets' heat pumps a year in just seven years-time will require training thousands of existing plumbing and heating installers, irrespective of the future of alternative fuels. However, many interviewees express a preference for hydrogen as a means for doing so, in comparison to heat pumps. This was primarily due to a belief that transitioning from natural gas to hydrogen would be less disruptive and less costly for both homeowners, industry and workforce, based on the presumption that the existing infrastructure for home heating systems and the national gas grid could be repurposed for hydrogen.

"[Heat pumps] will cost home owners a lot of money for no real benefit when the simple solution is just hydrogen and gas." (55 year old, gas)

"Hydrogen for me looks like it's going to be the replacement. [...] Hopefully [the government] will push more hydrogen, it's more like-for-like with a traditional boiler." (36 year old, gas installer)

"Hydrogen will be the replacement for natural gas – the technology is already there, and the infrastructure is coming in. Once the industry finds the way to store it, the infrastructure there for natural gas will be used for hydrogen." (52 year old, heat pump and gas installer)

The science and technology of hydrogen as a renewable energy source is still in its infancy, particularly in regard to home heat. Keele University in the West Midlands is currently running the UK's first pilot of injecting up to 20% of hydrogen into the existing natural gas network, fuelling 100 homes and 30 faculty buildings.⁶⁴ As it stands, hydrogen is not a market-ready heating solution for the home and the feasibility of repurposing the existing gas infrastructure is unclear.

These findings suggest installers may conceivably wait for further signals from the government on the future of home heating before retraining, thus risking delaying kick-starting the market for heat pump installation. Additionally, where some customers are already asking interviewees about the future of gas, there is a risk that these attitudes could be passed onto consumers, impacting the uptake of heat pumps. Interviewees largely tell their customers that they do not know enough or that the boiler's warranty is long enough not to be concerned or take action yet. However, it is conceivable that some installers may be more candid about their opinions on different heating solutions. It is therefore critical that installers receive clear, evidenced and reliable information on heating technologies available to consumers.

Information sources

We are keen to identify where installers get their information from and how it informs their attitudes. This is especially relevant for sole trader installers who may be more responsible for staying informed with industry updates, compared to those working for employers. Although, employee interviewees also say that they do not receive enough information from their employers as they would like.

Interviewees use a range of information sources to stay up to date with home heat policy and low-carbon heating technology developments. The most popular sources include trade magazines, manufacturer outputs, the news or Internet, and employers. It was anticipated that unions or other industry representatives may also be a source of information, however this is not the case among the interviewees sampled. One of the most prominent information sources for interviewees is Gas Safe's monthly magazine, *Registered Gas Safe*. Upon reviewing eleven editions of Registered Gas Safe published in 2021, we find subtle differences in the way in which the context of heat pumps and hydrogen are mentioned (see page 35). We note that these messages share similarities with interviewees' attitudes on the suitability of heat pumps for different properties, and a preference for hydrogen as a heating solution.

Installer representation

Engaging with stakeholders across the industry, as well as installers themselves, we note that there is a perceived lack of representation in a fragmented market with a high proportion of sole traders. In 2019, Gas Safe highlighted this theme in its Decade Review, noting a strong desire for better leadership and clarity from overlapping organisations and a lack of representation among sole trader installers.⁶⁵

Within the gas and heating industry, there are a number of key employers, manufacturers and stakeholders who may arguably play a representative role, such as British Gas, MCS, Gas Safe, and GMB. However, it is unclear how far these stakeholders explicitly represent the workforce in its entirety, including sole traders. Of the installers we interviewed for this research, only a small number are members of a union and all of which worked for a large employer. Bodies such as MCS and Gas Safe partly play representative role for their members, however, their explicit and respective roles in the industry are a professional standard and a safety qualification. Gas Safe highlights in their Decade Review that "*engineers would like to see Gas Safe Register take a leadership role on their behalf*" indicating that there is recognised scope for improving representation across the industry here.⁶⁶ It is thus unclear who would directly advocate for installers, particularly sole traders, to communicate their specific challenges with industry leaders or policymakers.

Mobilising a sole trader workforce without clear representation to undergo a significant skills transformation is likely to be challenging. Developing clearer lines of communication between decision makers and the installer base will likely be critical for keeping installers up to date with objective information on the plans for decarbonising home heat.

Gas Safe Register magazine

Registered Gas Engineer is produced by Gas Safe and is the only official industry magazine for gas heating engineers, with an estimated distribution to 77,000 gas engineers.⁶⁷ Each monthly issue contains information on news and technical updates from the gas industry, and will often feature guest articles from prominent industry players, such as manufacturers.

Across January to November 2021 editions, there are a similar number of mentions for heat pumps (500) and hydrogen (452). This may indicate that the magazine provides a balanced account of the technologies. Looking closer at the context, we note differences in the tone around these mentions. Some recent headlines include:

“Public can’t afford heat pumps, says EUA” (August 2021)

“Government kick-starts the UK’s hydrogen future” (September 2021)

Magazine content on heat pumps tends to have a balanced or caveated approach. Editions highlight the opportunities for heat pumps in new builds or off-gas-grid properties, while also citing cost, disruption and retrofitting challenges for installation in existing builds. In line with this thinking, hydrogen is sometimes offered as a more suitable solution for the gas grid or alongside hybrid heat pumps in blended systems.

“Even if money was no object [...] the other barrier for uptake of heat pumps will be disruption. Much better then, for an alternative zero-carbon fuel for existing heating systems to be introduced. For example, hydrogen. That’s not to say that there isn’t a place for heat pumps on the road to decarbonisation. They would be well suited for new-build homes...”
(February 2021)

Content on hydrogen largely focuses on the longer-term ambitions and optimism for the technology, with less discussion of some of the practical challenges. Editions tend to highlight the benefits of a blended gas system and note developments on hydrogen innovation, pilots and the opportunities for job creation.

“Hydrogen could be a secure and relatively easy alternative to natural gas because it provides the outcomes that the market expects from domestic natural gas. So it makes sense to continue with familiar technology, only with a different energy source.” (October 2021)

Inconsistent landscape for retraining

The current landscape for heat pump training is in development. Currently, the accreditation framework for heat pump installers and the training they undertake is not as clearly defined in the same way that gas installers are legally required to be Gas Safe qualified and registered to fit a gas boiler. MCS operates as a market-based installation standard that is recognised by the government but not required for all installations. Heat pump installers must be MCS registered only in order for consumers to claim government grants (such as the existing Renewable Heat Incentive or the recently announced Boiler Upgrade Scheme).

Training programmes currently offered vary considerably in the standard of content, length and mode of delivery, with some amounting to a week of theory and practical classroom and workshop learning, against a one-day webinar. This was reflected by our interviewees whose heat pump training ranged from webinars and classroom-based courses with manufacturers, to training centres or on-site learning.

“In order to install one [heat pump], we did a 2 hour online course that wasn’t the greatest. We did what we have always done where you get on site and you learn on the site. If we were doing them every day, it would be ok. But at the moment it’s like, ‘let’s get the manufacturer’s instructions out’. I think a couple of times we’ve had to call their technical numbers for various things just to make sure it’s set up. It’s not always the easiest.” (41 year old, heat pump and gas installer)

The MCS Scheme Criteria does offer a non-exhaustive list of training programmes sufficient for becoming an MCS installer or business. However, it is unclear how accurate this list is given that at the time of our research just over half of the programmes are still running and MCS themselves have clarified they have no oversight of the course content.

A lack of standardisation in training provision can result in an inconsistently skilled workforce of varying competence. Within the gas industry there is already a concern around illegal gas work, despite being an already regulated industry.⁶⁸ It is therefore conceivable that a lack of mandatory standards and accreditation for heat pump installation could also lead to unqualified “cowboy” installers exploiting of this absence in the heat pump market. This poses a risk to consumers and reputational damage to heat pumps and qualified heat pump installers, if unaware consumers are taken advantage of and left with a poorly functioning systems at great cost.

Businesses and actors within the industry are beginning to take action in responding to this challenge. The Heat Pump Association has designed a training route with a revised curriculum, which would set out common principles and standards for faster and cheaper training across the industry. The training route would take 5-7 days to complete^{ix}, amounting to 40-65 hours, and could be carried out in segments rather

^{ix} The route consists of an initial technology neutral two day low temperature heating and hot water systems course, to be followed by a two day course on heat pump foundations. Upon the completion of the foundation course, a specific heat pump technology course can be chosen, each requiring a one day course.

than all at once. They recommend that an organisation, such as MCS, takes ownership of the scheme so that course content can be regularly updated in line with any industry developments and to ensure consistency in provision across training providers.⁶⁹ MCS are also involved in the design of a low carbon heating apprenticeship, which stakeholders expect to be active in 2022.

Attractiveness of the industry

There are also concerns about the attractiveness of the industry to new entrants, and the satisfaction of existing workers. Our research finds this to be the case among a small minority of interviewees, industry stakeholders as well as existing research. Some interviewees describe the industry as a “*race to the bottom now*”, noting that installations are expected to be done in a shorter amount of time or more cheaply. For some, this led to disputes with their employer over contractual changes that included worse terms on hours and pay. As a result, these interviewees have considered exiting the industry altogether. Survey findings of 2,814 Gas Safe registered engineers from 2019 similarly found that the most common challenge facing the gas industry was the pressure to do work more cheaply with 60% of respondents agreeing.⁷⁰ ONS data on the median gross annual pay of plumbing, heating and air conditioning installers shows that salaries have seen a gradual decline in real terms over the past decade.⁷¹ This phenomenon is not unique to the plumbing and heating industry, stagnant and declining pay in the UK has been a well-documented feature of the last decade.⁷² Although, plumbing, heating and air-conditioning installers have seen a greater decline of their gross annual pay in real terms compared to UK employees as a whole. Installers experienced a 7% decrease from £32,406 in 2011 (2020 prices) to £30,124 in 2021 (2020 prices) compared to the 1% decrease of all employees from £26,299 in 2011 (2020 prices) to £25,971 in 2021 (2020 prices).⁷³

This may prove to be a challenge for recruitment as well as retention in the industry. As noted in Chapter Two, the industry already faces challenges of an older and declining existing workforce. The findings from industry stakeholders and interviewees indicate that recruiting new entrants into the industry for low-carbon installations could likely be a challenge due to issues with attractiveness not just as a result of declining pay, but due to wider perceptions of vocational training and a tendency for politics and media to focus on academic, university routes for young adults.⁷⁴ The interview findings indicate that a successful recruitment campaign should draw on aspects such as the business opportunity of working in a new emerging market and the pride associated with contributing to climate action – albeit, the former being more of a motivation than the latter.

The Environmental Audit Committee’s latest report on green jobs also highlights useful evidence from a roundtable discussion of young people and their perspectives on green employment opportunities.⁷⁵ The findings raise potential concerns around pay, availability, social standing, and diversity and inclusion of green jobs in comparison to other sectors. Additionally, there are some concerns raised about how well education prepared participants for finding and securing a green job, suggesting there may be a more active role for schools, colleges, universities and other providers to play here.

Additionally, ensuring that existing installers are incentivised to remain in the industry throughout the transformation could be as important as recruiting new entrants. Failing to address the barriers to retraining and wider challenges discussed in this report risks exacerbating some attitudes of dissatisfaction. The findings discussed in Chapter Three on interviewees' anticipated demand for their existing skillset also raises questions around how installers may respond to potential changes in the industry. Some interviewees indicate that, hypothetically, if demand for gas work was low and retraining was not attractive or viable, then they would consider using their existing skillset for plumbing and pipework more generally rather than retraining – thus, exiting the installation industry. While this was a hypothetical consideration, it is worth noting that some installers may not see a need to retrain without incentives and/or the removal of key barriers, highlighted in Chapter Four.

CHAPTER SIX – POLICY CONSIDERATIONS

The UK Government has legislated to reduce carbon emissions to net zero by 2050. A crucial part of this will be to reduce emissions from home heating by installing low-carbon alternatives, such as heat pumps as outlined in the Government’s own strategy.⁷⁶ Previous research from the SMF published in November 2020 highlighted that without intervention, the market alone is unlikely to deliver this transformation.⁷⁷ Decarbonising home heat and thus reaching net zero therefore requires greater action from policymakers to support the heat pump market.

Workers and the skills and training they will require to deliver this transformation are key to making ambitious climate policies a reality. However, the challenges they face have been largely overlooked by policymakers.⁷⁸ This chapter draws on the research findings from extensive interviews with installers, businesses and industry stakeholders to identify where policymakers can better support the reskilling and retraining of installers.

Looking abroad to other European countries with more developed heat pump markets, evidence indicates that the training of installers has largely been driven by government signals and support for market mechanisms. In these cases, clear phase-out commitments and financial support for consumers led to increased demand and thus an increase in installer training. Strong information campaigns, accompanied by minor government interventions and standardised training have played a role in improving consumer confidence and driving demand.⁷⁹ While other countries may have different energy and housing contexts which may not be as relevant to the UK, we also draw on this overarching evidence to offer policy recommendations.

Recommendations

Policymakers should give installers confidence to retrain for heat pump installation by stimulating consumer demand through a boosted Boiler Upgrade Scheme, including a committed ringfenced pot for lower-income homeowners.

The biggest and most common barrier to the uptake of training for installers is low consumer demand. With demand for heat pumps currently at 40 times less than the current demand for gas boilers, our findings indicate that installers are unlikely to be incentivised to retrain. The most commonly reported consumer barriers to the uptake of heat pumps are cost and low levels of awareness and understanding.

In October 2021 the Government announced the Boiler Upgrade Scheme for homeowners in England and Wales to support the upfront costs of installing a heat pump with £5,000 grants. This scheme launching in April 2022 is backed by a £450 million commitment until 2024/25. This is estimated to deliver just 90,000 heat pumps over the three-year period, which is broadly in line with the existing deployment rate. This level of funding is likely to be insufficient in both sum and duration for kickstarting demand enough to scale supply and incentivise retraining – as highlighted in the SMF’s recent briefing paper analysing the HBS.⁸⁰

Analysis from Energy Efficiency Infrastructure Group (EEIG) suggests that in order to be on track for the 600,000 heat pumps a year target by 2028, half will need to be installed in existing homes while the other half installed in new builds. In line with this target, EEIG estimates that a £1.3bn scheme of £5,000 grants over three years would be required to deliver 277,000 heat pumps to 2025. This suggests that the funding gap for the Boiler Upgrade Scheme could be as large as £850 million.⁸¹

Additionally, the HBS does not provide any ringfenced funding to cover the costs of installing low-carbon heating for low-income homeowners. Installing a heat pump can cost between £7,000 and £14,000 depending on the characteristics of the home^x.⁸² The Government expects this cost is expected to fall by 20% by the end of the decade.⁸³ However, until then, £5,000 grants are unlikely to cover the majority of installation costs, making it disproportionately more expensive for lower income homeowners to replace their gas boiler with a heat pump.

As a result, policymakers should consider committing more funding by April 2022 to the Boiler Upgrade Scheme to support homeowners to install heat pumps, thus incentivising installers to retrain. As part of this boosted scheme, policymakers should consider ringfencing a pot of higher-rate grants for specifically for lower income household.

Policymakers should launch a clear national information campaign on the phasing out fossil fuel heating for installers and consumers.

A lack of information, awareness, and understanding around the phase-out of fossil fuel home heating is a pervasive barrier for installers to retrain. The research findings indicate that installers and consumers have low awareness, understanding or confidence in policy timelines referring to ‘the future of gas’ or different heating technologies that will replace gas boilers. Among installers, this may be exacerbated by the fact that a large proportion of workers are sole traders and thus largely responsible for keeping themselves informed, compared to larger employers with greater resources. This poses a risk to the uptake of low-carbon heating, the training for installation, and thus the reduction of carbon emissions from homes. The findings suggest that a lack of clear messaging directly from Government on this is not only confusing for people (installers and consumers alike), but could create a space within which other actors, for reasons of self-interest or not, may become key sources of information.

Policymakers should therefore launch a clear national information campaign on the phasing out of fossil fuel heating including evidenced information on: home heating-related emissions; key policy phase-out dates; low-carbon heating options; retrofit requirements and associated costs; and support schemes for installation costs. This campaign should include a range of mediums and actors including online and TV advertising, consumer bodies, trade bodies, charities, local councils, FE colleges, and employers. Previous research from the SMF finds that consumer bodies and

^x Mainly floor area, fabric efficiency and whether it has already got central heating or not, as noted in the HBS.

environmentally charities are more trusted for useful advice and information on making environmentally friendly choices or purchases.⁸⁴

Previous information campaigns can and should be used to inform how best to develop this. Examples can be taken from successful public health campaigns, such as those around COVID-19 (e.g. Hands, Face, Space; Symptom Recognition) which focused on educating the public about the virus as well as encouraging behavioural changes. Campaigns surrounding energy related technological changes, such as smart meters⁸⁵, and the successful town gas switch over in the 1960s and 70s can also be drawn on.⁸⁶ The latter campaign in addition to informing the public, had visible support from industry.

Policymakers should consider providing vocational tax relief for the loss of earnings of sole trader and self-employed SME installers when training for new green skills.

A significant proportion of the installer base are self-employed and/or sole traders who are largely responsible for funding their own training. This can have a direct cost and an opportunity cost to installers, since a sole trader who is participating in a training course cannot use that time for paying work. As a result, this loss of earnings may likely prove to be a barrier for installers who would otherwise retrain. The HBS provides no direct support for this group of workers or the loss that they would incur.

Under the current tax system, the self-employed can deduct the cost of training incurred “wholly and exclusively” for their business where it maintains or updates existing skills. However, this is not applicable to training that introduces new skills.⁸⁷ As a result, a self-employed sole trader gas installers would be able to deduct costs of maintaining their Gas Safe qualifications, for example, but not for heat pump training. The government consulted on this discrepancy in 2018 drawing on the lessons learnt from a similar vocational training tax relief scheme in the 1990s.⁸⁸ The consultation highlighted criticisms of the scheme for funding expensive ‘hobbies’, such as flying, diving and horse riding, as opposed to intended vocational skills. The consultation also reviewed training related tax credits in international contexts, highlighting insights and lessons from the OECD, including but not limited to:

- Tax reliefs are often more complex to administer and for taxpayers to understand than direct spending on skills investment.
- Existing skills tax reliefs are often only available for training connected to a workers’ current employment, and may be ineffective in assisting workers who need or want to change careers.
- Many tax incentives are only of value to those who earn a taxable income.
- Low skill, low-income taxpayers are more likely to not claim or misunderstand what they are entitled to claim.

As a result, the consultation concluded that there was insufficient evidence that extending tax relief is likely to be effective in incentivising self-funded work-related training, and instead opted for direct spending on skills investment through the National Retraining Scheme (now integrated into the National Skills Fund).

However, this approach seems to be incongruent with the Government's approach to reskilling and retraining the workforce as alluded to in the HBS, which rests in large part on market mechanisms: *"we are committed to communicating signals for investment to provide certainty and stability for businesses to invest in training"*.⁸⁹ Additionally, it remains to be seen just how useful the existing pots of funding highlighted within the HBS will be to the workforce. Our analysis of the HBS finds that the National Skills Fund (Lifetime Skills Guarantee), Skills Bootcamps, Skills Training Competition, and the Public Sector Low Carbon Skills Fund fall short in their eligibility, relevance and scale, meaning that they are unlikely to provide existing plumbing and heating installers with support for heat pump training.⁹⁰

By increasing demand for heat pumps through boosting the Boiler Upgrade Scheme, it may be conceivable that in time installers judge there to be a greater business case in investing in heat pump training, and thus rationalising the loss of earnings from training. In the short-term, installers will likely require greater incentives that address the loss of earnings. Given the market approach set out by the Government in its HBS, expanding vocational tax credits for self-employed to include new skills would be a more consistent policy approach. In order to mitigate concerns around misuse or complexity, these credits should be ringfenced for designated green skills to include heat pump installation as well as the wider construction sector who have similar patterns of high levels self-employment (60%) and are critical to green jobs in the net zero economy.⁹¹

Policymakers should set out clear training standards and an accreditation badge for all heat pump training providers and installers.

The research identifies that the current landscape for heat pump training is inconsistent in its mode of delivery and standard. While industry representatives are beginning to address this challenge through training and apprenticeship programmes, policymakers should consider setting a formal and regulated official training standard across the industry as a whole including providers and installers. Introducing a formal accreditation badge for installers and the training that they receive would instil greater confidence in a developing heat pump market for both installers (that investing in training will provide them with sufficient skills) and consumers (that heat pumps will be installed to a high standard).

Policymakers should look to develop this accreditation badge and corresponding training framework with industry and training providers to build on the existing broad base of expertise and work in development, including relevant government departments (e.g. Department for Business, Energy and Industrial Strategy, Department for Education, and Department for Levelling Up, Housing and Communities), existing standard schemes (e.g. CPSEs, MCS and TrustMark), manufacturers, employers, FE colleges, local councils, wider industry stakeholders as well as installers themselves. This is particularly significant given that our research findings indicate that expertise and insight about the workforce is fragmented across different industry stakeholders; for example, the evidence base for the workforce is thin and differs across organisations on the number of heat pump installers and the extent of sole trader status. In addition, a lack of representation of installers,

particularly sole traders, may mean that the expertise of workers is not entirely captured by existing industry stakeholders.

In future, policymakers may look to establish such an accreditation scheme as a legal requirement for all heat pump installers. However, this should only be considered after a thorough review of the scheme in consultation with industry stakeholders and installers themselves.

Policymakers should launch an engaging and attractive Climate Heroes recruitment campaign for new installers using lessons from other sectors

Given the age of the existing installer base, policymakers not only face challenges of reskilling the existing workforce, but also recruiting new entry-level workers for heat pump installation. BEIS and the DFE are currently developing a Heat Network Skills Programme to increase the recruitment pool through the apprenticeship framework. An advisory group will aim to identify which apprenticeships support the green agenda and where new opportunities could be created, as well as encouraging the alignment of existing apprenticeship providers to net zero and wider sustainability objectives.⁹² This is a good start, but policymakers will also need to consider the appeal of the offer for prospective workers in order to ensure that recruitment is successful.

This report identifies some concerns around the attractiveness of the career path, including negative perceptions of declining income returns. There are also concerns that arise from a wider political and media culture that focuses more on academic, university routes for young adults than vocational training.⁹³ Simply put, Britain does not assign high enough social value and status to heat installers. This is striking, given the key role that heat installation work will play in delivering net zero, a goal that is generally assigned high social value. The findings indicate that a successful recruitment campaign should emphasise the economic and social value of this career for the UK's net zero plans, and thus its future. Key motivations for individuals are likely to include the business opportunity of working in a new emerging market and the altruistic motivations of contributing to climate action, as well as emphasising the economic and social value of this career for the UK's prosperity. To simplify again, this is a way for people to make money while doing something good for the world. But the evidence we have gathered from our interviewees and the industry suggests that this message is not widely communicated to or understood by prospective entrants to the workforce. Plumbers, installers, heat engineers and other workers in home heat will be vital to Britain hitting its climate goals. Anyone who supports those goals – the majority of the public and their political representatives – should recognise that work as of vital national importance, and celebrate the people who do that work as “climate heroes”.

Policymakers should look to examples from similar nationally important careers, such as teaching, and learn lessons from their recruitment campaigns. Teach First is a government funded scheme set up in 2001 which, within its first 10 years, was credited with improving the prestige of teaching and attracting greater numbers to the profession who had not previously have considered it.⁹⁴ Campaigns by Teach First have predominantly been carried out through billboard, magazine and social media advertising, and have an altruistic approach, focusing on the opportunity to help foster abilities, positively shape children's futures and tackle disadvantage in education.

Advertised personal benefits are given a similar appeal of having a job with purpose which can a difference from the first day.⁹⁵ The Department for Education's own campaign *Get into Teaching* has continued this altruistic and inspirational approach through both their TV advertising and digital marketing campaigns grounded in the message "every lesson shapes a life".⁹⁶ The 2020 application cycle for teacher training saw over a 16% increase in teacher training applications on the previous year, although a part of this may be attributed to the COVID-19 pandemic and the attractiveness of teaching as a more secure job.⁹⁷

ENDNOTES

¹ <https://es.catapult.org.uk/guide/decarbonisation-heat/>

² <https://es.catapult.org.uk/guide/decarbonisation-heat/>

³ <https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf>

⁴ <https://www.smf.co.uk/publications/boiler-alert/>

⁵

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/990498/social-research-installers-off-gas-grid-heating.pdf

⁶ <https://www.smf.co.uk/publications/hbs-analysis/>

⁷ Footnote on page 33

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1032119/heat-buildings-strategy.pdf

⁸ <https://www.heatpumps.org.uk/wp-content/uploads/2019/11/A-Roadmap-for-the-Role-of-Heat-Pumps.pdf>

⁹ https://www.heatpumps.org.uk/wp-content/uploads/2020/06/Building-the-Installer-Base-for-Net-Zero-Heating_02.06.pdf

¹⁰ <https://www.thesun.co.uk/news/15068214/net-zero-boiler-ban-britains-poorest-cold/>

¹¹ <https://www.thesun.co.uk/news/15068214/net-zero-boiler-ban-britains-poorest-cold/>

¹² <https://www.gassaferegister.co.uk/about-us/what-is-gas-safe-register/>

¹³ <https://mcscertified.com/about-us/>

¹⁴ <https://mcscertified.com/consumers-communities/certificate-queries/>

¹⁵ <https://mcscertified.com/faq/consumer-faqs/>

¹⁶

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291988/140313_mtc_front_section_-_march_2014_.pdf

¹⁷ Annual Population Survey, October 2020–September 2021, SOC Code 5314

<https://www.nomisweb.co.uk/datasets/aps210/reports/employment-by-status-and-occupation?compare=undefined>

¹⁸ <https://www.gassaferegister.co.uk/media/3117/gas-safe-at-a-glance-lr-web.pdf>

¹⁹ <https://www.theguardian.com/commentisfree/2021/sep/28/britain-homes-energy-crisis-governments-insulation-low-carbon-heating>

²⁰

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766109/decarbonising-heating.pdf

²¹ <https://www.ippr.org/files/2021-02/skills-for-a-green-recovery-feb2021.pdf> p. 16

²² <https://www.gassaferegister.co.uk/media/2490/decade-review.pdf> & SMF analysis of Annual Population Survey

²³ <https://www.heatpumps.org.uk/wp-content/uploads/2019/11/Installer-Skills-Survey-Summary.pdf>

²⁴ Annual Population Survey, January 2019–December 2019

<https://www.nomisweb.co.uk/datasets/apsnew>

25

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1044598/6.7408_BEIS_Clean_Heat_Heat___Buildings_Strategy_Stage_2_v5_WEB.pdf

²⁶ <https://www.gassaferegister.co.uk/media/2490/decade-review.pdf>

²⁷ https://www.cipd.co.uk/Images/megatrends-ageing-gracefully-the-opportunities-of-an-older-workforce-1_tcm18-64897.pdf

²⁸ <https://www.skillstg.co.uk/blog/the-trade-trends-report-2021/>

²⁹ <https://www.skillstg.co.uk/blog/the-trade-trends-report-2021/>

³⁰ <https://researchbriefings.files.parliament.uk/documents/SN06113/SN06113.pdf>

³¹ <https://es.catapult.org.uk/guide/decarbonisation-heat/>

³² Annual Population Survey, October 2020–September 2021, SOC Code 5314

<https://www.nomisweb.co.uk/datasets/aps210/reports/employment-by-status-and-occupation?compare=undefined>

³³ <https://www.heatpumps.org.uk/wp-content/uploads/2019/11/Installer-Skills-Survey-Summary.pdf>

³⁴ <https://www.gassaferegister.co.uk/media/2490/decade-review.pdf>

³⁵ <https://www.gov.uk/government/publications/heat-and-buildings-strategy>

³⁶ <https://www.ehpa.org/market-data/>

³⁷ <https://www.hhic.org.uk/uploads/6165409B9D4C9.pdf>

38

https://d2e1qxpsswcpgz.cloudfront.net/uploads/2020/09/The_pathway_to_net_zero_heating_UKERC_briefing.pdf

³⁹ https://ina.org.uk/wp-content/uploads/2021/06/EY-Report-on-the-Future-Homes-Standard-June-2021_Final-1.pdf

40

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/943712/heat-pump-manufacturing-supply-chain-research-project-report.pdf

⁴¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1028157/net-zero-strategy.pdf

⁴² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1026507/heat-buildings-strategy.pdf

⁴³ https://www.heatpumps.org.uk/wp-content/uploads/2020/06/Building-the-Installer-Base-for-Net-Zero-Heating_02.06.pdf ; <https://www.heatpumps.org.uk/wp-content/uploads/2019/11/A-Roadmap-for-the-Role-of-Heat-Pumps.pdf>

⁴⁴ https://www.heatpumps.org.uk/wp-content/uploads/2020/06/Building-the-Installer-Base-for-Net-Zero-Heating_02.06.pdf

45

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/943712/heat-pump-manufacturing-supply-chain-research-project-report.pdf

⁴⁶ <https://prod-drupal-files.storage.googleapis.com/documents/resource/public/Heat-pump-retrofit-in-London-v2.pdf>

⁴⁷ <https://www.hhic.org.uk/uploads/6165409B9D4C9.pdf>

⁴⁸ According to stakeholder conversations, completing manufacturer training could also extend the warranty on a particular product, and some manufacturers would require their

- training to be completed in order for the warranty to be issued
https://www.citb.co.uk/media/kkpkwc42/building_skills_net_zero_full_report.pdf
- ⁴⁹ https://www.heatpumps.org.uk/wp-content/uploads/2020/06/Building-the-Installer-Base-for-Net-Zero-Heating_02.06.pdf
- ⁵⁰ <https://www.gmb.org.uk/news/hydrogen-key-net-zero-and-greener-future>
- ⁵¹ February, June, October 2021 editions <https://registeredgasengineer.co.uk/latest-issue/>
- ⁵² <https://www.vaillant.co.uk/homeowners/advice-and-knowledge/how-different-technologies-work/hydrogen/>
- ⁵³ <https://phpionline.co.uk/news/heating-engineers-plumbers-widely-trusted-survey/>
- ⁵⁴ <https://www.smf.co.uk/publications/boiler-alert/>
- ⁵⁵ https://www.heatpumps.org.uk/wp-content/uploads/2020/06/Building-the-Installer-Base-for-Net-Zero-Heating_02.06.pdf
- ⁵⁶ https://www.heatpumps.org.uk/wp-content/uploads/2020/06/Building-the-Installer-Base-for-Net-Zero-Heating_02.06.pdf
- ⁵⁷
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/699674/050218_International_Comparisons_Study_MainReport_CLEAN.pdf in
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/990498/social-research-installers-off-gas-grid-heating.pdf
- ⁵⁸ <https://www.london.gov.uk/sites/default/files/options-appraisals-for-heat-pump-retrofit-15-london-buildings.pdf>
- ⁵⁹ <https://www.theguardian.com/environment/2019/jun/05/home-solar-panel-installations-fall-by-94-as-subsidies-cut>
- ⁶⁰ <https://www.theguardian.com/environment/2016/jun/10/uk-solar-power-industry-job-losses-government-subsidy-cuts-energy-policy> ;
<https://www.theguardian.com/environment/2019/jun/05/home-solar-panel-installations-fall-by-94-as-subsidies-cut>
- ⁶¹ <https://www.smf.co.uk/publications/hbs-analysis/>
- ⁶² <https://www.smf.co.uk/publications/hbs-analysis/>
- ⁶³ <https://www.thetimes.co.uk/article/hydrogen-or-heat-pump-the-battle-of-the-boilers-is-hotting-up-b09gcp0vq>
- ⁶⁴ <https://www.keele.ac.uk/sustainable-futures/ourchallengethemes/providingcleanenergyreducingcarbonemissions/hydeploy/>
- ⁶⁵ <https://www.gassaferegister.co.uk/media/2490/decade-review.pdf>
- ⁶⁶ <https://www.gassaferegister.co.uk/media/2490/decade-review.pdf>
- ⁶⁷ <https://registeredgasengineer.co.uk/about-us/>
- ⁶⁸ <https://www.gassaferegister.co.uk/media/2490/decade-review.pdf>
- ⁶⁹ https://www.heatpumps.org.uk/wp-content/uploads/2020/06/Building-the-Installer-Base-for-Net-Zero-Heating_02.06.pdf
- ⁷⁰ <https://www.gassaferegister.co.uk/media/2490/decade-review.pdf>
- ⁷¹ SMF analysis of
<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/industry4digitsic2007ashtable16>
- ⁷² <https://www.resolutionfoundation.org/comment/the-economic-history-of-the-2010s/>

- ⁷³ SMF analysis of <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/industry4digitsic2007ashtable16>
- ⁷⁴ <https://www.smf.co.uk/publications/missing-the-story/>
- ⁷⁵ <https://committees.parliament.uk/publications/7615/documents/79773/default/>
- ⁷⁶ <https://www.gov.uk/government/publications/heat-and-buildings-strategy>
- ⁷⁷ <https://www.smf.co.uk/publications/boiler-alert/>
- ⁷⁸ <https://www.smf.co.uk/wp-content/uploads/2021/11/HBS-skills-briefing-FINALE.pdf>
- ⁷⁹ <https://www.theccc.org.uk/wp-content/uploads/2017/01/UKERC-for-the-CCC-Best-practice-in-heat-decarbonisation-policy.pdf>;
<https://www.sciencedirect.com/science/article/pii/S2214629620300670>;
<https://www.rapidtransition.org/stories/peer-to-peer-support-and-rapid-transitions-how-finland-found-an-answer-to-heating-homes/>
- ⁸⁰ <https://www.smf.co.uk/publications/hbs-analysis/>
- ⁸¹ https://www.theeig.co.uk/media/1114/eeig_analysis-of-the-heat-and-buildings-strategy_03.pdf
- ⁸²
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1032119/heat-buildings-strategy.pdf
- ⁸³
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1026607/clean-heat-market-consultation.pdf
- ⁸⁴ <https://www.smf.co.uk/publications/aint-easy-being-green/>
- ⁸⁵
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/893119/smart-meter-consultation-future-coordinated-consumer-engagement.pdf
- ⁸⁶ <https://obr.uk/box/decarbonising-domestic-heating-lessons-from-the-switch-to-natural-gas/>
- ⁸⁷
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/689227/PU2152__Consultation_on_self-funded_training_web.pdf
- ⁸⁸
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/689227/PU2152__Consultation_on_self-funded_training_web.pdf
- ⁸⁹
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1032119/heat-buildings-strategy.pdf
- ⁹⁰ <https://www.smf.co.uk/publications/hbs-analysis/>
- ⁹¹ <https://www.nomisweb.co.uk/datasets/aps210/reports/employment-by-status-and-occupation?compare=undefined>
- ⁹² <https://www.gov.uk/government/publications/heat-and-buildings-strategy>
- ⁹³ <https://www.smf.co.uk/publications/missing-the-story/>
- ⁹⁴ <https://publications.parliament.uk/pa/cm201012/cmselect/cmeduc/1515/1515we31.htm>
- ⁹⁵ <https://www.teachfirst.org.uk/our-mission>, <https://www.iebrand.co.uk/work/teach-first>, <https://www.johnsonbanks.co.uk/work/teach-first>

⁹⁶ <https://www.youtube.com/watch?v=YHBikn0xfk> ; <https://www.bamuk.com/dfe-campaign2020/>; <https://getintoteaching.education.gov.uk/>

⁹⁷ <https://schoolweek.co.uk/teacher-training-apply-ucas-applications-rise/>;
<https://www.ucas.com/data-and-analysis/ucas-teacher-training-statistical-releases>