Workforce planning for clean heat

Where will the heat pump workforce come from?

November 2025

A WPI Economics Report for Aldersgate Group, The MCS Foundation, Phoenix Group, Santander UK and Standard Life Centre for the Future of Retirement

WPI ECONOMICS

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Executive summary

The heat pump sector has a vital role to play in supporting the Government to achieve its national missions. Heat pumps are central to decarbonising the UK's built environment, a key element of the Clean Energy Superpower Mission. The sector is also recognised as a *frontier industry* in the Government's Modern Industrial Strategy,[1] which can contribute to growth by supplying the domestic market and taking advantage of the significant potential for export.

However, **the UK's current rate of heat pump adoption is falling far short of what is needed**. There were 73,000 heat pump installations in existing homes in 2024,[2] yet installations must rise to 450,000 annually by 2030 and approximately 1.5 million by 2035 to meet climate targets.[3]

The forthcoming Warm Homes Plan is expected to provide new demand-side measures to accelerate energy efficiency and uptake of low-carbon heating, growing demand for heat pumps. Yet stimulating demand is only part of the challenge. Without a skilled workforce in place there is a risk that the pace of heat pump adoption stalls and develops unevenly across regions – undermining the just transition. The heating industry, however, is already facing a labour shortage, compounded by an aging workforce and too few new entrants, raising the critical question: **where will the heat pump workforce come from?**

This research addresses that question by identifying the occupations and skillsets essential to scaling up the heat pump sector, assessing their availability within the current labour market and education system and examining how competition for these skills overlaps with other Government priorities – such as housebuilding and infrastructure delivery.

Our analysis finds significant potential to expand the heat pump workforce across the value chain, from manufacturing to installation. Based on analysis of job postings data, we find that approximately **76,000 jobs in England have heat pump-relevant skillsets**, such as plumbers, pipe fitters, manufacturing engineers and electricians. However, unlocking this potential will require overcoming several barriers:

- **High competition for talent:** Many relevant occupations are already in high demand. **Ten key roles – representing 91% of the potential installation workforce – appear on the Skilled Worker Visa Temporary Shortage List**. Heat pump-related skillsets also overlap heavily with those needed in construction and infrastructure, sectors which are likely to experience skills shortages. Compounding the challenge further, there are very few workers outside of 76,000 jobs identified who could potentially perform this work. For example, there are only 2,300 plumbers and 7,500 electricians that possess all the necessary skills but are not already working in those occupations.
- **Fragmented, SME-led workforce:** Micro and small businesses account for 56% of employers hiring people with heat pump-related skills. **SMEs often lack the financial capacity to fund training** or the time to undertake training alongside their existing workloads.
- **Ageing workforce:** Over a third (36%) of potential heat pump installers and almost half (46%) of potential heat pump design and manufacturers, are over 45 years of age, raising **the risk of retirement-driven attrition by 2030 to 2035**.
- **Lack of gender and ethnic diversity:** Women make up just 8% of the potential workforce. The lack of gender and ethnic diversity within the current workforce presents a further **challenge in attracting women and underrepresented groups into new roles**.
- **Regional disparities:** Our analysis found that **London and the North East have proportionally fewer heat pump-related jobs per capita**, indicating potential regional workforce shortages. These regions also have some of the lowest levels of heat pump installations. In contrast, the largest share of heat pump-related jobs per capita are located in the South East, East of England and East Midlands.

Our analysis also considers the pipeline of new market entrants, which will be essential for addressing medium to long-term skills shortages. Yet **participation in heat pump-related further education and apprenticeships has stagnated**. Many colleges and training providers are not delivering the most relevant programmes – the low-carbon heating technician or the environmental pathway within the plumbing and domestic heating apprenticeship – due to limited employer demand. This reflects broader uncertainty about market growth and the commercial viability of investing in new trainees.

Achieving heat pump adoption targets depends not only on the size of the workforce but also on its quality. **Building a skilled and competent workforce is essential** to meeting quality standards, keeping people's homes heated reliably and affordably and maintaining public confidence in the transition to clean heating.

In short, without decisive action, workforce shortages – exacerbated by demographic pressures, competition from other sectors and barriers to training and retraining – risk limiting the UK's ability to meet its clean energy and economic growth objectives. To address this, **the Government should implement targeted interventions** in workforce planning, support the upskilling of existing workers and expand and diversify education and training pathways into heat pump occupations. Taken together, these measures could enable the sector to scale rapidly and deliver on its full potential.

Recommendations for Government

Policy area 1: Demand creation and strategic workforce planning

1. **Strengthen market demand to give businesses and training providers the certainty they need to invest in training.** The Warm Homes Plan must act to strengthen demand from households for heat pumps by addressing existing barriers limiting heat pump adoption. A Government-backed, low-interest loan and interventions to reduce electricity bills would make heat pumps more attractive and create a strong market signal.
2. **Unblock data challenges to better inform skills and training decision-making.** Data limitations in apprenticeship matching and limited evidence on the extent of self-employment and informal hiring practices must be overcome to enable Skills England and Local Net Zero Hubs to provide more granular labour market intelligence and anticipate future skills needs.

Policy area 2: Upskilling the existing workforce

3. **Increase financial support for SMEs to cover the cost of heat pump training.** The current Heat Training Grant does not always cover the full cost of training, nor does it cover the cost of travel, accommodation and lost earnings during training periods, which disincentivises uptake of training.
4. **Develop a heat pump skills passport.** This digital tool would help match the skills of existing workers with available training pathways, qualification and training standards required for the sector and available support. This tool could be used by careers advisers in the new National Jobs and Careers Service for those out of work or recently made redundant from a related industry.

Policy area 3: Expanding the pipeline of new workers

5. **Incentivise SMEs to take on more apprentices.** The Apprenticeship Incentive Payment should be increased to support SMEs to take on, train, pay and retain apprentices. A targeted approach could see the increased grant linked to eligible courses only, such as the low-carbon heating technician apprenticeship.
6. **Launch a national green heat careers campaign aimed at young people, particularly those from underrepresented groups.** Next year, a UK Government-supported campaign on job and career opportunities in clean energy will be launched. This campaign should include green heat careers and learn from existing good practice, such as the *This is Engineering* campaign, to attract young people.

CHAPTER 1 Introduction

Heat pumps are an essential part of decarbonising the residential (and non-residential) building sector, the second-highest emitting sector in the UK.[4] Within the Climate Change Committee's (CCC) Seventh Carbon Budget recommendations, the electrification of heating is central to eliminating emissions from the built environment, with heat pumps anticipated to be the dominant low-carbon technology harnessed to achieve this.[5] As well as the environmental case for adopting heat pumps, there is also a clear economic opportunity for the UK. The Government's Modern Industrial Strategy identifies heat pumps as a *frontier industry*, "with potentially one of the largest domestic markets in Europe, a skilled domestic heating workforce, and an undersupply in the global market relative to project demand creating significant opportunities for the UK's manufacturing base to expand and export to the world".[6]

Despite the clear environmental and economic case for implementation, heat pump adoption in residential buildings is currently well behind the CCC's annual target of 450,000 heat pump installations by 2030 and 1.5 million by 2035.[7] The Heat Pump Association, for example, estimates that 98,345 heat pumps were installed in new builds and existing homes in the UK in 2024,[8] while the Microgeneration Certified Scheme (MCS) Data Dashboard recorded 43,109 MCS-certified heat pump installations in 2024.[9] Similarly, the National Audit Office (NAO) found only 18,871 heat pumps were installed through the Boiler Upgrade Scheme between May 2022 and December 2023, less than two thirds of the scheme's annual target of 30,000 grants in England and Wales.[10] These figures remain far below the CCC's recommended target and, if current trends persist, it is unlikely that this shortfall will be addressed in the next five years.

A key factor holding back the adoption of heat pumps in the residential sector is that there are not enough skilled workers to deliver heat pumps. Skills England have estimated that employment across the clean energy sector needs to increase by 77% by 2030 – the fastest of the 10 priority sectors assessed.[11] Building a skilled workforce is also imperative to maintain continued public buy-in to the net zero transition. The NAO's recent report on energy efficiency installations under the Energy Company Obligation highlighted "poor workforce skills" as a root cause of widespread insulation installation quality issues.[12] Poor-quality installations risk undermining consumer confidence in future energy efficiency and low-carbon heating schemes.

Previous analysis from a range of organisations has focused heavily on the future size of the installation workforce. For example, the Heat Pump Association has estimated that the heat pump installation workforce will need to grow to 41,143 Full-Time Equivalent (FTE) to deliver the volume of heat pump installations required to meet the previous Government's target of 600,000 installations a year by 2028 and triple in size to 122,672 FTE installers to meet the 1.6 million installation target for 2035.[13]

Installers, of course, are just one part of the workforce and there are other important areas with sizeable gaps in the skillsets needed for the wide adoption of heat pumps. Given the significant gap between the current state of the labour markets for heat pumps and the levels required to achieve necessary heating electrification, it is essential to undertake a comprehensive analysis of the potential heat pump workforce across the value chain.

This research conducts an analysis of the potential heat pump workforce, including its size and occupational make-up, the main in-demand skills, geographical distribution and expected growth over the next five years. It examines the key challenges diminishing the availability of skills (including challenges of the workforce's demographic composition and training pathways) and the match between workforce demand and the current and projected supply. This report also sets out policy recommendations which focus on ensuring that the heat pump workforce is equipped to deliver the necessary adoption of heat pumps to residential homes at the pace and scale required to meet net zero targets.

This analysis highlights that skill and labour shortages impact not only the heat pump workforce but the wider economy also. This includes key sectors in the wider construction industry, as well as other priority sectors, where the skills amongst the potential heat pump workforce are both transferable and in competing demand. This is especially important to consider given a number of key Government targets creating further demand across these sectors, including building 1.5 million new

homes, fast-tracking planning decisions for 150 major economic infrastructure projects by the end of this Parliament and upgrading the energy efficiency of 5 million homes over the same period.

Careful workforce planning is therefore crucial to ensure the right spread of skills and labour across these targets. To achieve this, we need to understand not just the existing supply of skills relevant to the sector and how those skills are being invested in and curated for the future needs of the sector, but also how demand will be increased simultaneously. Skills England's sector skills need assessments,[14] the Clean Energy Jobs Plan,[15] and the forthcoming Warm Homes Plan will help provide much-needed strategic direction for developing the skilled workforce required to achieve the Government's targets, as well as its central growth mission.

The findings of this report have the potential to play a key role in supporting this workforce planning by providing granular analysis on the heat pump sector. This will help policymakers to think ahead to the needs of different areas and elements of the workforce, identify similarities and differences across the various occupational categories and adapt policy recommendations to meet their needs accordingly. Given the sector's ambitious timeline to scale up heat pump deployment by 2035, and the time required to reskill existing workers and train new market entrants, a coordinated and urgent intervention is essential to achieving this target.

Scope and approach

Our analysis of clean heating solutions focusses solely on heat pumps, including ground-, air- and water-source heat pumps, in both domestic and commercial contexts. Other low-carbon heating solutions such as electric boilers and heat networks are not covered. Data analysis on the heat pump workforce only covers England and the policy recommendations are aimed at UK Government level due to the devolved nature of skills policy. Nevertheless, these recommendations will also be relevant for devolved administrations, as well as strategic authorities in England with devolved responsibility for skills.

To define the heat pump workforce, our analysis uses the Lightcast Occupation Taxonomy (LOT) as the primary classification system for labour demand and skills related to heat pump occupations between June 2024 and June 2025. This approach involves using a pre-determined list of heat pump-related keywords to search jobs postings text in each of the identified LOT occupations and then using this to estimate demand for heat pump roles as well as educational attainment and employment estimates. The benefit of this approach is its ability to generate highly granular, detailed and near real-time labour market trends through LOT classifications, offering insights which enhance and complement traditional official statistics. However, this approach relies exclusively on job listings from businesses that use formal hiring processes and the accuracy of tagging to relevant LOT occupations is contingent upon the quality and completeness of the information in those listings.

Lightcast's analysis of the heat pump workforce is supported by additional Lightcast analysis of those occupations, industries and sectors with similar skills demands to the heat pump workforce, as well as the composition of employers hiring workers with heat pump-related skills.

The methodology for all aspects of Lightcast's labour market analysis is explained in more detail in the Technical Annex.

In addition to Lightcast's labour market analysis, this report incorporates qualitative insights derived from expert interviews and a dedicated industry workshop, alongside findings from an extensive evidence review conducted by WPI Economics. We also analysed a range of official datasets for comparability with Lightcast data and to strengthen the robustness of the overall assessment.

CHAPTER 2

The composition of the potential heat pump workforce

Section Summary

- Our analysis finds that over 76,000 jobs in England have skillsets relevant to heat pump deployment, with most employed in installation occupations (62%).
- London and the North East have proportionally fewer heat pump-related jobs per capita, indicating potential regional workforce shortages.
- Based on current employment trends and assuming no significant policy or behavioural shifts, the potential workforce is projected to grow by 2.9% over the next five years, reaching around 78,300 roles by 2030.

This section provides an overview of the *potential* heat pump workforce in England, exploring the scale of this workforce and how this breaks down by skills, demographics, regions and projected growth over the next five years. It also explores the training pathways of the heat pump workforce, as well as the size and scale of those employers operating in the heat pump sector.

Our analysis focuses on jobs, roles and training opportunities where relevant heat pump skills have the *potential* to be used. It is therefore important to note that the analysis in this section covers jobs where these skills may not necessarily be being used on heat pumps currently.

Size

Based on an analysis of job postings between June 2024 and June 2025, we found that there are an estimated **76,100 jobs** that have skillsets relevant to heat pumps. The potential heat pump workforce spans 26 LOT occupations, covering a diverse range of jobs, roles and skills. A comprehensive list of these LOT occupations, along with their corresponding Standard Occupational Classification (SOC) codes, is provided in Annex 1.

Table 1 outlines the five occupations that comprise the largest share of the potential heat pump workforce, collectively accounting for 72% of the total potential workforce. Notably, plumbers represent more than a quarter (28%) of this figure, highlighting the sector's potential to play a central role in building a skilled heat pump workforce.

Table 1: Heat pump occupations with the largest job share

LOT occupation name	Number of potential heat pump jobs in LOT	Share of jobs
Plumber	21,514	28.3%
Engineering manager	13,083	17.2%
Electrician	10,827	14.2%
Electrical engineer	5,643	7.4%
Civil engineer	3,641	4.8%

The 26 LOT occupations identified in this analysis have been grouped into four thematic categories, each reflecting clusters of similar skillsets: heat pump installation; heat pump design and manufacturing; heat pump safety and sustainability; and heat pump sales. A detailed breakdown of the LOT occupations within these categories and their corresponding job share is provided in Annex 2.

As Table 2 shows, the largest category is heat pump installation, which accounts for 62% of the total potential workforce. Just over a third (35%) of occupations fall within the design and manufacturing category, while a small proportion (3%) are associated with safety, sustainability or sales roles. The relatively small size of these latter categories reflects that the heat pump sector is dominated by smaller employers, as these roles tend to be concentrated within the limited number of larger employers. However, as discussed below, skills related to safety and sales are considered critical common skills across a range of occupations.

Table 2: Job share of heat pump occupational categories

Heat pump occupational category	Number of jobs	Share of jobs
Heat pump installation	46,971	62%
Heat pump design and manufacturing	26,944	35%
Heat pump safety and sustainability	1,502	2%
Heat pump sales	659	1%

Main skillsets

When assessing skills, the Lightcast taxonomy categorises them into two categories: "specialised" (technical, job-specific) and "common" (broad, transferable) skills.

Table 3 shows that the "specialised skills" most in demand by employers across the potential heat pump workforce are HVAC, plumbing and electrical engineering. "Specialised skills" do vary by workforce segment, however. Within the installation workforce, the most sought-after specialised skills are those relating to aspects of the heating system, whereas the design and manufacturing workforce focuses more on engineering and project management skills. Notably, even amongst the heat pump sales workforce, plumbing is still the most in-demand "specialised skill", highlighting the importance of an understanding of the installation process for those workers in sales.

Table 3: Most in-demand "specialised skills" amongst heat pump occupational categories

Overall	Heat pump installation	Heat pump safety and sustainability	Heat pump design and manufacturing	Heat pump sales
HVAC: 23%	Plumbing: 34%	Auditing: 26%	Electrical engineering: 27%	Plumbing: 20%
Plumbing: 20%	HVAC: 30%	Risk analysis: 25%	Project management: 24%	Selling techniques: 18%
Electrical engineering: 13%	Boilers: 17%	Environmental health and safety: 14%	Mechanical engineering: 24%	Air-source heat pump: 12%
Mechanical engineering: 13%	Heating systems: 15%	Project management: 14%	Autodesk Revit: 20%	Customer relationship management: 12%
Project management: 12%	Air-source heat pump: 9%	Net zero: 10%	HVAC: 18%	Sales engineering: 11%

Overall, communication emerges as the most in-demand "common skill" across the workforce as seen in Table 4. It is particularly prominent within the heat pump installation, heat pump safety and sustainability and heat pump design and manufacturing categories. Sales is also classified as a "common skill" within Lightcast's taxonomy and – unsurprisingly – is required by 82% of the jobs within the heat pump sales workforce.

Table 4: Most in-demand "common skills" amongst heat pump occupational categories

Overall	Heat pump installation	Heat pump safety and sustainability	Heat pump design and manufacturing	Heat pump sales
Communication: 26%	Communication: 19%	Communication: 37%	Communication: 32%	Sales: 82%
Management: 13%	Customer service: 17%	Management: 31%	Management: 18%	Customer service: 42%
Customer service: 10%	Problem solving: 10%	Investigation: 13%	Problem solving: 6%	Communication:35%
Problem solving: 8%	Management: 7%	Planning: 10%	Leadership: 5%	Willingness to learn: 12%
Sales: 4%	Troubleshooting: 4%	Presentations: 8%	Coordinating: 3%	Strong work ethic: 9%

It is not surprising that communication has been identified as a top, in-demand "common skill" across the heat pump workforce. Communication is an essential skill given the low public awareness of heat pumps and how they operate. For example, the National Home Energy Survey in 2023 found that only 51% of consumers had even heard of a heat pump.[16] Good communication skills are therefore necessary to help promote heat pumps and interrupt the usual decision-making process, where customers opt to replace an existing gas boiler when it breaks down with another one.

Whilst the Lightcast taxonomy has not identified digital skills as in-demand "common skills", we anticipate these will become more important as heat pump technologies continue to innovate with smart- and AI-driven systems,[17] as well the potential usage of generative AI tools to support the heat pump installation process.[18]

Regional distribution

The South East region accounts for the largest share of potential heat pump jobs, with 16% of all potential heat pump jobs located there. In contrast, the North East has the smallest share, with just 4% of potential heat pump jobs. This regional disparity in our analysis aligns with data on the location of MCS-accredited contractors, with the highest number of contractors located in the South East (374) and the fewest in the North East (67).[19]

As shown in Table 5, London and the North East have a disproportionally low number of jobs for their population size, as well as noticeably fewer job postings compared to other regions. This suggests that these regions may be experiencing workforce shortages in the heat pump sector compared to other parts of England. Given the demand-led nature of the skills system, these workforce shortages reflect the low levels of consumer demand for heat pump installations within these regions. As of October 2025, only 0.2% of households in London have had a heat pump installed – the lowest of any English region – with the North East amongst the regions with the lowest installation uptake (0.9%).[20] By contrast, installation uptake is highest in the three regions – South West (1.8% of households), East of England (1.6% of households) and East Midlands (1.4% of households) – where there is the highest proportion of heat pump-related jobs per capita. In addition, heat pump installation is typically lower in privately-rented dwellings and in flats or apartments, both of which are significant features of London's housing market: 56% of dwellings are a flat, maisonette or apartment and 30% of those living in London are privately renting.[21]

Credit: Liz Seabrook / Nesta / Climate Visuals

Table 5: Regional distribution of the potential heat pump workforce

Region	Heat pump jobs	Percentage of jobs	Population	People per job	Job postings
South East	12,200	16%	9,600,000	793	2,622
North West	10,200	13%	7,700,000	760	2,456
London	9,800	13%	9,100,000	931	1,805
East of England	8,800	12%	6,600,000	744	2,748
South West	8,600	11%	5,900,000	681	2,623
West Midlands	8,500	11%	6,200,000	725	3,374
East Midlands	7,400	10%	5,100,000	688	2,679
Yorkshire	7,200	9.5%	5,700,000	784	3,307
North East	3,400	4%	2,800,000	823	1,660

A similar pattern emerges when examining how the distribution of the occupational categories varies by region. As Table 6 shows, the North East has the lowest share of jobs across all occupational categories. The South East holds the highest concentration of roles in heat pump design and manufacturing, installation and sales. For both design and manufacturing and installation, jobs are relatively evenly distributed across most English regions. By contrast, heat pump and sustainability jobs are more geographically concentrated, with over a quarter (27%) located in London. All other regions – with the exception of the South East and North West – account for less than 10% of the jobs in this category. This concentration reflects the sector's structure, where smaller employers dominate and specialised roles are typically found within a limited number of larger organisations.

Table 6: Regional distribution of the heat pump occupational categories

Heat pump occupational category	South East	North West	London	West Midlands	South West	East of England	Yorkshire and The Humber	East Midlands	North East
Heat pump design and manufacturing	15%	14%	13%	12%	11%	11%	10%	9%	4%
Heat pump installation	16%	13%	12%	11%	12%	12%	9%	10%	5%
Heat pump safety and sustainability	13%	14%	27%	8%	8%	9%	9%	7%	5%
Heat pump sales	17%	16%	14%	13%	9%	12%	8%	8%	3%

Growth projections

Our projections for the future potential heat pump workforce are based on current employment trends and therefore represents a baseline scenario without further policy intervention or shifts in technological, environmental or market trends. More detail on the assumptions behind the growth projections can be found in the Technical Annex.

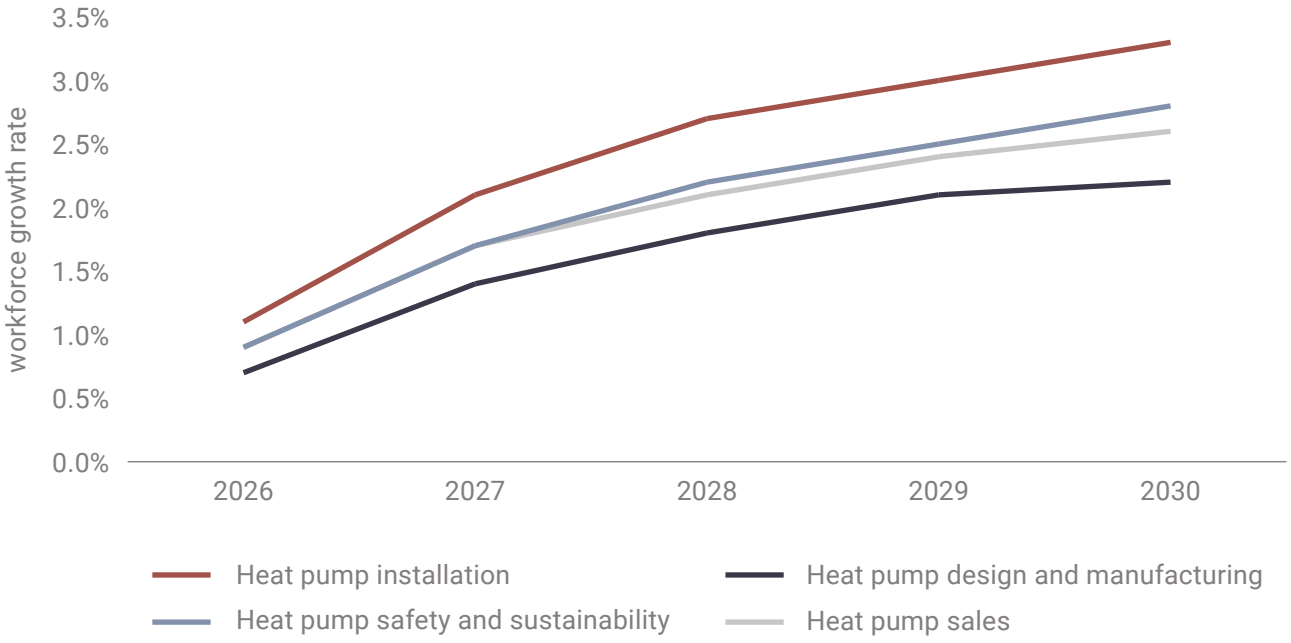
Under these assumptions, we predict moderate growth, with the workforce expected to grow by 2.9% between 2025 and 2030, reaching around 78,300 jobs. Table 7 provides a breakdown of the baseline growth across the four occupational categories over the five-year period. The baseline growth of the potential heat pump workforce is broadly in line with expected employment growth in the wider economy. The Office for Budget Responsibility has forecast that UK employment is expected to grow by 3.2% between 2025 and 2030.[22]

Table 7: Projected jobs growth of the heat pump occupational categories (2025-2030)

Heat pump occupational category	2025	2026	2027	2028	2029	2030	% growth (2025-2030)
Heat pump installation	46,971	47,487	47,942	48,216	48,400	48,528	3.3
Heat pump design and manufacturing	26,944	27,143	27,321	27,428	27,500	27,550	2.2
Heat pump safety and sustainability	1,502	1,516	1,528	1,535	1,540	1,544	2.8
Heat pump sales	659	665	670	673	675	676	2.6
Total	**76,076**	**76,811**	**77,461**	**77,852**	**78,114**	**78,299**	**2.9**

Figure 1 shows the cumulative baseline growth across the four occupational categories between 2025 and 2030. The installation workforce is projected to see the most significant growth, increasing by 3.3%. The heat pump safety and sustainability category follows with a projected growth of 2.8%, followed closely by sales at 2.6%. The workforce expected to see the least growth over the five-year period is design and manufacturing at 2.2%.

Figure 1: Five-year projections of growth of the heat pump occupational categories (2025-2030)



This pattern is mirrored at the occupational level. Occupations with the highest project growth are primarily found within the installation workforce, while those with the lowest growth are concentrated in design and manufacturing. For example, as shown in Table 8, plumbing is expected to experience the most growth over the next five years (3.8%), whereas mechanical engineering is expected to grow by only 1.8%.

Table 8: Occupations with highest / lowest projected growth rate (2025-2030)

Occupations with highest projected growth rate	Projected 5-year growth rate (%)
Plumber	3.8
HVAC mechanic / installer	3.4
Pipe fitter	3.4
Roofing / siding worker	3.4
Sales representative	3.3

Occupations with the lowest projected growth rate	Projected 5-year growth rate (%)
Manufacturing engineer	2.2
Civil engineer	2.1
Energy broker	2
Electrical engineer	1.9
Mechanical engineer	1.8

Looking regionally, Table 9 shows that the heat pump workforce in the East of England is projected to grow most between 2025 and 2030 at 4.3%, whilst the North East is projected to see the least growth at just 1.5%.

Table 9: Projected growth rate of the heat pump workforce by region (2025-2030)

Region	Projected 5-year growth rate (%)
East of England	4.3
East Midlands	3.9
London	3.1
West Midlands	3.1
South East	2.6
North West	2.5
South West	2.4
Yorkshire and The Humber	2.3
North East	1.5

At the occupation level, projected regional growth plans are driven by a few key roles. In the East of England and East Midlands – the regions expected to see the highest overall growth – the plumbing occupation is projected to spearhead the growth by 7.2% and 5.9% respectively. Electricians in both of these regions are also expected to experience strong growth, with rates of 5% between 2025 and 2030. By contrast, the North East's low overall growth partly reflects declines in two occupations: pump workers (-7%) and electrical engineers (-4.4%).

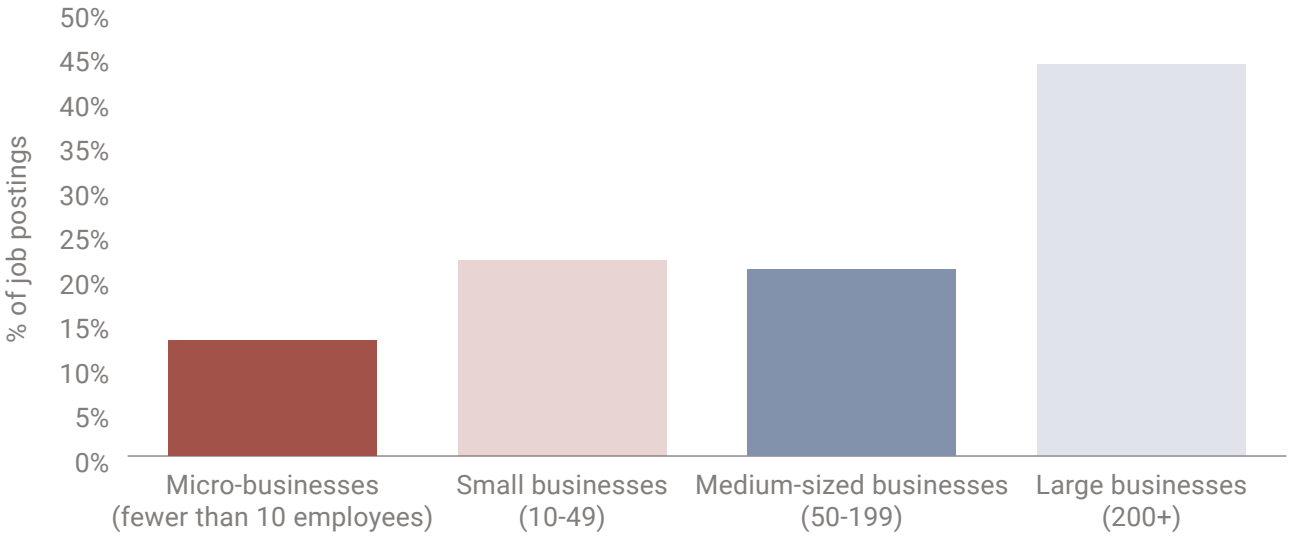
Company size trends

Existing evidence has focused primarily on the size of heat pump installers, showing that these companies are predominantly micro-businesses (employing ten people or fewer). The average MCS-certified heat pump contractor employs 4.8 installers.[23] The latest Office for National Statistics data shows that amongst plumbing, heating and air-conditioning installation businesses – which would include heat pump installers – 95% are micro-businesses. Only 0.3% of heat pump installers employ more than 100 people.[24] This trend was echoed by the sample and response rate to the employer survey as part of the-then Department for Business, Energy & Industrial Strategy's (BEIS) 2023 Heating and Cooling Installer Study.[25]

Our analysis explores the hiring trends of companies demanding heat pump-relevant skills and occupations.[26] As our analysis is based on job postings, we will not necessarily have captured many of the sole traders and micro-businesses that are especially dominant within the installation workforce. For example, previous analysis has shown that 51% of plumbing, heating and ventilation engineers are self-employed.[27] A fuller overview of how we approached the company size analysis is provided in the Technical Annex.

Figure 2 shows that the majority of job postings for heat pump-related skills came from small and medium-sized enterprises (SMEs). Collectively, companies with fewer than 200 employees made up 56% of demand. Small businesses (with 10-49 employees) and medium-sized businesses (with 50-199 employees) accounted for roughly the same share of job postings – 22% and 21% respectively.

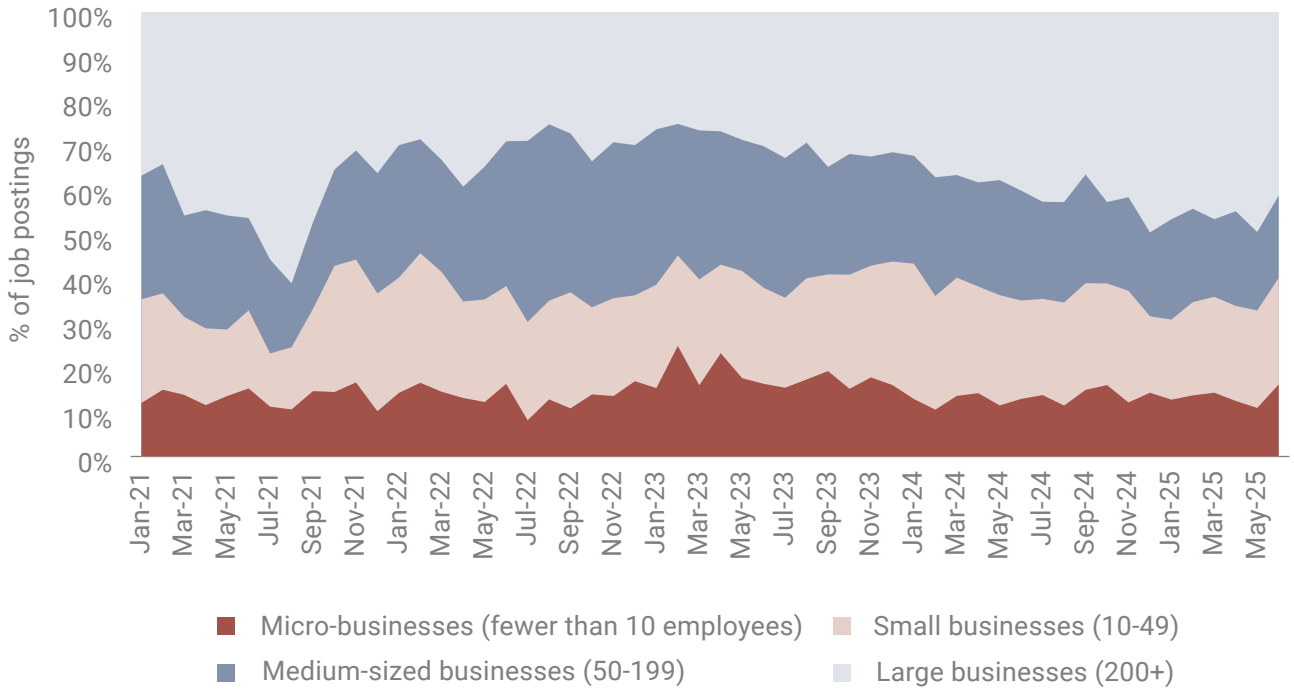
Figure 2: Distribution of companies hiring heat pump-related skills by company size



This trend is also evident over time, with Figure 3 showing that companies with fewer than 200 employees made up the majority of the postings for heat pump-related skills between January 2021 and June 2025. Between October 2021 and June 2024, SMEs made up at least 60% of the hiring – sometimes as high as three-quarters (January 2023 – April 2023). However, hiring data between July 2024 and June 2025 suggest that larger employers are incrementally increasing their demand for heat pump-related skills.

In interviews with industry experts, we heard that energy suppliers — including members of the "Big Six" — are increasingly moving into the heat pump market. Many are now offering specialised heat pump energy tariffs for consumers, while also manufacturing and installing heat pumps themselves, and even investing in workforce training. Another emerging trend is the rise of umbrella schemes, in which a contractor engages a network of subcontractors rather than employing its own staff directly.

Figure 3: Monthly distribution of demand for heat pump-related skills by company size (January 2021 – June 2025)



Credit: Katy King / Nesta / Climate Visuals

CHAPTER 3

The challenges of scaling up the heat pump workforce

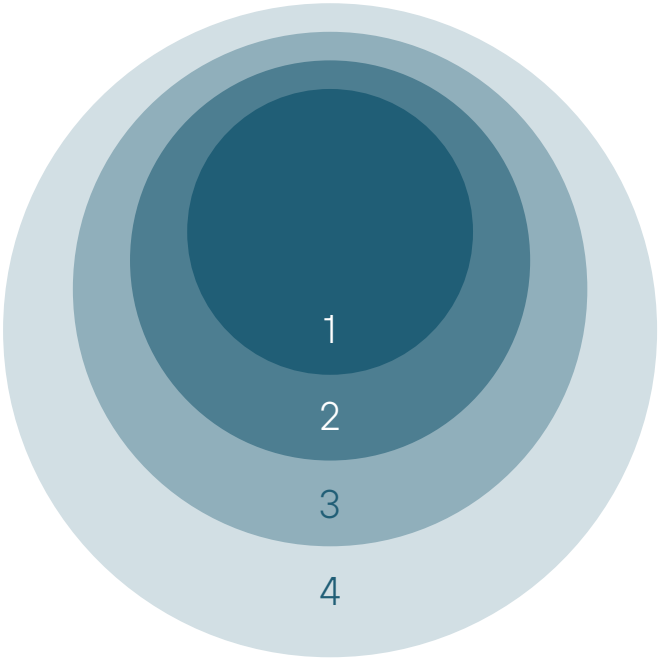
Section Summary

- It is estimated that there are currently no more than 10,000 qualified heat pump installers in England, but our analysis shows there is a potentially significant pool of jobs (around 47,000) with the relevant skills to install heat pumps but who may currently lack heat pump qualifications.
- The UK's strong domestic heat pump manufacturing capacity is well placed to meet domestic demand and scale up export potential. The potential design and manufacturing workforce (around 27,000 jobs with relevant skills) can help achieve these ambitions, however it is a part of the heat pump workforce with a significant number of experienced workers (45% are over 45 years of age).
- Scaling up the heat pump workforce from the existing workforce faces the challenges of heat pump-related occupations being widely demanded in other sectors as well as many workers approaching or being at retirement age.
- Very few workers with the required plumbing, heating or engineering skillsets are currently working outside of these heat pump-relevant occupations.
- Enrolments and achievements across apprenticeships and FE training courses are at a much lower level than is necessary to meet demand and exacerbated by employer reticence to bringing through new talent.

At face value, our analysis suggests there is a potentially healthy supply of skilled workers for the heat pump workforce. However, several significant challenges remain in ensuring that the workforce is sufficiently large and appropriately skilled to meet the anticipated future demand. These challenges are multi-layered – as outlined in Figure 4 – and include the currently low number of qualified and certified heat pump installers; wider demand for skilled workers across the economy; skills and demographic challenges within the wider potential heat pump workforce; the lack of a sufficient workforce outside relevant heat pump-aligned occupations; and the challenges of generating a new talent pipeline into heat pump occupations.

Credit: Sam Bush / Nesta / Climate Visuals

Figure 4: The layered challenges of building a sufficient heat pump workforce



1 **Currently qualified heat pump installers**
Low number of certified heat pump installers, but a potentially significant pool of installation workers exists who mostly do not have specific heat pump training.

2 **Broader heat pump workforce**
76,100 jobs have heat pump-relevant skills but are in occupations facing competing demand from similar sectors and wider skills shortages. This is also a workforce that has increasing number of workers at or approaching retirement age.

3 **Workforce outside relevant heat pump occupations**
Very few people outside relevant occupations have the required required plumbing, heating or engineering skillsets.

4 **New workforce entrants**
Apprenticeship starts are very low in the relevant standards due to limited employer demand and a lack of supply from training providers.

Despite a low base, there is significant potential to scale up the workforce

Heat pump manufacturers in the UK are well placed to not only scale up production to become one of the largest domestic markets for heat pump manufacturing in Europe, but also to become a leading heat pump exporter.[28]. The previous Government's heat pump investment roadmap suggested that by 2028 up to 300,000 heat pumps could be manufactured in the UK, serving both the domestic and export market.[29] In 2024, a third (33.5%) of heat pumps sold in the UK were domestically manufactured,[30] with 4,145 MCS-certified products on the market as of October 2025.[31] Moreover, the Heat Pump Association has reported that data from their manufacturing members shows that current factory line capacity can exceed the expected UK demand for heat pumps by 2028 as well as serving the EU market without any need for significant factory expansion.[32] Our analysis shows that there are around 27,000 jobs with heat pump manufacturing and design-relevant skills who could further bolster the UK's existing strengths in heating and cooling manufacturing. However, as we will discuss in more detail below, the potential design and manufacturing workforce is ageing – 45% is over 45 years of age – which could potentially impact heat pump manufacturing output into the 2030s without a sizable talent pipeline coming through.

By contrast, there is greater uncertainty and challenges amongst the heat pump installation workforce. At present, the number of heat pump installers who are certified by the MCS is relatively low. There are 1,801 MCS-certified heat pump contractors operating in England, as of October 2025.[33] As this data on certification covers an entire business, it is difficult to know the total number of individual installers included within that figure, although the MCS estimates that an accredited contractor employs 4.8 installers on average.[34] This would mean that there were 8,645 MCS-accredited heat pump installers in England as of October 2025, which is within the range of previous estimates of between 4,000-10,000 installers.[35] In addition, the Heat Pump Association estimates that around 25,500 people have completed one of the heat pump training courses eligible for the Heat Training Grant between 2022 and Q3 2025.[36]

In spite of these relatively low figures, there may be a significantly wider pool of potential installation workers. Our analysis indicates that nearly 47,000 people have the relevant skills to install heat pumps, but they may not currently have specific heat pump training or qualifications. When examining the broader SOC codes encompassing the five occupations with the largest share of the potential heat pump workforce, there could be significant opportunities to scale up the heat pump workforce's capacity, as shown in Table 10.

Table 10: The wider potential workforce of the five largest heat pump occupations

LOT occupation	Number of potential heat pump jobs	Number of SOC workers
Plumber	21,500	216,300
Engineering manager	13,100	265,100
Electrician	11,000	173,100
Electrical engineer	5,600	41,400
Civil engineer	3,200	89,300

The central challenge lies in persuading this potentially wide pool of workers to recognise the benefits of undertaking (re) training that would enable them to transition effectively into the heat pump sector. Recent survey evidence underscores the scale of this challenge: 51% of plumbers and heating engineers and 48% of electricians have no intention to upskill to conduct heat pump installations. The primary barriers cited relate to the flexibility and timing of training opportunities, with many tradespeople struggling to find time to for additional training alongside existing workloads.[37]

Additionally, workers need to know that the cost and time associated with training will deliver a return on that investment and are quickly able to utilise their new skills. A mid-scheme review of the Heat Training Grant found that just 27% of those surveyed had installed a heat pump since completing their training.[38] Schemes such as Nesta's Start at Home initiative have proven successful in offering an important practical solution to building both the confidence and competence of newly-trained heat pump workers.[39] However, more needs to be done to expand the geographical and numerical scale of these schemes to make them a viable proposition to meet the challenge of incentivising training amongst the wider potential installation workforce.

Heat pump-relevant skills are widely demanded

As made clear by the Office for Clean Energy Jobs's assessment of the clean energy skills challenge, the heat pump workforce is likely to experience significant shifts in both skills requirements and labour demand.[40] At present, there are 12 heat pump-related occupations – including three of the five occupations with the largest job share – that are classified by the Government as in "critical" or "elevated demand".[41] The Government's Clean Energy Jobs Plan also places plumbers and heating and ventilation installers and repairers at the top of the list of 31 "high-demand, high-supply constraint" occupations.[42]

A key driver is that many occupations in the heat pump workforce are subject to skills shortages and are in high demand elsewhere in the economy. For example, ten key heat pump-related occupations – accounting for 91% of the potential heat pump installation workforce – appear on the Skilled Worker Visa Temporary Shortage List.[43]

There is also relatively broad skills similarity between the heat pump workforce and wider construction and manufacturing sectors. Lightcast carried out analysis on the skills similarity between the potential heat pump workforce and a range of comparable Standard Industrial Classification (SIC) codes. This analysis was scored on a 0–1 scale, with scores closer to 1 representing greater similarity. Details on the approach of this similarity analysis are provided in the Technical Annex.

Table 11 shows that there is greatest similarity with the electrical, plumbing and construction installation and wider building development and construction. This suggests that workers in construction-related sectors are likely to have many of the necessary skills to work in the heat pump workforce. A high degree of transferability between these sectors and the heat pump workforce – particularly in installation and design and manufacturing occupations – is therefore possible.

While this analysis suggests that there is a potential opportunity for skills transferability across a range of occupations and sectors, it also presents a significant challenge: competition for talent could limit the availability of workers for the heat pump sector. Ensuring that the construction and infrastructure sectors are not competing for similar occupations and skills is especially critical given the Government has set a number of ambitious targets for improving the quantity and quality of the nation's housing stock and infrastructure delivery.

Table 11: Similarity of skills between several construction, infrastructure and manufacturing sectors and the heat pump workforce

Standard Industrial Classification (SIC)	Total heat pump workforce	Heat pump installation	Heat pump design and manufacturing	Heat pump safety and sustainability	Heat pump sales
Electrical, plumbing and other construction installation activities	0.37	0.33	0.26	0.10	0.18
Development of building projects	0.25	0.18	0.19	0.12	0.11
Construction of residential and non-residential buildings	0.19	0.10	0.18	0.14	0.07
Manufacturing	0.13	0.08	0.12	0.06	0.07
Repair and installation of machinery and equipment	0.13	0.10	0.10	0.04	0.08
Building completion and finishing	0.11	0.10	0.08	0.09	0.05
Electric power generation	0.11	0.07	0.10	0.07	0.06
Construction of other civil engineering projects	0.11	0.05	0.12	0.06	0.04
Other specialised construction activities	0.10	0.08	0.07	0.04	0.05
Construction of roads and railways	0.10	0.04	0.10	0.08	0.06
Steam and air conditioning supply	0.06	0.06	0.04	0.02	0.03
Oil and gas	0.04	0.03	0.03	0.01	0.03
Construction of utility projects	0.03	0.01	0.03	0.02	0.01

The potential heat pump workforce is ageing and male-dominated

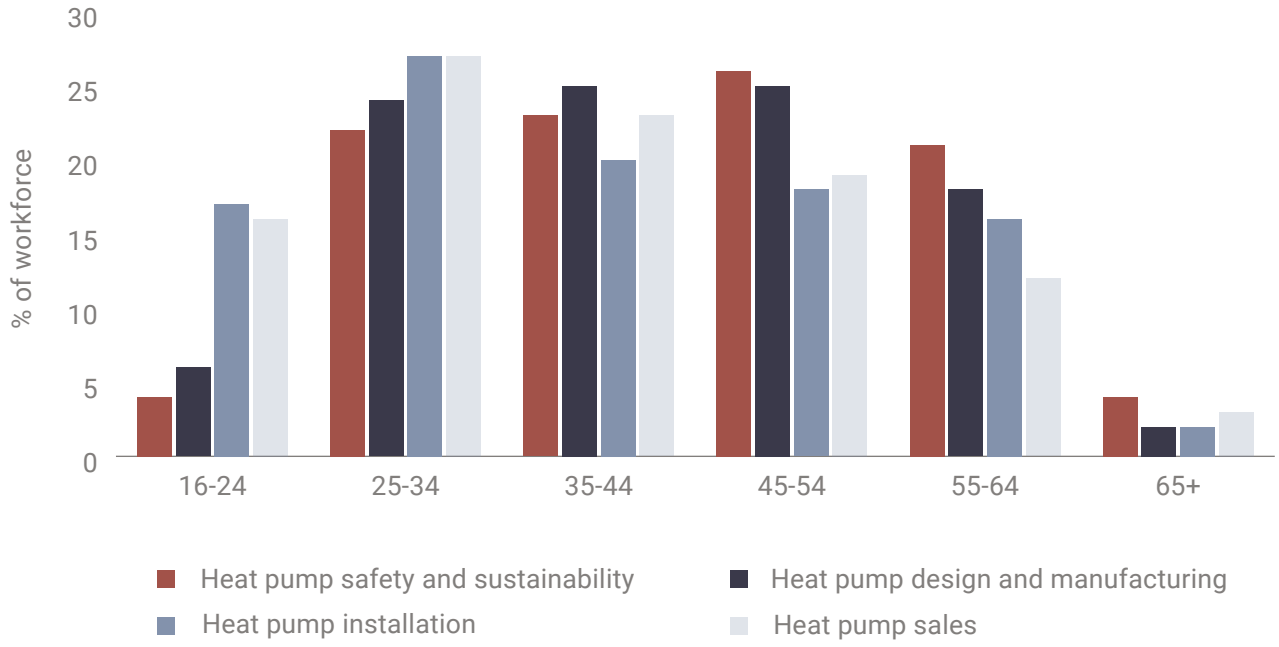
In addition to the wider competition for skills amongst heat pump-related occupations, the potential heat pump workforce is both ageing and lacking in diversity. BEIS's 2023 Heating and Cooling Installer Study highlighted the scale of these challenges within the heat pump installation workforce, finding that:[44]

- two-thirds of the heat pump installation workforce were over 45 years of age;
- 95% of the installation workforce were male and white; and
- just 7% of the installation workforce had a disability.

Similar patterns emerge from our analysis of age and gender breakdowns among the wider potential heat pump workforce.

Figure 5 shows that workers over 45 years of age make up around half of the potential design and manufacturing workforce (45%) as well as the potential safety and sustainability workforce (51%). Over a third of the potential heat pump sales (34%) and heat pump installation (36%) are experienced workers. However, it should be noted that as our analysis relies on job postings, this will omit many of the sole traders who operate in the heat pump sector. As self-employed workers are, on average, older than workers who are employees,[45] the proportion of experienced workers across the potential heat pump workforce is likely to be higher.

Figure 5: Age breakdown of the heat pump occupational categories

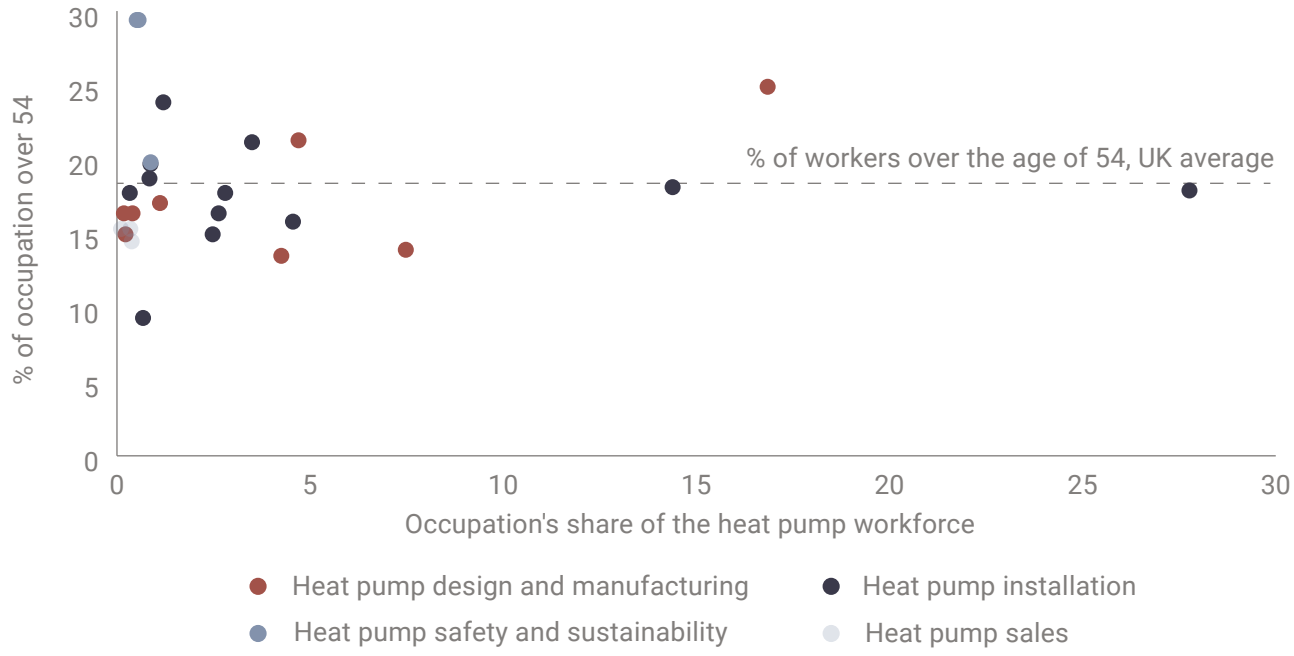


However, as workers continue to age and the number of new entrants stagnates, the share of over-54-year-old workers is likely to increase. The Gas Safe Register has previously estimated that 55 is both the median age for gas engineers as well as the age that engineers start to retire or leave the workforce, with peaks at 50 and 65.[46] This is an especially acute problem given that, on average, men and women exit the labour market at 65.8 years and 64.7 years respectively.[47] There is, therefore, an urgent need to attract a younger, more diverse cohort into relevant training pathways to help close the skills gap.

Indeed, as Figure 6 shows, a significant minority of the potential workforce is aged 55 or older. There are eight LOT occupations in which at least 20% of the workforce is aged 55 or older – above the proportion of experienced workers amongst the general working-age population – and many other LOT occupations are nearing this average. Occupations with the higher percentage of workers over 55 years old are primarily concentrated in the heat pump safety and sustainability

categories, as well as in engineering or managerial roles. These engineering or managerial roles tend to be less physically demanding than installation roles and may reflect typical career progression as workers age. Amongst the five occupations that make up the largest share of the potential heat pump workforce, only two have more than one-fifth of workers over 54 years old: engineering managers (25%) and civil engineers (21%).

Figure 6: Percentage of heat pump workforce over 54 years of age in each heat pump occupation



Similarly to the BEIS study, our analysis found only 8% of heat pump-related workers are women, highlighting a significant gender imbalance across the sector.

Across nearly all heat-pump related occupations, men substantially outnumber women. Table 12 illustrates the gender ratios of the five largest heat pump occupations. The most significant imbalances can be observed in plumbing and electrician occupations, where men outnumber women 51 to 1 and 48 to 1, respectively.

Table 12: Male to female ratio of the five largest heat pump occupations

LOT occupation	Male to female ratio
Plumber	51:1
Electrician	48:1
Civil engineer	10:1
Electrical engineer	8:1
Engineering manager	6:1

The most pronounced disparity is found in the Pipe worker / operator occupation, where there are 1,232 men for every woman. In the roofing / siding worker occupation, our analysis identified no female workers at all. Only two occupations – sustainability specialist and energy broker – show a reversal of this trend, with women slightly outnumbering men at ratios of 1.4 and 1.3, respectively.

As a result, a clear pattern emerges amongst the occupation's categories in terms of gender representation. As Table 13 shows, women are most represented within occupations within the sales or safety and sustainability workforce categories which have near gender parity. However, significant challenges remain in creating pathways for women into installation, design and manufacturing roles.

Table 13: Male-to-female ratio of heat pump occupational categories

Heat pump occupational category	Male-to-female ratio
Heat pump installation	27:1
Heat pump design and manufacturing	7:1
Heat pump safety and sustainability	1:1
Heat pump sales	1:1

There are limited opportunities to plug the skills gaps amongst the wider workforce

However, adding to the demand, skills and demographic challenges of those within relevant heat pump occupations, there are few people outside relevant occupations with required plumbing, heating or engineering skillsets. Moreover, limited support, funding and opportunities are readily accessible for people looking to change careers, as well as the significant upfront costs for retraining and initial lower salaries. These act as significant disincentives to changing careers – especially into skilled trade roles.[48]

Lightcast similarity analysis found that there are 81 occupations which have a high degree of similarity to the 26 LOT occupations that make up the potential heat pump workforce. However, despite the similarity between occupations, key skills gaps exist that mean it would be difficult for these workers to transition fully into the potential heat pump workforce. The analysis shows that many adjacent occupations would need to gain either relevant green skills (such as renewable energy or environmental, social and corporate governance) or core "specialised skills" (such as electrical engineering or plumbing) in order to occupy roles in the heat pump sector. A full analysis of the occupational similarity is provided in Annex 3, with details on the approach of this similarity analysis provided in the Technical Annex.

Furthermore, ONS data shows that there are very few people outside of many of the key occupations in the heat pump workforce who could potentially perform this work.[49] In a number of occupations relevant to heat pump installation, design and manufacturing, such as HVAC mechanic / installer, heating engineer / boiler operator, roofing / siding worker, refrigeration technician and electrical engineers, there are zero people who have 100% of the skills needed for the occupation and are not already doing so.

For the occupations which make up the largest share of the potential heat pump workforce, there are relatively few replacement workers with 100% of the relevant skills who currently are not employed in those occupations. For example, only 2,300 plumbers and 7,500 electricians possess all of the necessary skills but are not already working in these occupations. Importantly, this data is captured at the SOC level, meaning the number of individuals with specialist heat pump skills is likely even lower.

With a limited pool of workers who already possess the crucial relevant skills, there is growing pressure to upskill those already working in relevant occupations. At the same time, it is essential to bring new talent into the workforce to meet future demand and close emerging gaps.

Barriers to training are resulting in insufficient numbers of new entrants

Enrolments and achievements in heat pump-related Further Education courses and apprenticeships have been experiencing stagnating growth over recent years. Figure 7 shows that Further Education achievements in subjects relevant to the five largest heat pump occupations have fallen between 2021 and 2023 and only gradually recovered into 2024. Moreover, Table 14 shows that apprenticeship achievements in 2024 were also at a much lower level than is necessary to meet demand. A full analysis of the training pathways into the potential heat pump workforce is provided in Annex 4.

This slowdown in enrolments and achievements of heat pump-relevant training pathways continues to negatively impact the pipeline of new entrants to the heat pump workforce. Ensuring the pipeline of new heat pump workers into the workforce is an essential component of growing the sector.

Figure 7: Educational achievements in subject areas relevant to the five largest heat pump occupations (2020-2024)

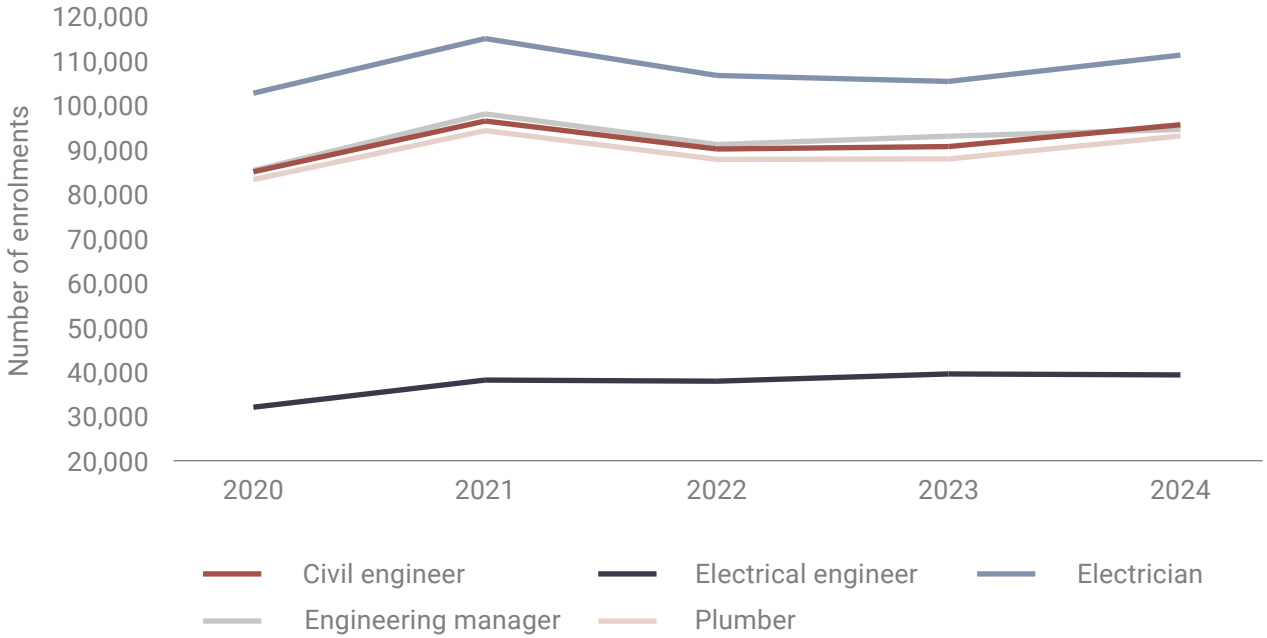


Table 14: Apprenticeship achievements in the five largest heat pump occupations (2024)

LOT occupation	Apprenticeship achievements
Civil engineer	86
Electrical engineer	49
Electrician	4,362
Engineering manager	71
Plumber	691

There are particular challenges around the apprenticeship pathways into heat pump occupations. Currently, there are two apprenticeships that are directly tailored to the needs of the heat pump installation workforce:

- **Plumbing and domestic heating technician (level 3):** Fitting and servicing domestic water, heating and drainage systems. The knowledge, skills and behaviour of this apprenticeship includes "the common processes and techniques used in the installation and maintenance of air-source heat pump systems".[50]
- **Low-carbon heating technician (level 3):** Skilled heat pump installer. The knowledge, skills and behaviour of this apprenticeship include "common installation practices and techniques used in the installation and maintenance of low-carbon heating and hot water systems (air-source, water-source and ground-source heat pump)"[51].

Due to the relative newness of the low-carbon heating technician apprenticeship and limitations in available data, there is currently inadequate reporting on enrolments and achievements. Research by Nesta has found that, as of the end of 2024, only three colleges across Great Britain were offering this apprenticeship.[52] Many colleges are delivering neither the low-carbon heating technician apprenticeship nor the environmental pathway within the plumbing and domestic heating apprenticeship, citing insufficient demand from local businesses.

This employer reticence presents a major barrier to the growth of apprenticeships in the heat pump sector. Surveys conducted by BEIS and Nesta found that employers face several barriers in taking on apprentices, including concerns about cost, the suitability of apprenticeships for small businesses and the quality of both teaching and learners.[53] Often, these challenges are particularly pronounced among micro-businesses and SMEs as they often lack the capacity or resources to meaningfully engage with training opportunities.[54] Our interviews for this research with industry stakeholders echoed these findings, highlighting that the slow apprenticeship uptake is primarily driven by their perceived administrative complexity and doubts about commercial viability – especially in the absence of strong consumer demand.

Apprenticeships are widely recognised as the most effective long-term solution to scaling up the capacity of new, skilled workers into the heat pump workforce. However, this potential will not be realised unless employers overcome perception barriers and gain the demand-side certainty needed to invest in workforce expansion.

Credit: Sam Bush / Nesta / Climate Visuals

CHAPTER 4

Meeting the challenges

Section Summary

Developing the skilled workforce needed for mass heat pump adoption will require close coordination between UK Government, strategic authorities and devolved administrations, industry and training providers.

In this section, we set out our recommendations for the UK government to help address the challenges preventing the future growth of the heat pump workforce. These cover three policy areas:

- *Demand creation and strategic workforce planning* to give confidence to strategic authorities, businesses and training providers to invest in training and identify where – regionally – that investment is most needed.
- *Upskilling the existing workforce* by increasing the financial support available for SMEs and developing a heat pump skills passport to streamline the transition for those with the relevant skills.
- *Expanding the pipeline of new workers* through targeted support for SMEs hiring green heat apprentices and a careers campaign aimed at young people, particularly those from underrepresented groups.

Policy area 1: Demand creation and strategic workforce planning

Our analysis shows an urgent need for strategic workforce planning to ensure a sufficient supply of skilled workers to manufacture and install heat pumps at the required pace and scale. This workforce planning is essential to mitigate potential competition between sectors and Government targets to attract skilled workers.

Skills England's skills need assessments, the Clean Energy Jobs Plan and the forthcoming Warm Homes Plan will help provide strategic direction, but there is a need for further targeted interventions focused on the heat pump sector.

1. **Strengthen market demand to give businesses and training providers the certainty they need to invest in training.** Employer and worker resistance around retraining is, in no small part, a result of uncertainty around the future demand for heat pumps. The UK has Europe's second lowest stock of operational heat pumps.[55] Work is currently underway to develop a single digital advice and information service (HEAT) that should help to improve consumer decision making,[56] whereas measures like the Future Homes Standard will help stimulate demand for heat pumps in new build properties.[57] Furthermore, the forthcoming Warm Homes Plan is a critical policy package to help address demand-side barriers at a consumer level in existing residential properties. Amongst other interventions, the plan should:
    - **Offer a Government-backed, low-interest loan**. Even with the generous £7,500 Boiler Upgrade Scheme, many households continue to face significant upfront costs, particularly when additional expenses such as new radiators, pipework, or electrical upgrades are required. Introducing a Government-backed, low-interest loan would enable these households to spread costs more affordably. Research by Citizens Advice shows that such a loan scheme – with flexible repayment options – would be highly attractive to households, especially when combined with complementary measures such as grants and a trusted consumer advice service.[58] Scotland offers £7,500 in grant funding for clean heating systems, as well as an additional £7,500 of funding available as an optional interest-free loan.[59]
    - **Make heat pumps more competitive relative to gas boilers.** Despite being four times more efficient than gas boilers, heat pumps can be more costly to run as electricity is more expensive than gas. One way in which the Government could help incentivise households is by rebalancing policy costs on energy bills and offering energy bill support to remove the distributional impact on low-to-middle-income households.[60]

2. **Unblock data challenges to better inform skills and training decision-making.** The Clean Energy Jobs Plan committed to fund Local Net-Zero Hubs to build a regional picture of clean energy skills and jobs within local authority areas.[61] Separately, the Post-16 Education and Skills White Paper indicated that Skills England will work in partnership with strategic authorities to provide insights to enhance their local labour market intelligence and anticipate future skills needs.[62]

   This approach will help strengthen place-based skills planning by providing a clearer picture of where investment in skills and further education is most needed. Such data could help:

   - guide Government decision-making on where to appoint colleges as Technical Excellence Colleges in clean energy;
   - inform Local Skills Improvement Plans to address cold spots in under-served regions;
   - support business investment decisions (such as the siting of new manufacturing facilities); and
   - give confidence to training providers on how and where to expand their course offerings.

   Our analysis identified several limitations in the existing data which may hinder Skills England and strategic authorities from developing a data-driven national view of heat pump skills. Out of the five largest heat pump occupations, only 17 of the 35 relevant apprenticeships have apprenticeship achievement data available. Our research also highlights the insights which can be extracted from job postings data, which will most likely not capture self-employed workers or positions that are filled through more informal means such as word of mouth or friends and family connections.[63] This means that any employment data on the heat pump workforce may be missing a substantial portion of the total jobs available. The Green Jobs Taskforce has also highlighted data limitations, such as the lack of data on the quality of jobs and inability to break down the ONS's low carbon and renewable energy economy survey by diversity characteristics.[64] These limitations pose a threat to the accuracy of potential sub-regional labour market analyses that Skills England or other interested bodies may want to conduct.

Policy area 2: Upskilling the existing workforce

As 80% of the 2030 workforce is already in employment, upskilling the existing workforce will be critical to meet near-term heat pump installation targets.[65] As our analysis makes clear, most of the potential heat pump workforce will also be in demand from other sectors facing skills challenges. To incentivise the existing pool of workers to undertake heat pump training, the Government should undertake the following measures:

3. **Increase financial support for SMEs to cover the cost of heat pump training.** The Government should consider increasing the Heat Training Grant to make the decision to take time off work to retrain more attractive. A survey of UK plumbers and heating installers by City Plumbing identified cost (28%) as the key barrier to undertaking heat pump training.[66] While the Government's Heat Training Grant provides up to £500 towards eligible courses (with heating manufacturers offering additional discounts to participating trainees), this does not always cover the cost of the training. GTEC Training, for example, offers a three-day MCS-recognised course at £660 (excluding VAT).[67] Additionally, the Heat Training Grant does not cover the cost of travel, accommodation and, most significantly, loss of earnings during the training periods. According to a Valliant survey, half of installers anticipate between £251- and £450-income loss for a full day of training.[68]

4. **Develop a heat pump skills passport.** The Post-16 Education and Skills White Paper indicated that Skills England will "engage with industry and other partners to explore the development of skills passports".[69] We recommend that Skills England considers developing a heat pump skills passport. This digital tool would help to match the profile of existing workers with available training pathways by identifying what qualifications and training standards are needed for roles in the sector (including both manufacturing and installation), what Government support is available (such as the Heat Training Grant and Start at Home initiative) and potential career progression. Importantly the passport should highlight the transferability of the tasks, skills, qualifications, conditions and pay of heat pump-related jobs, rather than promoting

them as "green jobs". Previous research has found that the phrase "green jobs" is an unhelpful description, often leaving workers unsure about whether they are able to do these types of jobs. [70] Focusing on the transferability of skills would offer flexibility and enable the Government to build a responsive, resilient workforce able to respond to changes in demand as needed.

Energy passports have been used in other sectors, such as the Energy Skills Passport developed by RenewablesUK and OEUK – supported by the UK and Scottish Governments – for oil and gas workers transitioning into offshore wind.[71] The heat pump skills passport could leverage existing resources (such as the Green Careers Hub) and be offered as a tool by careers advisers in the new National Jobs and Careers Service for those out of work or recently made redundant from a related industry.[72] An additional benefit of the passport is that it could serve as a mark of quality, giving consumers confidence that their installer has the necessary training and expertise to deliver high-standard work. For example, the passport could be used to showcase an installer's MCS accreditation.

Policy area 3: Expanding the pipeline of new workers

As highlighted in previous sections, the pipeline of new heat pump workers into the workforce is an essential component of growing the sector and meeting Government targets. To achieve this, action is needed to support businesses to take on apprentices and improve careers advice, information and guidance for young people (particularly women, ethnic minorities and other underrepresented groups):

5. **Incentivise SMEs to take on more apprentices.** While the Government's Growth and Skills Levy widens the apprenticeship offer to provide employers and learners with greater flexibility, barriers to uptake remain. Existing research has shown smaller businesses in the heat pump industry to be significantly less likely than larger ones to hire apprentices, with associated costs being the most significant barrier faced by employers.[73] Our company analysis shows that the heat pump industry is dominated by SMEs, who will struggle to afford the hidden costs of an apprenticeship – these include the cost of travel, accommodation, equipment, additional learner support and the cost of backfill or lost work when the apprentice is completing their off-the-job training.

   To support SMEs to take on, train, pay and retain apprentices, the Government should increase the Apprenticeship Incentive Payment. Under this grant, employers can receive a £1,000 payment for each new 16-18-year-old apprentice or those aged under 25 with an Education, Health and Care Plan. Increasing the grant once again to £3,000 for each apprentice, as it was in 2021 during the Covid-19 pandemic, and expanding it to all those aged under 25 not in employment, education, or training, could help to boost SME intake and investment into youth apprenticeships.[74]

   Our analysis found that smaller businesses make up the majority of employers demanding heat pump-relevant skills. Given the constraints on funding across the public sector and to offset increased business costs, the Apprenticeship Incentive Payment could be restricted to SMEs or linked to eligible courses, such as the low-carbon heating technician apprenticeship. The latter approach would help to incentivise the uptake of the heat pump relevant apprenticeships, alleviating current concerns around low enrolments and completions whilst making the system administratively simpler.

6. **Launch a national green heat careers campaign aimed at young people, particularly those from underrepresented groups.** Young people's decision-making on career pathways begins at secondary school. Although heat pump-relevant pathways exist, many students considering careers in the trades remain unaware of the potential careers in green heat technologies – a problem exacerbated by the fact that most teachers do not feel confident advising their students on green career opportunities.[75] Additionally, our analysis found that women are 8% of the potential heat pump workforce, and previous studies found that ethnic minority groups account for just 5% of the workforce.[76]

   Often, stereotypes and societal biases contribute to the idea that such occupations are not for them, meaning that women and those from ethnic minority groups are deterred from joining the industry. These perceptions are affecting young people's decision-making when choosing career paths, yet industry experts suggest that women and young people show more interest in sustainable energy and renewables than senior members of the trade workforce, posing a promising growth opportunity for the heat pump sector. By deconstructing stereotypes and addressing cultural biases

surrounding careers in the trades while potential new entrants are still in school or college, we can attract more women and ethnic minority groups to the heat pump workforce, supporting its long-term growth. Women and ethnic minority groups therefore present an untapped pool of talent that could help address the labour and skills shortages in the heat pump workforce.[77]

The Clean Energy Jobs Plan announced that Energy & Utility Skills, with support from the Department for Energy Security and Net Zero and other trade bodies, are launching a UK-wide, industry-led awareness and recruitment campaign on job and career opportunities next year.[78] To be successful, this campaign should include clean heat careers and look to learn from the This is Engineering campaign, led by the Royal Academy of Engineering in partnership with EngineeringUK.[79] The multi-year campaign aimed to increase the number and diversity of future engineers by repositioning engineering careers to young people (aged 13-18) and their influencers. The campaign included free resources, a film series celebrating engineering and technology trailblazers, a free photo library and a series of short videos that each profiled a young engineer. Since 2018, *This is Engineering* films have attracted more than 69 million views and encouraged more than 1.45 million teenagers to consider a career in engineering.

This campaign would give teachers, careers advisers and other influencers (such as parents) the confidence, knowledge and resources to engage with young people – regardless of their background – on the available opportunities and pathways in the renewable energy and clean heat sector.

Credit: Katy King / Nesta / Climate Visuals

CHAPTER 4 Conclusion

Ahead of the Warm Homes Plan, and as the Government delivers its Clean Energy Workforce Strategy, this report has shown that while the current heat pump workforce is small, there is a substantial base of workers in related trades and occupations who could transition into heat pump roles with the right support. Around 76,000 people in England already possess relevant skills, but only a fraction hold specific heat pump qualifications. Without decisive Government action, workforce shortages – driven by demographic pressures, competition from other sectors and barriers to training – will constrain the UK's ability to meet its clean heat and wider net-zero ambitions.

At the same time, the potential is clear. With targeted interventions in workforce planning, upskilling of the existing workforce and expanding – and diversifying – the education and training pathways into heat pump occupations, the sector could rapidly boost its capacity. Strategic regional forecasting, stronger demand signals and clearer policy direction would give businesses and training providers the confidence to invest in skills pipelines. Upskilling existing tradespeople through improved financial incentives and the introduction of a portable heat pump skills passport could unlock thousands of potential installers. Furthermore, by incentivising SMEs to take on apprentices and improving careers advice, the Government and industry can expand and diversify the next generation of the heat pump workforce.

Delivering this transition will require alignment between policymakers, industry and training providers. Heat pumps are the key driver of green economic growth. With coordinated action now, the UK can create a sustainable, skilled and inclusive heat pump workforce that supports cleaner homes, lower emissions and a stronger economy for the future.

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