HEAT PUMP ASSOCIATION

PROJECTING THE FUTURE DOMESTIC HEAT PUMP WORKFORCE

BACKGROUND AND METHODOLOGY REPORT

November 2024

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INTRODUCTION

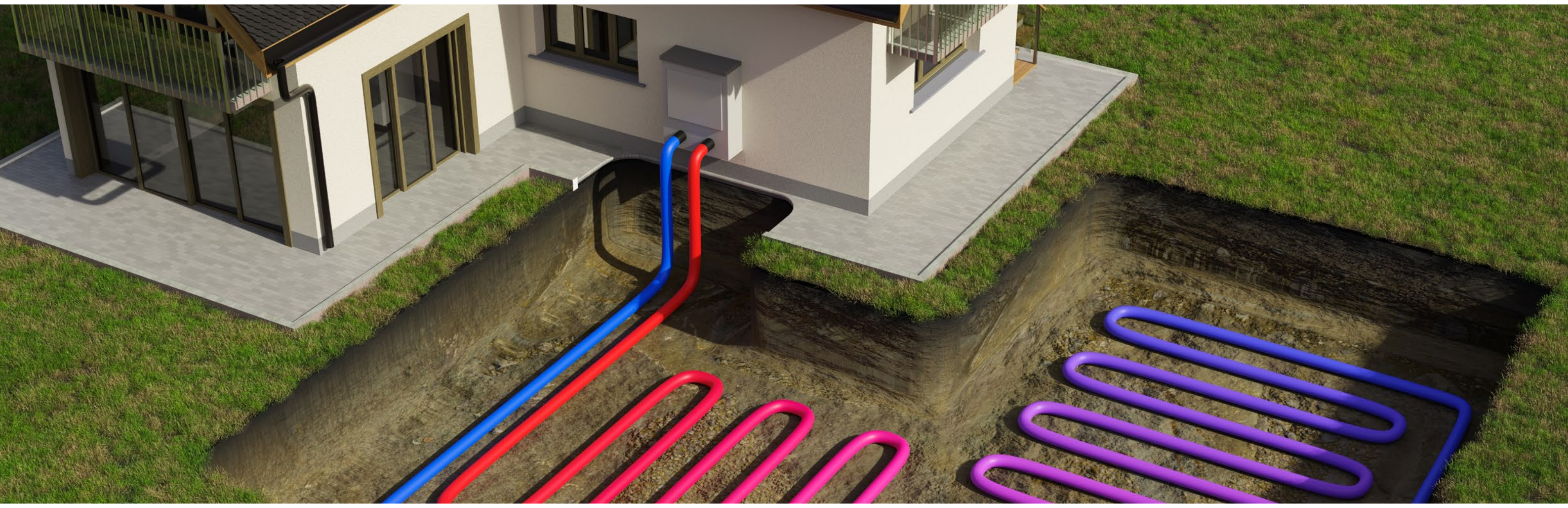
BACKGROUND AND METHODOLOGY REPORT

The key findings of the research project have been covered in the main report, entitled 'Projecting the Future Domestic Heat Pump Workforce'[1]. The purpose of this accompanying report is twofold.

1. **Setting out the methodology for the research:** The first purpose is to provide a more detailed overview of the methodology than is provided in the main report. The underpinning analysis to the findings of the report are technical and complex. For policymakers and thought leaders in the field it is important to understand that the conclusions reached are based on a sound methodology, sharing this is key to that objective.

2. **Sharing wider findings:** The findings outlined in the main report focus on the workforce requirements for the two scenarios that are set out below. However, during the project, the research team captured a range of wider information that, while not directly applicable to the objectives of the main report, is still relevant to the sector as a whole. These findings are set out in this report.

The structure of the report covers the underlying methodology and the further findings of the research, distinguishing between quantitative and qualitative aspects. As set out in the main report 'Projecting the Future Domestic Heat Pump Workforce'[2], the purpose of this overall research is to determine the number of individuals needed within the heat pump workforce to deliver the heat pump installations projected under two scenarios.



1 HPA (2024) 'Projecting the Future Domestic Heat Pump Workforce'. Available at:https://www.heatpumps.org.uk/wp-content/uploads/2024/11/HPA-Projecting-the-Future-Domestic-Heat-Pump-Workforce-Report.pdf

2 HPA (2024) 'Projecting the Future Domestic Heat Pump Workforce'. Available at: Available at:https://www.heatpumps.org.uk/wp-content/uploads/2024/11/HPA-Projecting-the-Future-Domestic-Heat-Pump-Workforce-Report.pdf

1. **Scenario 1: Current and future policy**[3]**.** This scenario models heat pump installation across the United Kingdom (UK) according to policies already in place, as well as proposed policies that are set to come into force in future, for example, the Future Homes Standard (FHS)[4] and the Clean Heat Market Mechanism (CHMM)[5]. It considers the workforce that will be required to deliver this number of heat pump installations.
2. **Scenario 2: UK Government heat pump installation targets**[6]**.** This scenario considers the workforce that will be required to meet the following heat pump installation targets set by the previous UK Government:
   - To install 600,000 heat pumps annually by 2028[7].
   - To install 1.6 million heat pumps annually by 2035[8].

The workforce projections are based on a granular analysis of the heat pump installation process and the different job roles involved. They consider differences in the installation process and labour intensity requirements between various property archetypes and heat pump types.

The installation assumptions and workforce projections are based on extensive engagement with key stakeholders in the sector, including heat pump installation businesses and manufacturers, as well as policy officials and third sector organisations. This has enabled a granular analysis of the end-to-end installation process to be conducted, which has identified the roles and skills required to meet each scenario.

3 These are either current policies which are already in place or ones that are expected with a reasonable degree of confidence to be implemented, for example those where the Government has set out a clear timeline for introduction (e.g. FHS) or has already consulted on them. This reflects the policy landscape at the time of writing.

4 Department for Levelling Up, Housing and Communities (2023) The Future Homes Standard 2023 consultation on the energy efficiency requirements of the Building Regulations affecting new and existing dwellings. Available at: https://assets.publishing.service.gov.uk/media/65cc90e139a8a7000f60d508/Future_Homes_Standard_consultation_stage_impact_assessment.pdf

5 DESNZ (2023). Clean Heat Market Mechanism. Available at: https://assets.publishing.service.gov.uk/media/6424154560a35e000c0cb07f/clean_heat_market_mechanism.pdf

6 Please note that these targets were announced by the previous Conservative Government. As of the time of writing of this report, these are assumed to remain in place, as there has no indication to the contrary from the new Labour Government. Nonetheless, the report does not account for any changes that may be implemented by the new Government between then and the publication date of this report. The same applies to all subsequent references to these targets in the report.

7 HM Government (2020). The Ten Point Plan for a Green Industrial Revolution. Available at: https://assets.publishing.service.gov.uk/media/5fb5513de90e0720978b1a6f/10_POINT_PLAN_BOOKLET.pdf

8 HM Government (2023). Responding to the Climate Change Committee's (CCC) 2023 Annual Progress Report to Parliament. Available at: https://assets.publishing.service.gov.uk/media/666c1642fed5bd09e5195a4b/ccc-annual-progress-report-to-parliament-2023-government-response.pdf

SCOPE OF THE REPORT

Both Scenario 1 and Scenario 2 cover the United Kingdom[9]. The purpose of this research is to determine the number of individuals needed within the heat pump workforce to deliver and maintain the heat pump installations projected under these two scenarios. As such it does not consider:

- **The heat pump manufacturing workforce**: The report does not consider roles in the broader heat pump supply chain such as manufacturing and assembly of heat pumps.
- **Additional training drivers:** To achieve the necessary net growth in workforce, training demand will be greater than workforce need. This is due to 5 yearly re-training cycles required by some courses and the need for Continuous Professional Development (CPD), together with a need to train to replace those who leave a given role for a variety of reasons (such as retirement, health, career change, promotion, etc.).
- **Non-domestic heat pump installations:** This report focusses on the domestic heat pump workforce. While there will be some inevitable overlap between the domestic and non-domestic heat pump workforces, the non-domestic workforce and any overlap is not modelled in this report.

9 Northern Ireland has a negligible impact on deployment in Scenario 1 because the policy landscape for heat pump deployment within Northern Ireland is currently minimal. The only dedicated policy that will apply there (from April 2025) is the CHMM, meaning it is challenging to accurately model policy-driven deployment for Northern Ireland. Analysis of MCS data suggests that Northern Ireland installations only accounted for 0.02% of UK installations in 2023. MCS data is derived from MCS (2024). The MCS Data Dashboard. Available at: https://datadashboard.mcscertified.com/InstallationInsights

METHODOLOGY

The methodology for this research project brings together three main elements to generate heat pump workforce projections. These are set out in Figure 1 and in more detail in the section below, where each element is explained in turn.

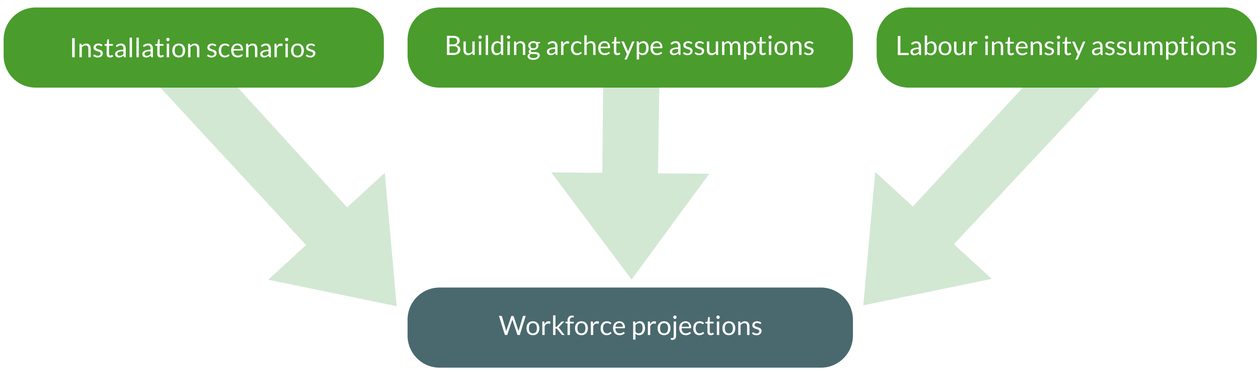
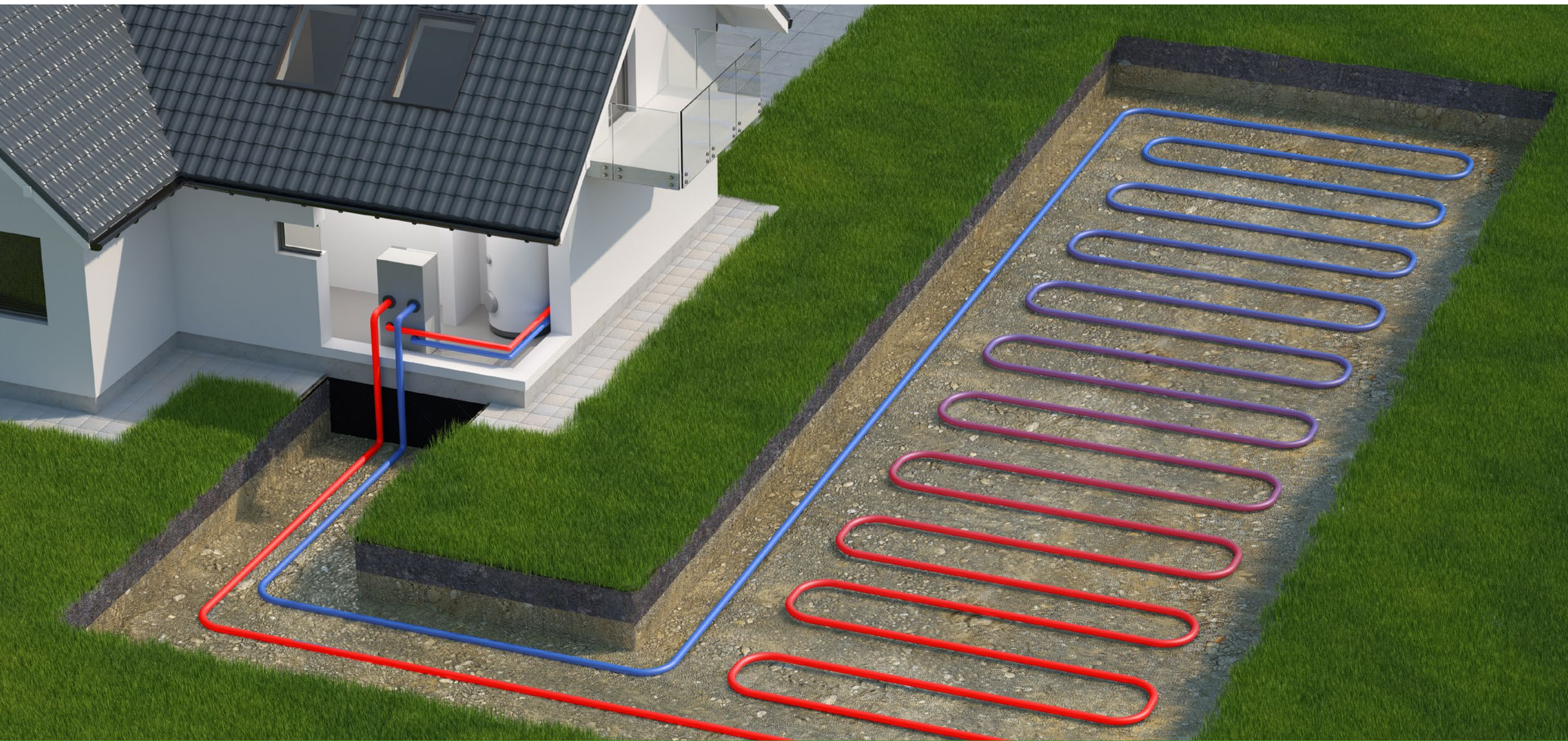


Figure 1 - The main underlying assumptions behind our workforce projections

By combining the installation scenarios, building archetype assumptions and labour intensity assumptions, it was possible to determine a projection for the total workforce required across each of the installation scenarios.



The high-level methodology is set out in the main report, while the full approach to this is set out in detail below.

OVERALL MODELLING APPROACH

Figure 2 provides an overview of the approach to the modelling. This involved calculating total deployment requirements for both scenarios. The installation process and labour intensity were mapped in detail for a range of heat pump technologies and property archetypes (new build, retrofit average, and retrofit large[10]). These were gathered through surveys and interviews with key stakeholders, with labour intensity values then applied to deployment figures to calculate the total workforce.

STEP 1:

Collated the heat pump deployment figures from government policies intended to generate heat pump demand.

STEP 2:

Calculated the total growth in heat pump deployment resulting from in-scope policies and targets.

STEP 3:

Developed labour intensities for the installation process for in-scope technologies based on interviews and surveys.

STEP 4:

Labour intensity values were applied to the deployment figures to calculate the workforce requirement. These were aligned with the technology split set out later.

10 The approach to archetypes is explained in the Building archetype assumptions section of this report.

QUANTITATIVE RESEARCH

HEAT PUMP DEPLOYMENT SCENARIOS

The workforce projections are determined by two different heat pump deployment scenarios. This reflects the fact that future heat pump uptake and policy is uncertain, therefore mapping out the two scenarios helps demonstrate how the workforce requirements may differ depending on the level of future heat pump deployment and policy support. The two deployment scenarios that the workforce projections are based on are:

1. **Scenario 1: Current and future policy[11].** This scenario models heat pump deployment in the period 2023-2028 according to current policies already in place, as well as proposed policies that are set to come into force in future, for example, the FHS and CHMM. It considers the heat pump workforce that will be required to deliver this level of deployment.

2. **Scenario 2: UK Government installation targets[12].** This scenario considers the workforce that will be required to meet the following heat pump installation targets set by the previous UK Government:
    - To install 600,000 heat pumps annually by 2028[13].
    - To install 1.6 million heat pumps annually by 2035[14].

An important variable for deployment other than volume, is the mix of heat pump type within the deployment scenarios. This is based on the best available projections for the deployment of different heat pump types, but if the mix of types changes, then this will impact the relative mix of workforce roles. For example, if the relative proportion of Ground Source Heat Pumps (GSHPs) was to increase relative to Air to Water Heat Pumps (AWHPs), then the number of Groundworks Technical Operatives (GTOs) would increase with it. The methodology for determining the split of heat pump types in the deployment modelling is discussed in more detail in the Heat pump types section of this report. The impact of heat pump type on the labour intensity of roles can be found in the Labour intensity assumptions section.

11 These are either current policies which are already in place or ones that are expected with a reasonable degree of confidence to be implemented, for example those where the Government has set out a clear timeline for introduction (e.g. FHS) or has already consulted on them. This reflects the policy landscape at the time of writing.

12 HM Government (2020). The Ten Point Plan for a Green Industrial Revolution. Available at: https://assets.publishing.service.gov.uk/media/5fb5513de90e0720978b1a6f/10_POINT_PLAN_BOOKLET.pdf

13 Please note that this target was announced by the previous Conservative Government in 2020. Therefore, this scenario reflects the UK Government's installation target as it was at the time of writing this report, it does not account for any changes that may be implemented by the new Government between then and the publication date of this report.

14 HM Government (2023). Responding to the Climate Change Committee's (CCC) 2023 Annual Progress Report to Parliament. Available at: https://assets.publishing.service.gov.uk/media/666c1642fed5bd09e5195a4b/ccc-annual-progress-report-to-parliament-2023-government-response.pdf

BUILDING ARCHETYPE ASSUMPTIONS

While every dwelling and installation is different, for this research it was necessary to make general assumptions about the heat pump installation process in different properties. To reflect the variation in the installation process across different types of property, the assumptions are based on three different property archetypes with variable labour intensity. This recognises that some properties will be more or less labour-intensive to fit a heat pump in than others. In consultation with the sector as part of the interview process, heat pump installations were grouped into the following three archetypes: new build, retrofit average, and retrofit large. The distinction between retrofit average and retrofit large was made purely for methodological purposes – to improve the accuracy of labour intensity assumptions and reflect the heterogeneity of the UK housing stock. As such, this distinction does not feature in the main report's findings, where retrofit average and retrofit large are combined into a total retrofit category.

NEW BUILD

Assumes an average 70m^2 in floor area 3-bedroom house or flat, built from scratch.

RETROFIT AVERAGE

Assumes an average 100m^2 to 125m^2 in floor area 3–4-bedroom house or flat, with gas central heating and 4 radiators which require replacing.

RETROFIT LARGE

Assumes any property over 125m^2 in floor area with 6-8 radiators that need to be replaced per property.

There is an important question about how the split of property archetypes has been determined. As set out in this report, the property archetype has a material impact on the labour intensity of the heat pump installation, so in turn, will have an impact on the workforce requirements for the sector. The approach taken in this report divides the UK property market into new build and retrofit properties. Retrofit properties are then further divided into retrofit average and retrofit large according to the size of property. It does not distinguish properties by type of property in the sense of being detached, semi-detached or a flat.

The Business, Energy and Industrial Strategy Committee stated that 29 million households in the UK need to be retrofitted with low carbon heating by 2050[15]. The split in property archetypes is determined by the English Housing Survey that collates the percentage of properties by size in the UK. It identifies the average property size (by floor area) in the UK as 100m^2 in 2024[16]. As such, this forms the standard archetype for the retrofit average scenario. All properties that are more than 25% larger than the average (so over 125m^2) fall into the 'retrofit large' category. The extent of heating system installations or upgrades that would be required in these property archetypes has been informed by extensive stakeholder engagement with those in the industry and a review of existing research. It is assumed that a retrofit average property has 4 radiators that need replacing, with 6-8 for retrofit large properties[17]. Interviews with HPA members and independent research suggest that on average half of all radiators would need to be replaced in any retrofit context[18].

For new build properties, the methodology has two stages. For England, the new build projections from the FHS were used, which assumes net completions of 176,000 new builds in 2026, rising to 218,700 in 2035[19]. Consistent with the Future Homes Standard Impact Assessment (FHS IA), this assumes that by 2027, 50% of these new builds will have low carbon heating. For Scotland, the main policy driver for new builds is the Scottish New Build Heat Standard (SNBHS). Data from the Scottish Government suggests that around 20,000 new build properties were constructed in Scotland in 2022, hence an initial annual new build rate of 20,000 was assumed[20]. Due to this policy requiring a 'Zero Emissions Heating System' and being strongly worded towards heat pumps and heat networks[21], 75% of these Scottish new build homes have been assumed to be equipped with a heat pump, in line with the Climate Change Committee's (CCC) Sixth Carbon Budget[22]. More detail on how heat pump deployment in new builds has been determined for England can be found in the section below entitled: New build heat pump deployment in England

15 Business, Energy and Industrial Strategy Committee (2022) 'Decarbonising Heat in Homes'. Available at: https://committees.parliament.uk/publications/8742/documents/88647/default/

16 Ministry of Housing, Communities and Local Government (2024). Collection: English Housing Survey. Available at: https://www.gov.uk/government/collections/english-housing-survey

17 Viessmann (2022). What size of boiler do I need for my home? Available at: https://www.viessmann.co.uk/en/heating-advice/boilers/what-size-of-boiler-do-i-need.html

18 Delta Energy and Environment (2018). Cost of Domestic Heating Measures. Available at: https://assets.publishing.service.gov.uk/media/5f6d9379e90e077514e06719/delta-ee-cost-domestic-heating-measures-final-cost.ods

19 DESNZ (2023) Future Homes Standard: Consultation Stage Impact Assessment. Available at: https://assets.publishing.service.gov.uk/media/65cc90e139a8a7000f60d508/Future_Homes_Standard_consultation_stage_impact_assessment.pdf

20 Scottish Government (2022) Quarterly Housing Statistics 2023. Available at: https://www.gov.scot/news/quarterly-housing-statistics-january-2023/

21 Scottish Government (2022). New Build Heat Standard: consultation – part two. Available at: https://www.gov.scot/publications/new-build-heat-standard-consultation-part-ii/documents/

22 CCC (2020). The Sixth Carbon Budget. Pg 115. Available at https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf

The resulting archetype split for each scenario over the period 2023 to 2028 can be found in Figure 3 and Figure 4 below.

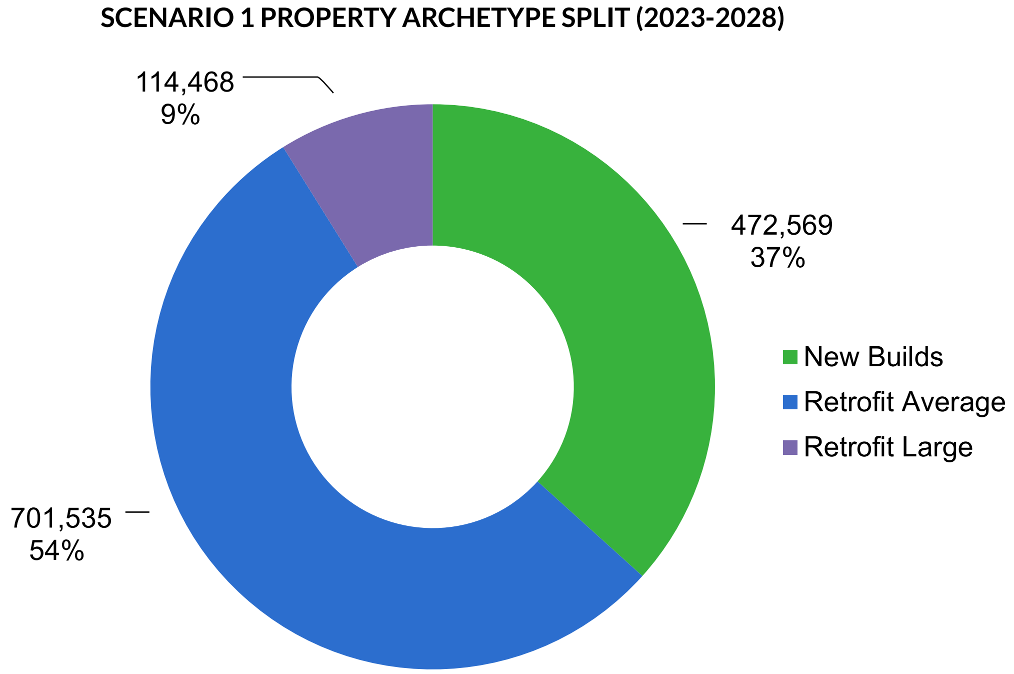


Figure 3 – Scenario 1 property archetype split (2023-2028)

Figure 3 shows how the total projected heat pump installations carried out in Scenario 1 between 2023 and 2028 are split between property archetypes. The most common property archetype is a retrofit average property, representing 54% of heat pump installations (701,535). Around 9% of the total are retrofit large properties (114,468) while 37% (472,569) of installations are projected to be in new builds.

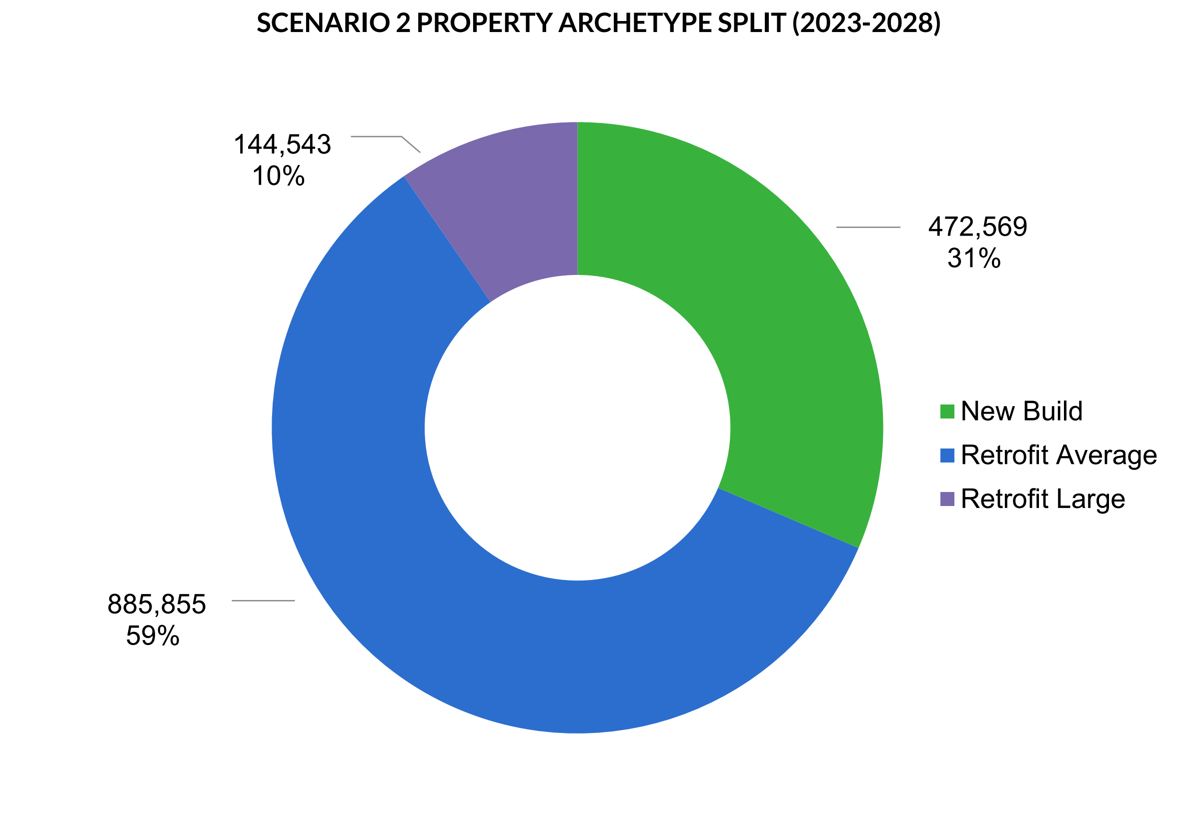


Figure 4 - Scenario 2 property archetype split (2023-2028)

In Scenario 2, the split of cumulative heat pump installations between property archetype is slightly different as shown by Figure 4. Between 2023 and 2028, the same number of new build installations take place as in Scenario 1, however 1,030,398 retrofit installations are projected during this period under Scenario 2. Therefore, the proportion of total heat pump installations that take place in retrofit properties is 6% higher (at 69%) in Scenario 2 than it is in Scenario 1 over the corresponding period.

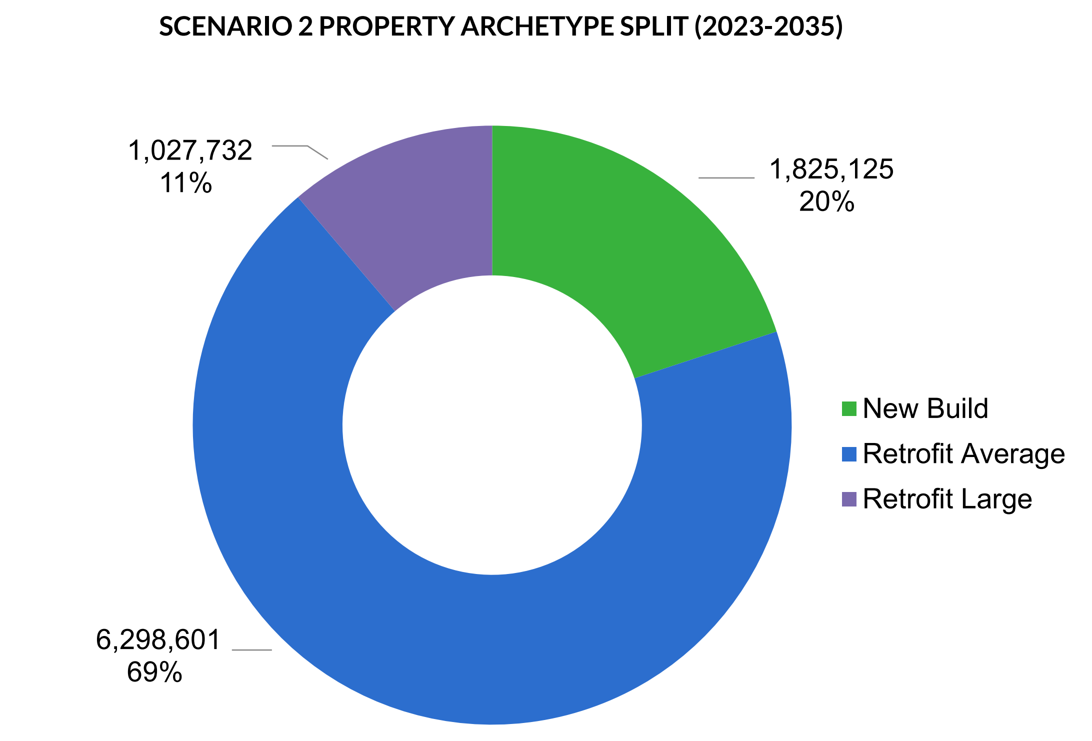


Figure 5 – Scenario 2 property archetype split (2023-2035)

When taken over the whole period covered by Scenario 2 (2023-2035), the split of total heat pump installations by property archetype changes so that 80% of installations (7,326,333) take place in retrofit properties and the other 20% (1,825,125) are in new builds. This is because, by 2035, as the total heat pump uptake increases, it is expected that the number of retrofit properties with a heat pump will increase correspondingly. Most of the growth is concentrated in retrofit average properties, which grows by 10% over the period to (6,298,601) properties, as opposed to retrofit large which still only represents 11% of properties in 2035, a growth of only 1%. The reason for this is that the scale of growth in retrofit is projected to outpace the scale of growth in new builds after 2028.

NEW BUILD HEAT PUMP DEPLOYMENT IN ENGLAND

The report's heat pump installation projections for new build properties in England are based on the following assumptions around the estimated proportion of new homes that will have heat pumps. This is projected to follow the trajectory set out in Figure 6 below.

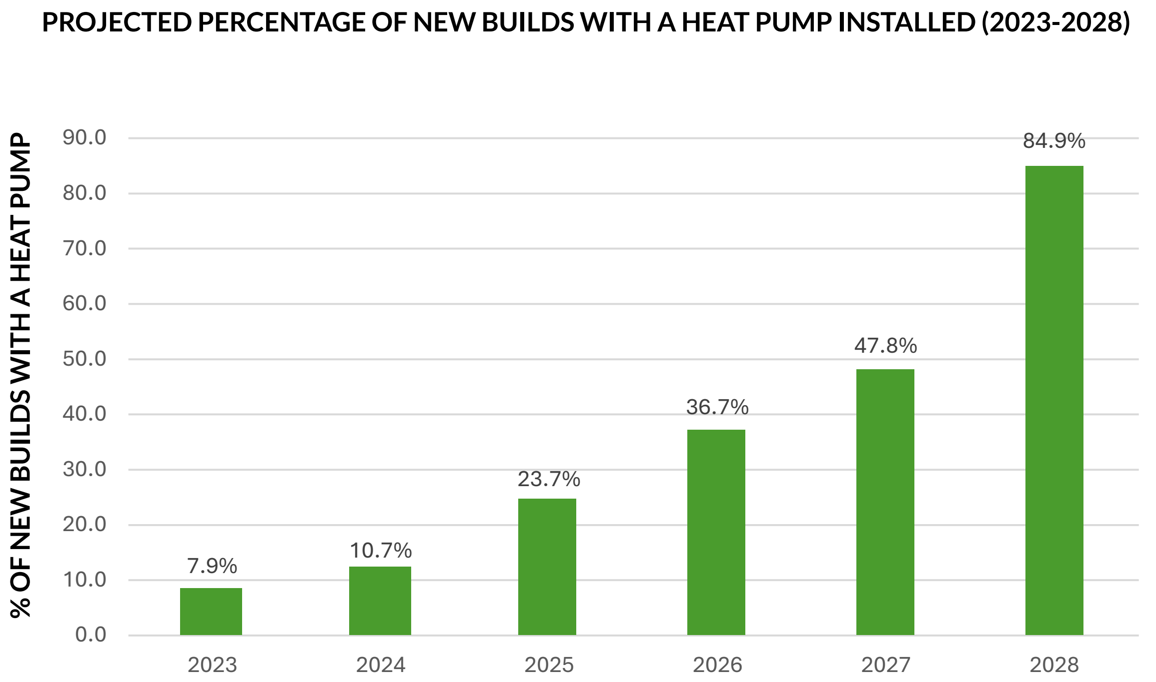


Figure 6 - Projected percentage of new builds with a heat pump installed (2023 – 2028)

To produce these projections, historical installation data, current building regulations (Part L 2021 uplift[23]) and future building regulations (Future Homes Standard 2025[24]) were scrutinised, along with the low carbon technology deployment split set out in the CCC's Sixth Carbon Budget[25]. The benefit to this approach is that it sticks closely to the FHS IA and the CCC's Sixth Carbon Budget which are both reputable sources that are publicly available.

23 Department for Levelling Up, Housing and Communities (2021). Impact assessment: 2021 uplift to energy efficiency standards, improved ventilation and new overheating requirement. Available here: [2021 uplift to energy efficiency standards, improved ventilation and new overheating requirement - GOV.UK (www.gov.uk)]

24 DESNZ (2023) Future Homes Standard: Consultation Stage Impact Assessment. Available at: https://assets.publishing.service.gov.uk/media/65cc90e139a8a7000f60d508/Future_Homes_Standard_consultation_stage_impact_assessment.pdf

25 CCC (2020). The Sixth Carbon Budget. Available at https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf

The approach to deriving these projections is set out in more detail below, separated by time period.

2023-2024

In 2023 and 2024, historical installation data is available. Where this is available, it is more reliable than heat pump installation projections made in the FHS IA. Therefore, for this period, historical data has been used for new build heat pump installations and overall new build completions[26]. For 2024, the latest available data is for the period up to 30 June 2024, hence projections have been extrapolated out for the rest of 2024 based on these half-year numbers. This 2023-24 historical data is used as the baseline for future projections.

2025-2026

The FHS IA projects that before the FHS 2025 is phased in from 2027, an increasing proportion of new homes will have a heat pump installed in line with the Part L 2021 uplift. These projections are displayed in Table 1 below. This projects that the percentage of new homes with a heat pump will rise to 50% in 2025 and then remain flat until the FHS 2025 comes into effect. In reality, future new build heat pump deployment is unlikely to follow this trajectory for several reasons. Firstly, historical data up until 2024 is significantly lower than the projections in Table 1. Therefore, to reach a percentage of 50% in 2025 would require an unprecedented rise of 39.3% on the 2024 baseline for new builds, with the actual percentage of new homes with heat pumps installed currently at 10.7% for 2024. Secondly, it is unlikely that new build heat pump installations will rise sharply to 50% in 2025, then plateau for 3 years, before increasing sharply once more to 95%. Given the lower than projected 2024 baseline, it is more likely that installations will gradually increase from the current 10.7% baseline to 50% by 2027.

Taken together, it is assumed that:

- 10.7% of new builds have heat pumps installed in 2024 rather than the 37% projected in the FHS IA.
- From this baseline, a gradual ramp up in installations is assumed in line with the rate of increase projected in the FHS IA.
- As the FHS IA projects a 13% year-on-year increase in the percentage of new builds receiving a heat pump from 2022-2025, the analysis assumes the same level of percentage increase but from a historical baseline of 10.7% in 2024. This approach enables a gradual ramp-up in new build heat pump installations in 2025 and 2026.

26 This historical data is derived using overall heat pump sales data submitted by HPA members and new build heat pump installation data taken from the EPC database.

Table 1 - Percentage of homes with a heat pump under the Part L 2021 uplift as per the FHS IA[27]

% OF NEW HOMES WITH A HEAT PUMP	2022	2023	2024	2025	2026
FHS IA projections	10.0%	23.0%	37.0%	50.0%	50.0%
Assumptions in the report (based on historical data for 2022-2024)	5.9%	7.9%	10.7%	23.7%	36.7%

2027 ONWARDS

Table 2 below sets out the projected installation rate for low carbon heating from 2027 onwards under the FHS 2025 regulations, as per the FHS IA. This shows the percentage of new build homes that are expected to have low carbon heating systems installed as the FHS 2025 regulations are phased in. The phase-in assumptions in the FHS IA assume that the FHS 2025 regulations are not phased in until 2027, when they result in 50% of homes having low carbon heat, rising to 100% from 2029 onwards.

The bottom row of Table 2 shows how this translates into the percentage of new homes with heat pumps installed, as the FHS 2025 regulations stipulate that the new requirements can be met by heat pumps, heat networks or other low carbon sources. Since, the CCC's Sixth Carbon Budget projects that, in 2027, 96% of new build low carbon heat installations will be heat pumps[28], it is assumed that 47.8% of new build homes have heat pumps installed in 2027. From 2027, the heat pump installation rate modelled in new builds mirrors the CCC's Sixth Carbon Budget deployment rate, accepting that heat networks (communal heat pumps) have an increasing role from about 2028 onwards. This means that the peak of heat pump deployment (as opposed to communal heat pumps used in heat networks) as a percentage of new builds is reached in 2029 and declines from that point onwards, while continuing to grow numerically as overall annual new build completions are projected to rise.

Table 2 - Phase - in assumptions (% of new homes with low carbon heat under the FHS 2025 requirements)[29]

IMPACT OF FHS 2025	2027	2028	2029	2030 ONWARDS
% of new homes built in that year with low carbon heat installed	50.0%	95.0%	100.0%	100.0%
% of new homes built in that year with heat pumps installed[30]	47.8%	84.9%	89.3%	87.3%

27 DESNZ (2023) Future Homes Standard: Consultation Stage Impact Assessment. Available at: https://assets.publishing.service.gov.uk/media/65cc90e139a8a7000f60d508/Future_Homes_Standard_consultation_stage_impact_assessment.pdf

28 CCC (2020). The Sixth Carbon Budget. Available at https://www.theccc.org.uk/wp-content/uploads/2020/12/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf

29 DESNZ (2023) Future Homes Standard: Consultation Stage Impact Assessment. Available at: https://assets.publishing.service.gov.uk/media/65cc90e139a8a7000f60d508/Future_Homes_Standard_consultation_stage_impact_assessment.pdf

30 The percentage In Table 2 refers to the proportion of new homes built in the corresponding year that have heat pumps or low carbon heat installed. At years of high, or 100% compliance (2028 onwards) as per CCC data it is assumed that aside from heat pumps, compliance is achieved using low carbon heat networks. Low carbon heat networks could encompass large heat pumps. These are out of scope of this report. We do not assume this figure to include networked ground source heat pumps, or shared ground loop heat pumps – these are included as part of the GSHP modelling assumptions.

LABOUR INTENSITY

The labour intensity of the heat pump installation process refers to how long a heat pump installation takes, the steps that are involved and who completes each step. A key step in the analytical process involved generating a set of primary labour intensity assumptions from HPA members. This involved:

- Setting out the key steps involved in the heat pump installation process
- Identifying the individual workforce role that would complete each step
- Confirming how long each step takes to complete in Full Time Equivalent (FTE) days

This was modelled by property and heat pump type. For each of these steps, the heat pump sector were consulted (manufacturers, installers, consultancies and professional services firms involved in the sector) through a combination of surveys and interviews. A significant proportion of the heat pump industry were engaged through this process. For more detail on surveys and interviews please refer to the Qualitative research section.

The installation steps covered by this process can be found at the Installation and maintenance steps section and detail on the labour intensities themselves can be found in the Labour intensity assumptions section of the report.

LABOUR UTILISATION AND ACTIVITY RATES

Workforce numbers were initially calculated in full time equivalent, or FTE, which assumes that people trained work full time in their roles. The research also projects the minimum number of trained individuals qualified to install heat pumps that the sector will need to meet its installation projections and targets under different scenarios. It does this by considering labour utilisation and activity rate assumptions for individuals qualified to install heat pumps. This considers the fact that the training requirement in terms of the number of individuals is always higher than the FTE workforce requirement. Labour utilisation and activity rates are only considered for individuals qualified to install heat pumps, not for other roles, for the following reasons:

- **Individuals qualified to install heat pumps represent a specialist role type specific to the heat pump sector which requires additional training and qualifications to carry out**. Unlike other job roles in the heat pump installation process, individuals qualified to install heat pumps require additional skillsets and qualifications specific to the heat pump industry. For instance, when recruiting Electrical Technical Operatives (ETOs) into the heat pump workforce, the sector can recruit individuals from an existing workforce pool with little need for additional training. By contrast, when it comes to filling the workforce requirement for individuals qualified to install heat pumps, the sector will need to train new individuals or re-train the existing workforce in a new skillset. Since this job role cannot be undertaken by the existing workforce without additional training and qualifications, it is vital that the heat pump sector knows the total number of individuals that will need to be trained to install heat pumps in order to meet installation projections and targets.
- **High proportion of part-time operatives.** Unlike other roles like ETOs and GTOs, where workers generally spend most of their time carrying out work specific to that occupation, many individuals who are qualified to install heat pumps do not currently work full-time installing heat pumps, partly due to the growing nature of the heat pump market. This means that the number of ‘trained and active’ individuals required to install heat pumps is generally much higher than the FTE role requirement. As explained in more detail later in this section, this is expected to change in future as heat pumps become a more prominent heating technology.
- **Largest future workforce requirement**. Finally, in both scenarios, Heat Pump Technical Operatives (HPTOs) and Plumbing and Heating Technical Operatives (PHTOs) are projected to constitute a majority of the workforce requirement. Therefore, it is crucial that the sector has a reliable estimate of the total number of individuals it will need to train to install heat pumps.

The methodology for calculating the total number of individuals qualified to install heat pumps that the sector will need to train involved two main steps: calculating the labour utilisation rate and the labour activity rate.

LABOUR UTILISATION RATE

The labour utilisation rate in this report is used to model the proportional time that individuals qualified to install heat pumps spend doing heat pump installations and maintenance. Microgeneration Certification Scheme (MCS) data suggests that the current average percentage of time that heat pump installation businesses spend installing heat pumps is 48%[31]. Therefore, it is assumed that individuals qualified to install heat pumps currently spend 48% of their time installing heat pumps. Installers also submitted data on their future expectations on how long they would spend installing heat pumps in the future. From this a yearly growth factor was calculated. This growth factor was applied to the initial 48% starting point and as a result it was assumed that in the year 2028 HPTOs would spend 72% of their time on the heat pump installation process[32]. From 2028 onwards it was assumed that this percentage is constant. This is explained by two factors:

1. It is reasonable to expect that a proportion of individuals qualified to install heat pumps will spend at least some time on installing and maintaining other heating systems (as it is anticipated that maintenance of existing gas and oil boilers will be necessary for a considerable time up to and beyond 2035).
2. Even in the case of specialised installers that only install heat pumps, the workforce will be required to spend a proportion of their time doing work that is not directly related to their job of installing heat pumps. This could be general administration, line management, business strategy or even tasks like accounting for smaller businesses. On this interpretation, a per individual utilisation rate of 100% is essentially impossible. Regardless, the research already measures a theoretical 100% labour utilisation rate through the FTE figures.

LABOUR ACTIVITY RATE

The labour activity rate refers to the proportion of individuals qualified to install heat pumps that go on to install heat pumps. The research assumes an activity rate of around 61% - to determine a ratio between trained and active individuals qualified to install heat pumps and all individuals qualified to install heat pumps. This means of those that are trained, 39% are not expected to enter the workforce to install heat pumps. This activity rate is modelled to increase in proportion to the increase in labour utilisation rate until 2028 and remain consistent thereafter.

31 MCS (2024) 'Research highlights heat pump business size.' Available at: https://mcscertified.com/research-highlights-heat-pump-business-size/

32 This labour utilisation rate represents the average percentage of their time a typical individual qualified to install heat pumps would spend on installing and maintaining heat pumps. It is worth noting that this percentage might vary depending on an organisation's business model. For instance, in a smaller installation company, an individual might spend a greater proportion of time doing other tasks, such as general administration, sales and accounting. In a larger employer, there are likely to be dedicated personnel for admin, sales, accounting and other supporting activities, thereby enabling qualified individuals to spend a higher proportion of time on the core heat pump installation.

The methodology for calculating activity rates is as follows:

- The number of trained and active individuals working for MCS contractors (total contractors at the end of June 2024), at a rate of 4.8 trained and active individuals per contractor, was compared with the total number of individuals who have undergone heat pump installation training to the end of June 2024.
- To capture the work done by unregistered contractors, MCS notified work[33] was compared to HPA-reported UK sales data.[34] The ratio between the known heat pump installations and the modelled supply of heat pump installers resulted in an average activity rate of 61%.
- It is assumed that this activity rate will improve (due to increasing demand) at the same rate that the utilisation rate will improve. This results in the activity rate increasing from 61% in 2023 to 74% in 2028. The rate remains constant thereafter.

While the report utilises a similar methodology for activity rate to that used for labour utilisation, the incentives and behavioural assumptions are different. The activity rate for individuals qualified to install heat pumps will likely be driven by both economic and personal factors. Economic factors could include the availability of work installing heat pumps, and labour market conditions such as the availability and pay for heat pump installation work. As economic factors improve, it is assumed that labour activity rates will rise. Personal factors represent a 'ceiling' on activity rates. Influences such as sickness, pregnancy and children, moving home and other changes to personal circumstances will mean that inevitably, some who train and become qualified to install heat pumps will not take up work as one.

It is possible that the labour activity rate could rise higher than 74% in future particularly if economic factors are driving more of the inactivity than personal factors. However, based on current information, it is impossible to know how much inactivity is attributable to personal or economic factors, so a conservative rise in activity with a lower ceiling is assumed for the purposes of this report.

HEAT PUMP TYPES

In the deployment modelling, an overall heat pump installation workforce requirement has been assumed. This overall requirement is heat pump agnostic; hence it covers all heat pump installations regardless of technology type. However, to make accurate workforce requirement estimates, it was necessary to assume a deployment split by heat pump technology type in the analysis. This reflects the fact that the installation process and labour intensity can vary depending on the heat pump technology being installed. A total of labour intensities by heat pump technology type was then used to calculate the overall workforce requirement.

It is important to note that deployment split by heat pump technology type is not a forecast or projection about the future composition of the heat pump market and should not be viewed as such. It is based on the best available evidence and projections as of the time of writing for the technologies in scope

33 MCS (2024) Data Dashboard. Available at: https://datadashboard.mcscertified.com/Welcome
34 HPA (2024) Sales Data. Available at: https://www.heatpumps.org.uk/resources/statistics/

of this research. The assumptions underpinning the technology distribution have been derived from reputable external sources, as set out in Table 4 later in the report. Please note that heat networks and domestic hot water heat pumps are excluded from the scope of this analysis.

Table 3 - Heat pump type and definitions

HEAT PUMP TYPE	DEFINITION
Air to Air Heat Pump (AtAHP)	A heat pump that extracts heat from the air and delivers heat in the form of warm air. It usually delivers heat via an indoor fan convector. They do not have the ability to provide hot water heating.
Air to Water Heat Pump (AWHP)	A heat pump that extracts heat from the air and transfers it to water. This then heats properties via radiators or underfloor heating and provides domestic hot water.
Exhaust Air Heat Pump (EAHP)	A heat pump that transfers heat from an internal ventilation system to water, which is then used to heat properties and domestic hot water, normally via a wet central heating system[35].
Ground Source Heat Pump (GSHP)	A heat pump that extracts heat from the ground/groundwater via boreholes or horizontal loops. This heat is then transferred to water and used to heat properties and domestic hot water.
Hybrid Heat Pump (Hy-bridHP)	A heating system that contains a heat pump (usually but not always an AWHP) alongside another heat source, often a fossil fuel boiler. There are different types of HybridHPs, including purpose-built systems that combine a heat pump and fossil fuel boiler as well as bivalent systems where a heat pump is paired with a fossil fuel boiler and combined via a buffer tank[36].
Shared Ground Loop Heat Pump (SGL)	GSHPs connected to in-street pipework which absorbs heat from the ground and delivers it to individual heat pumps in people's homes[37].

The assumed split of heat pump deployment by heat pump technology type for 2023 to 2035 is set out below in Figure 7. This is constant over the period given there is currently no strong evidence regarding a change in technology split over time.

35 Energy Saving Trust (2024). Exhaust Air Heat Pumps. Available at: https://energysavingtrust.org.uk/advice/exhaust-air-heat-pumps/
36 The Heating Hub (2020). Hybrid heat pumps – our heating future? Available at: https://www.theheatinghub.co.uk/articles/hybrid-heat-pumps
37 Kensa (2024). Networked Heat Pumps. Available at: https://www.kensaheatpumps.com/networked-heat-pumps/

HEAT PUMP DEPLOYMENT BY TYPE

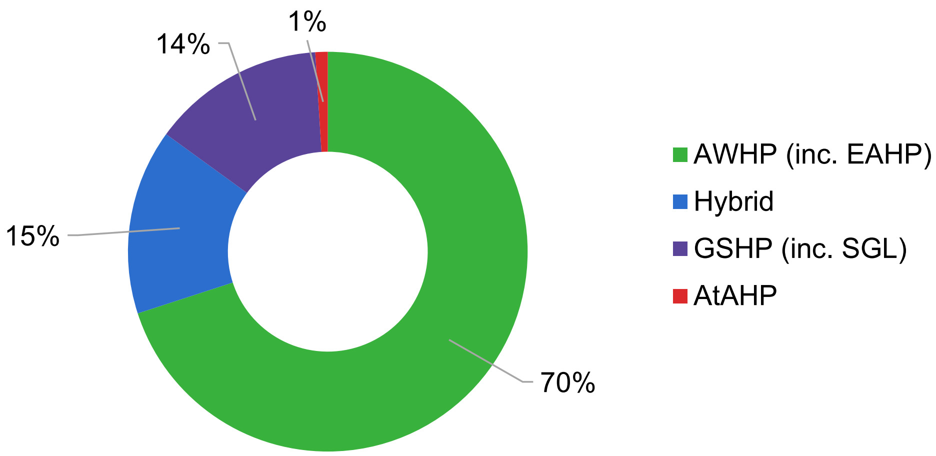


Figure 7 – Heat pump deployment by type

Table 4 shows how this assumption was derived by evaluating the projected technology split outlined in several external studies and government policy impact assessments.

Table 4 - Heat pump deployment by type

TECHNOLOGY	ELECTRIFICATION OF HEAT[38]	BUS IA[39]	CHMM IA[40]	HPA SALES DATA	CCC (EE)[41]	NATIONAL GRID FES[42]	TOTAL	CORRECTED TOTAL
AWHP (inc. EAHP)	74%	98%	76%	84%	39%	40%	69%	70%
HybridHP	20%	NA	10%	NA	17%	18%	16%	15%
GSHP (inc. SGL)	5%	1%	15%	4%	19%	26%	12%	14%
AtAHP	0%	0%	NA	NA	5%	NA	2%	1%
Total	99%	99%	101%	88%	80%	84%	98%	100%

As demonstrated by Table 4, various sources suggest a contribution from HybridHPs of around 15%. The remaining 85% of heat pump installations are split between AWHPs, EAHPs, GSHPs and SGLs. In the absence of external data, a 1% contribution from AtAHPs is assumed, while EAHPs are included in the AWHP category and SGLs in the GSHP category. In practice, many HybridHPs are likely to require AWHPs, so the HybridHP figure subsumes a significant number of these.

This assumed split by heat pump type translates into the deployment projections outlined in Figure 8 and Figure 9, found in the Deployment projections by heat pump type section of this report.

38 BEIS (2022). BEIS Electrification of Heat Demonstration Project: Home Survey and Install Report. Available at: https://es.catapult.org.uk/report/electrification-of-heat-home-surveys-and-install-report/

39 BEIS (2022). Future Support for Low Carbon Heat: Boiler Upgrade Scheme Impact Assessment. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1055336/boiler-upgrade-scheme-final-impact-assessment.pdf

40 DESNZ (2023). Clean Heat Market Mechanism Impact Assessment. Available at: https://assets.publishing.service.gov.uk/media/647757b15f7bb700127fa2a4/clean-heat-market-mechanism-ia.pdf This relies on RHI deployment data. Available at: https://www.gov.uk/government/statistics/rhi-monthly-deployment-data-december-2022-annual-edition

41 Element Energy (2021). Development of trajectories for residential heat decarbonisation to inform the Sixth Carbon Budget. Available at: https://www.theccc.org.uk/wp-content/uploads/2020/12/Full-Report-Development-of-trajectories-for-residential-heat-decarbonisation-to-inform-the-Sixth-Carbon-Budget-Element-Energy.pdf

42 Future Energy Scenarios (2024): Data Workbook. Available at: https://www.nationalgrideso.com/document/322326/download

QUALITATIVE RESEARCH

INTERVIEWS

In total, 15 in-depth interviews were conducted with key stakeholders in the sector between April and June 2024. This included HPA manufacturer and installer members, the Department for Energy Security and Net Zero (DESNZ), the Scottish and Welsh Governments, and industry think tanks and research bodies.

In these interviews, interviewees were given an overview of the project's aims and methodology, before talking them through the assumptions in detail. For heat pump manufacturers and installers, this centred on installation labour intensity assumptions and making sure that these were as reflective as possible of their experience of heat pump installations. In interviews with the UK and devolved governments, the policy assumptions were discussed to ensure that all the main policies driving heat pump installations were captured and that the modelled scenarios provided an accurate representation of the current and future policy landscape. The full list of policies is available at Annex 2 in this report.

It is worth noting that stakeholder engagement was conducted prior to the UK General Election that took place on 4th July 2024. Therefore, the findings are based on a pre-election understanding of the policy context and do not take account of any major policy changes that may have occurred between June 2024 and the date of this report's publication.

SURVEYS

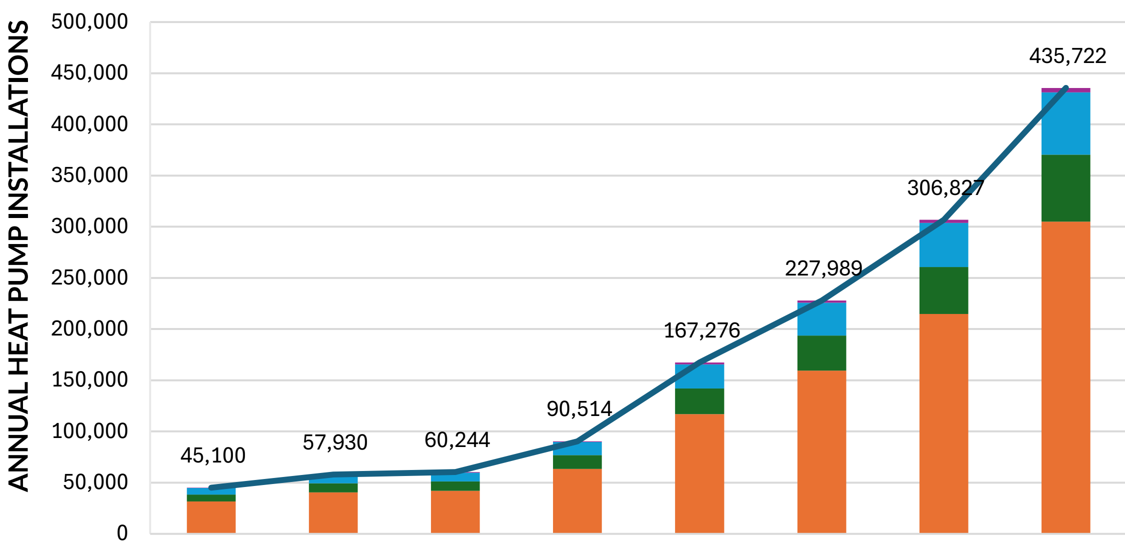
After developing the initial assumptions and refining these through multiple interviews with key stakeholders, a survey was compiled to seek the views of the wider industry on the research's assumptions. This enabled the sector to input their own role and labour intensity assumptions for each step of the installation process. It was distributed to all members of the HPA, in addition to members of the Ground Source Heat Pump Association, the Heat Pump Federation and the MCS Heat Pump Working Group. This enabled validation of the assumptions with a wide range of stakeholders from across the industry. The initial labour intensity assumptions were subsequently refined based on the feedback received via the survey.

FURTHER FINDINGS

QUANTITATIVE FINDINGS

DEPLOYMENT PROJECTIONS BY HEAT PUMP TYPE

SCENARIO 1 - DEPLOYMENT PROJECTIONS BY HEAT PUMP TYPE



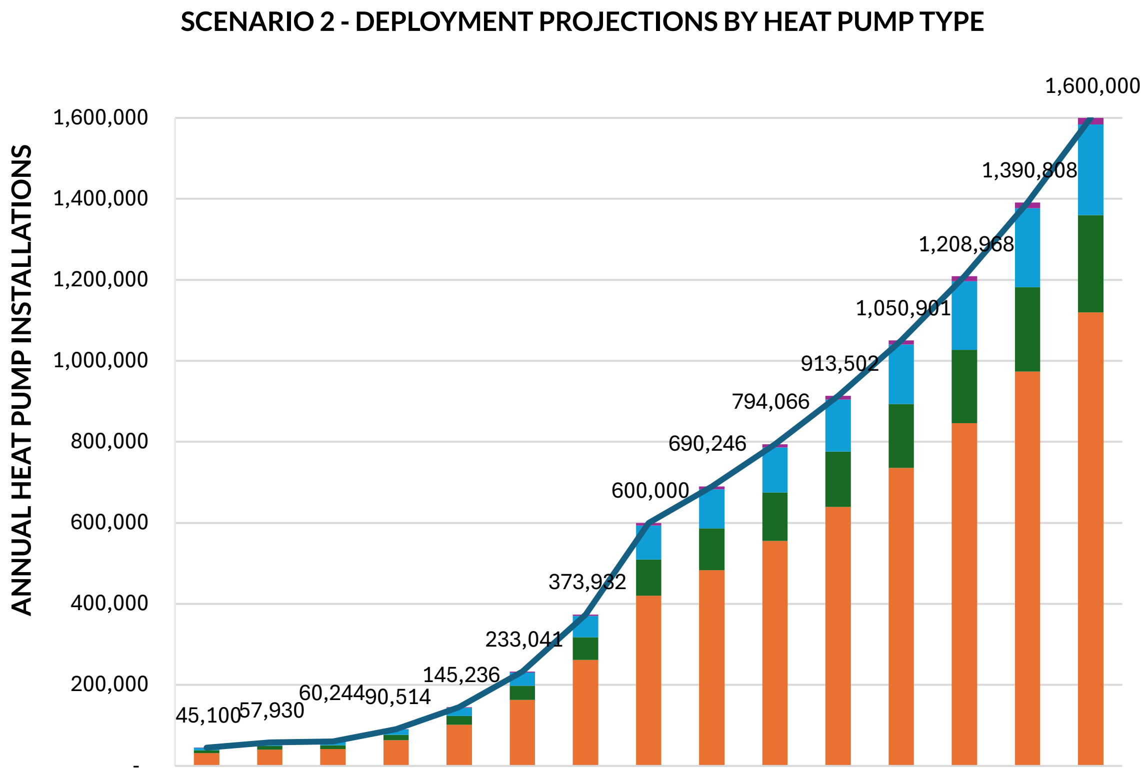
	2021	2022	2023	2024	2025	2026	2027	2028
AtAHP	451	579	602	905	1,673	2,280	3,068	4,357
GSHP	6,314	8,110	8,434	12,672	23,419	31,918	42,956	61,001
HybridHP	6,765	8,690	9,037	13,577	25,091	34,198	46,024	65,358
AWHP	31,570	40,551	42,171	63,360	117,093	159,592	214,779	305,005
Total -	45,100	57,930	60,244	90,514	167,276	227,989	306,827	435,722

Figure 8 – Scenario 1 deployment projections by heat pump type[43, 44]

Figure 8 shows that, in 2028, 435,722 heat pump installations are projected, around 70% or 305,005 of which are expected to be made up by AWHPs. By comparison, in the same year, 15% of installations are made up by HybridHPs and 14% by GSHPs at 65,358 and 61,001 installations respectively. For all technologies, the annual rate of installations is expected to increase by 623% from 2023 to 2028.

43 AtAHP = Air to air heat pump, GSHP = Ground source heat pump, HybridHP = Hybrid heat pump, AWHP = Air to water heat pump
44 Please note that in Figure 7, EAHPs are included in the AWHP category and SGLs in the GSHP category.

Figure 9 shows required annual heat pump deployment under Scenario 2 – the previous UK Government's heat pump installation targets to reach 600,000 heat pump installations by 2028 and 1.6 million annual heat pump installations by 2035.



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
AWHP	31,570	40,551	42,171	63,360	101,665	163,129	261,752	420,000	483,172	555,846	639,451	735,631	846,277	973,566	1,120,000
HybridHP	6,765	8,690	9,037	13,577	21,785	34,956	56,090	90,000	103,537	119,110	137,025	157,635	181,345	208,621	240,000
GSHP	6,314	8,110	8,434	12,672	20,333	32,626	52,350	84,000	96,634	111,169	127,890	147,126	169,255	194,713	224,000
AtAHP	451	579	602	905	1,452	2,330	3,739	6,000	6,902	7,941	9,135	10,509	12,090	13,908	16,000
Total -	45,100	57,930	60,244	90,514	145,236	233,041	373,932	600,000	690,246	794,066	913,502	1,050,901	1,208,968	1,390,808	1,600,000

Figure 9 - Scenario 2 deployment projections by heat pump type[45, 46]

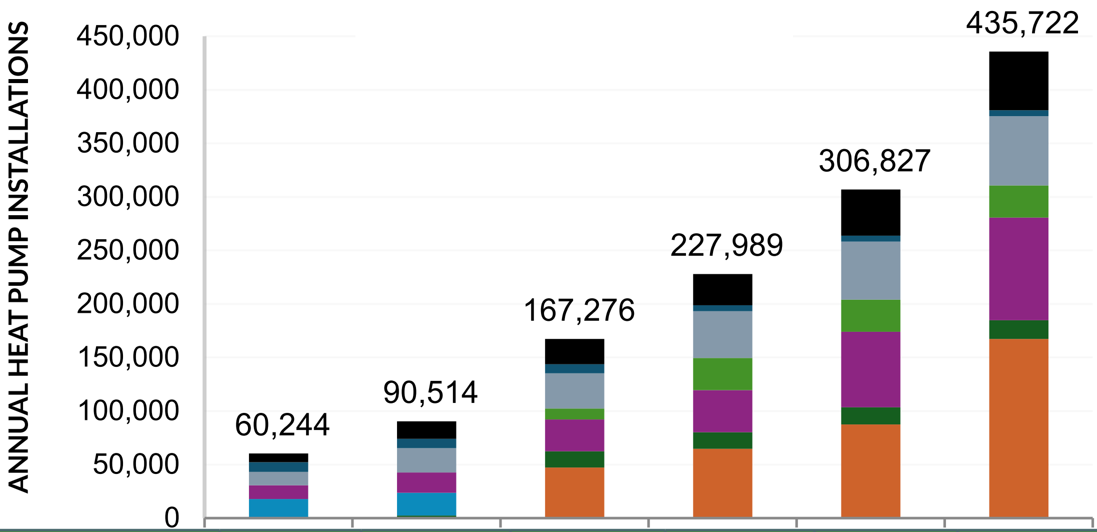
As with Scenario 1, AWHPs form the majority of the projected heat pump installations in this period, with over 1.1 million annual AWHP installations projected in the peak year of 2035, representing 70% of total installations in that year. The next two most common heat pump types in terms of projected deployment are expected to be HybridHPs and GSHPs at 15% (240,000) and 14% (224,000) of annual installations respectively in 2035.

45 AtAHP = Air to air heat pump, GSHP = Ground-source heat pump, HybridHP = Hybrid heat pump, AWHP = Air to water heat pump.
46 Please note that in Figure 8, EAHPs are included in the AWHP category and SGLs in the GSHP category.

POLICY CONTRIBUTION TO HEAT PUMP DEPLOYMENT IN SCENARIO 1

These estimates at Figure 10 are based on Gemserv's interpretation of heat pump deployment projections. The modelling combines both policy driven and non-policy driven heat pump sales derived from HPA sales data. Policy deployment projections are derived from the latest publicly available impact assessment at the time of publication in autumn 2024. It should be noted that some of these impact assessments are several years old. These figures are liable to change, if the policy framework changes.

SCENARIO 1 POLICY CONTRIBUTION TO TOTAL DEPLOYMENT



	2023	2024	2025	2026	2027	2028
Total	60,244	90,514	167,276	227,989	306,827	435,722
NON-POLICY RETROFIT	8,125	16,559	23,538	29,193	43,000	54,828
OTHER RETROFIT POLICIES	8,869	8,591	8,441	5,583	5,583	5,583
ECO	12,683	22,764	33,046	43,558	54,070	64,582
CHMM	0	0	10,000	30,000	30,000	30,000
BUS	12,731	18,828	29,850	39,333	70,666	96,000
OTHER NEW BUILD	17,837	21,412	0	0	0	0
SNBHS	0	2360	15,000	15,565	16,129	17,391
FHS	0	0	47,401	64,758	87,378	167,338

Figure 10 - Scenario 1 policy contribution to total deployment[47, 48, 49, 50]

47 Acronyms used in Figure 10 stand for: ECO = Energy Company Obligation; CHMM = Clean Heat Market Mechanism; BUS = Boiler Upgrade Scheme; SNBHS = Scottish New Build Heat Standard; FHS = Future Homes Standard.

48 The policies outlined in this graph are those that contribute the most to heat pump deployment. The impact of the remaining policies is set out in the 'Other Retrofit Policies' category. A full list of policies in scope of this analysis can be found in this report. All remaining retrofit heat pump installations that are not carried out under any of the modelled policy schemes are captured within the 'Non-Policy Retrofit' category.

49 Please note that the stated deployment contribution for the CHMM does not include heat pumps installed under other policy schemes, such as BUS. This is to avoid "double-counting" heat pumps that are installed under policy schemes but would also count towards a manufacturer's contribution under the CHMM. Therefore, it only includes additional heat pump installations under the CHMM that are not already accounted for by other government policies.

50 Please note that 2023 deployment numbers are based on historical publicly available data for all policy schemes. 2024 deployment numbers take into account historic published data for the first half of the year and uses this to project deployment for the rest of the year. From 2025 onwards, all deployment numbers are projections based on policy impact assessments.

Figure 10 shows that the Boiler Upgrade Scheme (BUS) is projected to become the biggest policy driver for retrofit installations over the duration of the period, while the FHS is assumed to become the biggest policy driver for new build installations. From 2023-2028, the BUS scheme is projected to deliver 340,753 installations and the Energy Company Obligation (ECO) scheme is projected to deliver 294,069 installations. Together, these two policies represent half of total deployment projected to take place under Scenario 1 during the period. The FHS is projected to deliver 366,875 installations.[51] Combined, these three policy drivers represent 78% of the total projected heat pump deployment between 2023 and 2028. The largest year-on-year increase in installation is projected to occur between 2027 and 2028 as the FHS is fully phased in. This is projected to contribute, along with other policies, to a 42% increase in heat pump installations in the space of one year.

LABOUR INTENSITY ASSUMPTIONS

Table 5 - Overall FTE labour intensity of the heat pump installation process by technology and property archetype

HEAT PUMP TYPE	NEW BUILD	RETROFIT AVERAGE	RETROFIT LARGE
AWHP[52]	10.13 SC 9.63 PC	12.81 SC 12.37 PC	17.59 SC 17.03 PC
GSHP[53]	15.12 SC 14.26 PC	18.69 SC 18.07 PC	25.18 SC 24.42 PC
AtAHP	4.55	4.96	6.88
HybridHP	9.88	11.19	14.26

**In Table 5, SC refers to Standard Cylinder and PC to Pre-Plumbed Cylinder[54].*

Table 5 sets out the labour intensity of the heat pump installation process by property archetype and technology. It shows that GSHPs are the most labour-intensive heat pump technology to install and retrofit large properties are the most labour-intensive property archetype to install heat pumps in. The installation time for a GSHP is around 40-50% longer than for an AWHP on average. The installation time for an AtAHP was the lowest across all property archetypes, primarily because there is no requirement to install a hot water cylinder. New builds are the least labour-intensive property archetype to install heat pumps in, regardless of technology.

51 DLUHC (2023)., Future Homes Standard Consultation Stage Impact Assessment. Available at p22 https://assets.publishing.service.gov.uk/media/65cc90e139a8a7000f60d508/Future_Homes_Standard_consultation_stage_impact_assessment.pdf

52 Including EAHP systems

53 Including SGL systems.

54 Unless otherwise stated, all values presented are in full time equivalent (FTE) days.

LABOUR INTENSITY BY ROLE

The research found significant variations in labour intensity for individual roles as well as for property archetype and heat pump technology. Each individual role and its typical function in the installation process is covered in the Qualitative findings section. The role with the greatest intensity of all those covered by this research is the HPTO role by a significant margin. This is illustrated in Figure 11 below which sets out the labour intensities for each job role across different property archetypes and heat pump type.

To give an example of this, the total labour intensity for an AWHP installed in a retrofit average property alongside a standard cylinder is 12.81 FTE days. Of this total, the HPTO's contribution is 5.92 FTE days, or nearly half of the average total labour intensity of the installation. The next highest contribution for a single role is the PHTO which has an average labour intensity of 3.06 days – just over half the HPTO's labour intensity.

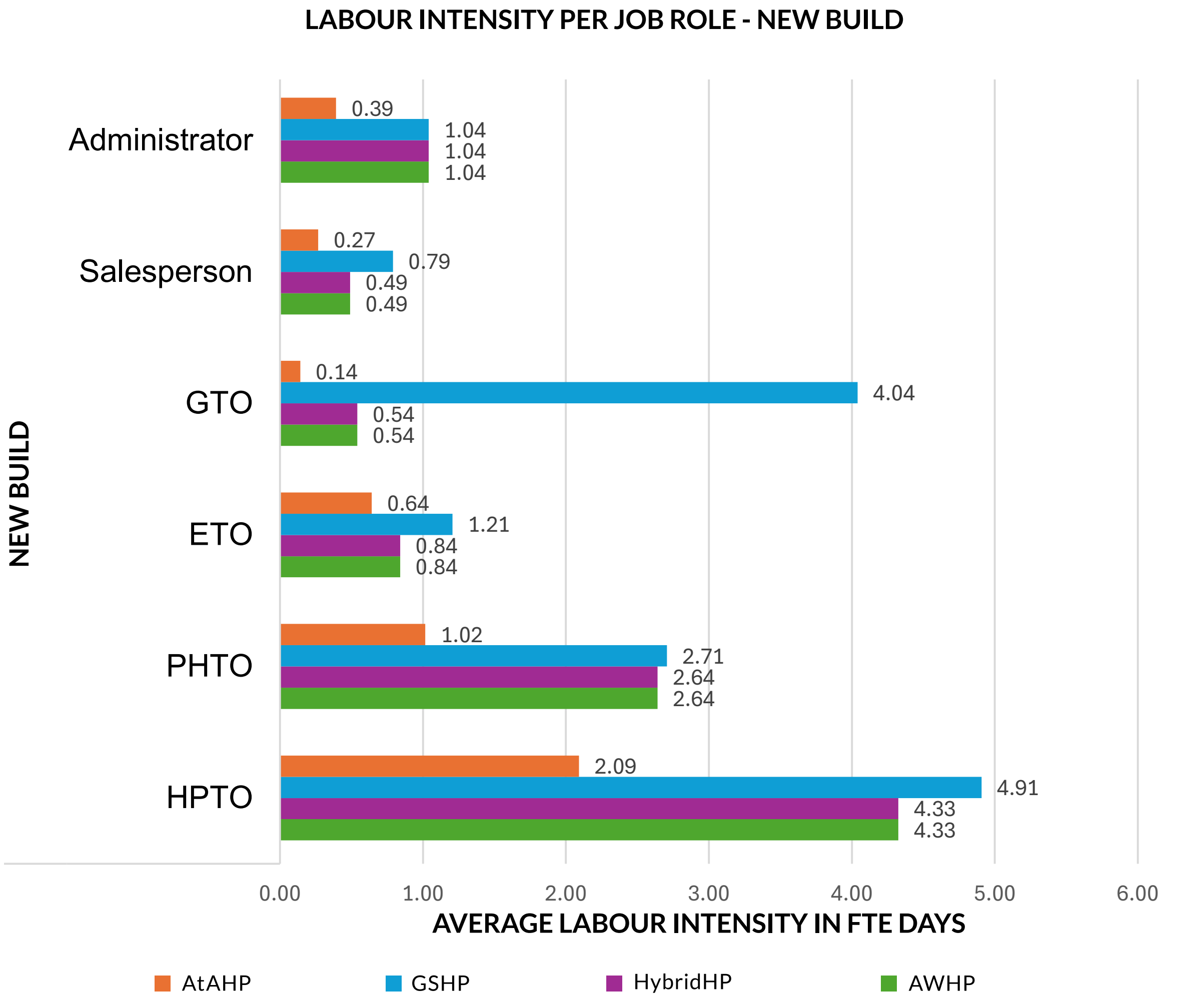


Figure 11 - Labour intensity by role and function for new build installations[55]

55 AWHP includes EAHPs and GSHP includes SGL systems.

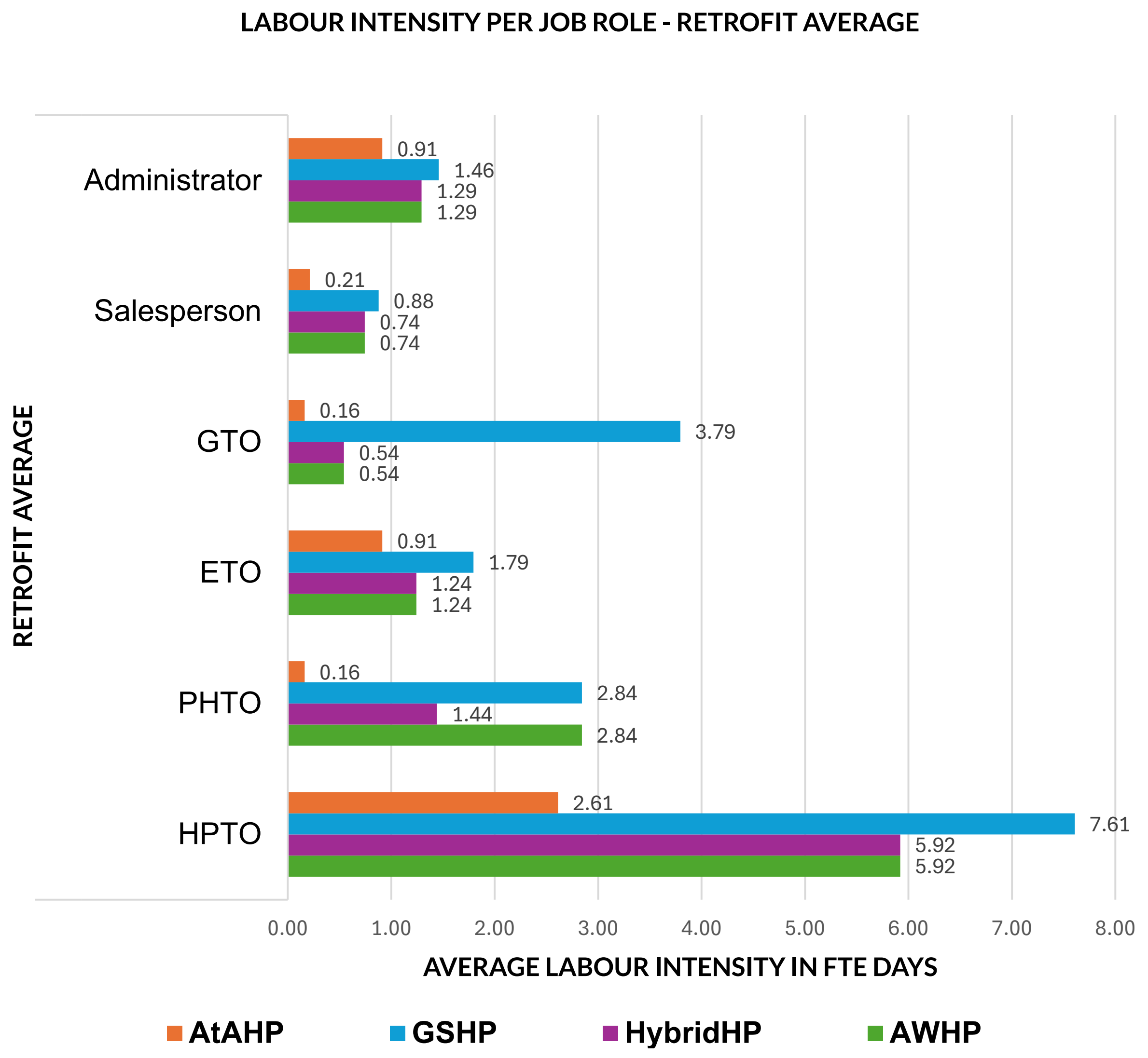


Figure 12 - Labour intensity by role and function for retrofit average installations.

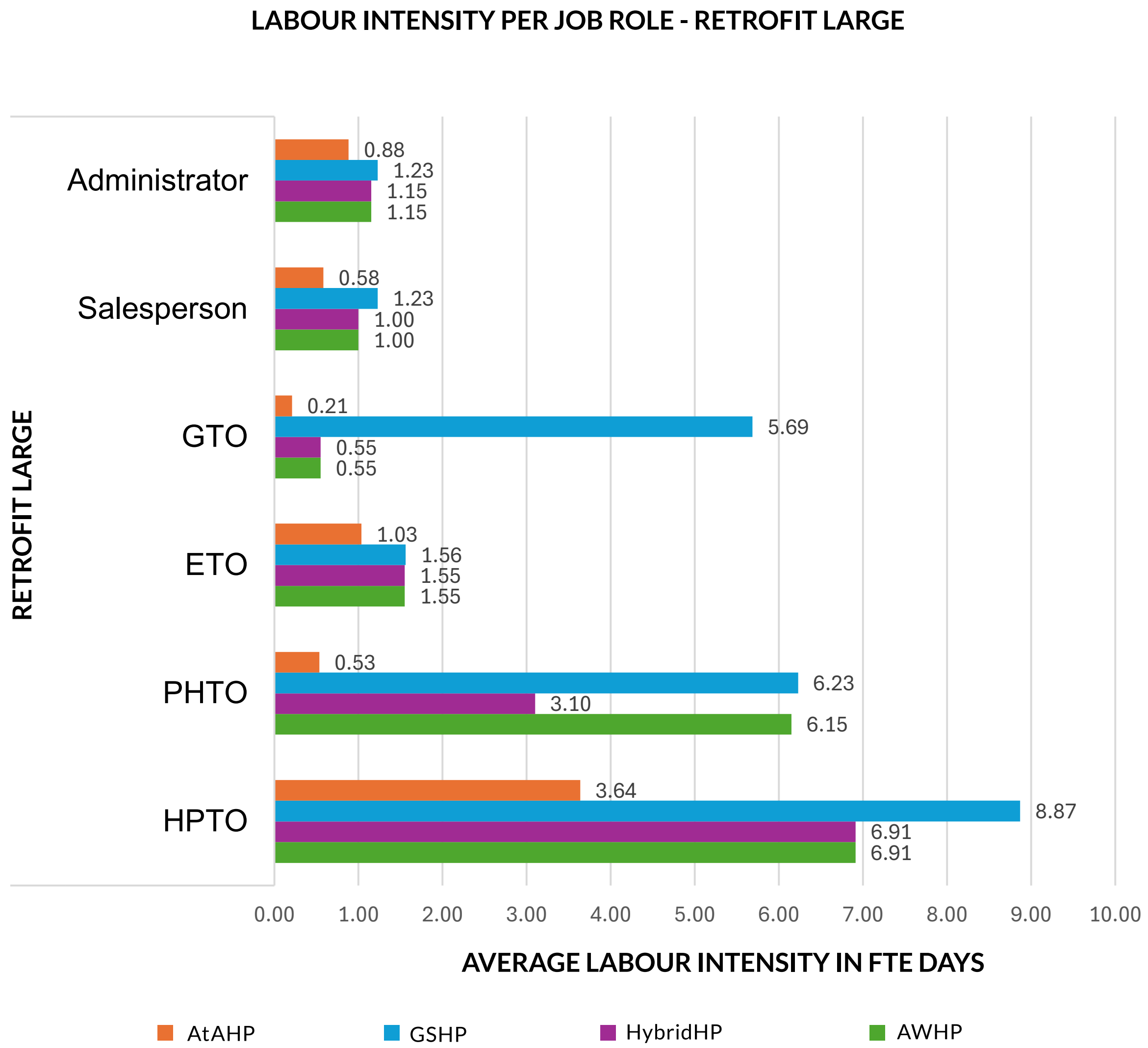


Figure 13 - Labour intensity by role and function for retrofit large installations.

The figures show that the underpinning administrative roles such as salesperson and administrator are consistent between all heat pump and property types, and have therefore, minimal variation in labour intensity. The biggest variation is between PHTO and HPTO roles between new build and retrofit properties (of both sizes). For example, the HPTO labour intensity for AWHP installations increases by 60% between new build and retrofit large. The role with the biggest variations between heat pump types is the GTO. For example, the labour intensity in retrofit average for GTOs is 602% higher for GSHPs than it is for AWHPs and HybridHPs, largely due to the greater groundwork requirement of GSHPs. This is replicated across property archetypes.

EFFICIENCY SAVINGS

This research raises questions around how the heat pump installation process might change over time. As noted in this report, the heat pump manufacturer and installer bases are actively identifying ways in which the installation process can be streamlined and improved. The installation process is expected to become quicker and less labour-intensive over time because of innovation in both technology and processes. From interviews with heat pump businesses and other stakeholders, several areas were raised where innovation is already starting to streamline the installation process (like pre-plumbed cylinders for example) or is expected to do so in future.

Therefore, this section of the report shows the impact of potential efficiency savings on the total heat pump workforce. The purpose of modelling these efficiency savings is to reflect potential improvements to the installation process and technological innovation. It is also to recognise that the heat pump installation business models and processes set out in this report are likely to change. In other words, the heat pump installation process now is unlikely to be the installation process in 2035[56]. This research provides evidence to target interventions and innovation on more time-consuming areas of the installation process.

EFFICIENCY MODELLING

The efficiency modelling set out below is an example, not a prediction of potential labour intensity savings. These efficiency savings are not guaranteed but are illustrative of the impact that innovation could have on the labour intensity of the heat pump installation process and therefore the overall workforce requirement. In practice, savings could be higher or lower, and the ultimate impact will depend on how quickly they could be introduced.

A blanket 10% efficiency saving across all installation steps has been assumed to factor in technology advancement, process improvements and economies of scale as the heat pump sector grows over time. This may also cover additional innovations in the sector that we have been unable to account for specifically in the installation process. In addition to this, based on feedback from industry stakeholders, the following installation steps have been identified as areas where there is scope for larger efficiencies to be realised by 2035.

56 However, these savings should not be taken as a prediction for how the market will develop. They rely on implementation of the measures set out in the methodology. This is in essence an illustrative exercise designed to show the workforce reductions attributed to potential efficiencies.

Table 6 - Projected efficiency savings in the installation process

STEP	EFFICIENCY SAVING	RATIONALE
Pre-sale advice	20%	Currently, the heat pump sales process can be protracted because manufacturers and installers must explain an unfamiliar technology to consumers and in some cases dispel common misconceptions about heat pumps. However, as heat pumps become more established and familiar technologies, the sales process should become less labour-intensive as consumer awareness of heat pumps and consumer confidence in the technology increases.
Pre-installation survey and heat loss calculation	30%	Improvements in technology are expected to enhance the efficiency and accuracy of this process. Advancements in digital technology could make the calculation process much more efficient, enabling survey data to be entered into a model and heat demand output generated almost instantaneously. Innovation also has the potential to create efficiencies in heat loss data collection, reducing the need for a labour-intensive room-by-room survey of the property.
Travel	20%	The average travel time per install is assumed to reduce over time as the heat pump market expands meaning that heat pump contractors do not have to travel over as large a geographical area to find sufficient demand for heat pump installations.
Installing the cylinder	15%	Heat pump manufacturers and installers interviewed during the stakeholder engagement identified the cylinder install as a step where there is significant potential for efficiency. This is because pre-plumbed hot water cylinders are expected to make up an increasing share of the cylinder market going forward. As pre-plumbed cylinders are quicker and easier to install than standard hot water cylinders (by around 0.5 FTE), this should reduce the time required for the cylinder install. Please note that the methodology assumes that 50% of cylinders currently installed are pre-plumbed cylinders. This percentage is projected to rise in future, hence accounting for this further 15% efficiency saving.

When the following efficiency savings are applied across the board to the scenarios there is an average efficiency saving of 15%. This results in the following labour intensity figures, as shown in Table 7 below.

Table 7 - Projected efficiency savings by archetype and heat pump type

ARCHETYPE	LABOUR INTENSITY (FTE)	AWHP[57]	GSHP[58]	ATAHP	HYBRID HP	AVERAGE
NEW BUILD	Current scenario	9.88	14.69	4.55	9.88	
	Efficiency modelling	8.60	12.81	4.02	8.60	
	Efficiency savings	**1.28 (12.9%)**	**1.88 (12.8%)**	**0.53 (11.7%)**	**1.28 (12.9%)**	**1.24**
RETROFIT AVERAGE	Current scenario	12.59	18.38	4.98	11.19	
	Efficiency modelling	11.06	16.25	4.35	9.80	
	Efficiency savings	**1.53 (12.1%)**	**2.13 (11.6%)**	**0.63 (12.6%)**	**1.39 (12.4%)**	**1.42**
RETROFIT LARGE	Current scenario	17.31	24.80	6.88	14.26	
	Efficiency modelling	15.22	21.94	6.00	12.48	
	Efficiency savings	2.09 (12.1%)	2.86 (11.5%)	0.88 (12.8%)	1.78 (12.5%)	1.90

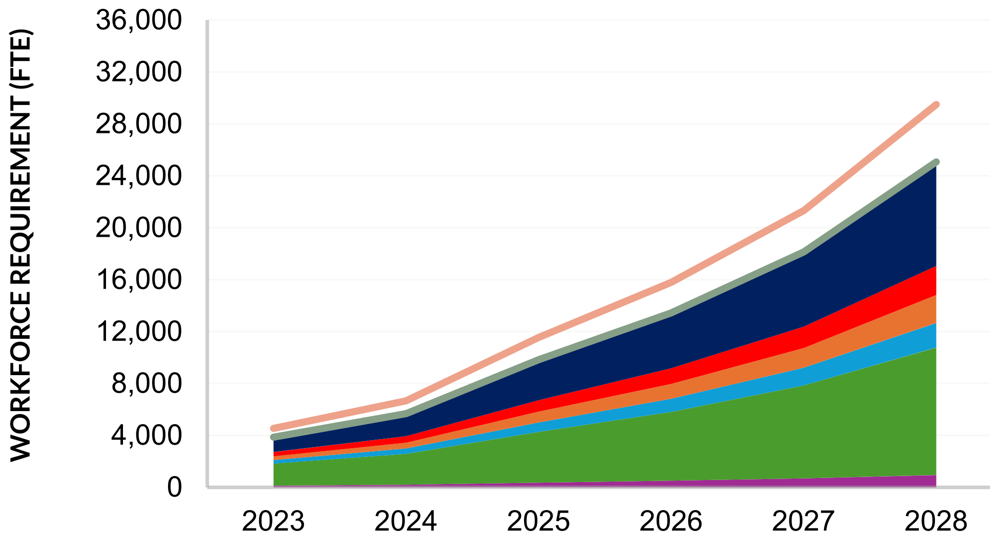
It is anticipated that efficiency savings over the next 10 years could reduce the labour intensity of the installation process by between 0.53 FTE and 2.86 FTE days compared to today, depending on the property archetype and the type of heat pump installed. In percentage terms, there is the potential to save between 11.5% and 12.9% on the labour intensity of the installation process, depending on archetype and heat pump.

57 Please note that EAHPs have been included in the AWHP category.
58 Please note that SGLs are included in the GSHP category.

IMPACT OF EFFICIENCY SAVINGS ON THE WORKFORCE

Figure 14 and Figure 15 model the potential impact of the efficiency savings outlined above on the projected heat pump workforce requirement for Scenario 1 and Scenario 2.

SCENARIO 1 WORKFORCE PROJECTIONS - EFFICIENCY SCENARIO



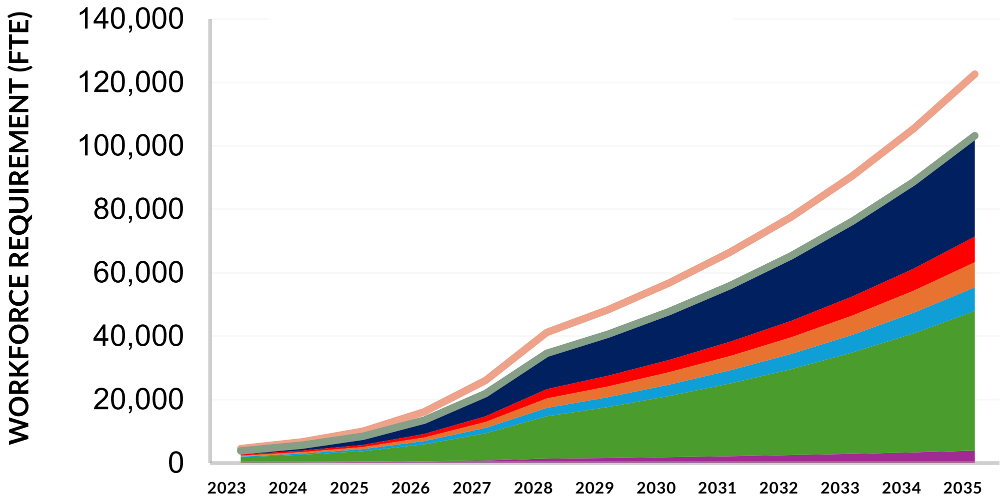
	2023	2024	2025	2026	2027	2028
PHTO	1,143	1,732	3,114	4,266	5,763	8,007
ETO	328	499	881	1,212	1,641	2,246
GTO	300	451	830	1,133	1,525	2,160
Administrator	269	407	735	1,006	1,359	1,893
HPTO	1,689	2,380	3,896	5,309	7,161	9,822
Salesperson	137	209	370	509	689	945
Total Workforce Without Efficiency Savings -	4,543	6,670	11,556	15,796	21,321	29,498
Total Workforce With Efficiency Savings -	3,867	5,679	9,827	13,436	18,138	25,074

Figure 14 - Scenario 1 workforce projections - efficiency scenario[59]

59 PHTO = Plumbing and heating technical operative, ETO = Electrical technical operative, GTO = Groundworks technical operative, HPTO = Heat pump technical operative.

The efficiency saving modelling for Scenario 1 shows a reduction in the potential workforce projections by nearly 4,500 compared to a scenario in which no efficiency savings are realised. In Scenario 1, the standard scenario requires a total workforce of 29,498 FTE by 2028 whereas the efficiency scenario requires 25,074 FTE workers. This is a saving of 15% of the workforce compared to if there were no efficiency savings. Most of these savings are realised through a reduction in the required number of HPTOs and PHTOs, as the two individual roles with the largest workforce requirement. The workforce required by 2028 reduces by 1,821 FTE for HPTOs and 1,453 for PHTOs. This is a percentage saving of 15.6% and 15.4% respectively.

SCENARIO 2 WORKFORCE PROJECTIONS - EFFICIENCY SCENARIO



	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
PHTO	1,143	1,732	2,665	4,369	7,130	11,353	13,136	15,256	17,681	20,473	23,716	27,418	31,746
ETO	289	438	671	1,102	1,802	2,867	3,320	3,860	4,477	5,187	6,013	6,955	8,058
GTO	300	451	720	1,158	1,862	2,985	3,437	3,959	4,559	5,249	6,044	6,958	8,011
Administrator	269	407	630	1,031	1,678	2,675	3,092	3,587	4,153	4,805	5,562	6,426	7,435
HPTO	1,689	2,380	3,428	5,386	8,562	13,383	16,073	19,261	22,910	27,110	31,982	37,549	44,046
Salesperson	137	209	314	522	860	1,363	1,582	1,847	2,150	2,498	2,904	3,367	3,911
Total Workforce Without Efficiency Savings -	4,543	6,670	10,005	16,115	26,015	41,143	48,283	56,751	66,443	77,602	90,552	105,350	122,627
Total Workforce With Efficiency Savings -	3,828	5,617	8,428	13,568	21,895	34,626	40,640	47,770	55,929	65,323	76,221	88,673	103,208

Figure 15 - Scenario 2 Workforce Projections - efficiency savings[60]

60 PHTO = Plumbing and heating technical operative, ETO = Electrical technical operative, GTO = Groundworks technical operative, HPTO = Heat pump technical operative.

Efficiency saving modelling for Scenario 2 shown in Figure 15. Potential workforce requirements are markedly lower in the efficiency scenario compared to a scenario in which no efficiency savings are realised. By both 2028 and 2035, the overall workforce requirement is 15.8% lower in the efficiency scenario. This equates to 6,517 fewer FTE roles required in 2028 and 19,419 fewer FTE roles in 2035. Since they represent most of the workforce, most of these savings are achieved through a reduction in HPTOs and PHTOs. At an individual role level, this means a saving by 2035 of 8,217 FTE for HPTOs and 5,301 FTE for PHTOs. This is a 15.7% and 14.3% saving respectively.

QUALITATIVE FINDINGS

One of the primary aims of the analysis was to map out the heat pump installation process in granular detail, focussing on the individual steps needed, the time required to undertake them and the roles that would generally carry these out. As the main report focusses on the overall workforce requirements of the heat pump workforce, this report sets out the findings on the installation process taken from interviews with the sector.

JOB ROLES AND QUALIFICATIONS

Table 8 defines the job roles, functions and typical minimum qualifications of individuals carrying out the main steps of a heat pump installation[61].

Table 8 - Summary of job roles and qualifications

ROLES	FUNCTIONS	TYPICAL *MINIMUM* QUALIFICATIONS
Salesperson	Generating leads and closing sales. In some smaller contractors, the role may be combined with installation responsibilities. Providing initial advice to the consumers.	No minimum qualification requirements
Administrator	Administrative tasks such as diary management, scheduling, issuing contracts, arranging subcontractors, data entry and notifications.	No minimum qualification requirements
Groundworks Technical Operative (GTO)	Preparing the ground for a project before the work begins. In the case of air-to-water heat pumps (AWHP) this may include preparing the plinth or platform for the heat pump. For ground source heat pumps (GSHP) this would involve drilling and preparing boreholes or horizontal loops for the unit.	Level 2 NVQ in Construction and Civil Engineering Operations Level 2 Groundworker Apprenticeship Level 2 NVQ in Land Drilling
Plumbing & Heating Technical Operative (PHTO)	Carrying out the installation and/or upgrading of the heating system including upgrading the heat emitters, fitting thermostatic radiator valves, installing the hot water pipework and installing a hot water cylinder, removal of existing heating appliances (for retrofit). PHTOs generally work on the plumbing and hot water system and may sometimes also have the specialist skillset or qualifications to install/ maintain the heating unit itself, similarly to a HPTO (see below).[62]	Level 3 Diploma in Plumbing and Domestic Heating (in England) Plumbing & Heating SVQ Level 3 SCQF 7 (in Scotland) Building Services Engineering – Plumbing & Heating Level 3 (in Wales) UKAS Accredited ISO 17024 Certificate of Competence for Gas or Oil Heating Certificate of Competence in Unvented Hot Water Cylinders Certificate of Competence in Energy Efficiency
Electrical Technical Operative (ETO)	Carrying out any electrical work necessary for the heat pump installation, including wiring the heat pump, consumer unit, residual-current devices, as well as any electrically connected heating controls.	Level 3 Electrotechnical Apprenticeship Level 3 Certificate in Installing, Testing and Ensuring Compliance of Electrical Installations in Dwellings Level 3 Award in the Requirements for Electrical Installations: BS 7671 Level 3 Award in the Initial Verification of Electrical Installations

61 Different businesses may have different models meaning that sometimes one person may do many, or all of these roles.

62 This is why along with HPTOs PHTOs are referred to in this report as 'individuals qualified to install heat pumps'.

Heat Pump Technical Operative **(HPTO)**	Carrying out the installation, commissioning, and handover of the heat pump itself. This includes placing the unit, installing the drain, and fixing and connecting the piping of the system. For retrofit, this also includes decommissioning the existing heating system. Also responsible for carrying out post-installation maintenance, including routine servicing and necessary repairs. The HPTO might be involved in designing, scoping and planning for the installation, although in some cases this might be carried out by an independent designer, particularly in new build or large refurbishment projects.	Pre-requisites as per the heating and hot water installation role above, plus: Level 3 Low Carbon Apprenticeship Level 3 Heat Pump Installation Qualification Certificate of Competence for Heat Pump Installation F Gas or Flammable Refrigerant Qualification if handling refrigerants (in some but not all cases)

**These are examples, other equivalences exist*

***Individuals may hold qualifications exceeding those required for the role.*

INSTALLATION AND MAINTENANCE STEPS

It is worth noting that the installation process and the roles involved can differ between businesses, as different contractors have varying business models and ways of working. As such, there is no single 'correct' installation process. Nonetheless, based on extensive engagement with heat pump installers and manufacturers, the installation process would generally involve the following steps, as set out in Table 9 below.

Table 9 - General steps involved in heat pump installation and maintenance.

Pre-sale advice	First contact with the consumer, including support for choosing the correct system, advice around subsidy and funding, finding out some preliminary information about the property, and arranging a pre-installation survey.
Pre-installation survey and heat loss calculations	Pre-installation survey of the property, involving the taking of all the heat loss measurements required to both perform a heat loss calculation and to estimate the size of the required heat pump. This survey will also scope out where the heat pump and cylinder can be installed, as well as assessing the need for any heating system or fabric upgrades.
Back-office support	Funding applications, scheduling, issuing contracts, arranging subcontractors (where needed), data entry and notifications. In certain cases, this might include supporting with planning applications.
Travel	Assumed average travel time to a job site for the installer team. This is cumulative travel time and recognises that many installations will involve multiple site visits.
Groundwork	Drilling boreholes or ground loops and installing the platform/foundation/plinth for the heat pump.
Data lodging the installation into MCS/ CPS/DNO (where applicable)	This covers all the data lodgement activities that may be required at different stages of the installation process. This may involve lodging the heat pump installation with the relevant organisations or certification bodies, including but not limited to self-certification with a Competent Person Scheme (CPS), notification to the building control body, lodgement with the Distribution Network Operator (DNO), and MCS (if required).
Designing, scoping and planning	This stage involves designing, scoping out and planning the installation itself. This might also include providing an initial heat pump performance estimate and quotation off the back of the design and heat loss calculation. In the case of a GSHP installation, the contractor may have to plan out drilling for the groundwork, which could include a feasibility study in some cases.
Decommissioning the old heating system	Removing the old heating system and flushing the existing heat distribution system (typically radiators). Disconnecting from the gas network (in cases where the previous system was a gas boiler).
Installing/upgrading the heating system	Installing the heating system in a new build or upgrading the existing one in a retrofit install. Upgrading the heating system could involve replacing existing radiators, pipework, thermostatic radiator valves (TRV) and heating controls, although this will vary between properties.
Electrical wiring	Wiring of the heat pump into the electrical system of the property, wiring between the constituent elements of the heat pump and the connection of the heat pump to heating controls.

Installing the heat pump	Fully installing the heat pump unit and associated parts, excluding groundwork and controls, and hot water cylinder.
Commissioning and handover	The process of putting the heat pump into safe and effective operation leading to its handover for everyday operation and use by the customer. This may involve providing consumers with a user guide or manual on effective operation of the system.
Ongoing servicing and maintenance	Covers the annual servicing of a heat pump. This process could include checking the different parts of the heat pump, unvented cylinder, settings, filters, pumps, pressure settings, run time, brine checks, outside manifold (if GSHP), etc. With a GSHP, the ground loop heat transfer fluid would need to be flushed out approximately every 8 years.

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HOW DOES THE INSTALLATION PROCESS DIFFER BETWEEN PROPERTY TYPES?

The labour intensity of the installation process and in some cases, the process itself, can differ depending on the property archetype and the heat pump type being installed. As part of the interview process for this project, the following nuances were determined which are set out in Table 10[63].

Table 10 - Installation process differences by property archetype

PROCESS OR ROLE	NEW BUILD	RETROFIT
Workforce	The workforce for new builds is likely to be derived from the property developer who may have either a staffed workforce or an existing supply chain of sub-contractors. Large housing developers may put installations out to tender.	HPTOs are likely to be employed by a heat pump installation company or retrofit contractor, while the other roles involved, such as ETOs and PHTOs, may come from the same contractor or from partner organisations.
Sales	In new build contexts, the heat pump manufacturer generally sells the heat pump unit to the housing developer, either directly or via merchants and distributors.	In retrofit contexts, the heat pump unit can be sold by the heat pump manufacturer or installer. In the case of heat pump installers, they will normally sell directly to the consumer. Some manufacturers may also sell directly to the consumer but others may sell via merchants and distributors. .

63 For the purposes of this exercise, we have not distinguished between retrofit average and retrofit large properties because the differences in process are generally the same between new build and all retrofit properties. What differs with the retrofit large and retrofit average properties is the complexity of the installation process.

Heat loss calculations	In the new build context, property-by-property heat loss calculations are not required. These are typically completed offsite and off-plan, with the heat loss calculations completed by the manufacturer to the specification of the building archetypes for that particular development.	Heat loss calculations are completed on a bespoke property-by-property basis, typically by the HPTO.
Groundwork	Groundwork will be completed as part of the broader housing development, delivering efficiencies.	Groundwork will need to be completed separately. The steps required to mitigate disruption take additional time.
Travel	Travel time is lowest for new builds. This is because new builds tend to be on estates where multiple properties are being constructed simultaneously.	Installers may need to travel between several, disparate locations, entailing generally longer travel times than is required in new build properties[64].
Data lodging the installation	Often, new build installations do not require or utilise grant funding, so will only require registering with the DNO.	Currently, a high proportion of retrofit installations are carried out using Government grants, hence a funding application must be submitted, which will usually be filled out by the installer
Installing/ upgrading the heating system	The heating system must be installed from scratch along with the rest of the property.	The existing heating system must typically be upgraded, and the old heating unit decommissioned.

HOW DOES THE HEAT PUMP INSTALLATION PROCESS DIFFER BY TECHNOLOGY TYPE?

This section summarises feedback received from stakeholders on the installation process. It is not intended to be a comprehensive guide on the differences between installing different heat pump types.

CYLINDER CHOICE

The stakeholder engagement produced a range of views on different technologies and how they vary in terms of their installation requirements. One general variation noted between all technology types (except for AtAHPs) was the distinction between pre-plumbed and standard cylinders. Pre-plumbed cylinders are faster and more efficient to install than the traditional alternative. It takes considerable time to install the pipework and fit the cylinder in a traditional system. Noted in the interviews with installers and manufacturers, pre-plumbed hot water cylinders are already becoming increasingly common within the industry, particularly in the new build market. Installing pre-plumbed cylinders as opposed to standard hot water cylinders can take 0.5 FTE off the cylinder install time.

64 The average travel time is expected to come down in future as the market for heat pump installations scales up, meaning that installers will be able to do a greater proportion of installations within a smaller travel radius.

AWHPs

AWHPs are taken as the standard reference point, as the most commonly installed heat pump system currently. Therefore, the following information on different heat pump types in this section should be read in reference to this.

GSHPs AND SGL SYSTEMS

The organisations interviewed noted that there is significant variation in the installation process between different types of GSHPs. GSHPs tend to be installed in larger individual properties – typically houses with individual boreholes. SGL systems however tend to be installed in blocks of flats or apartments. This is because SGL systems are shared infrastructure where a ground loop is shared between individual GSHP units in each property. The labour and installation time for the ground loop is then divided between all heat pumps connected to the system. This means that SGL systems tend to be more appropriate for installation in communal housing such as blocks of flats, apartment buildings or for properties very close together.

These two installation models impact the time and labour intensity of the installation process. The labour intensity of the installation can vary depending on whether the groundwork involves a horizontal ground loop or deeper boreholes, with the latter usually entailing a greater workforce requirement.

The groundwork process differs between technologies. Traditional GSHPs require drilling of individual boreholes or horizontal ground loops for individual properties whereas SGL systems require a larger shared ground loop system. The SGL takes longer to install than individual boreholes but is spread between multiple properties, whereas the GSHP individual boreholes take less time to install than a SGL but need to be repeated for each property.

Drilling and trenching is an element of the heat pump installation process that is unique to GSHPs. As such, GSHPs drive most of the GTO workforce requirement. This element of the workforce will require specific consideration and development by government and industry. For both GSHPs and SGLs, there is a significant additional groundwork requirement when compared to an AWHP.

AtAHPs

Due to a lack of policy modelling or analysis, it is assumed within this report that AtAHPs will constitute a small segment of the heat pump market, currently modelled at about 1%. One of the most popular types used in homes is a split system, which is split into two units: one indoors and one outdoors. While heating, the outdoor unit extracts heat from the outside air and transfers it inside via the indoor unit, or the reverse when cooling your home.

AtAHPs are quicker to install than hydronic equivalents because they typically do not require the installation of a hot water cylinder as an integral part of the system. However, this does obscure the fact that in many cases a separate hot water system will be required, subsuming a labour time that is not captured in the analysis.

EAHPs

Manufacturers and installers advised there may be more time associated with sales as it is a less familiar technology to many consumers than ASHPs and GSHPs. Given the requirement of this heat pump system to derive heat from exhaust air, there is a specific requirement of around 1 day FTE to install the ductwork – this step is particularly labour intensive for retrofit EAHPs.

HybridHPs

The installation process for hybrid heat pumps is heavily influenced by the sub-category of hybrid system which include single appliances, packaged systems with both fossil fuel and heat pump units, and heat pumps retrofitted to existing fossil fuel systems. The key installation difference is the fossil fuel appliance element which will require the specific skills of those registered for gas or oil work. The heat pump elements of installation work are considered to be near identical to that of the corresponding heat pump technology involved.

ANNEX

ANNEX 1 – LIST OF ACRONYMS USED IN THIS REPORT

Table 11 - List of acronyms used in this report

ACRONYM	DEFINITION
AtAHP	Air to Air Heat Pump
AWHP	Air to Water Heat Pump
BUS	Boiler Upgrade Scheme
CCC	Climate Change Committee
CHMM	Clean Heat Market Mechanism
CPS	Competent Person Scheme
CPD	Continuous Professional Development
DESNZ	Department for Energy Security and Net Zero
DNO	Distribution Network Operator
EAHP	Exhaust Air Heat Pumps
ECO	Energy Company Obligation
EPC	Energy Performance Certificate
ETO	Electrical Technical Operative
FHS	Future Homes Standard
FHS IA	Future Homes Standard Impact Assessment
FTE	Full Time Equivalent
GSHP	Ground Source Heat Pump
GTO	Groundworks Technical Operative
HPA	Heat Pump Association
HPTO	Heat Pump Technical Operative
HybridHP	Hybrid Heat Pump
MCS	Microgeneration Certification Scheme
NVQ	National Vocational Qualification
PHTO	Plumbing and Heating Technical Operative
SGL	Shared Ground Loop
SHDF	Social Housing Decarbonisation Fund
SNBHS	Scottish New Build Heat Standard
SVQ	Scottish Vocational Qualification
TRV	Thermostatic Radiator Valve
UK	United Kingdom

ANNEX 2 – POLICIES IN SCOPE OF THE HEAT PUMP DEPLOYMENT SCENARIOS

Table 12 lists the policies in scope of the analysis for both heat pump deployment scenarios. Please note that these policies only cover drivers of demand for heat pump uptake, not policies aimed at supporting growth in the installer base. These policies are also reflective of UK Government policy as of July 2024 and do not include any policy changes or new policies announced between then and the publication date of this report.

Similarly, while all policies are in scope, not all have been modelled. Only policies where there is data available have been modelled in this report – these are highlighted by an asterisk in Table 12 below.

Table 12 - Policies in scope of the heat pump deployment scenarios

POLICIES	SCOPE	STATUS	CURRENT & FUTURE POLICY MIX	UK GOVERNMENT TARGETS
Future Homes and Buildings Standard*	England	Consulted (proposed start date 2025)	✓	✓
Clean Heat Market Mechanism (fines included)*	UK	Consulted (proposed start date 2025)	✓	✓
Scotland Heat in Buildings Bill	Scotland	Consulted	x	✓
Boiler Upgrade Scheme *	England and Wales	In effect	✓	✓
SHDF Wave 2*	England	In effect	✓	✓
SHDF Wave 3*	England	Proposed from 2025	✓	✓
ECO4*	GB	In effect until March 2026	✓	✓
Home Upgrade Grant*	England	In effect until 2025	✓	✓
Warm Homes: Local Grant	England	Proposed from 2025	✓	✓
Energy Efficiency Voucher Scheme	GB	Proposed from 2025	✓	✓
Rebalancing of energy prices to reduce the price of electricity relative to gas	GB	Required reform	x	✓
Public Sector Decarbonisation Scheme*	England	In effect	✓	✓

Introduction of Home Energy Model	GB	Consulted in 2023	✓	✓
Stamp duty relief for energy efficiency upgrades	UK	Required policy	✗	✓
Mass roll out of government-backed consumer finance products	UK	Required policy	✗	✓
EPC reform	UK	Required reform	✗	✓
EPC reform (Scotland)	Scotland	Consulted in 2023	✓	✓
Wales Optimised Retrofit Scheme*	Wales	In effect	✓	✓
Heat Pump Investment Accelerator	GB	Closed	✓	✓
Hydrogen for Home Heating 2026	UK	Confirmation on role expected in 2026	✗	✓
Scotland Home Energy Grant and Loan Scheme*	Scotland	In effect	✓	✓
Private rented sector MEES by 2028 (Scotland)	Scotland	Consulted in 2023	✗	✓
Improving Home Energy Performance through Lenders	GB	Consulted in 2021	✓	✓
Scotland New Build Heat Standard*	Scotland	In effect	✓	✓
Social Housing Net Zero Standard in Scotland	Scotland	Consulted in 2023	✓	✓
Warmer Homes Scotland	Scotland	In effect	✓	✓
Wales Warm Homes Nest Scheme*	Wales	In effect	✓	✓

ANNEX 3 – LIST OF FIGURES IN THIS REPORT

LIST OF TABLES IN THIS REPORT

REFERENCES

1. HPA (2024) 'Projecting the Future Domestic Heat Pump Workforce'. Available at: https://www.heatpumps.org.uk/wp-content/uploads/2024/11/HPA-Projecting-the-Future-Domestic-Heat-Pump-Workforce-Report.pdf
2. HPA (2024) 'Projecting the Future Domestic Heat Pump Workforce'. Available at: https://www.heatpumps.org.uk/wp-content/uploads/2024/11/HPA-Projecting-the-Future-Domestic-Heat-Pump-Workforce-Report.pdf
3. These are either current policies which are already in place or ones that are expected with a reasonable degree of confidence to be implemented, for example those where the Government has set out a clear timeline for introduction (e.g. FHS) or has already consulted on them. This reflects the policy landscape at the time of writing.
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6. Please note that these targets were announced by the previous Conservative Government. As of the time of writing of this report, these are assumed to remain in place, as there has no indication to the contrary from the new Labour Government. Nonetheless, the report does not account for any changes that may be implemented by the new Government between then and the publication date of this report. The same applies to all subsequent references to these targets in the report.
7. HM Government (2020). The Ten Point Plan for a Green Industrial Revolution. Available at: https://assets.publishing.service.gov.uk/media/5fb5513de90e0720978b1a6f/10_POINT_PLAN_BOOKLET.pdf
8. HM Government (2023). Responding to the Climate Change Committee's (CCC) 2023 Annual Progress Report to Parliament. Available at: https://assets.publishing.service.gov.uk/media/666c1642fed5bd09e5195a4b/ccc-annual-progress-report-to-parliament-2023-government-response.pdf
9. Northern Ireland has a negligible impact on deployment in Scenario 1 because the policy landscape for heat pump deployment within Northern Ireland is currently minimal. The only dedicated policy that will apply there (from April 2025) is the CHMM, meaning it is challenging to accurately model policy-driven deployment for Northern Ireland. Analysis of MCS data suggests that Northern Ireland installations only accounted for 0.02% of UK installations in 2023. MCS data is derived from MCS (2024). The MCS Data Dashboard. Available at: https://datadashboard.mcscertified.com/InstallationInsights
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13. Please note that this target was announced by the previous Conservative Government in 2020. Therefore, this scenario reflects the UK Government's installation target as it was at the time of writing this report, it does not account for any changes that may be implemented by the new Government between then and the publication date of this report.
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26. This historical data is derived using overall heat pump sales data submitted by HPA members and new build heat pump installation data taken from the EPC database.
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30. The percentage In Table 2 refers to the proportion of new homes built in the corresponding year that have heat pumps or low carbon heat installed. At years of high, or 100% compliance (2028 onwards) as per CCC data it is assumed that aside from heat pumps, compliance is achieved using low carbon heat networks. Low carbon heat networks could encompass large heat pumps. These are out of scope of this report. We do not assume this figure to include networked ground source heat pumps, or shared ground loop heat pumps – these are included as part of the GSHP modelling assumptions.
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32. This labour utilisation rate represents the average percentage of their time a typical individual qualified to install heat pumps would spend on installing and maintaining heat pumps. It is worth noting that this percentage might vary depending on an organisation's business model. For instance, in a smaller installation company, an individual might spend a greater proportion of time doing other tasks, such as general administration, sales and accounting. In a larger employer, there are likely to be dedicated personnel for admin, sales, accounting and other supporting activities, thereby enabling qualified individuals to spend a higher proportion of time on the core heat pump installation.
33. MCS (2024) Data Dashboard. Available at: https://datadashboard.mcscertified.com/Welcome
34. HPA (2024) Sales Data. Available at: https://www.heatpumps.org.uk/resources/statistics/
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42. Future Energy Scenarios (2024): Data Workbook. Available at: https://www.nationalgrideso.com/document/322326/download
43. AtAHP = Air to air heat pump, GSHP = Ground source heat pump, HybridHP = Hybrid heat pump, AWHP = Air to water heat pump
44. Please note that in Figure 7, EAHPs are included in the AWHP category and SGLs in the GSHP category.
45. AtAHP = Air to air heat pump, GSHP = Ground-source heat pump, HybridHP = Hybrid heat pump, AWHP = Air to water heat pump.
46. Please note that in Figure 8, EAHPs are included in the AWHP category and SGLs in the GSHP category.
47. Acronyms used in Figure 10 stand for: ECO = Energy Company Obligation; CHMM = Clean Heat Market Mechanism; BUS = Boiler Upgrade Scheme; SNBHS = Scottish New Build Heat Standard; FHS = Future Homes Standard.
48. The policies outlined in this graph are those that contribute the most to heat pump deployment. The impact of the remaining policies is set out in the 'Other Retrofit Policies' category. A full list of policies in scope of this analysis can be found in this report. All remaining retrofit heat pump installations that are not carried out under any of the modelled policy schemes are captured within the 'Non-Policy Retrofit' category.
49. Please note that the stated deployment contribution for the CHMM does not include heat pumps installed under other policy schemes, such as BUS. This is to avoid "double-counting" heat pumps that are installed under policy schemes but would also count towards a manufacturer's contribution under the CHMM. Therefore, it only includes additional heat pump installations under the CHMM that are not already accounted for by other government policies.
50. Please note that 2023 deployment numbers are based on historical publicly available data for all policy schemes. 2024 deployment numbers take into account historic published data for the first half of the year and uses this to project deployment for the rest of the year. From 2025 onwards, all deployment numbers are projections based on policy impact assessments.

51. DLUHC (2023)., Future Homes Standard Consultation Stage Impact Assessment. Available at p22 https://assets.publishing.service.gov.uk/media/65cc90e139a8a7000f60d508/Future_Homes_Standard_consultation_stage_impact_assessment.pdf
52. Including EAHP systems
53. Including SGL systems.
54. Unless otherwise stated, all values presented are in full time equivalent (FTE) days.
55. However, these savings should not be taken as a prediction for how the market will develop. They rely on implementation of the measures set out in the methodology. This is in essence an illustrative exercise designed to show the workforce reductions attributed to potential efficiencies.
56. Please note that EAHPs have been included in the AWHP category.
57. Please note that SGLs are included in the GSHP category.
58. PHTO = Plumbing and heating technical operative, ETO = Electrical technical operative, GTO = Groundworks technical operative, HPTO = Heat pump technical operative.
59. Different businesses may have different models meaning that sometimes one person may do many, or all of these roles.
60. This is why along with HPTOs PHTOs are referred to in this report as 'individuals qualified to install heat pumps'.
61. For the purposes of this exercise, we have not distinguished between retrofit average and retrofit large properties because the differences in process are generally the same between new build and all retrofit properties. What differs with the retrofit large and retrofit average properties is the complexity of the installation process.
62. The average travel time is expected to come down in future as the market for heat pump installations scales up, meaning that installers will be able to do a greater proportion of installations within a smaller travel radius.

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About The MCS Foundation:

Our vision is to make every UK home carbon-free. The MCS Foundation helps drive positive change to decarbonise homes heat and energy through our work programmes, grants and advocacy. We support engagement programmes, fund research and facilitate innovative solutions to drive widespread adoption of renewables to help achieve a Net Zero future. In addition, the Foundation oversees the Microgeneration Certification Scheme (MCS) which defines, maintains and improves quality standards for renewable energy at buildings scale.

Find out more about The MCS Foundation: https://mcsfoundation.org.uk/

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