

Decarbonising home heating in the UK

Vaillant White Paper

July 2024



Vaillant



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The Vaillant journey began in 1874 in Remscheid, Northern Germany, when Johann Vaillant a copper beater and pump maker by trade began working on ideas that would forever change how we heat our buildings.

Today, we are a 150 year old family business leading the way in designing and manufacturing heating technologies, such as heat pumps and high-efficiency boilers, supported by our smart controls to deliver some of the most efficient heating systems in the world. Our research and development facilities headquartered in Remscheid are at the heart of the energy transition to develop and innovate heating and hot water solutions that provide our 30 million plus customers globally with a comfortable home environment.

Vaillant's UK headquarters is in Belper, Derbyshire with an onsite 22,000m² factory producing both heat pumps and high-efficiency boilers. We are proud to be leading the way in developing low carbon technologies that deliver sustainable domestic energy solutions. Our heat pump manufacturing line made us the first boiler manufacturer to serve the domestic heat pump market with onshore manufacture.

Since October 2022, we have invested over £50 million into heat pump manufacture and installer training demonstrating our support towards the UK's net zero ambition. Through our 6 Centres of Excellence and college partnerships, we upskill and train installers to grow the green supply chain in the UK. At full capacity, this investment will have created 300 new green jobs and apprenticeships for the local economy.

As a business, our corporate vision is 'Taking care of a better climate - inside each home and the world around it.' All our employees are working to achieve this shared vision. Innovation and sustainability are at the heart of everything we do as a business. Vaillant is becoming climate-neutral, and we have developed an ambitious long-term climate strategy which focuses on the following areas;

- Climate-neutral from 2020 thanks to afforestation projects
- Company's own CO₂ emissions to be halved by 2030
- Vaillant is supporting the aims of the United Nations and the EU on climate protection and sustainable development

Further information on Vaillant Group can be found here: www.vaillant-group.com/en/



Key Statistics



Approximately

18m

homes are connected to the gas grid, with 4.4m off the gas grid in Great Britain¹



Home heating makes up

18%

of all UK emissions²



circa

40k

oil boilers installed in the UK in 2023³



circa

14k

electric boilers installed in the UK in 2023⁴



circa

150k

gas safe registered engineers⁵



circa

4.5k

qualified heat pump businesses in the UK in 2023⁶

1. House of Commons Library, Households off the gas-grid and prices for alternative fuels (2024). Available at: commonslibrary.parliament.uk/research-briefings/cbp-9838/

2. National Audit Office, Decarbonising Home Heating Report (2024). Available at: www.nao.org.uk/reports/decarbonising-home-heating/

3. Vaillant Group estimate based on the BRG Building Solutions report for 2023.

4. Vaillant Group estimate base on BRG Building Solutions report for 2023.

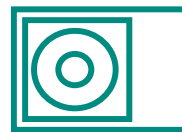
5. Gas Safe Register, At a Glance Report 2023/2024. Available at: www.gassaferegister.co.uk/media/c5ag1xjo/2023-24-gas-safe-register-at-a-glance.pdf

6. Department for Energy Security & Net Zero, Clean Heat Market Mechanism Impact Assessment (2023). Available at: assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1160093/clean-heat-market-mechanism-ia.pdf



2035

Phase out on the installation
of new and replacement
natural gas boiler



Previous government
ambition for

600k

heat pumps to be
installed in 2028



circa

1.4m

gas boilers installed
in the UK and
Ireland in 2023⁷



+60k

heat pumps sold in
Great Britain in 2023⁸

75%

of consumers are
aware of air source
heat pumps, which is
a 6% increase from
the previous year⁹



Median energy
efficiency of ratings
of homes in England
and Wales is band D¹⁰

7. Data acquired from the Heating and Hotwater Industry Council
8. HPA (Heat Pump Association), Statistics. Available at: www.heatpumps.org.uk/resources/statistics/. Accessed 09.07.2024.
9. Department for Business, Energy & Industrial Strategy, DESNZ Public Attitudes Tracker: Heat and Energy in the Home Winter 2023, UK. Available at: assets.publishing.service.gov.uk/media/65fc5d5e65ca2f001b7da82c/DESNZ_Public_Attitudes_Tracker_Winter_2023_Heat_and_Energy_in_the_Home_Revised.pdf
10. Office for National Statistics, Energy efficiency of housing in England and Wales: 2023. Available at: www.ons.gov.uk/peoplepopulationandcommunity/housing/articles/energyefficiencyofhousinginenglandandwales/2023



Executive Summary

Henrik Hansen,
Managing Director, UK & Ireland

To achieve net zero emissions by 2050, transitioning to low carbon technologies in all sectors, including the built environment, is crucial. In 2021, home heating accounted for 18% of all emissions in the UK.¹¹ Whilst low carbon heating solutions, such as heat pumps, are central to achieving our decarbonisation objectives, the future of home heating will rely on a multi-system, multi-technology approach.



The future of home heating will rely on a multi-system, multi-technology approach

We have identified four pillars, or action areas, essential to decarbonising home heating in the UK.



BUILDING STOCK FABRIC IMPROVEMENTS

Enhancing the insulation and overall energy efficiency of homes and buildings is critical. A well-insulated home reduces the long-term running costs and improves overall efficiency of all heating systems including heat pump, boiler and hybrid systems. For properties classified as complex-to-decarbonise hybrid heat pump solutions can provide heating and hot water, offering carbon and energy savings.



IMPROVING THE SYSTEMS USED TO HEAT HOMES

It is essential that existing heating systems are upgraded so they can be ready for a heat pump in the future. A phased approach to installations will help homeowners manage costs, lower their bills and reduce carbon emissions.



INSTALLER UPSKILLING AND DEVELOPMENT

Addressing the current shortage of qualified heat pump installers and system designers is vital for effective heat decarbonisation. Building a workforce fit for the future requires collaboration between businesses, government and educational institutions.



CONSUMER ENGAGEMENT

Engaging consumers is fundamental for transitioning from fossil fuel heating systems to heat pumps and other low carbon technologies. Education, acceptance, and confidence in heat pumps are necessary to successfully decarbonise buildings. The whole supply chain must support consumers on this journey, including participation in grid flexibility.

11. National Audit Office, Decarbonising Home Heating Report (2024). Available at: www.nao.org.uk/reports/decarbonising-home-heating/



“The widescale need to transition to low carbon is a once in a generation occurrence - the popularity of heat pump technology is growing at pace and is expected to continue to do so as homeowners become comfortable with the workings of lower carbon heating systems”

In 2023, the UK heat pump market saw a modest increase in sales, which falls short of the previous government's target of installing 600,000 heat pumps in 2028. In contrast, other European markets have experienced more organic growth in heat pump adoption due to clear government policies on energy efficiency and heat decarbonisation, long-term financing for heat pumps, reduced price differentials between gas and electricity, one stop shop advisory services and the availability of skilled and qualified installers.

The widescale need to transition to low carbon is a once in a generation occurrence - the popularity of heat pump technology is growing at pace and is expected to continue to do so as homeowners become comfortable with the workings of lower carbon heating systems.

This paper aims to identify key policy enablers necessary to sustain and drive the heat pump market in the UK, aligning with our decarbonisation goals.





Route to decarbonisation

In 2021, Vaillant published our first white paper on decarbonising home heating in the UK, this paper reflects on the opportunities and challenges associated with heat decarbonisation. We must focus on the solutions that are available to us here and now, primarily heat pumps and heat networks while encouraging innovation for full heating system solutions to be developed for various archetypes of buildings in the UK.

To accelerate home decarbonisation focus must be placed on the solutions that are available here and now - this is primarily heat pumps

Previously government has announced the ambition to install 600,000 heat pumps a year by 2028 with the target rising annually. This includes 200,000 installations in new build properties, mandated through The Future Homes and Buildings Standards in England and Wales. This set of updated building regulations will require new build homes to be future proofed with low carbon heating and increased levels of energy efficiency. In Scotland, from April 2024 there is a ban on the installation of fossil fuel appliances in new build.

In the retrofit market, there will be approximately 400,000 heat pumps installed in existing homes across the UK. This will prove to be a complex and multifaceted challenge which must be prioritised by government defining the right levers to drive consumer demand and build the green supply chain. Therefore, the government must consider long-term policy beyond 2035 aligned with the Climate Change Committee's recommendations and carbon budgets.

We acknowledge that it is a challenge to decarbonise the UK's building stock, but we are committed to confront this challenge head-on, as demonstrated by our investment, installer training, and on-site manufacture of heat pumps and ancillary components in the UK. Market certainty is critical to secure investment. In the last government the Prime Minister, Rishi Sunak delivered a speech in September 2023 reversing some key net zero priorities. This was detrimental to business confidence and investment including installers desire to upskill to heat pumps.

As a business, we are committed to confront the challenge of decarbonising home heating head-on





Through this policy change, it was concluded that 80% of homes are suitable for the installation of a heat pump but the remaining 20% are exempt. This led to the Department for Energy Security and Net Zero (DESNZ) commissioning a report on hard to treat or “complex to decarbonise” homes, developing a framework to categorise, complex to decarbonise, homes¹².

“Hybrids are potentially attractive in the complex to decarbonise properties where a heat pump solution is difficult to install”

We are concerned that through such a framework there may be a section of properties that wouldn't necessarily be complex to decarbonise but rather decarbonisation may come at a cost and/or disruption which could more easily be addressed with dedicated funding, qualified installers, and appropriate advice to such homeowners.

As we transition and continue to electrify heat it will pose significant challenges for the electricity grid to cope with seasonal demand, a stable grid capacity is needed to ensure there is long duration electricity storage. There is also the challenge in managing the grid flexibility due to renewables replacing fossil fuel electricity generation. We, therefore, urge the government to quickly define the mandate surrounding energy smart appliances for heat pumps to maximise flexibility and efficiency.

It is in these circumstances that hydrogen could be potentially a ‘replacement gas’. Through storage it can overcome the challenge of variability in electricity demand and generation throughout the year. This can be achieved by direct usage of hydrogen in heating or re-use of hydrogen to generate electricity. On a very small scale hydrogen has the potential to be used to heat homes near industrial clusters. We urge the government to make decisions on hydrogen for home heating sooner rather than in 2026 and reconsider the potential mandate for hydrogen ready boilers should hydrogen prove impractical for mass deployment in home heating.

Hybrids can offer a high degree of decarbonisation, energy savings and grid flexibility along with the potential for all three to be maximised in collaboration. Hybrids are potentially attractive in the complex to decarbonise properties where a heat pump solution is difficult to install or would impact homeowner comfort levels. There are currently no funding schemes in England and Wales for hybrids while Scotland offers grants under Home Energy Scotland. Once industry wide definition of what a hybrid system looks like, appropriate funding must be accorded to homeowners to support the installation of hybrid heat pumps.

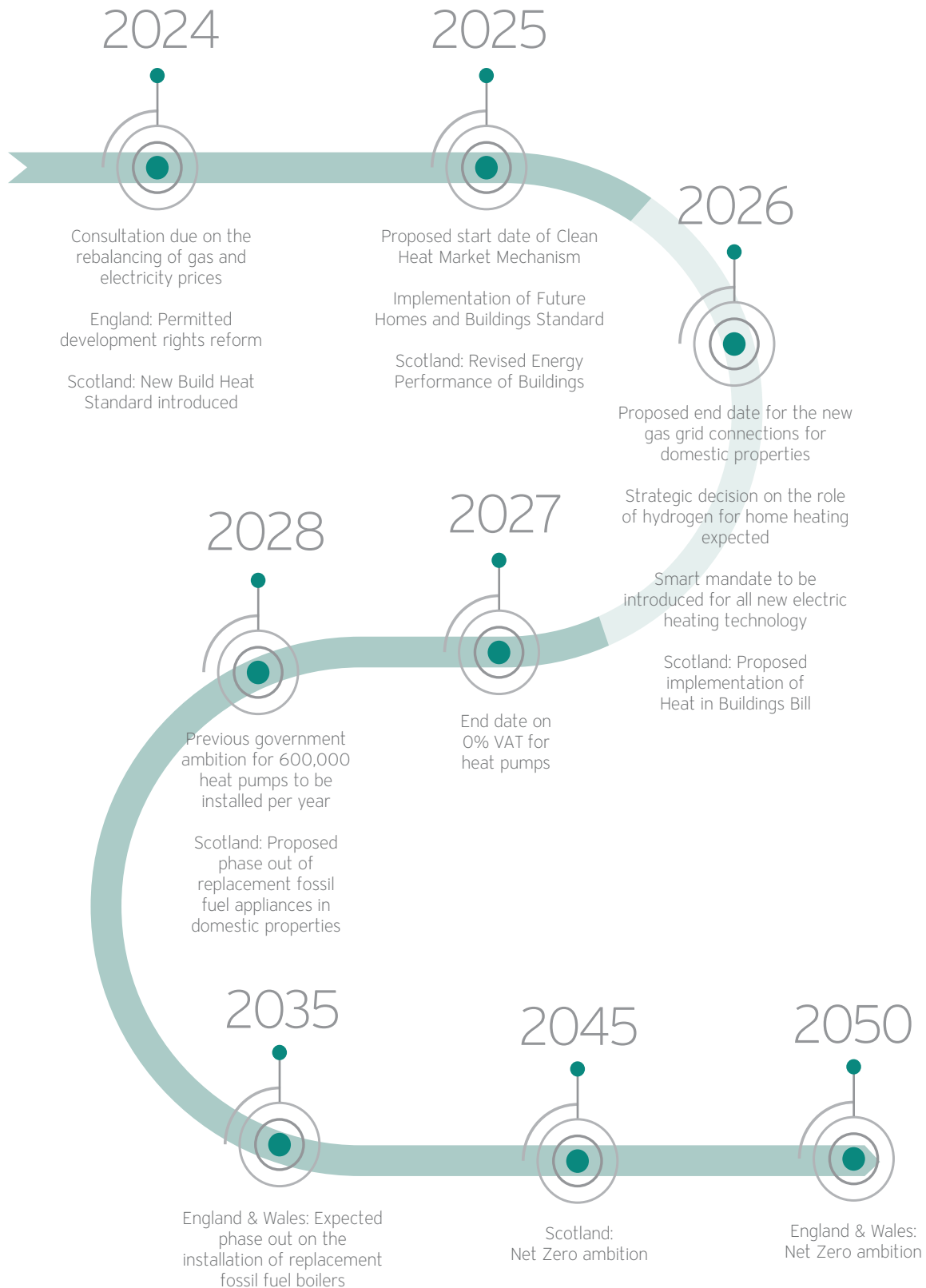
12. Department for Business, Energy & Industrial Strategy, Defining and identifying complex-to-decarbonise homes research and analysis. Available at: www.gov.uk/government/publications/defining-and-identifying-complex-to-decarbonise-homes



Route to decarbonisation

At Vaillant, we support the decarbonisation of home heating and hot water as a key mechanism to achieving the UK government's obligation to net zero by 2050, the pursuit of these should not be detrimental to homeowners or businesses.

Long-term energy policy will provide us with security and flexibility of supply, minimal environmental impact and affordable energy to homeowners. This will be realised from a mix of technology types as we transition to a full decarbonised connected system future.



Pillar 1



**BUILDING
STOCK FABRIC
IMPROVEMENTS**



Properties suitable for heat pumps

There is a myriad of building archetypes with an array of heating systems in the UK. The housing stock in the UK is regarded as the oldest and least energy efficient across Europe¹³, this contributes to significant challenges due to the nature of our UK housing stock. Some properties can pose a challenge towards the electrification of heat such as those that are categorised as ‘Complex to Decarbonise’.

A recent Department for Energy Security & Net Zero (DESNZ) study proposed a unified definition on the terminology of “Complex-to-Decarbonise” properties:

“Complex-to-decarbonise (CTD) homes are those with either one, or a combination of, certain physical, locational, occupant demographic, or behavioural attributes that prevent the effective decarbonisation of that home until they are addressed. These attributes might constrain the design and delivery of measures to improve energy efficiency, decarbonise heating, or realise occupant benefits (e.g., increased comfort and affordability of domestic heat and energy). These effects may be amplified by one or a combination of numerous system-level factors including financial (e.g., feasibility and affordability of measures), economic (e.g., Defining and identifying complex-to-decarbonise homes and retrofit solutions supply chain and materials availability), and/or organisational capacity and capability (e.g., workforce skills)”¹⁴

It is understood that circa 20% of UK properties could fit this definition.¹⁵

Over time, new buildings have evolved with new techniques and materials and therefore, the range of potential heat loss has reduced. From the 1970s onwards, the introduction of Building Regulations started to limit the variance in build quality, which continues to see the energy performance characteristics of the housing stock improve. In recent years, the variance in energy loss is minimal due to tightening of building regulations. We recommend applying the following simple changes to drastically improve the heat loss in properties that were built before 1990:

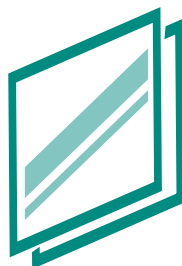
- 200mm loft insulation
- Upgrade to modern day argon filled double glazed windows and doors
- Install a minimum of 25mm of wall insulation which will be suitable for older properties with small cavities

Properties that have been constructed after 1990 will already meet the regulatory requirements on standards. The English Housing Survey 2022-2023 stated that 38% of homes have 200mm or more of insulation, 88% have full double glazed windows and 52% have a cavity or solid wall insulation.¹⁶ This means that a significant number of homes are suitable or can be made appropriate to have heat pump systems retrofitted.



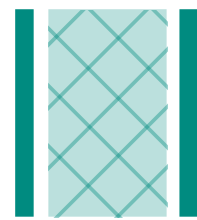
38%

of homes have 200mm loft insulation



88%

of homes now have double glazing fitted



52%

of homes have cavity or solid wall insulation

13. Reuters, Britain's old housing stock emerges as key emissions problem: Kemp (2021) Available at: www.reuters.com/markets/commodities/britains-old-housing-stock-emerges-key-emissions-problem-kemp-2021-12-02/

14. Department for Business, Energy & Industrial Strategy, Defining and identifying complex-to-decarbonise homes and retrofit solutions Research Report (2023). Available at: assets.publishing.service.gov.uk/media/65819bc3fc07f3000d8d44a5/complex-to-decarbonise-homes-report.pdf

15. Department for Business, Energy & Industrial Strategy, Responding to the Climate Change Committee's (CCC) 2023 Annual Progress Report to Parliament (2023). Available at: www.gov.uk/government/publications/committee-on-climate-change-2023-progress-report-government-response/responding-to-the-climate-change-committees-ccc-2023-annual-progress-report-to-parliament



Vaillant advocate a fabric first approach to decarbonisation where cost effective - this approach reduces consumer energy bills and prepares homes for a low carbon, low temperature future

The Electrification of Heat demonstration project funded by BEIS (Department of Business, Energy & Industrial Strategy) concluded that heat pumps can be installed in all property types across the UK (from flats to terraced houses).¹⁷ The project's result also revealed that those properties that were pre-1945 posed a greater challenge

in designing a suitable heat pump system. It is therefore imperative government recognise and target those properties that can be retrofitted in an easy and cost effective manner. This approach has a twin-fold function:

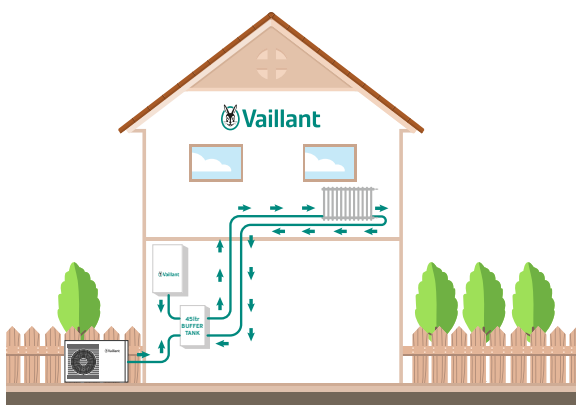
- Street by street decarbonisation of properties will take place at scale across the country driven by local authorities with the here and now technologies i.e. heat pumps and heat networks
- Identification of complex to decarbonise properties, such properties can be retrofitted to improve their heating systems and install insulation measures, while technological innovation continues, and the full decarbonised solution is developed.

Identification of properties that would be suited to the installation of heat pumps, local authorities would be best placed to deliver such schemes for their housing stocks. In the case of the Greater Manchester Combined Authority, their 'Whole System Smart Energy Plan' shows the potential for heat pump capacity in ten regions under its jurisdiction.¹⁸

Vaillant advocate a fabric first approach to decarbonisation where cost effective - this approach reduces consumer energy bills and prepares homes for a low carbon, low temperature future.

Considering hybrids in complex-to-decarbonise properties

Decarbonising residential heating systems presents various complexities. Hybrid systems, which integrate two distinct heating technologies, typically an electric heat pump and a fossil fuel boiler, offer advantages for both homeowners and government decarbonisation objectives.



Reduced costs and system modification

Integration with combination boilers:

Hybrid systems can work seamlessly with combination boilers, eliminating the need for a hot water cylinder and minimising system modifications.

Smaller heat pumps:

The heat pump component of a hybrid system can be smaller than that required for a standalone heat pump system, further reducing costs and installation complexity.

System flexibility

Optimised heating demand:

In a hybrid system with a combination boiler, the heat pump handles most of the central heating demand throughout the year. The boiler is used for hot water production and to meet peak heating demands during the coldest periods, thus negating the need to retrofit a hot water storage cylinder.

Balanced load management:

A heat pump sized at 50% of the design heat load of a house can fulfil 80% of the annual heat requirement. The boiler supplements the remaining demand during peak winter months. This configuration reduces stress on the electrical grid, particularly during peak usage times.

Space efficiency

Compact system design:

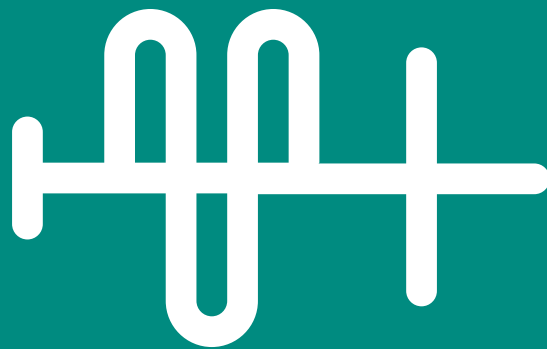
The smaller size of heat pumps used in hybrid systems makes them suitable for homes with limited physical space, offering a practical solution without compromising on performance.

16. Department for Levelling Up, Housing and Communities, Chapters for English Housing Survey 2022 to 2023 Headline Report. Available at: www.gov.uk/government/statistics/chapters-for-english-housing-survey-2022-to-2023-headline-report

17. Energy Systems Catapult, Electrification of Heat - Heat Pump Installation Statistics Report (2022). Available at: es.catapult.org.uk/report/electrification-of-heat-installation-statistics/

18. Energy Systems Catapult, Smart Energy Plan - Greater Manchester Combined Authority. Available at: es.catapult.org.uk/report/smart-energy-plan-greater-manchester-combined-authority/

Pillar 2



**IMPROVING THE
SYSTEMS USED
TO HEAT HOMES**



Improving the systems used to heat homes

We must look to upgrade today's heating systems to allow homes to be heat pump ready in the future and support the transition to a full decarbonised connected system.

The UK has set a legally binding target of reaching net zero greenhouse gas emissions by 2050. Through the 2021 Heat and Buildings Strategy, there is an overarching ambition to install 600,000 heat pumps in 2028 with the target rising annually. Approximately 200,000 of these heat pumps will be installed in new build homes driven by the Future Homes and Buildings Standard Regulations. The Future Homes and Building Standard will build on the 2021 Part L uplift and set high ambitions in terms of energy efficiency and ensure the installation of a zero carbon heating system. In the short term the implementation of this standard will reduce running costs for consumers, making the properties warm and comfortable to live in, whilst also using a cleaner energy source. The long-term benefit is that these properties will produce zero carbon emissions as the electricity grid decarbonises.

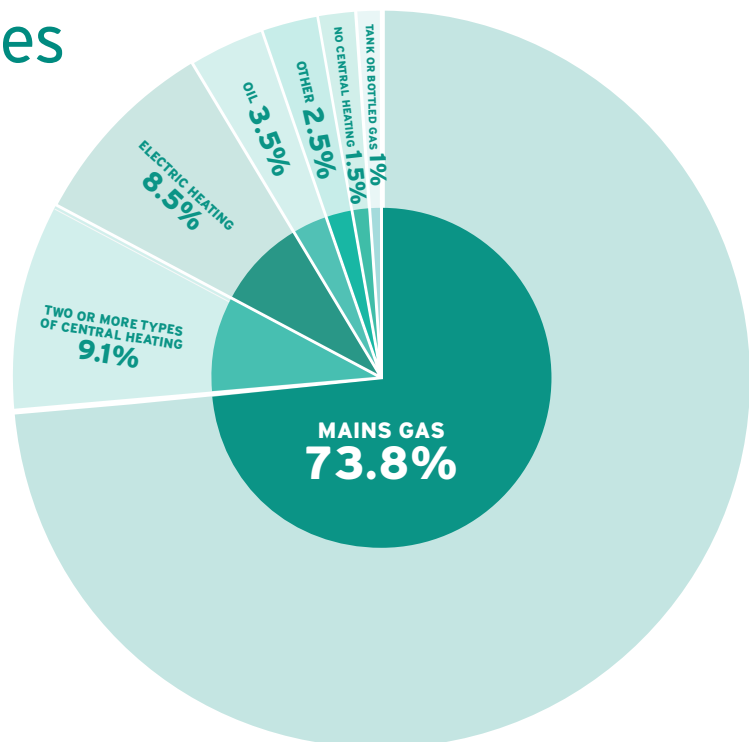
These properties can be designed from the outset to accommodate low temperature heat distribution systems through the means of a heat pump and a hot water cylinder. This overcomes the issue of space, often seen in the retrofit market.

The remaining 400,000 heat pumps will be realised through installation into existing homes, replacing an existing fossil fuel appliance which is higher in carbon emissions.

“New build properties can be designed from the outset to accommodate heat pump systems”

Potential challenges to upgrading a heating system

Although heat pumps are classified as a mature technology their application is still fairly new to the UK market, with the majority of UK homes using gas fired appliances. The graph¹⁹ highlights the diversity of UK systems and exactly how many properties will need to move onto zero emissions heating systems.



19. House of Commons Library, Households off the gas-grid and prices for alternative fuels (2024). Available at: researchbriefings.files.parliament.uk/documents/CBP-9838/CBP-9838.pdf



To aid the transition to a heat pump, these challenges need to be overcome

1 Reduce heat loss in our housing stock

Energy efficiency measures especially those around building fabric have had a slow rollout, poorly insulated homes often inadvertently raise the running costs and reduce comfort for homeowners. Significant investment is needed to raise the home insulation levels across the UK to reduce heat loss for a home to be suitable for a heat pump.

2 Additional space needs to be found to house a system

Around 80% of the boilers installed in UK properties are a combination boiler.²⁰ Combination boilers have grown in popularity as they don't require hot water storage as hot water is supplied instantly from the boiler, meaning that a traditional airing cupboard space is no longer required. In comparison, a heat pump system does require a hot water cylinder - meaning that space for both an outdoor unit and a cylinder inside the home will be required. This could prove a challenge as often the space has been repurposed.

3 Upgrading of radiators

Existing radiators will often be sized for high temperature gas boiler systems (around 70°C) whereas heat pumps work more efficiently at approximately 40-50°C. To accommodate a heat pump system, new larger low temperature radiators may need to be installed within homes, this will come at a cost and disruption to homeowners. This has been recognised by the previous government and we await the new grant scheme for radiators due to launch in 2025.

4 Heating system pipework

Four million homes need to reconfigure their system to suit higher water flow rates at 5KΔt (rather than 20KΔt with a high temperature boiler system). Additional changes may also be needed if microbore pipework is installed, as this pipework is often 8-10mm in diameter which may not be suitable for a heat pump system.

The market is transitioning from a focus on efficient products to efficient systems

5 Distress purchase

According to Energy Savings Trust, more often than not, a boiler purchase occurs when it breaks down.²¹ This is often known as a distress purchase, homeowners often need a rapid solution to fix their heating and hot water. The solution in this scenario is often a like for like fossil fuel appliance swap. Accessible finance offers will encourage homeowners with a working boiler system to upgrade their heating system to a heat pump before a failure.



As a business, we acknowledge that the market is constantly changing with new and emerging offers to encourage heat pump installations. This includes specific heat pump tariffs and Heat as a Service (HaaS) solutions to stimulate consumer demand and further drive down costs associated with the electrification of heat.

To achieve wider heat pump market deployment consideration must be given to how we encourage the section of the market that is not necessarily ready to switch to low temperature heating system completely. We suggest that consumers phase in their upgrades with a functioning heating system to include the installation of fabric efficiency measures, high recovery

'heat pump ready' cylinders, smart controls, and larger radiators. This method of phased installation supports homeowners' system costs and ensures their homes are future proofed for a heat pump. There is an opportunity for government grants and private finance models to support this.

The market is transitioning from a focus on efficient products to efficient systems. Connecting these systems to the internet opens numerous possibilities to consumers, such as applications for remote comfort control, and for businesses offering aftersales support, maintenance services, and usage-based tariffs.

20. Uswitch, UK boiler statistics 2023. Available at: www.uswitch.com/energy/boiler-statistics/

21. Energy Saving Trust, Phasing out fossil fuel heating in homes off the gas grid consultation (2022). Available at: energysavingtrust.org.uk/wp-content/uploads/2022/01/Domestic-consultation-response_for-website.pdf

Pillar 3





Installer upskilling and development

Heat pumps are a key technology to decarbonising home heating in the UK, however, there is a lack of qualified installers in the industry to achieve the previous government’s ambition of 600,000 heat pump installations in 2028. According to the Heat Pump Association (HPA), there are approximately 4,500 qualified heat pump businesses to date²² and around 40,000 full-time equivalent (FTE) installers will be needed to fulfil this ambition. Decarbonising home heating is essential to fulfilling our net zero commitments by 2050, a goal that necessitates the establishment of a robust green supply chain in the UK. However, we face significant workforce challenges,

including an ageing segment of the workforce, reluctance to upskill and a fragmented approach to plumbing, heating, and electrical apprenticeships.

Heat pump installers need many skills which are utilised today by traditional gas engineers to fit a fossil fuel boiler. These include understanding building regulations, thermodynamic principles, heat emitter sizing, temperature differentials, tightness testing, fault finding, servicing and customer service. To achieve net zero, a seismic shift needs to take place with our workforce, this means addressing political uncertainty, skills policy and the installer shortage,

1 Political uncertainty



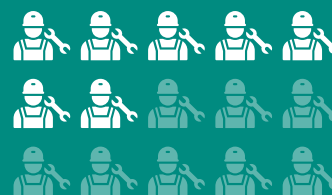
Along with a joined-up approach to policy, businesses need a stable political environment as well as a solid and consistent narrative on net zero. This will encourage investment and ensure industry confidence to invest in low carbon technologies and support the skills needed to pursue these green jobs. Last September, when the former Prime Minister Rishi Sunak, announced a rollback on green policies, including the delay in phasing out fossil fuel appliances in off-gas grid homes to 2035, we saw a decrease in confidence with gas safe engineers delaying heat pump training, citing that consumer demand would remain low without such a policy enabler.

2 Skills policy



We urge the new government to launch a cohesive skills strategy for the heating industry, such a policy should consider long-term industry requirements with regular milestones to track delivery and progress against the previous government’s 2028 ambition and beyond.²³ We look forward to the much-anticipated consultation on Minimum Technical Competencies (MTCs) to seek further recognition and alignment across the industry.

3 Installer shortage



Today the UK has over 150,000 gas boiler engineers compared to circa 4,500 MCS registered businesses in the UK.²⁴ While the Heat Pump Association (HPA) looks to finalise the exact number of installers needed, it is estimated that approximately 40,000 FTEs will be needed to meet the previous government ambition of 600,000 heat pump installations in 2028. There is a severe lack of qualified low carbon heating engineers in the industry.

22. Department for Energy Security & Net Zero, Clean Heat Market Mechanism Impact Assessment (2023). Available at: assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1160093/clean-heat-market-mechanism-ia.pdf

23. HM Government, The ten point plan for a green industrial revolution, Policy Paper (2020). Available at: www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution

24. Department for Energy Security & Net Zero, Clean Heat Market Mechanism Impact Assessment (2023). Available at: assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1160093/clean-heat-market-mechanism-ia.pdf



Growing the installer workforce

New entrants into the market

Installing a heat pump requires a multifaceted skill set combining heating, electrical and plumbing to develop a new skilled technician of the future. This approach differs from the siloed paths we see today. Young talent needs to be attracted into the industry by highlighting the prospect of well-paid green jobs for life. This often starts with engagement at the primary school level, showing young people that there are more career choices beyond the traditional university education route.

As a manufacturer, we recognise the crucial transition from fossil fuel heating appliances to heat pumps, and to support the low carbon heating industry, we are proud to invest in the UK's first cohort of 10 Low Carbon Heating Technician Apprentices.²⁵

Existing workforce

The rapid transition of current gas, plumbing, and heating installers is the most efficient approach to expanding the low carbon heating installation workforce, particularly for increasing the number of heat pump installers in the shortest possible timeframe. This existing workforce already possesses the necessary installation expertise and, to a large extent, the capability for system design and sizing. Nonetheless, the extent of the required upskilling should not be underestimated.

The heating industry faces the challenge of an ageing workforce, with some older members exhibiting reluctance to upskill for low carbon technologies. Despite this reluctance, these experienced professionals can still contribute significantly by training recruits who possess core plumbing, heating, or electrical skills. Such a strategy would preserve valuable industry knowledge, foster skill development in the next generation, and enhance resources for educational institutions through the involvement of part-time lecturers or mentors specialising in specific areas.

It should also be noted that training requires installers to be away from their trade, through our Installer survey we learnt that installers are willing to train should the consumer demand for heat pumps increase.²⁶ There are often people who are looking for a career change and the financial incentive from apprenticeships will not always be enough to support a switch to becoming a heat pump installer. Additionally, government funding needs to be reviewed, as the £500 Heat Training Grant (England) covers the cost of the course, but costs incurred by installers over the 3-6 days of training are not supported by any other incentive from the government or private finance models.

Vaillant provide training to existing heating engineers to upskill in heat pumps. Aspire is a blended modular learning pathway specifically tailored to the requirements of gas engineers.²⁷ At full capacity, we can train up to 15,000 heat pump installers at our 6 Centres of Excellence (training centres) and partnerships across the country.



25. Vaillant, Vaillant and Derby College welcome the UK's first 10 Low Carbon Heating Technician Apprentices, (February). professional.vaillant.co.uk/for-installers/business-support/developing-your-business/in-the-know/vaillant-and-derby-college-welcome-the-uk-s-first-10-low-carbon-heating-technician-apprentices-2811253.html
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To support and grow the installer base and green supply chain in the UK we have identified four critical calls for action from a new government

- 1** The government must launch a long-term coherent skills policy. This policy must consist of regular milestones to track, deliver, and measure progress against the wider net zero strategy for decarbonised heating. Such a strategy should also consider the importance of cross-industry collaboration between businesses, educational institutions, and the government to align funding and training routes with emerging career pathways. Industry must promote opportunities for a rewarding, well paid career that follows a vocational route rather than university and stimulates an ethos of lifelong learning and Continual Professional Development.
- 2** A reform of the Apprenticeship Levy will provide more flexibility for manufacturers providing training to use unspent levy to finance other aspects of the green supply chain such as investing in T-level students. Transferring the unused levy to SMEs will support existing installers with training costs and further encourage more new talent into the industry with well-paying green jobs for life.
- 3** Minimum technical competencies (MTCs) must be standardised across the entire low carbon heating industry. Additionally, soft skills should be consistently aligned throughout the broader low carbon sector. It is imperative that the industry urgently defines, agrees upon, and implements these MTCs to ensure the development of a skilled future workforce. Furthermore, the industry must take ownership of these MTCs, ensuring they are regularly reviewed and updated to maintain their relevance and effectiveness.
- 4** It is necessary to provide installers with further financing options to upskill and become qualified heat pump installers. Financing models for installers should be supported by a 'standardised skills card' that can track accreditations and competencies across all low carbon heating technologies and fossil fuel systems.

The ongoing energy transition is evidenced by the adoption of low carbon technologies, such as heat pumps, for residential heating. A crucial component of facilitating this transition is the development of a workforce equipped with the diverse skill set required to support the widespread implementation of heat pumps in the UK.

Policy and regulatory drivers will promote the installation of heat pumps, supported by a resilient green supply chain developed through collaboration between industry, education institutions and government. This partnership aims to cultivate the necessary skills to fulfil our net zero commitments. Investing in and supporting individuals and businesses today will ensure we have the qualified heat pump engineers needed in the future.

“Policy and regulatory drivers will promote the installation of heat pumps”



CASE STUDY - VAILLANT'S LOW CARBON HEATING TECHNICIAN APPRENTICES

Contributing to the enormous challenge of attracting apprentices into this growing field, we're delighted to be supporting the first cohort of Low Carbon Heating Technician Apprentices (LCHTA) which forms part of the Green Apprenticeships holding the Kings Standard, launched to celebrate the coronation of His Majesty King Charles III.

For the first time apprentices can take advantage of training that has low carbon technology as its focus through our partnership with Derby College. Previously, heating apprenticeships have focused on traditional gas heating systems, with students required to complete additional learning to install equipment such as heat pumps.

We're proud to be investing in apprentice training, with 10 full-time employed apprentices through their 3-year course, supporting the government's net zero ambitions. The new apprentices will eventually graduate with a Level 3 qualification in Low Carbon Technologies.

In addition to the Level 3 Low Carbon Technologies qualification, where the LCHTA apprentices will get to grips with the latest heat pump and other low carbon technology essential for the role, they will also get a rounder view of working in the heating industry and how to conduct themselves in customer's homes, to offer excellent customer experience and service. This includes additional qualifications and skills, such as plumbing, bricklaying, plastering, electrics and customer service, to ensure they are fully equipped to carry out quality work at every job. They will also benefit from experience gained from working across the Vaillant business to further their skills and competencies as the course progresses. The second and third year will include a programme of on-the-job training with qualified heating engineers to provide further first-hand installation experience.

Pillar 4



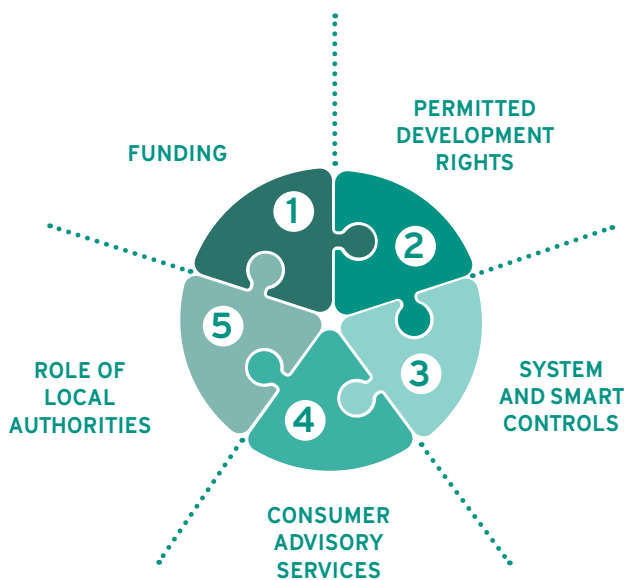


Consumer engagement

To achieve net zero, the UK has established ambitious emission reduction targets across all sectors, including residential buildings. We acknowledge and welcome the former government's decarbonisation obligations, however, it is imperative that these ambitions do not adversely impact homeowners or businesses. A long-term energy policy should define and prioritise affordable and secure energy for consumers and businesses.

As we transition to low carbon heating technologies such as heat pumps, consumer acceptance will be crucial for their widespread adoption. It is essential to involve consumers in the journey to decarbonisation, as their acceptance and engagement with heat pumps is central to transforming the way we heat our homes.

To support the large-scale deployment of heat pumps and achieve net zero while delivering energy efficient homes across the UK, we have identified the following:



1 Funding

According to The Energy Savings Trust a typical air source heat pump costs around £14,000 to install, this figure will vary based on the size and complexity of the install and if any other energy efficiency measures are required.²⁸ A ground source heat pump can be up to double this figure therefore funding packages need to be easily accessible and are critically important in supporting consumers in their journey to install a low carbon heating system:

Installation costs: In September 2023, we welcomed the 50% grant uplift to the Boiler Upgrade Scheme (BUS) in England and Wales, while this is a step in the right direction, we need the government to consider low or interest-free loans akin to Home Energy Scotland, green stamp duty and other innovative finance models such as Property Linked Finance.²⁹

- To enhance consumer uptake of the Boiler Upgrade Scheme (BUS), a dedicated long-term funding model based on council tax bands and property types should be considered. This approach would identify properties by varying fuel types and differing archetypes, including those properties which are classified as complex to decarbonise. Uplifted grant amounts, similar to those provided by Home Energy Scotland, should be allocated to such properties. These schemes are best managed in collaboration with local authorities, leveraging their detailed knowledge of local demographics and housing stock.
- Innovative service models such as Heat as a Service (HaaS) have rapidly emerged in countries like Germany where homeowners can lease a heat pump for a minimal monthly fee. Such models help consumers manage the potentially high upfront costs of heat pumps.
- Consumers should have the option of improving their existing heating system, gradually phasing out the costs associated with installing a heat pump. This includes the installation of high recovery cylinders (heat pump cylinders) and insulation measures to make homes heat pump ready.
- Hybrid heating systems should be eligible for funding under the Boiler Upgrade Scheme (BUS), this follows the path of the Home Energy Scotland Grant and Loan scheme.

Running costs: The UK has some of the highest electricity prices in Europe. The current gas-to-electricity ratio is £5.48 p/kWh to 22.36 p/kWh and this is set to rise in October.³⁰ This wide spark gap distorts the market and does not incentivise consumers to transition to heat pumps. It is therefore essential that the new government make it a priority to close the price differential between gas and electricity, making electricity both the lowest carbon and lowest cost fuel.

- We urge the new government to put building fabric improvements at the heart of their energy policy, since a poorly insulated home will inadvertently raise the running costs of heat pumps and use more energy.

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29. Green Finance Institute, Property Linked Finance has the potential to unlock up to £70 billion of investment for UK home energy efficiency improvements (2023). Available at: www.greenfinanceinstitute.com/news-and-insights/property-linked-finance-has-the-potential-to-unlock-up-to-70-billion-of-investment-for-uk-home-energy-efficiency-improvements/

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2 Permitted development rights

We eagerly await the response to the Permitted Development Rights consultation which looks to relax the one metre rule surrounding the installation of air source heat pumps, and allows multiple air source heat pump installations in blocks of flats while accounting for noise from heat pumps.

We look forward to the implementation of the new rules to support further the mass deployment of heat pumps in differing archetypes in England.

3 System and smart controls

We welcomed the previous government's response to the Improving Boiler Standards and Efficiency consultation to prohibit Class I-III controls from being placed on the market from 2026.³¹ According to a recent BEAMA report which concluded that Class VI controls demonstrate a 5% energy saving for a typical heating season, the new government should mandate Class VI controls as the minimum standard.³² As we move to a low carbon economy, we urge the new government to quickly define the requirements of a smart mandate through the response to the Smart and Secure Electricity System consultation, for energy smart appliances such as heat pumps to maximise grid flexibility and efficiency for homeowners.

4 Consumer advisory services

One-stop shop advisory services can raise awareness of the benefits of low carbon heating systems. France Rénov, Home Energy Scotland, and Your Home, Better (Greater Manchester Combined Authority) are great

examples of a comprehensive retrofit advice service offering impartial advice on financial support and technical requirements for home renovations. A national framework is needed in the UK to dispel myths and stimulate demand for heat pumps.

Energy Performance Certificates (EPC) reform is critical to the adoption of heat pumps and we urge the new government to publish this consultation quickly to ensure heat pumps are adequately recognised in EPC methodology and consumers are further able to understand and engage with their EPCs.

5 Role of local authorities

Leveraging their detailed knowledge of local demographics and housing stock, local authorities should be allowed to implement their own heat decarbonisation policy, supported by central government.

Consumer confidence

As we move to a low carbon economy, consumer education and government narrative on decarbonised home heating are essential to empower and give consumers the confidence to decarbonise their home with a heat pump. In addition, all sections of the public must be engaged on the benefits of adopting insulation measures and installing heat pumps with the benefit of reduced running costs.

True success can only be measured by the increase in consumer adoption of heat pumps.



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32. Beama, Load and Weather Compensation Controls - Test Report (2021). Available at: www.beama.org.uk/resourceLibrary/salford-tests-on-load-and-weather-compensation-.html

33. Vaillant, Introducing Heat Pump Plus. Available at: www.vaillant.co.uk/service/heat-pump-plus/ Accessed: 09.07.2024



CASE STUDY HEAT PUMP TARIFFS - VAILLANT AND OVO COLLABORATION

To support consumer adoption of heat pumps, the domestic heating market has seen the emergence of specific heat pump tariffs such as time of use and type of use tariffs to reduce the running costs of heat pumps further.

We're on a mission to make heating simple whilst also looking to decarbonise home heating with our heat pump technology. As more homeowners across the UK are looking to upgrade from their traditional gas boiler to a heat pump, our partnership with OVO supports with the ongoing running costs of a Vaillant heat pump.

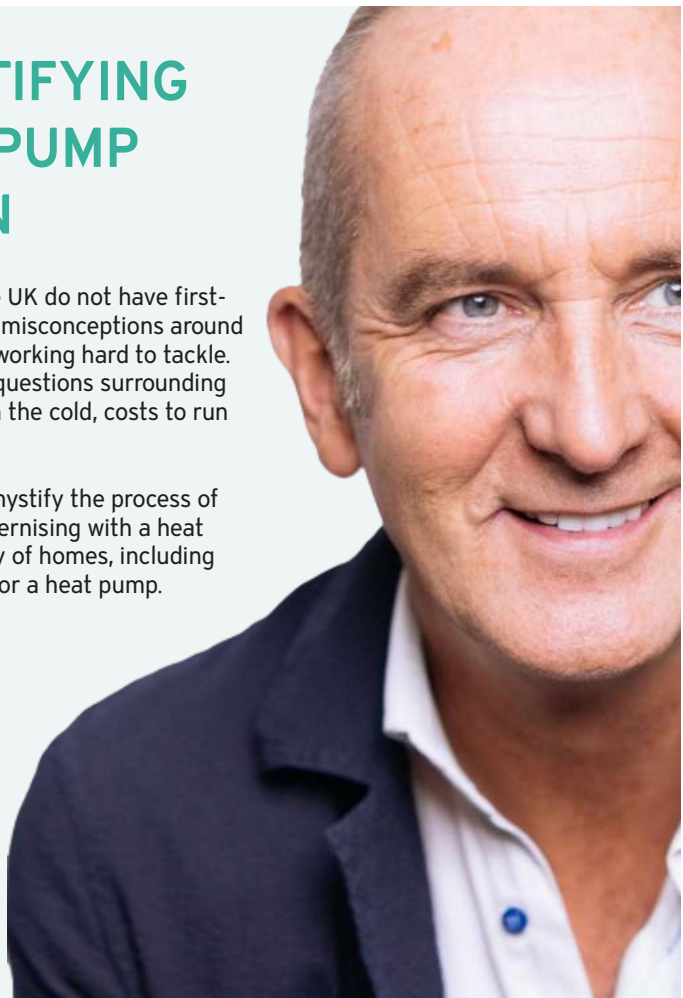
Heat Pump Plus is a free type of use add-on for eligible OVO and Vaillant customers allowing consumers to run their heat pumps at just £0.15 p/kWh.³³

CASE STUDY DEMYSTIFYING HEAT PUMPS - HEAT PUMP POSSIBLE CAMPAIGN

Despite the growing popularity, many people in the UK do not have first-hand experience of heat pumps and, there are still misconceptions around this low carbon technology that Vaillant has been working hard to tackle. Recent research has revealed there are still many questions surrounding this heating technology including how they work in the cold, costs to run and the type of homes they are suitable for.

Vaillant teamed up with Kevin McCloud to help demystify the process of heat pump installation, and demonstrate how modernising with a heat pump has benefitted homeowners in a wide variety of homes, including those which were perceived as not being suitable for a heat pump.

Given the diverse archetypes of UK properties and the associated challenges, the objective of this campaign was to highlight that consumers want to invest in low carbon heating and are willing to understand how they can make this technology work in their home. The campaign illustrated the importance of a complete technical solution and highlighted the expertise needed to make the installation a success.





Key recommendations

The previous government set an ambitious target of installing 600,000 heat pumps by 2028 with the target rising annually. However, according to the Tony Blair Institute it is estimated that this target will not be achieved until 2039³⁴, 11 years behind schedule, emphasising the significant effort required to decarbonise the UK’s housing stock.

The UK has a history of uncertainty, delayed delivery of support and inconsistent policies, all contributing towards the slow deployment of heat pumps. This paper has identified key barriers and policy enablers needed to develop the heat pump market, decarbonise heat, and achieve net zero by 2050. Below are key recommendations based on Vaillant’s four pillars of decarbonisation:



Our key recommendations are:

- Policy framework:** A clear and consistent policy framework is the crucial for sending early and appropriate signals to the industry, encouraging investment in developing and manufacturing heat pumps in the UK.
- Rebalancing of gas and electricity prices:** Addressing the price differential between gas and electricity is critical. Given that electricity is the lowest carbon heat source, it should also be the lowest cost fuel for households. This pricing strategy would enhance the economic case for homeowners to switch to heat pumps, thereby accelerating their deployment. To mitigate the financial impact on households most adversely affected by this shift, a carbon tax rebate system, similar to the Canada Carbon Rebate model, should be implemented.³⁵
- Local authority involvement:** Local authority-driven, street-by-street decarbonisation should be a policy measure implemented by devolved administrations and combined authorities. This approach facilitates the mass deployment of heat pumps and identifies properties that are complex to decarbonise, where hybrid heat pumps and other technologies would be viable solutions.
- Homeowner considerations:** Homeowners should be encouraged to upgrade their existing heating systems with measures such as insulation, high recovery cylinders (heat pump cylinders), smart controls and radiators correctly sized for low temperature heating systems to maximise efficiency of the heat generator. This phased installation method helps manage costs for homeowners and ensures their homes are heat pump ready.
- Sustainable funding mechanisms:** A long-term, sustainable funding mechanism is essential in the UK. Although dedicated heat pump funding mechanisms exist in England, Scotland, and Wales, these need improvement to further incentivise heat pump installation. Funding should be determined by council band types and property types to enhance incentives. A new government mandate for alternative finance models is crucial to support homeowners in this transition.
- Skills and training:** A coherent, long-term skills policy is essential, involving collaboration between businesses, government, and educational institutions to ensure training and upskilling of installers meet industry needs. To attract and retain individuals in the industry, the government should increase the flexibility of the Apprenticeship Levy’s applications and provide well-paying green jobs. Offering financing models to support heat pump training for existing gas engineers is also necessary.

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Contact

We would be delighted to meet with you to continue discussions on the areas touched on in this paper. Please email our team at vaillant@connectpa.co.uk to arrange a meeting.



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