United Kingdom: Strategic Market Outlook

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The publication of the UK Government's Heat and Buildings Strategy in October 2021 and media interest in decarbonising heating, particularly in the year when Britain hosted the COP26 Climate Change Conference, has galvanised consumer interest in heat pumps. UK sales of hydronic heat pumps are forecast by industry to nearly double over the next year, and the UK is reaching a tipping point whereby heat pumps are being seen as a mainstream alternative to fossil fuel heating systems rather than a niche product.

UK heat pump market seeing rapid growth

Currently, there are around 300,000 hydronic heat pumps installed in the UK, largely monobloc air to water systems. This represents approximately 1 per cent of the UK heating market, which is dominated by gas boilers. Annual sales of heat pumps reached around 37,000 in 2020, but this was dwarfed by the annual sales of gas boilers which topped 1.7 million.

Despite the current market for heat pumps being relatively modest, there are big plans afoot. With the publication of the UK's Heat and Buildings Strategy (Source: BEIS), the Government laid out an ambitious plan to grow the market to at least 600,000 installations a year by 2028. This plan will put the UK on a pathway that would mean around 1 in 6 homes will have a heat pump installed by the end of the decade, making the UK one of the largest markets in Europe for heat pumps (Figure 1).

Sector	Deployment assumptions	Unit	2019	2025	2030	2035	2050 illustrative range
Power	Electricity generation	TWh	320	315	370	460*-510	610-690
	Low carbon GB generation as a percentage of total projected generation required in 2035	%	29%-33%*	38%-42%*	62%-69%*	99%	99-100%
Heat and Buildings	Cumulative heat pumps installed domestically	Million installations	0.2	1.1	4*- 4.3	6.9* - 11.3	12-28
	Cumulative homes converted to 100% hydrogen for heat	Million homes	0	0	0-0.2*	0-4*	0-14
	Yearly homes treated by new domestic energy efficiency measures	Million homes	0	0.5	1	0.5	
	Low carbon fuels[a] consumption as a percentage of total fuel consumption in commercial buildings (excluding heat networks)	%	62%	63%	67%	78%-81%*	90-100%
	Yearly heat supplied via heat networks	TWh	14	16	22	29	70
	Yearly biomethane injected into the grid	TWh	3	8	12	12	0-20

Figure 1. Deployment assumptions underpinning UK Net Zero pathway (Source: BEIS Net Zero Strategy, 2021)

Building blocks for heat pump growth

To decarbonise buildings and support the switch to heat pumps, the Government will introduce requirements for new build homes that will mean – when the Future Homes Standard is implemented in 2025 – all new homes will need to be zero carbon ready; producing at least 75 per cent lower CO_2 emissions compared to those built to current standards. Subject to a full technical consultation in 2023, the intention is to set the performance standard of the Future Homes Standard at a level that will mean new homes will not be built with fossil fuel heating but with low carbon technologies, such as heat pumps, and will encompass very high fabric standards, and improved building services.

But to keep the UK on track to meet its carbon commitments and aid growth of supply chains also means taking action now; from later this year, there will be an interim uplift to building standards – so new homes will be expected to produce 31 per cent less CO_2 emissions compared to current standards; delivering homes that are future-proofed for the longer-term. Around 35% of heat pumps sold in the UK today are installed in new build, and this market is becoming increasingly important with many housing developers looking to fulfil their obligations under building regulations by deploying heat pumps, and indeed the Government expects a large majority of the 300,000 new homes to be built each year by the middle of the decade will have a heat pump installed. The UK Government are also taking action to move away from fossil fuel heating in existing homes and businesses by consulting on proposals to end the installation of new fossil fuel heating for homes and non-domestic buildings off the gas grid in this decade. This would start in 2024 for larger, non-domestic properties and from 2026 for households and smaller non-domestic buildings. The introduction of such regulation would effectively rule out the installation of new oil, coal or liquified petroleum gas heating systems once the appliance has reached the end of its life, and instead, consumers would be required to take a 'heat pump first approach', where a heat pump – or in limited cases biomass – would be installed in place of a fossil fuel heating system.

But Government analysis is clear that action is also needed in homes on the gas grid if the UK is to meet its net-zero objectives, and the Heat and Buildings Strategy outlined the intention to phase out the installation of new and replacement natural gas boilers by 2035 at the latest. There will continue to be gas boiler installations over the coming decade. These represent a significant target population for further improvements to in-home boiler performance, as well as measures to prepare homes for low carbon heating, such as sizing heat emitters for low-temperature operation. The government plan to consult shortly on whether to require new gas boilers to be hydrogen-ready from 2026 and also to test proposals on the future of broader boiler and heating system efficiency; this is in line with the timing of wider decisions on the future of the gas grid and the role of hydrogen.

Bridging the cost gap

Introducing regulations is, of course, only part of the solution to growing the heat pump market in the UK. The average installed cost of an air source heat pump in the UK is around £10,500, which is around three times higher than incumbent heating technologies like gas boilers. When considered against the median UK household disposable income of £29,900 a year (Source: ONS), this represents a significant investment, and many consumers making the transition to low carbon heating currently rely on government support to help bridge the cost gap.

As part of the Heat and Buildings Strategy, the government announced funding of £3.9bn to help decarbonise buildings and kick start the market for heat pumps – including £450m for the new Boiler Upgrade Scheme, £950m for the Home Upgrade Grant, £800m for Social Housing, and £1.4bn for Public Sector Decarbonisation. But to make heat pumps more affordable and less reliant on government grants, costs must fall. This will be achieved naturally as the market grows and the supply chain becomes more competitive, but it is also likely to be driven by new financing models – like heat as a service – and applying process engineering approaches to streamline installation. The market is already responding by making significant commitments to reduce upfront costs, which could realise savings of 25-50% off the installed price of a heat pump by 2025.

The government has also been consulting on introducing a potentially game-changing market-based mechanism from 2024, with the leading option under consideration being to put an obligation on manufacturers of gas and oil boilers sold on the UK market to achieve the sale of a certain number of heat pumps proportional to their boiler sales in a given period. This approach has worked successfully in other industries and would put industry at the heart of the transition to cleaner heating, potentially driving rapid reductions in cost.

Scaling up ambition requires fresh thinking

There are, of course, challenges facing the deployment of heat pumps in the UK. The UK remains reliant on gas boilers, with 85% of households connected to the national gas grid, and sales of gas boilers continue to grow, which has made re-training existing fossil fuel boiler engineers more challenging. But there are positive signs that existing installers are retraining and new installers are entering the market. There is also increasing interest and awareness of heat pumps among consumers.

And while it is true that many homes in the UK have radiators designed to operate at the high flow temperatures readily achieved by fossil fuel boilers, industry is responding by innovating and developing new technologies, like higher temperature heat pumps capable of working with the UK's existing heating systems. The UK Government is investing in developing such technologies through programmes like the £60 million Heat Pump Ready Innovation Programme.

There also remains much work to do to improve the fabric efficiency of the UK housing stock, to ensure that homes are insulated well enough to allow a heat pump to meet the thermal demands of consumers, but also to mitigate rising electricity costs that don't always allow consumers to make green decisions, because at present many consumers will see an increase in their fuel bills by switching to a heat pump. As part of the Heat and Buildings Strategy, Government announced plans to ensure that heat pumps are no more expensive to run than a gas boiler by incentivising insulation of homes and businesses, encouraging adoption of smart tariffs, promoting improved efficiency of products and considering approaches to remove price distortions in the levies applied to gas and electricity prices.

While challenges exist in reaching the Government's ambitious deployment targets for heat pumps, there is cause for optimism and a genuine sense that the UK has reached a tipping point in its approach to decarbonising heat.

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