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Turning up the heat

Making the home heating transition work for low-income households

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Summary

To date, the UK's impressive record on reducing carbon emissions has not required families to make significant changes in behaviour. But the next stage of the journey will, with how we heat our homes a key component. Here, the reality is that decarbonising home heating will not happen on its own: Government intervention will be needed if it's commitments to net zero are to be realised. This is far from impossible to deliver – policy will need to be proactive in ensuring that costs are fair and that solutions work for lower-, as well as higher-income, households. This policy challenge is the focus of this briefing note.

Carbon emissions from homes (principally from heating space and water) are largely unchanged over the past decade and are now the second largest contributor to the UK's carbon footprint. The Government is committed to reaching net zero, and the Climate Change Committee (CCC) has suggested that carbon emissions from homes should fall by two-thirds (65 per cent) by 2040 to stay on the lowest-cost route, with the overwhelming majority of this fall coming from replacing gas boilers which account for 79 per cent of emissions from homes.

Electric heat pumps are the most efficient solution for low carbon heating, but the pace of their rollout is too slow. Fewer than 100,000 were fitted in 2024, compared to 1.5 million gas boilers, leaving the UK's rollout as the slowest in Europe. The CCC recommends that uptake accelerates rapidly to 450,000 retrofits a year by 2030, before replacing all boiler sales in 2035.

As well as being slow, the heat pump rollout is uneven: 45 per cent of all heat pumps installed today are in richer neighbourhoods, compared with 19 per cent in those where incomes are lower. Furthermore, rural and less-densely populated areas account for nearly three-quarters (73 per cent) of the total. These trends are not particularly surprising – heat pumps are expensive and subsidies are a relatively recent phenomenon; and they offer bigger benefits and easier installations to homes not on the gas network. In addition, upfront spending is not necessarily rewarded through lower bills. But for heat pumps to be the main heating source in the future, they need to work for all families in all property types

Thankfully, policy has started to address these concerns. In 2023, the previous Government increased universal upfront heat pump grants from £5,000 to £7,500. In addition, schemes to alleviate fuel poverty are now fitting heat pumps for free alongside energy efficiency improvements. As a result, 2024 saw a similar share of heat pumps installed through untargeted grants as through schemes targeted at poorer households (23 per cent compared to 20 per cent).

But these large subsidies were introduced with an expectation that stoking demand would dramatically cut prices, as has been the case for electric vehicles. It was hoped that heat pump costs would halve by 2025, and reach cost parity with a gas boiler in 2030. But unsubsidised real costs are just 6 per cent lower than they were five years ago. And, on average, heat pump installations are close to twice the price of a gas boiler (£5,400, or £12,900 without subsidy, compared with around £3,000 for a gas boiler). Cost reductions are now expected to take longer, with the CCC expecting costs to fall by just 25 per cent by 2030, when a heat pump installation is still expected to cost £10,000.

So our home heating strategy needs a rethink.

Grants remain vital for catalysing the market, and untargeted subsidies are appropriate when the policy goal is to ensure as many homeowners participate as possible. But the status quo is also evidently not enough: installation rates need to speed up significantly, and costs need to fall. This suggests larger subsidies are needed. But we need to also be mindful of not wasting money, of deadweight, and of the benefits of using additional funds to target the distribution as well as the pace of take up.

So, we propose that a new, means-tested grant should be introduced on top of current programmes, set at a level so that the cost of a heat pump is comparable to a gas boiler (that would suggest a level of around £3,000, on top of £7,500 from the existing Boiler Upgrade Scheme). Targeting households based on income will ensure those least able to afford the outlay will benefit, while means testing by wealth can reduce deadweight loss.

Supporting a quarter of the 450,000 heat pumps a year needed by 2030 in this way would cost £370 million a year (additional to the cost of the Boiler Upgrade Scheme, which by 2030 could cost £3.7 billion a year in cash terms if it supported all retrofits at the current grant level). As heat pump costs could be high all the way to 2050, governments should prepare to support poorer homeowners throughout the heat transition, but aim for untargeted subsidies to be wound down gradually once demand and costs allow.

Such an approach is consistent with the subsidy-led approach the new Government seems to prefer. But subsidies should be reinforced with regulatory changes. In this context, it is disappointing that plans made by the previous Government in this area have been watered down. This is risks being short-sighted: current subsidies have not proven an effective way of driving down costs through either scale, competition, or technical progress. Subsidies have also done little change the behaviour of landlords. And subsidies are also likely to prove very expensive if they need to be maintained into the long term.

Regulatory changes can be an effective way of reinforcing the policy of subsidising demand. Experience with the rollout of electric vehicles (EVs) suggests that setting a date after which gas and oil heating systems can no longer be installed is key for

signalling to manufacturers that a large enough market will exist to justify investment to bring down production costs. It will also convince property owners (including landlords) that they must face up to the home heating transition. Sales mandates can also be effective, particularly if there are strong penalties for missing them: these sharpen incentives for manufacturers to cut prices. Higher standards on new homes – which continue to be overwhelmingly fitted with gas heating – should also be prioritised.

Such a regulatory approach – one broadly comparable to that employed in the switch to EVs – should increase the rate at which prices fall, improve accessibility and ultimately accelerate the decarbonisation of home heating.

But while drivers moving from petrol to electric cars can bank sizeable savings, the same is not true for those replacing a boiler with a heat pump. We estimate that, at current prices, households will, on average, face a £32 per year increase in heating bills. This is similar to other analyses, but we go further and also consider the distribution of bill changes. Overall, we estimate that 63 per cent of households would see spending rise when replacing a boiler with a heat pump, including 68 per cent of those in the poorest income quintile (compared with 57 per cent for the richest), and one fifth (22 per cent) of households would face additional costs of £100 or more per year. While these can be seen as relatively small sums in the context of typical energy bills of more than £1,800 per year, it makes a heat pumps a tough sell if they cost more to install and run than a gas boiler.

In this context, anything that can be done to bring down home heating costs should be investigated. This is even more important for lower-income families who spend 7 per cent of their disposable on keeping warm, compared to just 1.5 per cent for the highest.

There are a number of ways in which heat pumps can be made cheaper to run. For example, mandating higher performance standards (i.e. ensuring that heat pumps run more efficiently once installed) would be worth around £60 to the average household. But higher efficiencies are not attainable for all homes and could increase upfront installation costs. Promoting off-peak energy use may also yield savings but comes with a trade-off of exposure to high electricity prices during 'peak' times that many may not be able to avoid. Increasing the use of renewable energy and reforming energy markets should also yield savings, albeit slowly and uncertain in size. And insulating homes will certainly cut bills, but won't help tilt the balance in favour of heat pumps over a gas boiler. So, while these avenues are worth pursuing, we should look elsewhere for immediate – and sizeable – impact.

To give families the right incentives today, policy makers should focus on the relative prices of heating fuels. As things stand, a kilowatt hour (kWh) of electricity costs 27 pence, almost four times the price of gas (7 pence per kWh). This means that better efficiencies offered by heat pumps do not translate into lower bills. One reason for this

is that gas burnt at home is not taxed whereas electricity is (at around £60 per tonne of CO_2, or 0.75p per kWh). But increasing taxes on gas would just push up bills instead of saving households money, while the benefits from trimming taxes on electricity are low (less than £10 per year).

Instead, we can look to other means that impact electricity prices: levy costs – owing to schemes to fund renewable energy and social programmes – account for 16 per cent (5 pence per kWh) of the current per-unit price of electricity, compared to just 4 per cent (0.3 pence per kWh) for gas. There are three options here. The first is to fund these from standing charges. This approach would make each kilowatt hour used cheaper by increasing the flat charge paid by all households, meaning a saving for big users of electricity at the expense of others. The second is for the exchequer to pick up the tab, a move that would see energy bills fall for all (the typical household would save around £140), but especially for a family with a heat pump whose bills would be £280 lower, on average, than if their home remained heated by gas. The downside is the need for the Government to find around £5 billion per year.

Which brings us to a third way: funding via gas unit prices. Such a route would allow the Government to avoid a sizeable bill and would also increase the size of savings on offer by switching to a heat pump, albeit by making the status quo more expensive. But, with 16 per cent of households not on the gas network, compared to virtually all on the electricity grid, per-household costs would need to increase to recoup the same revenue from a smaller customer base. This means large gains to those off the gas grid and increases (around £30 per year) for everyone else. This increase is small, but should ministers prefer to avoid any additional pressure on bills – particularly for vulnerable households – they could use a social tariff, protecting those on pre-payment meters, on means-tested benefits or with low incomes. Shielding the roughly 10.5 million households that meet these criteria from price changes (via cheaper gas unit prices) would cost around £310 million per year.

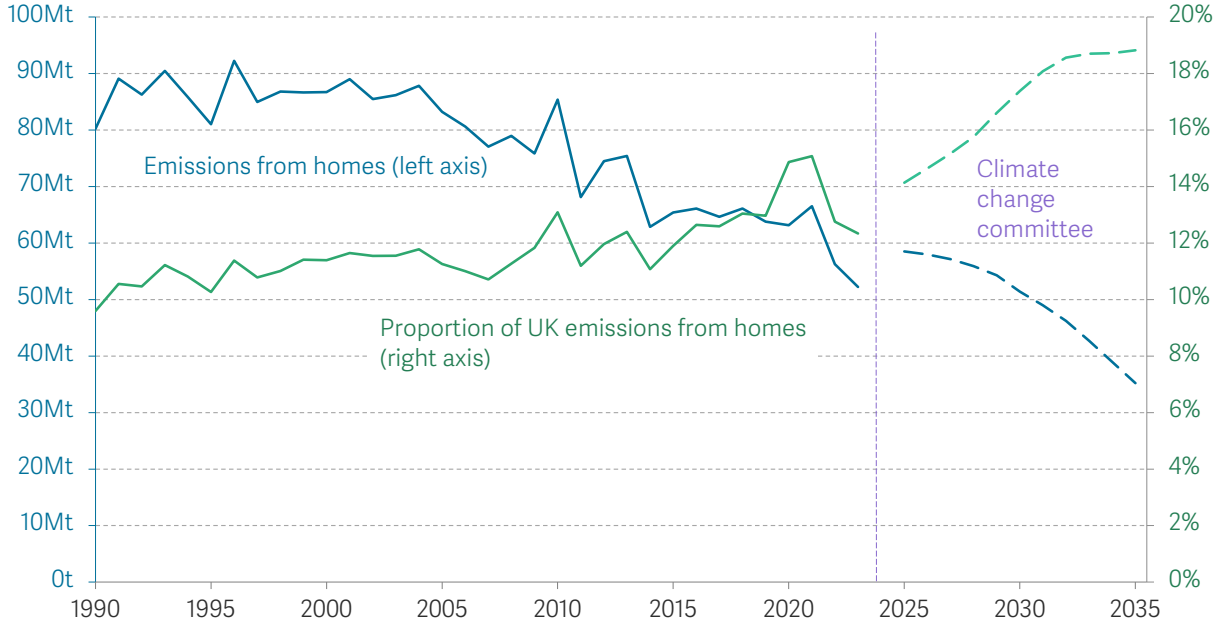
So as the need to accelerate the transition to carbon-free home heating becomes urgent, it is time for policy makers to get serious about the transition that is required. The focus should be on where that transition is lagging farthest behind – among lower-income households. Coordinated action is needed to drive a rapid and fair transition, with new and targeted subsidies to increase take-up among poorer families. This should be paired with regulations to bring down costs and ensure landlords are incentivised to make the change. Levy reform to deliver both incentives to switch and protections for living standards are vital too. These efforts should comprise the core of the new Government's strategy, and ensure that home heating no longer remains the black spot in the UK's net zero transition.

The next phase of the net zero transition will need families to change their behaviour

The UK has been an international leader on reducing its carbon footprint, with emissions more than halving (down 53 per cent) since 1990.[1] This impressive effort has largely taken place in the background, with the electricity sector doing most of the heavy lifting. But the remainder of the path to net zero will require families to make significant changes to their behaviour, with estimates that more than a third (37 per cent) of emissions reductions needed by 2040 are reliant on households making low carbon choices.[2] Decarbonising home heating is a key part of this household-led transition, in terms of both scale (only families moving to electric cars will have a bigger impact on greenhouse gases over the next 15 years), but also in terms of costs, disruption, and changes to the way households go about their daily business.[3] But there is a long way to go to get housing emissions down. They have not materially fallen in a decade (aside from families cutting back on heating use during the energy crisis), and now account for a growing share of the nation's carbon footprint (Figure 1).

FIGURE 1: **Carbon emissions from UK homes held firm over the past decade, until the energy crisis hit**

Greenhouse gas emissions from residential buildings, and emissions from residential buildings as a proportion of the total, $MtCO_2e$: UK



NOTES: Proportion shown is of UK territorial emissions. $MtCO_2e$ is a measure of the total warming potential of emissions, expressed as equivalent mega tonnes of carbon dioxide.
SOURCE: RF analysis of DESNZ, Provisional and Final Greenhouse Gas Emissions; CCC Seventh Carbon Budget data.

1 Department for Energy Security and Net Zero, Final UK greenhouse gas emissions statistics, February 2025.
2 Climate Change Committee, The Seventh Carbon Budget, February 2025.
3 Climate Change Committee, The Seventh Carbon Budget, February 2025.

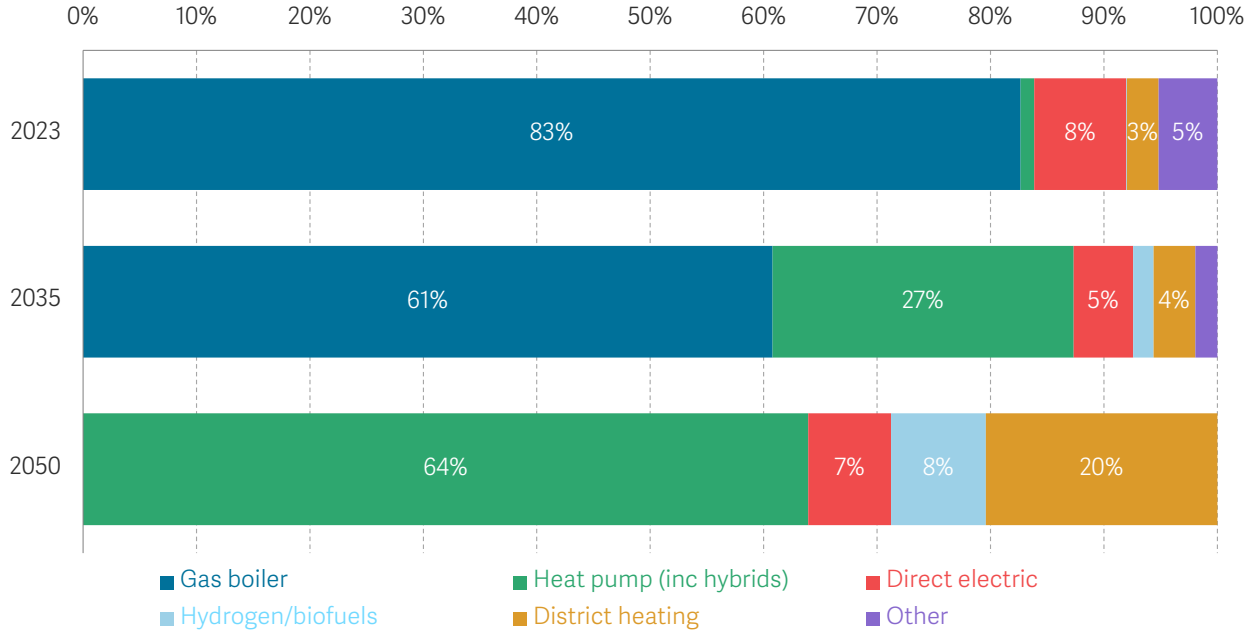
Homes are now the second-largest contributor to UK carbon emissions, and emissions in this sector need to fall by two-thirds (65 per cent) by 2040 to meet the Seventh Carbon Budget – an interim target on the lowest-cost route to net zero and a milestone the Government needs to meet to keep to its net zero pledge.[4] Heating space and water accounts for the overwhelming majority (93 per cent) of emissions from homes, of which the lion's share (85 per cent) is produced from the gas boilers that are ubiquitous in family life.[5] Home heating, therefore, is set to become an important part of the UK's efforts to reduce its contribution to climate change.[6]

Progress on replacing gas boilers with heat pumps has been very slow

After a long debate over which technology will replace gas boilers, it is now clear that electric heat pumps will be the main solution. They are by far the most efficient technology, and are suitable for the vast majority of homes.[7] Indeed, as Figure 2 shows, by 2050 they are expected to become the dominant heat source, with the National Energy System Operator (NESO) suggesting they will be keeping two thirds (64 per cent) of families warm, with oil and gas boilers consigned to the history books.[8]

FIGURE 2: **Heat pumps will become the main way that we keep warm**

Current and forecast residential heating technology mix: GB



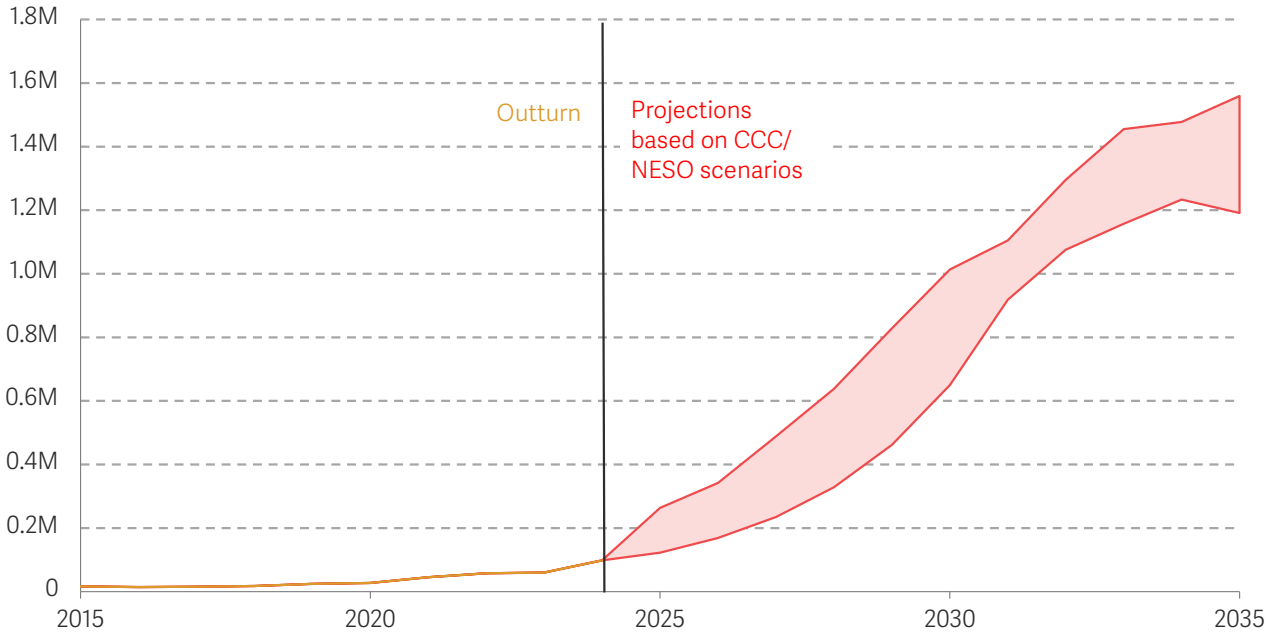
NOTES: Based on NESO's 'Holistic Transition' scenario.
SOURCE: RF analysis of National Energy System Operator, Future Energy Scenarios data.

4 Climate Change Committee, The Seventh Carbon Budget, February 2025.
5 Department for Energy Security and Net Zero, UK greenhouse gas emissions by source, March 2025.
6 The heat transition will have to happen throughout the UK, but policy in this area is mostly devolved and as such this briefing note is most relevant for policy in England. In particular, the existing heat pump subsidies discussed below cover only England and Wales, while other policies in contention (such as the Future Homes Standard) are England only.
7 Energy Systems Catapult, All housing types are suitable for heat pumps, finds Electrification of Heat project, December 2021.
8 Other forms of low-carbon heating will be important, particularly district heating which will grow from heating 3 per cent of homes at present to 20 per cent by 2050. These other forms have their own challenges but are out of scope of this note.

The CCC has said that, by 2030, we should be installing 450,000 retrofitted heat pumps a year, and that every suitable new home should have one.[9] Looking further ahead, for the Government to stay on the CCC's least-cost pathway to net zero, heat pumps will need to fully displace the gas boiler market by 2035 – some 1.5 million installations per year.[10] But the UK installed fewer than 100,000 heat pumps in 2024 (see Figure 3), a lower rate per person than anywhere else in Europe.[11] With 270,000 new home completions expected by 2030 to meet Government housebuilding targets, that means 720,000 heat pumps being fitted per year within six years, a more than seven-fold increase (or an annualised growth rate of 40 per cent).[12]

FIGURE 3: **The UK is not installing enough heat pumps to stay on track for climate targets**

Historical heat pump installation rate and a range required by future trajectories: UK



NOTES: The projection reflects the range of the CCC seventh carbon budget forecast and NESO, Future Energy Electrification and Hydrogen Led scenarios.
SOURCE: RF analysis of MCS, Installations database; DESNZ, Heat pump deployment statistics; NESO, Future Energy Scenarios; CCC, Seventh Carbon Budget.

The rollout of heat pumps has been uneven as well as slow

As well as being slow, the installation of heat pumps has long skewed towards richer parts of the country (see Figure 4). 45 per cent of those in use today in England and Wales are in neighbourhoods in the top-income tertile (i.e. third), more than double the 19 per

9 Climate Change Committee, Seventh Carbon Budget, February 2025.
10 Climate Change Committee, Seventh Carbon Budget, February 2025.
11 Nesta, How the UK compares to the rest of Europe on heat pump uptake, August 2023; Climate Change Committee, Seventh Carbon Budget, February 2025; Heat Pump Association, Statistics, accessed 27 March 2025.
12 RF analysis of MHCLG, Housing supply: net additional dwellings, November 2024. For housebuilding targets see: MHCLG, Housing targets increased to get Britain building again, July 2024.

cent in the poorest third of places. Installations have also been more common in rural parts of the country: the least-dense third of the country accounts for three-in-four (73 per cent) of all heat pumps in use today.

FIGURE 4: **Heat pumps are more common in richer and more rural places**

Heat pump installations by LSOA income deprivation tertile (left panel) and population density tertile (right panel): England and Wales

NOTES: Only MCS certified heat pumps in England and Wales are included. Income is determined by ranking on the Index of Multiple Deprivation income deprivation domain.
SOURCE: RF analysis of MCS installation dataset and EPC register for installations; LSOA data from census, index of multiple deprivation, and DESNZ energy use statistics.

These trends are unsurprising. Heat pumps are expensive to install and to run, and, as we will show later, wide-ranging subsidies that made them cheaper to households were only introduced in 2022.[13] The external installation of heat pumps makes them more suitable for properties with larger gardens, with planning regulations making it harder (until recently) to install them in homes with less outside space.[14] Further, heat pumps offer the biggest financial and carbon benefits to households heated by oil or solid fuels, which are overwhelmingly located in rural places with low population density. But while these trends can be tolerated at the start of the heating transition, if heat pumps are to fully replace the boiler market within a decade, they need to be accessible for more than just richer families in bigger homes.

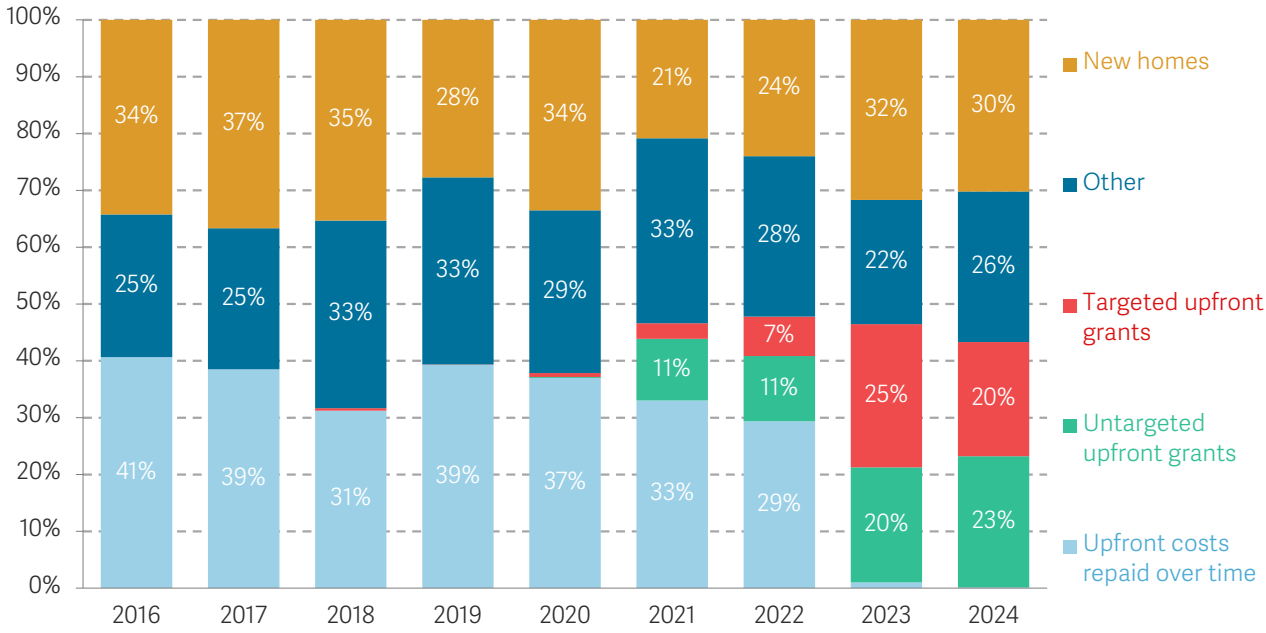
Policy makers have been aware of these issues for a number of years, and as Figure 4 shows, there has been a notable shift in the location of installations since 2022. And as we show in Figure 5, this can be attributed to a big change in the policy landscape

13 Department for Energy Security and Net Zero, Boiler Upgrade Scheme, accessed 27 March 2025.
14 Department for Energy Security and Net Zero, Help to save households money and deliver cleaner heat to homes, November 2024.

in England and Wales: up to 2020, households were expected to bear upfront costs with subsidies paid back over several years; since then, upfront grants have been introduced.[15] Grants through the Boiler Upgrade Scheme (BUS) were increased from £5,000 to £7,500 in 2023, and VAT on heat pumps was reduced from 5 per cent to zero.[16] In addition, the Energy Company Obligation (ECO), a scheme designed to reduce fuel poverty, started to fund heat pump installations alongside home energy efficiency upgrades.[17] In 2024, these two schemes funded a comparable share of installations (20 and 23 per cent of the total, as shown in Figure 5), and together accounted for 94 per cent of all government-supported heat pump installations in the UK.[18] ECO is also having a material impact in the very poorest places and is likely responsible for the 8 percentage point increase in the proportion of heat pumps going into the poorest third of neighbourhoods between 2022 and 2023.

FIGURE 5: **Recent changes in the distribution of heat pump installations can be attributed to changes in policy**

Proportion of annual heat pump installations, by Government scheme: England and Wales



NOTES: Upfront costs repaid over time schemes includes Domestic Renewable Heat Incentive. Untargeted upfront grants includes Boiler Upgrade Scheme and Green Homes Grant Voucher scheme. Targeted upfront grants includes Green Homes Grant (Local Authority Delivery), Energy Company Obligation, and Home Upgrade Grant. Assumes that new homes aren't certified, and that total installations equal Heat Pump Association figures where available. Installations with no policy support are MCS certified installations not accounted for by scheme installation statistics.
SOURCE: RF analysis of DESNZ scheme statistics, MHCLG EPC register, MCS database, Heat Pump Association statistics.

15 The Domestic Renewable Heat Incentive gave payments per kWh of heat demand, meaning bigger payments for those with bigger (and typically more rural) homes. The proportion of heat pumps going to the third densest areas increased by half in the last four years, likely stoked by the move away from this framework towards a flat subsidy. Scotland has a similar scheme called the Home Energy Scotland Grant and Loan, which provides up to £7,500 in optional loan funding, on top of £7,500 in upfront grants for all retrofitted heat pumps.
16 Department for Energy Security and Net Zero, Heat pump grants increased by 50%, October 2023.
17 Department for Energy Security and Net Zero, Boiler Upgrade Scheme, accessed 27 March 2025; Ofgem, Energy Company Obligation, accessed 27 March 2025.
18 Department for Energy Security and Net Zero, Heat Pump Deployment Statistics, March 2025.

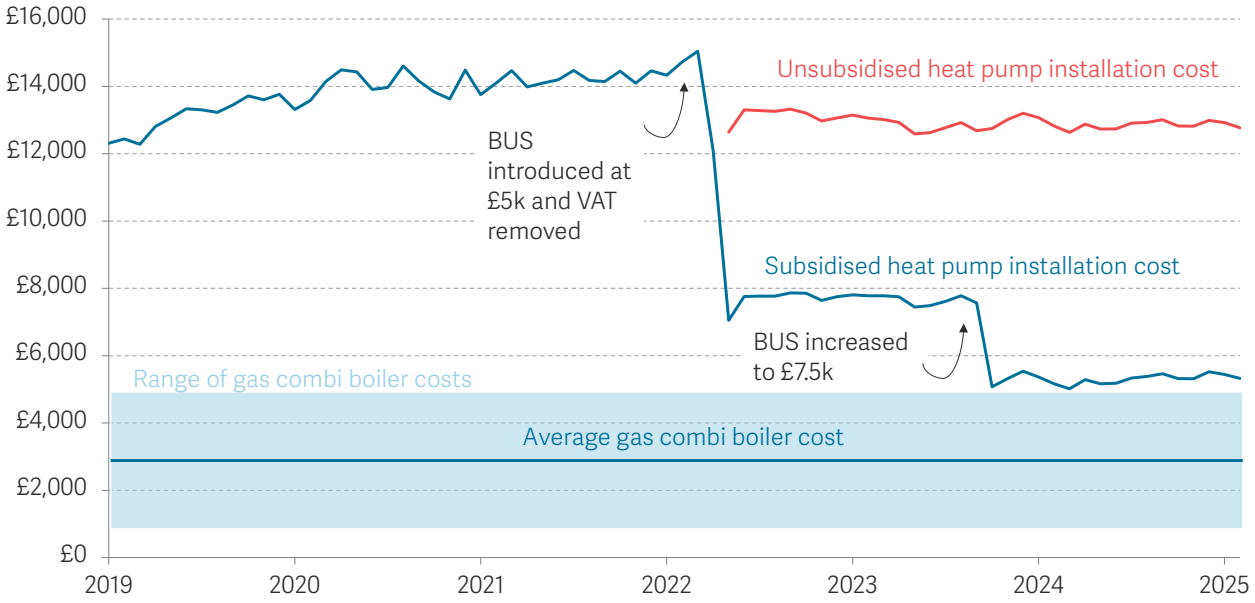
A strategy to make heat pumps cheaper is not delivering

By far the biggest obstacle that households face in the home heating transition is cost. Making heat pumps cheaper was a primary goal of the previous Government's plans: it suggested in October 2021 that costs should halve by 2025 and reach price parity with boilers in 2030.[19] This cost trajectory underpinned its Heat and Buildings Strategy and justified the subsidies that were deployed in a bid to stoke demand.

But, as Figure 6 shows, this vision of cheaper heat pumps is not playing out. Real, unsubsidised heat pump costs were just 6 per cent lower in December 2024 than five years ago, a fall almost entirely explained by the VAT cut implemented in April 2022. And even with a subsidy, a household would be expected to spend, on average, close to double on a heat pump than they would if purchasing a new gas boiler (£5,400, or £12,900 without subsidy, compared with £3,000).[20]

FIGURE 6: **The unsubsidised cost of installing a heat pump has not fallen**

Average real heat pump installation costs, and range of gas boiler costs: UK



NOTES: Installation costs are from MCS data, adjusted for CPI, and include £5,000 or £7,500 subsidy from the Boiler Upgrade Scheme. Boiler costs reflect the 2024 price according to Check a trade, a consumer support website. The producer inflation index for boilers shows that the cost of boilers has increased in line with inflation (within 2 percent) since 2019.
SOURCE: Check a trade, MCS, Boiler Upgrade Scheme, ONS CPI inflation indices.

This stickiness in upfront costs has caused major re-evaluations of expected future heat pumps prices. The CCC's most recent forecast implies that, by 2030, installing a heat pump will cost over three times as much (pre-subsidy) as a gas boiler (£10,000),

19 Department for Energy Security and Net Zero, Heat and Buildings Strategy, October 2021.
20 RF analysis of MCS, The MCS Data Dashboard, accessed 27 March 2025.

and still over double in 2050 (£7,400).[21] This means the heat transition will not be cheap – additional expenditure on heat pumps compared to gas boilers will need to account for a quarter of net zero capital spending over the next decade, a total of £70 billion.[22]

Continued subsidy will inevitably be part of any home heating strategy, but policy must also be better targeted

The underwhelming speed of heat pump installation, and the failure of prices to fall as was hoped, pose challenges for a Government aiming to keep to the CCC's least-cost pathway. In addition, the Government is legally required to outline a comprehensive plan to meet its future carbon targets at some point during 2025 and it is clear that the status quo will not be up to the task.[23] This means a renewed strategy is needed, that looks across both subsidy and regulation, with key decisions needing to be made in the 2025 Spending Review.[24]

The jumping off point for any new strategy is the recognition that the heat pump market remains in its infancy. Now is not the time to withdraw or overhaul the blanket subsidies currently on offer: chopping and changing policy has long blighted efforts to decarbonise the nation's housing stock, and the current approach to subsidies is well understood and remains vital to kickstart the market. The reality that the Boiler Upgrade Scheme (BUS) will be needed for the foreseeable future should be recognised and certainty provided by extending it beyond 2028, with grants maintained at the current level of £7,500. This could cost up to £3.4 billion a year by 2030 (up from around £170 million in 2024), assuming that it is subsidising all of the CCC's targeted 450,000 annual retrofits.[25]

But even with the BUS in place, progress has remained painfully slow. Low-carbon heating remains an expensive option, and out of reach for poorer households. More must be done if heat pumps are to become the primary choice for new heating systems this decade. Such efforts should be concentrated where progress is slowest – most obviously, among lower-income households – and should be designed in a way that is mindful of the need to avoid wasting money.

On this basis, we propose that a new (additional) subsidy scheme targeting low-to-middle income households is put in place. The scheme should cover more of the cost of installation, such that required spending on a heat pump matches that for a replacement

21 Figures in 2024-25 prices. Source: Climate Change Committee, Seventh Carbon Budgets Dataset, February 2025.
22 RF analysis of Climate Change Committee, Seventh Carbon Budget Dataset, February 2025.
23 Setting out a new strategy on heat decarbonisation is needed for the Government to produce a legally valid Carbon Budget Delivery Plan, which is now due in Q4 2025 after the previous Government's version was ruled to be invalid. See: M Mace, Government ordered to publish new climate plan by October, edie, March 2025.
24 The current flagship subsidy policy, the Boiler Upgrade Scheme, is currently funded until 2028, and the zero VAT rating of heat pumps is set to expire in 2027.
25 It also makes sense to increase the scope of technologies that are eligible for grants, which are only currently available for air-to-water heat pumps. This could include including other types of heat pumps, or indeed making subsidies entirely technology agnostic such that they cover all low carbon heating systems.

gas boiler. This means an extra £3,000, or a total subsidy of £10,500 that brings typical heat pump costs (for eligible households) down to around £2,400, within the range of boiler costs shown above in Figure 6. Such a funding arrangement is similar to the approach taken by other countries: France, for example, provides subsidies that range from €4,000 to €10,000 depending on income.[26]

The Energy Company Obligation (ECO) already provides means-tested support, but it is designed to provide support for only the very poorest households (just 4 per cent are eligible) and doesn't have a scalable funding model given it is paid for via energy bills. Such cross-subsidy is not a sustainable or equitable means of funding a significant component of capital expenditure on heat pumps.[27]

So the Government must go further, putting in place a new means-tested grant scheme that reaches more households than ECO. Means testing should balance vulnerability and need with value for money. The context of the subsidy, the vulnerability of households to negative outcomes, and the need (defined by a household's financial or material requirements) are all important considerations when outlining a way of effectively targeting support, and there are a number of approaches that a Government can take to assess those.

The most easily implementable scheme would involve passporting eligibility off Universal Credit and Pension Credit, leaving the act of means-testing to the social security system. Such an approach would, however, likely prove too restrictive: just 28 per cent of the poorest half of families are eligible for these benefits, and the costs of installing a heat pump are likely to be unaffordable for many of the rest – three in five of the poorest fifth of households have less than £1,000 in savings, for example.[28]

There are other options (or a combination thereof) that would allow a better-targeted approach:

- Income-based means-testing, whereby households with a gross income below a certain level can access additional support. Income assessment is relatively straightforward, eligibility can be extended further up the income distribution than welfare-passporting allows, and graded levels of support to avoid cliff-edges could be introduced.
- Wealth-based means-testing would see homeowners with accessible (i.e. non-pension) assets below a certain value eligible for state support. Assessing overall financial assets can ensure that households with significant savings or property

26 MCS Charitable Foundation, Heat pump rollout in France and the UK, June 2023.
27 Source: J Marshall, Net zeroing in on investment, Resolution Foundation, July 2024. ECO currently adds £59 a year to the energy bill of a typical duel fuel household. Source: RF analysis of Ofgem Price Cap Methodology data.
28 Z Leather, Sunny Day Savings: Assessing Government support for solar panels, Resolution Foundation, February 2025.

wealth do not benefit from subsidies meant for those in financial need. Wealth is also a more stable measure of a households' ability to make large-scale investments than income and seems particularly relevant when discussing the spending of state funds to improve families' private property. Wealth-based asset testing is less common, but is employed to assess eligibility for state funding for adult social care, for example.

- Means-testing according to criteria such as property characteristics or household composition. This approach could see metrics such as households' existing heating source or boiler age, property age, energy efficiency, household size or age of residents be used to deem eligibility. Such considerations have featured in subsidies for energy support and historical subsidies for low-carbon heating, which have focussed on homes that are not connected to the gas network.

But none of these options offer a silver bullet. Testing by income alone could see the state fund more generous grants for households with significant assets that could be liquidated or borrowed against: one-fifth (19 per cent) of homeowners with gross incomes below £30,000 have more than £500,000 of non-pension wealth, for example.[29] It may be reasonable to expect these families to contribute towards upgrades which may well increase the value of their home. And employing a wealth-only route would capture those without savings that can be dipped into, or homes that can be borrowed against, but would not effectively exclude those on higher incomes: half of households with assets worth less than £500,000 have incomes in excess of £100,000.[30] Targeting by property type or household composition would be blind to the ability of households to fund works themselves, and do little to ensure that a scheme can be applied for all families and in all types of homes.

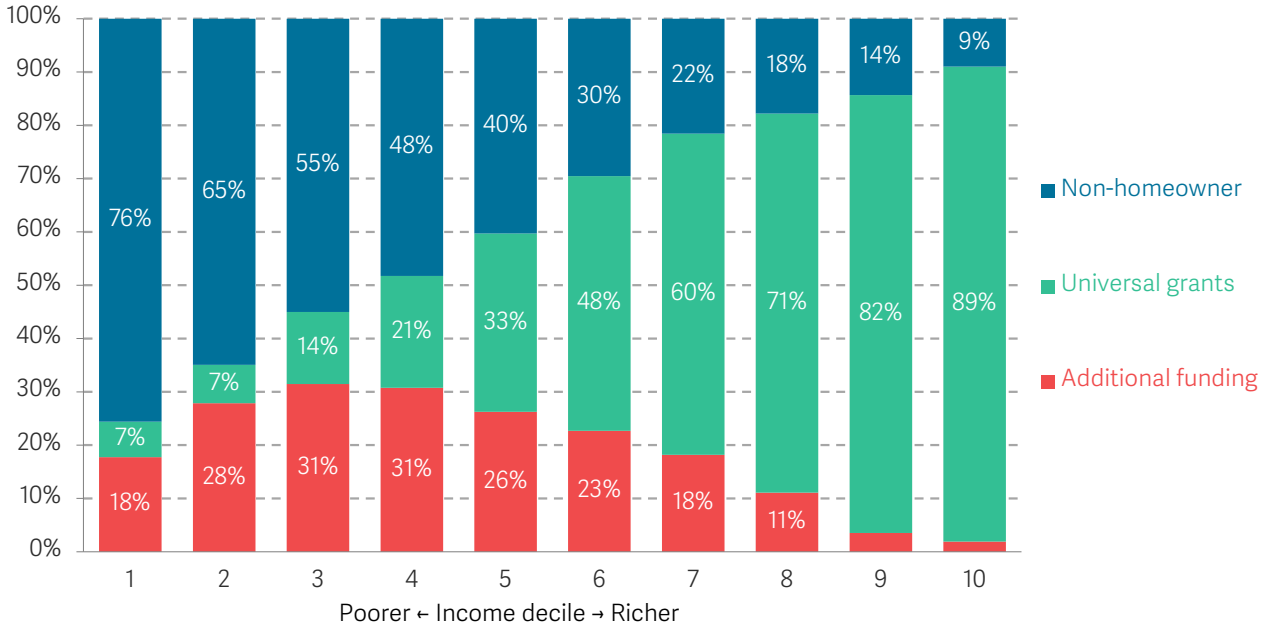
Considering these limitations, we recommend a hybrid approach in which homeowners are eligible for additional grants if their incomes and assets (including property, but excluding pension wealth) are below certain levels, or if they are in receipt of means-tested benefits.[31] This would ensure that higher subsidies are affordable – covering around a third (30 per cent) of homeowners – and well targeted to avoid waste. Such a scheme would be more complicated than one which used fewer metrics, but keeping it 'opt-in' (under which applicants take on the burden of proving their eligibility for a significant cash benefit) would avoid discouraging households from engaging. High heat pump costs mean that means-tested support could be needed for decades, so investing in a thorough and fair system is worthwhile.

29 Source: RF analysis of Wealth and Assets Survey.
30 Source: RF analysis of Wealth and Assets Survey.
31 Most capital limits do not include primary residence but in the context of grant funding for home upgrades it is a more obvious choice. Home improvements such as new kitchens or extensions are often funded through borrowing against housing equity, while works could add to house prices. This is particularly likely if regulation adds value to homes with heat pumps and if electricity gets cheaper through rebalancing of policy costs or otherwise, providing substantial bill savings to those in homes with heat pumps.

Figure 7 sets out the distribution of an illustrative means-testing scheme with a gross household income cap of £30,000 and an asset threshold of £500,000 (including property but excluding pension wealth) and includes any household in which a resident is in receipt of means-tested benefits. This example provides a stringent income criteria that focuses support on homeowners that are income-poor but excludes wealthier homeowners. It shows that it is possible to tailor support at the bottom of the income distribution and still account for the wealth of these families, but also that – as with most parts of economic policy that pertain to housing – tenure is something that cannot be left unaddressed: two thirds (65 per cent) of the poorest third of households live in homes they do not own. This scheme would cost £370 million in 2030, rising to £1.2 billion in 2035, on top of other subsidies.[32] This would bring the total costs of all heat pump support up to £3.7 billion in 2030 if the BUS continues at £7,500 for all retrofitted heat pumps, increasing total subsidy by just 10 per cent.

FIGURE 7: **Means-testing can help low-income homeowners**

Proportion of households eligible for an indicative means-testing scheme based on gross household income and asset values, and homeownership: GB, 2020-2022



NOTES: Indicative means-testing scheme provides additional subsidy to homeowners with below £500,000 in home equity and savings, and below £30,000 in gross income. Results are presented by decile of equivalised gross household income after housing costs.
SOURCE: RF analysis of ONS, Wealth and Assets Survey.

The Government has already set aside £13.2 billion to decarbonise homes during this Parliament, through the Warm Homes Plan, but these remain significant sums – especially considering the current squeeze on public finances. The cost of subsidies as

32 The exact cost depends on take-up for eligible households and installation rates in 2030. This costing assumes that the CCC balanced pathway is met, that the subsidy leads to take-up among eligible homeowners that matches ineligible homeowners, and that the vast majority (90 per cent) of heat pump retrofits occur in owner-occupier homes.

heat pump sales increase highlights the importance of making them cheaper. Indeed, cheaper heat pumps would pave the way for subsidies to be reduced.

Subsidies alone are not the answer – the Government must reconsider its reluctance to regulate

This Government has said it wants to follow an incentives-based approach to decarbonising home heating.[33] Consistent with that, it has not committed to an end date after which gas boilers can no longer be installed in domestic properties, and has weakened a mandate to ensure that heat pumps make up a growing share of heating system sales.[34]

But choosing not to use regulation to help drive heat pump installations is a risky approach, for three reasons.

First, heat pumps prices have not fallen (as we showed in Figure 6). This could be because market scale has not yet been achieved. Either way, evidence from the EV transition suggests that regulation can be effective in putting pressure on installers and manufacturers to reduce costs.

Second, as Figure 7 speaks to, subsidies cannot solve the issue of split incentives for rented homes and overcome tenants' lack of agency to change their heating systems.[35] This largely presents itself through a lack of engagement from private landlords despite them being eligible for the same £7,500 grants as other property owners: just 7,000 privately rented houses (0.3 per cent the total) in England and Wales are heated by heat pumps, comprising just 7 per cent of heat pump retrofits.[36] Including landlords in new, more generous subsidy schemes isn't the best use of public money (just one-in-ten of those who own more than one property would be eligible for the means-tested scheme we outline above), so a long-term regulatory solution will be needed to ensure participation in the low carbon heating transition from the private rented sector.

And third, sustained subsidy will weigh heavily on the Exchequer. Supporting all heat pump installations in 2035 would see it landed with a bill of more than £16 billion in today's prices – this is unlikely to be affordable.[37]

33 J Murray, Business Green, 'We've got to show heat pumps are affordable': Labour promises revamped approach to decarbonising home heating, June 2024.

34 A sales ban on gas boilers past 2035 and a ban on oil boilers that was originally due to come in in 2026 was moved to 2035 by the previous Government have yet to be reconfirmed by the current one. Under the Clean Heat Market Mechanism, boiler manufacturers must ensure that heat pumps make up an increasing share of total heating system sales, and pay fines for any shortfalls – these fines have been cut from £3,000 per heat pump not sold to £500.

35 "Split incentives" refers to when investment made by landlords benefits their tenants, rather than them seeing a return themselves.

36 Source: RF analysis of MHCLG EPC Register. Figures cover all privately rented homes for which an energy performance certificate has been issued since 2008, covering the majority of homes in this sector. It is a legal requirement for an EPC to be issued for new tenancies. Data on homes that have been continuously let since before this date are not available, but these are few in number and we assume that they are not heated by heat pumps.

37 Based on 1.5 million installations a year (in line with the CCC's Balanced Pathway), £7,500 grants for all retrofitted heat pumps, the means-tested scheme recommended in this report (and that both retain real value), and continued zero VAT-rating.

These factors suggest that the Government should reconsider its decision to water down the regulatory framework it inherited after the 2024 General Election. Indeed, the strongest signal to manufacturers would be setting a date after which carbon-emitting heating systems can no longer be fitted in homes. This will indicate that there will be a large enough market in the future to justify manufacturers' investment in research and development to bring down the cost of heat pump production, and also into skills and training so labour costs fall.

Such a ban would also ensure that landlords face up to the home heating transition without the need for separate measures for the private-rented sector. In principle, landlords could be regulated on a tenure-specific basis, just as they are for energy efficiency. But a similar approach for heat pumps would risk scrappage costs and uneven market demand if improvement was required by a given date. This means that Government shouldn't be concerned about raising installation rates in rented homes beyond that needed for net zero targets.[38]

As such, market-wide regulation should be implemented with clear dates set after which no new oil or gas boilers can be fitted in any home. Sitting alongside this should be a stronger sales mandate (with more substantial fines than at present) covering the interim period, giving manufacturers and installers confidence in future levels of demand and sharpening incentives to reduce prices along the way to a ban.

The Government's argument for weakening regulations seems to be that they would see heating system manufacturers cross-subsidise heat pumps by making gas boilers more expensive, and that pushing up the price of boilers would be politically untenable. This argument has also been made by those opposing the EV mandate for cars. There is a stronger case that this might be a problem in this setting: new car spending is heavily concentrated among richer households, but households across the income distribution are exposed to the cost of new boilers (8 per cent of both the poorest and richest fifth of homeowners have replaced their gas boiler in the past year).[39] But the presence of a scheme that renders heat pumps as affordable as gas boilers for struggling households – such as the additional means-tested subsidy we set out above – should give Government more confidence to implement sales mandates without fear of cost pass through to poorer homeowners, and crucially to reinstate fines at a level sufficient to drive progress.

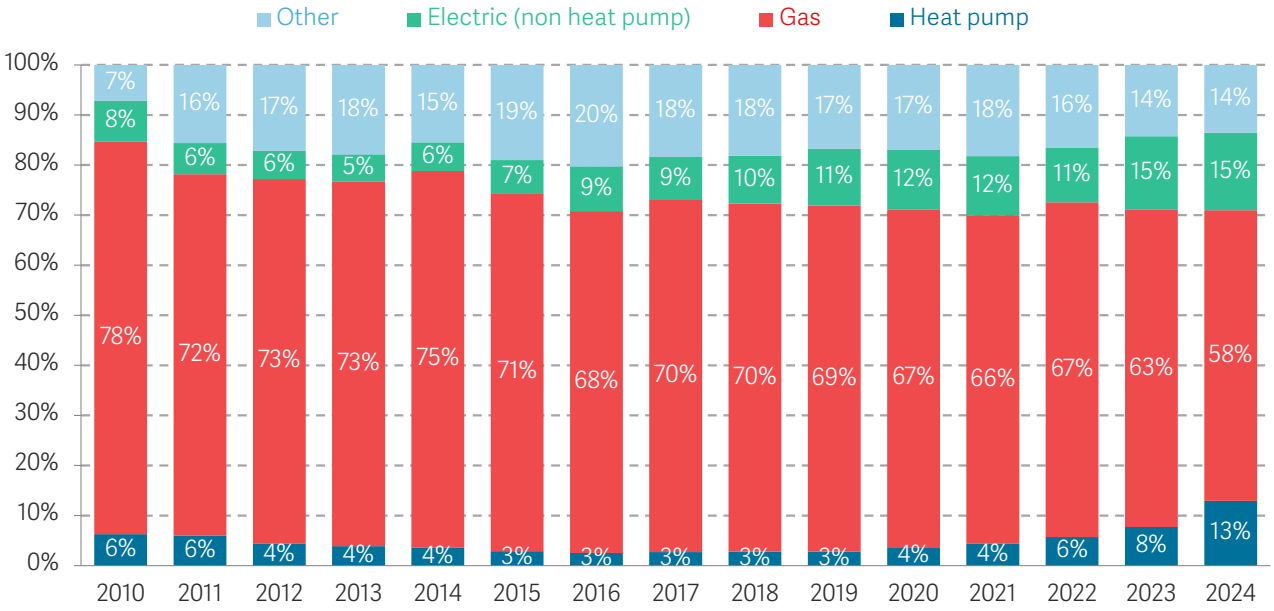
38 A tenure-specific approach would mean a sales ban preventing new gas boilers in rented homes. This might solve the renters problem (albeit with higher enforcement costs and potential for gaming if landlords reclassify between tenancies to access the boiler market), but leaving out owner-occupiers would water down the benefits of setting future market demand and preventing installations by the heat-pump-shy.

39 9 per cent of households in the highest income decile own a car that is less than one year old, compared with just 2 per cent in the lowest. Source: RF analysis of ISER Understanding Society. Figures on boiler age from RF analysis of MHCLG English Housing Survey data.

The Government should also regulate heating systems installed in new homes. As Figure 8 shows, just 13 per cent of homes built in England and Wales in 2024 had heat pumps installed (58 per cent had gas boilers), just 3 percentage points higher than in 2010 despite a wider push for low carbon heating.[40] New homes are by far the easiest part of the puzzle to solve: costs are lower when heat pumps are installed during construction, and there is no disruption to families. Indeed, every home constructed with a gas boiler represents a future retrofit challenge, with direct costs set to fall on the homeowner (or the taxpayer through subsidies) instead of the housebuilder. The lack of progress in new homes is telling: had all suitable homes constructed in 2024 been fitted with heat pumps, the size of the UK market would have nearly tripled (and with minimal cost to the public purse).[41] As such, regulations that prevent the installation of high-carbon heating in new homes should be delivered immediately.

FIGURE 8: **Too many new homes are heated by gas boilers**

Share of newly constructed homes per year, by heating source: England and Wales



NOTES: Other includes communal heating and all types that don't use gas or electricity.
SOURCE: RF analysis of MHCLG EPC Register data.

An approach that combines both subsidy and regulation represents, in our view, the best approach to increase the rate of heat pump adoption. At the same time, it has a better shot of bringing costs down than an incentive-only approach, reducing the risks that large subsidies are needed in perpetuity and providing a framework which ensures that lower-income households and private renters can participate in the heat transition.

40 RF analysis of MHCLG, EPC Register.
41 Though heat pumps in new homes don't attract direct subsidy at present, they are still eligible for the exemption to VAT.

Switching from a boiler to a heat pump won't bring down energy bills for most families

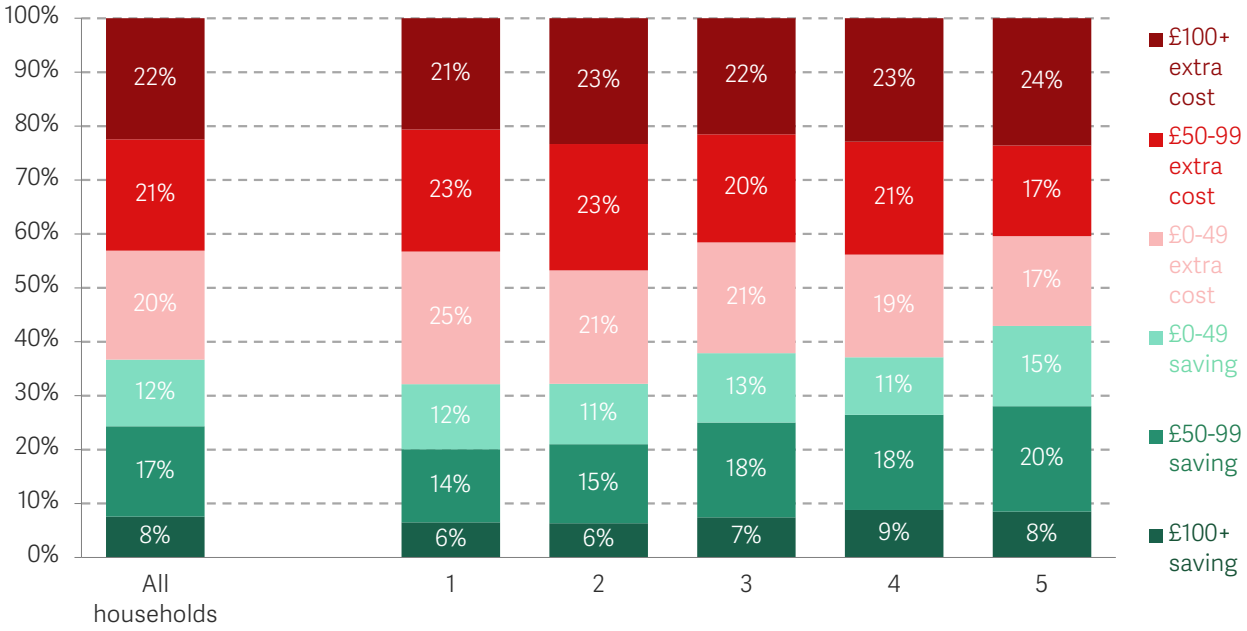
Our proposal to combine subsidies and regulation is comparable to the approach being employed in the UK (and elsewhere) for electric cars, where it is delivering good outcomes in terms of both technological change and cost reductions.[42] However the two policy challenges are different: drivers who replace their petrol cars with an electric alternative
can immediately bank sizeable savings, but the same cannot be said for those installing a heat pump. Heat pump running costs have been found to be similar to a gas boiler, with energy prices, property types and heating system efficiencies all impacting relative operational costs.[43] But our analysis – which accounts for the amount of energy a household needs to consume to achieve reasonable levels of comfort – suggests that (at current energy prices) families would see average annual heating bills increase by £32.[44]

As Figure 9 shows, however, most households are not average. Close to two thirds (63 per cent) of families would see their heating bills increase upon replacing their boiler with a heat pump, and one-in-five (22 per cent) would be spending more than £100 extra per year on heating. Just a third (37 per cent) of households in England would observe a reduction in energy spending. Digging deeper into the analysis presented in Figure 9 allows us to see who the biggest winners and losers would be. Almost all (97 per cent) of households set to pocket savings of £100 or more are those with the oldest and least efficient gas boilers, such as back boilers or non-condensing boilers, or boilers that are 12 or more years old. And pushing this a step further, we can see that the spread of higher or lower bills is largely even across the income distribution: 32 per cent of the poorest fifth of households would see lower bills, compared with 43 per cent of the richest.

42 A Corlett et al., Getting the green light, Resolution Foundation, October 2024.
43 Nesta, How to make heat pumps more affordable, June 2024.
44 Source: RF analysis of MHCLG English Housing Survey data. These figures were calculated by disaggregating variables relating to required energy spending into the number of kilowatt hours of gas or electricity actually used, and uprating into current prices using changes in prices under Ofgem's price cap. The different efficiencies of boilers in existing homes were controlled for to ensure that baseline consumption figures were not skewed by the presence of a higher or lower performing system – avoiding the underestimation of benefits for those with older systems – and a coefficient of performance of 3.0 was assumed for new heat pumps. We assume the gas standing charge is not paid after switching to a heat pump, so this will overstate the short-run savings, on average.

FIGURE 9: **Replacing a gas boiler with a heat pump will lead to higher bills for most**

Proportion of households seeing change in annual energy bills from replacing a gas boiler with a heat pump, by bands and equivalised after housing costs income quintiles: England, 2024-25



NOTES: Homes without gas boilers excluded. Assumes gas standing charge no longer paid. Different boiler efficiencies accounted for according to system type and age. Heat pump coefficient of performance of 3.0 assumed. Based on gas and electricity unit prices as set in the Q1 2025 Ofgem Price Cap.
SOURCE: RF Analysis of Ofgem, MHCLG English Housing Survey data.

It is worth noting that, for most households, these modelled changes in energy costs are relatively modest in the context of typical dual fuel bills currently upwards of £1,800 per year. But higher bills mean families do not have a financial incentive to change their heating system. Given the cost and disruption associated with installation, and the unfamiliarity of a new technology, there are few drivers for households to install a heat pump, meaning most will likely opt for a replacement boiler should theirs break – a move that would likely see that property remain on the gas system for at least another decade.

BOX 1: **Incentives to install a heat pump are clearer for homes without gas boilers**

For most households, the low carbon heating transition will involve replacing their gas boiler with a heat pump, but around one-in-six homes in Britain are starting from a different position. Close to a million properties in Britain are heated by oil boilers (and close to half – 49 per cent, or 380,000 – in

Northern Ireland), producing an average of 6 tonnes of CO_2 per year each. This potential to cut emissions explains why policy efforts have historically focussed on these properties, but the cash savings that can be banked by replacing these highly inefficient ways of keeping warm can also be considerable.

Before oil and gas prices spiked during the energy crisis, the average oil-heated home in England cost around 10 per cent more to heat per square metre than one heated by gas.[45] But since then, oil prices have been on something of a rollercoaster ride, tripling in spring 2022, dipping again, and increasing substantially again in the summer of 2023.[46] Gas prices have of course been volatile over this period, but these are smoothed for households by the Price Cap while families purchasing heating oil must do so in a single large transaction at whatever the current price is. Purchasing heating oil is also more hassle than being connected to the gas grid, requiring individual deliveries which can be difficult to come by during the winter months.[47]

This means that families with oil boilers have a greater impetus to switch to heat pumps: thanks to lower and more stable running costs, the payback for upfront investment is more favourable. Policy efforts, therefore, need to focus on the lack of incentives for households in gas-heated homes to drive forward the home heating transition.

We should treat the home heating transition as an opportunity to reduce the cost of keeping warm

Heating costs are a key part of family budgets, particularly for poorer households: for lower-income families such spending accounts for 7 per cent of disposable incomes, compared with just 1.5 per cent for the richest. So anything that can be done to bring costs down is surely worthwhile. In this context, there are some ways that heat pumps can be made cheaper to run, but they all require policy changes. So what are the options?

First, as proposed in a recent consultation, the Government could impose minimum performance standards on heat pumps, ensuring that only those that operate more efficiently are eligible for grants.[48] Doing so would save the average household around £60 per year, turning an additional annual cost of £37 into a £22 saving.[49] But this is

45 Heating oil is generally cheaper to purchase than natural gas, but the lower efficiency of oil boilers means that any savings are eroded.
46 Source: BoilerJuice, UK Heating Oil Prices, Accessed March 2025.
47 See: L Ford, Oil delivery delays leave elderly and families without heating and hot water, Press Association, January 2023.
48 Department for Energy Security and Net Zero, Raising product standards for space heating, December 2024.
49 Saving is based on an increase of heat pump efficiency from a coefficient of performance of 3.0 to 3.25. At this efficiency, a heat pump would mean cheaper heating costs than a boiler for two thirds (65 per cent) of households, with 31 per cent saving more than £100 per year. Even higher efficiencies may be achievable, but not for all households. Source: RF analysis of MHCLG English Housing Survey and Ofgem data.

not a free lunch: one of the main drivers of lower performance is installation quality, so operational savings would likely come at the expense of additional upfront labour and materials costs. Further, higher efficiencies are less likely to be achieved in certain property types: specifically, older homes with solid wall construction, and those with single glazed windows – for which remediation will be expensive; and higher temperature heat pumps may find achieving these higher efficiencies difficult.

A second option is to encourage households to make use of off-peak tariffs, whereby electricity consumed outside of hours where demand on the system is highest (typically in the early evening) is offered at a discounted rate. These tariffs already exist, with one prevalent example offering a discount of 50 per cent on prices for electricity consumed in off-peak hours – and stating that savings of more than £300 per year are on offer if heating energy demand is moved to these times.[50] While this may suit some households, it may be less scalable across the wider population. The trade-off for cheaper off-peak prices is equally higher prices (50 per cent more) at peak hours, and some families may find it difficult to reduce their electricity consumption at these times (such as those with irregular working patterns, young children or caring commitments for others, or those living in homes that struggle to retain heat), and therefore seeing less of a reduction, or even higher costs.[51]

Third, decarbonising electricity should reduce per-kilowatt hour costs, especially if paired with extensive market reforms. But the current focus from Government is on sectoral emissions targets in 2030, and less on what this means for electricity prices. Placing more emphasis on the latter during a period of significant investment and widespread overhaul would make heat pumps more attractive. But investment takes time and changes to wholesale, capacity and ancillary services markets are complicated and should, therefore, not be rushed.

Finally, home insulation is often described as the key to making heat pumps cheaper to run. While this is certainly true, a more efficient home would also be cheaper to heat by a gas boiler. For example, at current gas prices, the median EPC E-rated home spends £910 more on gas bills per year than one rated EPC C or better (and £575 more than a D-rated property).[52] This means that, although low-carbon heating and improved thermal

50 Octopus Energy, Cosy up to more savings: Octopus Energy launches new off-peak rate for heat pump customers, January 2024. There have also been calls for specific tariffs that offer households with heat pumps cheaper electricity at all times during the day. But while these would improve the incentives to replace a gas boiler, they would likely come with distributional concerns as costs not faced by families on these hypothetical tariffs are picked up by others instead.

51 Heating water, which can then be stored until use, is more suitable for demand shifting than heating space, where heat dissipates through walls, windows and floors: Government estimates that water heating can be shifted by 12 hours, and heating only by 3, and the latter will be lower for homes with less thermal capacity to store heat, such as those with poor insulation. Water heating accounts for around a fifth (22 per cent) of average household heating demand. Tariffs with 'off peak' periods see these prices applied to all electricity consumption, not just that used for heating, and therefore potential upsides and downsides are more nuanced than those accounted for by consideration of heating bills alone. The wider implications of time-of-use tariffs are complicated and will be the future of Resolution Foundation research to be published later in 2025.

52 Source: RF analysis of National Energy Efficiency Database, Ofgem data.

efficiency are often discussed in lock step, a consumer offer for families changing their heating system should be based on the economics of that action alone.

The Government should make electricity cheaper relative to gas

But there is one issue which the Government can tackle, and quickly: the relative prices of gas and electricity. In this context, there are two factors that determine the costs of gas and electric heating: the efficiency at which fuel is converted into heat, and the prices paid for each fuel. Heat pumps are more than three times as efficient as even the newest gas boilers, but, under the current price cap, a kilowatt hour (kWh) of electricity costs close to four times as much as gas (around 27 pence vs around 7 pence). This explains why most households will find it cheaper to heat their home using a gas boiler but also highlights fertile ground for policy makers to act. The importance of the price of electricity will be felt beyond home heating too: it will have spillovers into wider parts of the net zero transition – particularly for electric vehicles and the decarbonisation of heavy industry – and will ultimately dictate the extent to which the costs and benefits of the UK's journey to carbon neutrality are distributed.[53]

The Government could start by looking at how it taxes different fuels. Electricity is subject to two carbon taxes – the UK's Emissions Trading Scheme (ETS), and an additional Carbon Price Support (CPS) – totalling around £65 per tonne at current prices. Gas consumed in the home, on the other hand, is not taxed at all. This perverse status quo – very much against the polluter pays principle – could be remedied in two ways: taxing electricity less, or taxing gas more.

The CPS was introduced in 2013 with the aim of making the cost of generating electricity from burning coal higher than from the combustion of natural gas. But the last coal-fired power station in Britain closed in 2024, leaving gas as the only major carbon-producing fuel in the nation's electricity mix.[54] As such, this tax no longer incentivises the decarbonisation of electricity and prices each tonne of CO_2 produced from generating electricity at a higher price than those from other parts of the economy, despite all having an equal contribution to global warming. This higher tax rate, therefore, pushes up wholesale electricity prices without a clear rationale. Scrapping this would help provide incentives to move away from gas heating but only marginally: reducing the cost of electricity by only 0.2 pence per kilowatt hour, a number that would decline further as gas generators are phased out.

The logic behind the ETS is different. A cap-and-trade carbon tax that covers multiple parts of the economy should, in theory, see emissions reduction materialise in areas with

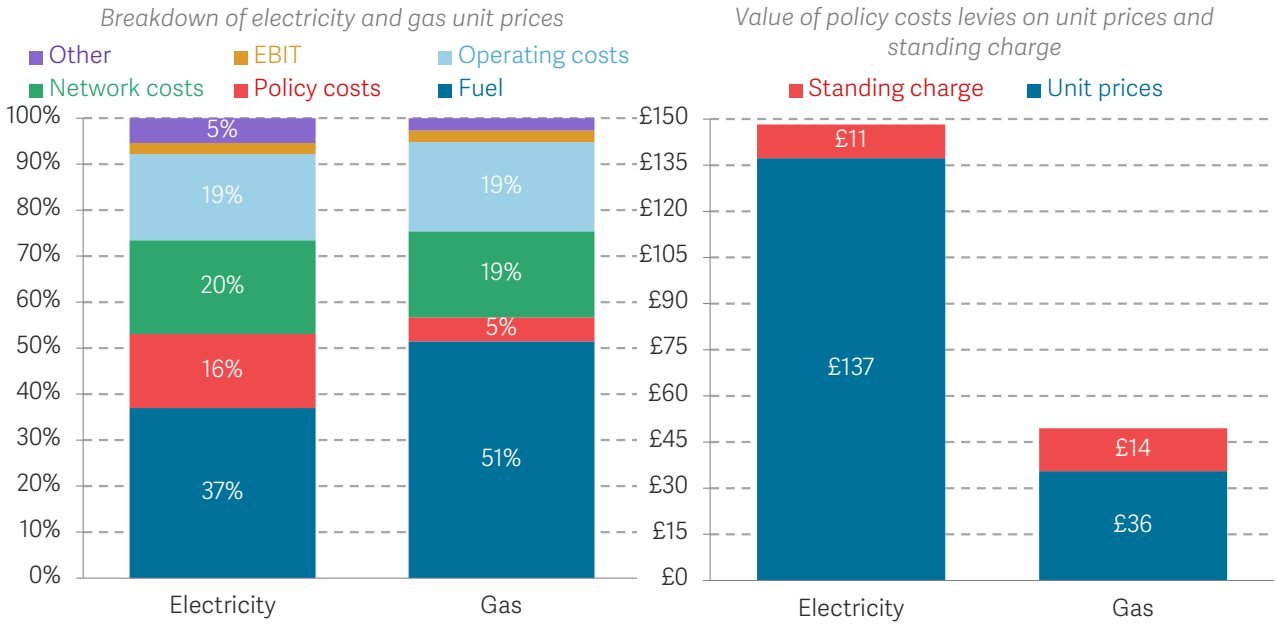
53 E Fry and J Marshall, Electric Dreams, Resolution Foundation, April 2024.
54 Biomass also produces large amounts of emissions at the point of combustion but is currently deemed as zero carbon for tax purposes.

the lowest marginal cost of decarbonisation. The inclusion of electricity generation in this tax, therefore, remains sensible. But gas used in the home is not taxed through the ETS, despite the economic rationale behind a tax that covers all sources of emissions. Policy makers could, therefore, act by including gas into the ETS cap. But the result would be increasing the cost of each kWh of gas burned in a gas boiler by 14 per cent (approximately 1 pence per kWh), an approach would come with significant living standards (and likely political) consequences. It would make heat pumps more attractive than gas boilers, but only because it would allow households to avoid the (roughly) additional £115 per year of ETS-imposed costs.[55]

Looking beyond taxes, there are two other factors that make electricity more expensive than gas. Some of these are hard to change: converting gas to electricity comes with costs that simply burning at home does not, and network and operating costs are largely fixed. But some are not, and are highlighted when we look at other parts of fuel unit costs: a breakdown of gas and electricity unit costs is shown in the left-hand panel of Figure 10.

FIGURE 10: **Policy costs comprise a larger share of electricity prices than gas and fall largely on unit prices**

Breakdown of electricity and gas unit prices (left panel) and value of policy costs levied on unit prices and standing charges, by fuel (right panel): GB, Q1 2025



NOTES: Left hand panel shows costs levied per kilowatt hour only, those recouped through standing charges not shown. 'Other' includes capacity market costs, adjustment allowances and headroom. EBIT refers to earnings before interest and taxes and is a common way of measuring company profitability. Policy costs included in the right-hand panel are: Renewables Obligation, Feed-in Tariff, Energy Company Obligation, Warm Homes Discount, Green Gas Levy, AAHEDC and Network Charging Compensation.
SOURCE: RF Analysis of Ofgem Price Cap methodology

55 This figure refers to a household for typical levels of gas consumption. Additional costs would be higher for those with greater gas demand.

From this we can see the outsized impacts of policy costs on electricity, comprising more than three times as much of the unit price paid by households as gas (16 per cent compared with 5 per cent). The right panel of Figure 10 shows how this relates into annual energy spending, with levies funded through unit costs adding £137 to the typical electricity bill compared to just £36 on gas.

There is a historic rationale for policy costs being apportioned in this way: applying them on electricity ensures that the customer base is as wide as possible, and focussing renewable subsidies on per-unit levies means that households who consume more of this electricity make a greater contribution to its cost. But they are now clearly an impediment to electrification, adding 5 pence to the cost of each kWh of electricity, and just 0.3 pence to each kWh of gas consumed. The allocation (or indeed, reallocation) of these costs warrants attention from policy makers as a means of addressing unwanted distortions in fuel prices.

There are three other ways levies could be funded: standing charges, general taxation, or gas bills

In this context, the key reason for changing how levies are funded is to make the price households pay for a unit of electricity lower relative to the price of gas. As such, while some levies are imposed on standing charges (see Figure 10), we do not consider the implications of funding them through different means. And while levies fund a range of outcomes, their impact on prices is the same – so it makes sense to treat them the same. So, what could the Government do?

The first option is to move these costs from electricity unit prices to standing charges, making each unit of electricity consumed cheaper, but with a commensurate increase in the flat charge paid by all households as the trade-off. This would keep all energy costs within the energy sector, thereby avoiding the need for large-scale state spending. But there are clear downsides to this approach. First, only households that consume above average amounts of electricity would see bill reductions – spending for those with less energy-intensive lifestyles would actually increase. Second is the increased political focus on standing charges, with both the 2024 Labour and Conservative General Election manifestos promising to reduce standing charges (and the energy regulator Ofgem recently announcing that suppliers would be obliged to offer standing charge-free tariffs from winter 2025-26).[56] And third, standing charges comprise a larger share of both incomes and spending for poorer households than for their wealthier counterparts, and

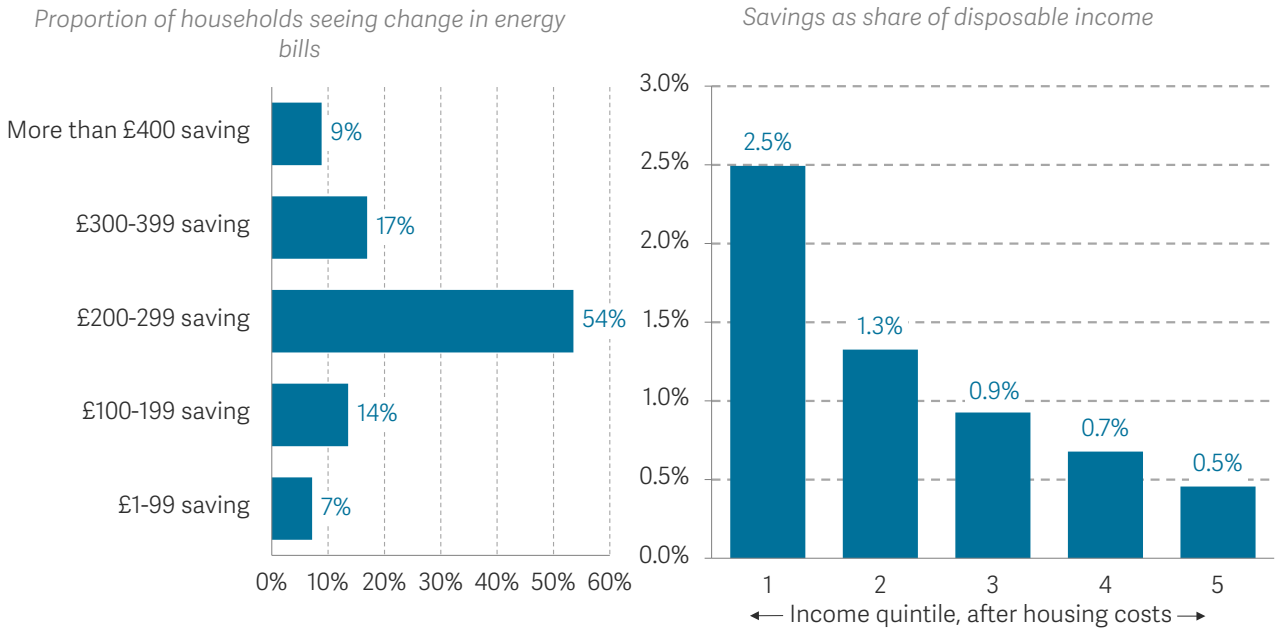
56 While standing charge-free tariffs could see energy spending fall for households with low levels of energy consumption, the higher unit prices that they would necessitate would be problematic, risking an increase in energy spending for consumers with high consumption. It would also reduce the incentive to consume more electricity for households on these tariffs, thereby making electric heating and electric cars less appealing. For more, see: Ofgem, Introducing a zero standing charge energy price cap variant, February 2025.

are costs that cannot be reduced by cutting back on consumption – increasing them would accentuate this issue further.

The second option is for these costs to be funded by the Exchequer, a move that would reduce electricity bills by around £140 for the typical household (with higher-than-average electricity users consumers saving more and lower-than-average users saving less). Cheaper electricity would quickly bolster the economics of running a heat pump, with average savings of £280 per year on offer for a household replacing their gas boiler, and three-in-four saving more than £200 per year, as Figure 11 shows.

FIGURE 11: **Having the taxpayer funding electricity levies would increase the incentive to switch to a heat pump, especially for poorer families**

Proportion of households seeing change in energy bills from replacing a gas boiler with a heat pump, by amount saved, if unit levy costs removed from electricity bills (left hand panel), and savings as a share of after housing costs incomes, by income quintile (right panel): England 2024-25



NOTES: Chart shows effects of removing levy costs funded through unit prices from electricity costs, those on standing charges assumed unchanged. Cost change shown across total energy bill to account for spillover effects of changing energy prices on electricity not used for space or water hearing. Assumes that households no longer pay gas standing charges once a heat pump is installed. Only shows impacts on households that currently have a gas boiler. Different boiler efficiencies accounted for according to system type and age.
SOURCE: RF Analysis of Ofgem, English Housing Survey, DESNZ Digest of UK Energy Statistics.

Figure 11 also shows a distributional rationale for this change, with the resultant reduction in heating costs equivalent to 2.5 per cent of incomes for households in the lowest-income quintile, compared with just 0.5 per cent for the richest fifth. But this route requires a significant public outlay – in the region of £5 billion per year.[57] A level-

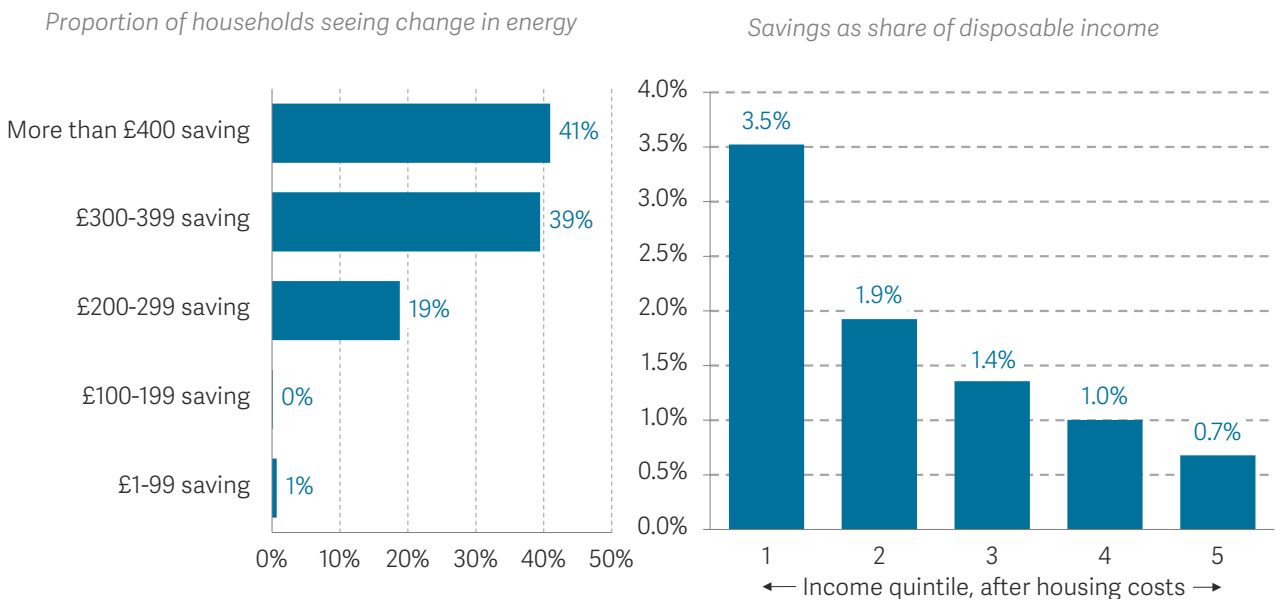
57 The cost of levies borne by electricity unit prices are not set to begin to fall significantly until the mid-2030s, when early projects under the Renewables Obligation scheme reach the end of their contracted lifetimes.

headed reading of the public finances suggests that this is unlikely in the current fiscal climate.

Which brings us to a third way: funding these costs through additional levies on gas unit prices. This would be cost-neutral for the state, and would increase the financial incentive to install a heat pump (albeit by making gas more expensive). Figure 12 shows the increased incentives that a household would face: four fifths of families would save more than £300 per year with a heat pump compared with sticking with a gas boiler (and two-in-five more than £400 per year), with savings accounting for 3.5 per cent of incomes of the poorest families.

FIGURE 12: **Moving electricity levies to gas bills would increase the incentive to switch to a heat pump**

Proportion of households seeing change in energy bills from replacing a gas boiler with a heat pump, by saving (left panel) and income quintile (right panel), if unit levy costs removed from electricity unit charges and added to gas unit charges: England 2024-25



NOTES: Chart shows effects of removing levy costs funded through unit prices from electricity costs, those on standing charges assumed unchanged. Cost change shown across total energy bill to account for spillover effects of changing energy prices on electricity not used for space or water hearing. Assumed that households no longer pay gas standing charges once a heat pump is installed. Only shows impacts on households that currently have a gas boiler. Different boiler efficiencies accounted for according to system type and age. SOURCE: RF Analysis of Ofgem, English Housing Survey, DESNZ data.

But the incentives in Figure 12 are driven by making gas more expensive, as well as making electricity cheaper, an endeavour that would hit those on low incomes hardest if enacted alone. There are fewer homes on the gas grid than on electricity, per-household costs would be higher than they are now to recoup the same revenue, and the relatively flat split of homes that aren't on the gas grid over the income distribution (17 per cent of households in both the poorest- and richest-income quintiles have no gas connection)

means that many poorer families would face additional expense. This would initially be small, at around £30 per year, but would likely increase over time as more families disconnect. And while extra costs would be similar for poorer and richer households (£28 and £32 per year for those in the lowest- and highest-income quintile, respectively), the heightened political focus on energy bills, where it seems that politicians won't countenance any upward pressure on costs for anyone (even if they aren't affected on average), means they may look to intervene.

But intervening for all households would unwind some of the incentives created by moving levy costs from electricity to gas, so any efforts should be focussed on those who are vulnerable: those on pre-payment meters and with both low incomes and high levels of consumption. Indeed, the current under-pricing of gas means that cost pass through to non-vulnerable households is of limited concern.

Any mitigation, therefore, needs to be able to distinguish between these groups. The energy crisis highlighted that neither welfare nor energy policy alone can identify who is most at risk of higher energy prices, but the oft-mooted solution – a social tariff – can.[58] Often suggested as a solution to 'today's problems' by identifying households in need and offering them lower unit prices (thereby scaling support with energy need), a social tariff also has the potential to identify future forms of vulnerability (such as whether a household retains a gas connection) rendering it a valuable tool for protecting households as the net zero transition continues apace. And it could do so at a much lower cost than government support that is spread across all energy consumers: there are approximately 10.5 million households in Britain that meet the above vulnerability criteria, ensuring that they are shielded from changes in energy spending caused by moving policy costs to gas would cost around £310 million per year.[59]

As such, the Government should pursue this route: keeping costs within the energy system but ensuring that consumer protections are in place before change begins. There is a strong case for a social tariff in any case, but this shows that it is also a key policy to enable the heating transition to pick up pace.

Coordinated policy action is needed to both accelerate the decarbonisation of home heating, and make sure it is fair

Decarbonising home heating requires households to make significant changes to their behaviour. This will not happen by itself – proactive policy making is essential.

58 For more, see: M Brewer et al., A Chilling Crisis, Resolution Foundation, August 2022.
59 Based on a social tariff which sees households in homes on the gas grid and either in receipt of means-tested benefits or with a gross income of less than £30,000 eligible for support, with support funded by the Exchequer rather than cross-subsidised from energy bills. Based on RF analysis of MHCLG English Housing Survey 2020-21 data and scaled to cover the rest of GB. Note, this is likely an over-estimate of the number of families eligible (and therefore the cost to HMT) due to a higher prevalence of off-gas homes in Scotland and Wales.

This difficulty, and the inherent risks that changes to expenditure could mean for lower-income households, helps to explain sluggish progress in a vital aspect of the UK's journey to net zero emissions. But this report has set out a framework for this vital transition, making it clear how policy makers can successfully wrestle with the challenging distributional consequences of the big changes to how we heat our homes. It puts poorer families at the centre of policy thinking and highlights the need for a coordinated approach instead of relying on single policies in isolation.

The Government needs to acknowledge that the heat pump rollout is off the pace needed to get to net zero as cheaply as possible. Making up this lost ground means retaining the current subsidy offer so that more households can participate, while delivering an additional means-tested scheme so vulnerable families pay no more for a heat pump than they would for a replacement gas boiler. Second, it must recognise that subsidies alone are unlikely to drive change through the rented sectors (and have not yet delivered cost reductions) and that regulation is needed to deliver strong signals to the market. It also needs to stop new homes being fitted with gas boilers that will need to be retrofitted in the next decade or two. And third, to move policy costs from electricity unit prices to gas unit prices, so that low carbon heating becomes significantly cheaper, while delivering consumer protections so that vulnerable households do not see their heating bills go up.

Devising a strategy for removing emissions from home heating sits near the top of the Government's net zero priority list, and taking this approach will ensure that it both accelerates and does so in a way that allows poorer families to participate and cut their heating costs as a result.

Annex: Data citations

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