Energy UK

MITSUBISHI ELECTRIC

Sparking Change

How to make clean heat cheaper and accelerate electrification

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The voice of the energy industry

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Foreword

In recent years we have made great strides building a modern, clean energy system. We now need to use that system more impactfully. The single, most significant thing Government can do to support this is to reduce the price of electricity, relative to gas – also known as the 'spark gap'.

The UK has led the way on decarbonisation, largely driven by the power sector. Shifting from fossil fuels to electricity for heating buildings and transport is the next step. Clean heat will deliver the benefits of electrification to people, households, businesses and public services across the country – including lower bills, more efficient technology, cleaner air and increased energy security. The transition to clean heat will also deliver good jobs in almost every postcode of Great Britain – from manufacturing and supply chains to installers and engineers.

And as our climate continues to warm, clean heating technologies can also offer cooling to help mitigate the impact of rising temperatures.

Upgrading millions of homes is not something the energy industry can do alone – we know that working in partnership with Government will be crucial and that there needs to be support for customers as the country navigates this change. The UK has some of the most diverse housing stock in Europe – and 80% of it will still be in use in 2050. Getting this right will require careful planning, well-designed frameworks and collaboration with colleagues across national, regional and local government.

To drive demand for electrification, clean heat must be both the cheapest and easiest option. This report looks at how reducing upfront and operational costs of clean heat technologies can accelerate their adoption across both businesses and households, electrifying the economy and delivering permanently lower bills for customers.

It's been great to work with Mitsubishi Electric and other Energy UK members to gain valuable insights into the experiences of their domestic and business customers. We look forward to working with Government to develop the right policy framework that ensures the transition to clean heat works for all consumers.

Dhara Vyas
Chief Executive, Energy UK

Foreword

Buildings are predicted to become the largest source of CO_2 emissions by 2033, so the transition to clean heat is no longer optional; it is essential.

Today, buildings produce a quarter of the nation's carbon emissions with heating accounting for a significant proportion of those emissions. So, we need to shift from fossil fuels to efficient, renewable heating in both homes and businesses. At the same time, our summers are becoming hotter and more extreme, so cooling becomes critical to health and comfort.

The drive towards decarbonisation can already be solved with existing technologies, but to really capitalise on the potential, we must accelerate the shift to a cleaner, electric economy. However, with some of the most expensive electricity in Europe, the UK lags behind most of the continent's leading economies in heat pump sales.

To change this, we must address the difference between the price of electricity and gas, the 'spark gap', which is preventing clean heating that is run on electricity becoming the most cost-effective option. This is largely due to the UK's reliance on gas generation and the way policy costs are placed on the bill, rather than in general taxation.

While the use of gas power is reducing over time as we bring on an increasing amount of cheap, renewable energy, policy and other non-commodity costs are set to rise. Why should households and businesses change to renewable heat technologies when electricity prices mean they won't see bill savings?

The electrification of heating in the UK therefore stands at a pivotal moment. While the technical pathways are proven and the long-term benefits are widely acknowledged, progress remains constrained by pricing barriers that restrict momentum.

As the UK's largest heat pump manufacturer, we accept our responsibility to help decarbonise buildings by reducing the energy consumed by heating, ventilation and air conditioning (HVAC).

We know that our technologies are not a silver bullet to solving the challenges of climate change, but their contribution is significant and we believe we can play an important role in supporting the creation of an electric economy. This will help to increase the use of renewable, low-carbon technologies, create sustainable jobs and careers, and encourage investment in the country, as we move to a fully electric society.

This important report sets out how targeted interventions can turn ambition to electrify heat into action by creating an economic environment for all consumers and businesses to switch.

Russell Dean
Deputy Divisional Manager (Living Environment Systems), Mitsubishi Electric

Executive summary

The UK has made significant progress in building a clean electricity system. However, for households and businesses to benefit from that transition, we must now incentivise businesses and households to invest in clean heat. The lack of heat electrification could see electricity demand struggle to increase as projected, creating a vicious cycle in which prices rise further as fixed costs are spread over fewer units of consumption.

The opposite picture, with greater heat electrification, sees lower electricity costs by spreading fixed costs over greater consumption, easing pressure on household budgets, improving business competitiveness, strengthening energy security, and supporting sustainable economic growth across every region of the UK. To deliver this, immediate government intervention is needed to address the high electricity to gas price ratio – the 'spark gap' – to incentivise the electrification of heat across households and businesses.

The UK's existing approach of funding decarbonisation and social schemes through electricity bills has made electricity artificially expensive relative to gas, resulting in one of the highest spark gaps among major economies.[1] This deters investment in the UK by making electricity costs uncompetitive compared to peer economies.

As contributions are based on electricity usage, low-income, high consumption customers pay a much greater share of the costs than they would do if the schemes were funded through general taxation.

Reducing the spark gap would improve the economics of heat pumps and other clean heating technologies and ensure that the benefits of the energy transition are felt sooner. This would help to maximise the impact of the Government's £15 billion Warm Homes Plan and accelerate progress towards healthier, more energy-efficient homes. If the spark gap is reduced from 4:1 to 3:1 from April 2028, this could see at least an additional 250,000 heat pumps installed by 2030.[2, 3, 4]

A larger electrified customer base would also support the growth of smart tariffs and flexibility services, better aligning consumer demand with periods of abundant low-cost renewable generation, helping to deliver a more efficient, responsive, and lower-cost energy system.

The economic opportunity is equally significant. Lower electricity costs would boost productivity and competitiveness, stimulate local growth and help create skilled manufacturing, installation, and maintenance jobs across the country. In addition, taking certain policy costs off non-domestic

1 Eurostat (2026), Energy statistics - natural gas and electricity prices (from 2007 onwards), Ofgem (2026), Final levelised cap rates model (Annex 9), Energy UK analysis

2 Based on uptake trends in other European countries with a lower spark gap - see Figure 1.

3 This is the baseline spark gap from before the conflict in the Middle East, taken as an average of the previous four price caps (up to July 2026), and applying the 2025 budgetary changes to energy bills, including the taxpayer subsidisation of 75% of the Renewables Obligation and cancelation of the Energy Company Obligation, to the three previous price caps. The spark gap has temporarily reduced due to the conflict, but we assume this will not last.

4 Eurostat (2026), Energy statistics - natural gas and electricity prices (from 2007 onwards), Ofgem (2026), Final levelised cap rates model (Annex 9), EHPA (2025), Heat pump sales testify to government action; Energy UK analysis

electricity bills could generate £130 billion of additional economic output between 2027 and 2050.[5] The additional policy measures recommended in this report would increase this impact.

Accelerating electrification is also essential to protecting consumers from future energy shocks caused by volatile international gas markets. The recent conflict in the Middle East has driven a 17% increase in the energy price cap between April and October 2026, with a further significant rise expected in January 2027.[6] Gas consumption in Great Britain would be reduced by an additional 0.5 percentage points on top of existing forecasts in this period, helping to enhance energy security and deliver permanently lower, more stable bills.

This paper recommends comprehensive policy packages to cut the spark gap and accelerate electrification of heat across both households and businesses.

For households, a long-term target spark gap of 2.5:1 is required to ensure clean heating technologies are always cheaper to run than gas boilers. As this would be very difficult to achieve in the near-term, the Government should set an interim spark gap target of 3:1 to be achieved by 2030. This can be reached by shifting the remaining policy costs on electricity bills to taxation and moving the gas standing charge to the unit rate, alongside regulatory changes to manage the risk of supplier cost recovery and improving targeted support to mitigate the impact on low-income, high gas consumption households. These changes will create the right conditions to drive the spark gap down further during the 2030s through a combination of additional cost allocation reform and higher electricity demand, spreading fixed system costs over more units of consumption.

For businesses, setting a single target spark gap would be unlikely to achieve the desired outcome, as the tipping point for clean heat to become economically attractive varies significantly across sectors, business sizes and energy consumption patterns. To drive uptake of clean heat, the Government needs to cut electricity prices for all businesses and reform Enhanced Capital Allowances (ECAs) to incentivise decarbonisation investment. Further policies should then be tailored around business circumstances. Smaller businesses should get support with upfront costs through interest-free loans and cashback grants as part of a new Business Energy Upgrade (BEU) scheme. Larger businesses may have better access to capital but need to achieve a Return on Investment (ROI) so should get support through a targeted electricity price discount, focusing on space heating.

Making electricity the affordable choice is not simply an energy policy intervention. It is a critical element of an effective economic strategy to reduce cost of living pressures, drive reindustrialisation, strengthen resilience, and generate local growth. The Government must act now to capitalise on these opportunities and deliver a positive future for the whole of the country.

5 Energy UK and the Confederation of British Industry (CBI) (2026) Cutting Business Energy Costs: A blueprint to boost growth

6 Ofgem (2026), Final levelised cap rates model (Annex 9): 1 October to 31 December 2026, based on consumption adjusted levels figures, using most up-to-date TDCV values.

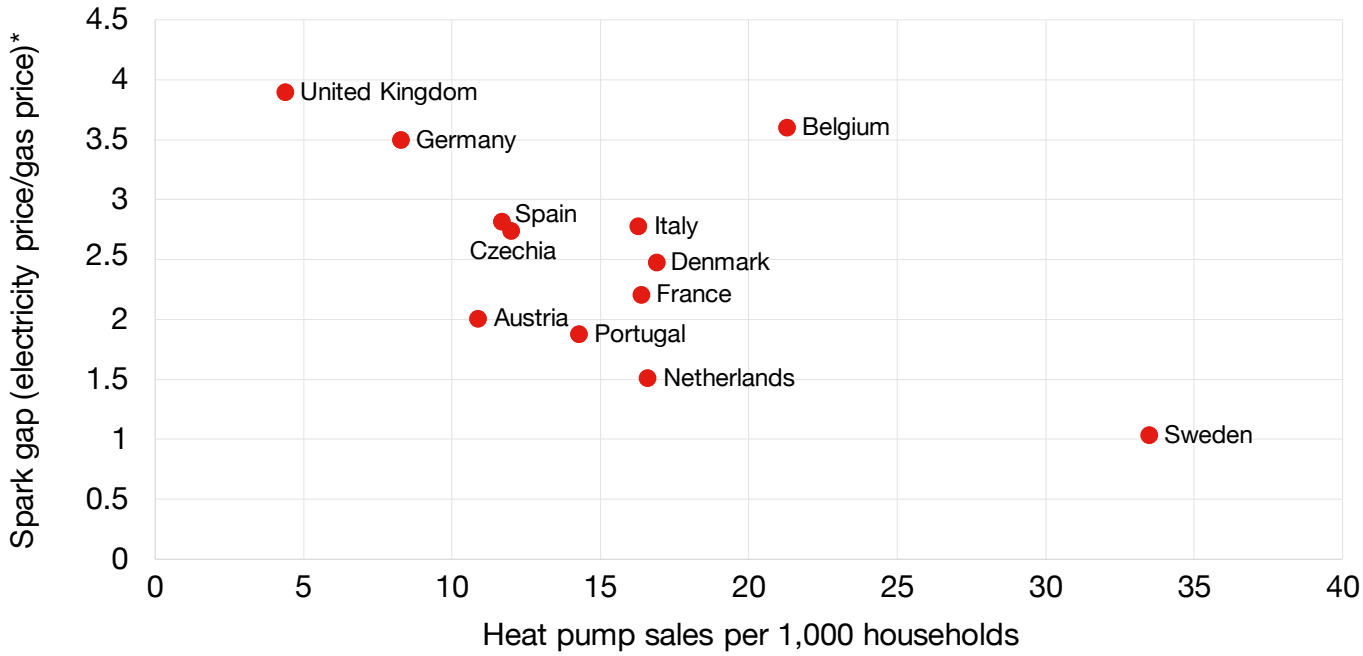
Reducing the spark gap for households across the UK

A spark gap of 2.5:1 will make modern clean heating technologies cheaper than fossil-fuel equivalents

Helping households move to clean heat, in combination with the transition to clean power generation, will protect them from future price shocks in global gas and oil markets.

Approximately 75% of households still rely on gas boilers for heating their home and adoption of clean heat technologies remains low, with heat pumps providing heating for only 2% of households, with a further 2% serviced by heat networks (note heat networks use non-domestic energy pricing and are included in the non-domestic chapter).[7] Across Europe, countries with the lowest spark gap have the highest rates of heat pump uptake, as shown in **Figure 1**. While around 125,000 heat pumps were installed in the UK in 2025, this is far below the level needed to meet decarbonisation targets and realise the benefits of electrification.[8]

Figure 1: 2025 spark gaps and heat pump sales in selected European countries[9]



7 DESNZ (2026), DESNZ Public Attitudes Tracker: Heat and energy use in the home, Winter 2025, UK

8 HPA UK (2026), UK Heat Pump sales reach record high in 2025, but more must be done to meet Government targets

9 Eurostat (2026), Energy statistics - natural gas and electricity prices (from 2007 onwards), Ofgem (2026), Final levelised cap rates model (Annex 9), EHPA (2025), Heat pump sales testify to government action; Energy UK analysis

To drive the demand for household electrification needed to meet Government targets, including those outlined in the Warm Homes Plan, alongside our broader ambitions around energy resilience, the target domestic spark gap should be 2.5:1. This figure will effectively guarantee that the running costs of efficient, electric heating systems, such as heat pumps, are cheaper than fossil fuel boilers.[10] This is the case because heat pumps are typically 300% - 400% efficient, converting one unit of energy into three to four times as much heat. In contrast, gas boilers have an efficiency of less than 100%.[11]

The UK has a long road to travel to reach a spark gap of 2.5:1. To do this immediately would require dramatic policy changes and market interventions. It would include options that are politically challenging in the current environment, such as moving all electricity network costs onto the standing charge.

Therefore, Energy UK proposes that alongside setting a long-term goal of 2.5:1 for the domestic spark gap, the Government should also adopt an interim target of 3:1 by 2030. This target can be reached through moving all remaining policy costs currently on electricity bills to Exchequer funding, at a cost of £2.5 billion per year, as well as moving the gas standing charge onto the unit rate.[12]

These policy changes would generate significant benefits for household bills, growth and energy security.[13] As shown in **Figure 2**, by removing policy costs from electricity bills and the gas standing charge, a medium-use dual-fuel customer would save around £40 on their annual energy bill. If they switched to a heat pump, they might save over £300.[14] Achieving a spark gap of 3:1 from April 2028 could see at least an additional 250,000 heat pumps installed by 2030, based on uptake trends in other European countries with a lower spark gap (**Figure 1**). Gas consumption in Great Britain would be reduced by an additional 0.5 percentage points on top of existing forecasts in this period.[15]

10 Heat pumps have a typical efficiency rating of 300 – 400% in comparison to <100% for gas boilers. This means that a spark gap of 2.5:1 will ensure that a heat pump is always cheaper to run than a gas boiler.

11 Energy Savings Trust (2026), Heat pumps: How they work, costs and savings

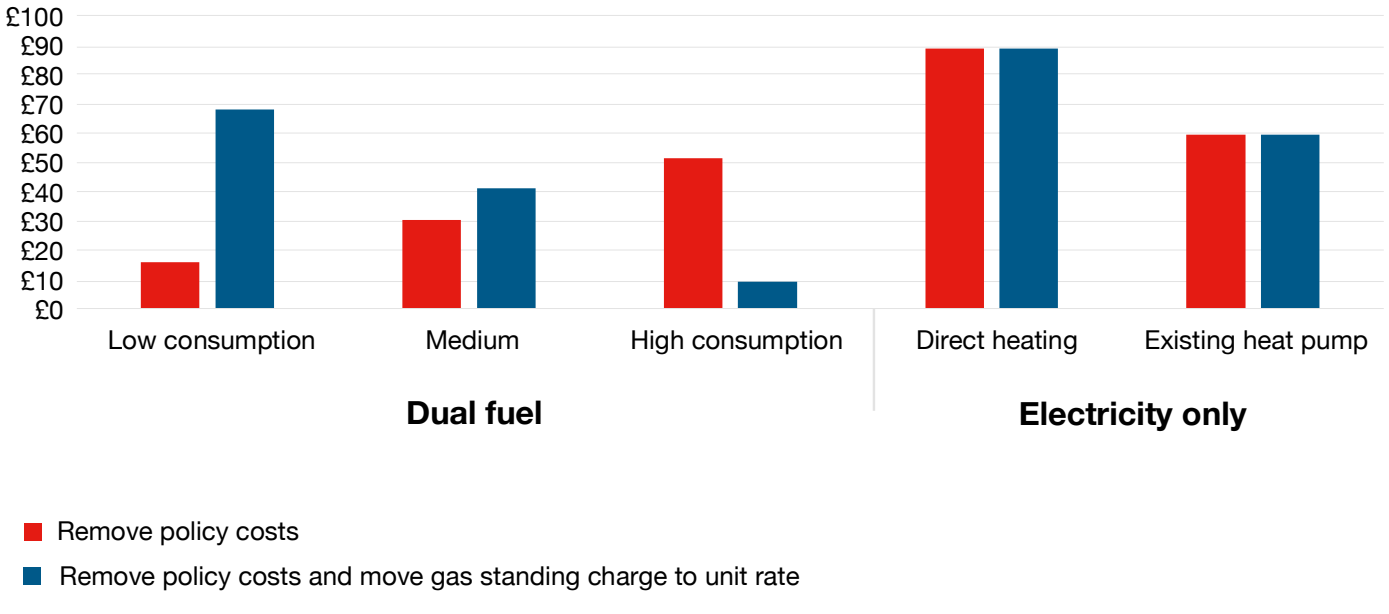
12 These policy costs include the Warm Homes Discount that's charged on the electricity unit rate, full Renewables Obligation, Feed-in Tariff, nuclear Regulated Asset Base (RAB), the Assistance for Areas with High Electricity Distribution Costs (AAEDHC), and the Network Charging Compensation (NCC). Ofgem (2026), Policy cost allowance methodology (Annex 4)

13 Throughout this section, 'Low', 'Medium', and 'High' dual-fuel households are assumed to consume gas and electricity at the levels from Ofgem's Typical Domestic Consumption Values (TDCVs); Ofgem (2026), Review of typical domestic consumption values

14 Savings for a typical consumption dual-fuel household switching to a heat pump and consuming 5,350kWh of electricity, using a leading smart tariff.

15 Eurostat (2026), Energy statistics - natural gas and electricity prices (from 2007 onwards), Ofgem (2026), Final levelised cap rates model (Annex 9), EHPA (2025), Heat pump sales testify to government action; Energy UK analysis

Figure 2: Estimated bill savings after removing policy costs from electricity bills and moving the gas standing charge to the unit rate[16]



This analysis uses the average of the four price caps up to July 2026 as a baseline. This is because from July, the impacts of international conflict have distorted prices. Both the 75% Renewables Obligation (RO) discount and the temporary removal of VAT to electricity bills have been applied to the baseline to reflect the current policy context.[17]

In addition to the measures recommended in this report, reducing wholesale electricity prices through building more renewable capacity will contribute to lowering the spark gap in the medium to long term.

These policy proposals taken together provide a pathway for the UK to meet its decarbonisation objectives while driving growth and building resilience in our energy system.

16 Ofgem (2026), Policy cost allowance methodology (Annex 4), Ofgem (2026), Final levelised cap rates model (Annex 9): 1 July to 30 September 2026, DESNZ (2026), Supply and consumption of electricity (ET 5.2 - quarterly), DESNZ (2026), Natural gas supply and consumption (ET 4.1 - quarterly) direct heating assumes 6,100kWh consumption and heat pump assumes 5,350kWh; Energy UK analysis

17 The VAT discount on bills is in place from October 2026 – March 2027

Reducing domestic electricity bills over this Parliament

The Government should remove all remaining policy costs from electricity bills and move the gas standing charge to the unit rate. These measures are projected to lower the spark gap to 3:1.

The baseline spark gap before the conflict in the Middle East was 4:1.[18] The conflict has temporarily increased the cost of gas but electricity has not followed suit due to the growing renewable penetration in electricity generation. This has led to a narrowing of the spark gap, but the effect will be temporary.[19] Therefore, the analysis has used 4:1 as the starting point for the spark gap for domestic bills undertaken throughout this report.

Move all policy costs from electricity bills into Exchequer funding

Lowers the spark gap to 3.6:1

This intervention entails funding the following electricity costs through the Exchequer:

- The 75% of domestic Renewables Obligation (RO) costs beyond March 2029, when the current cost reduction on household bills is set to end, as well as the remaining 25%.

- The Feed-in Tariff (FiT), the Assistance for Areas with High Electricity Distribution Costs (AAEDHC), and the Network Charging Compensation (NCC).

- The share of the Warm Homes Discount that is charged on the electricity unit rate.

- Costs associated with the nuclear Regulated Asset Base (RAB). These should be put back onto energy bills from the point at which Sizewell C is operational. This aligns with the principle of energy customers paying for the infrastructure that is providing them energy. This is currently expected to be in 2039.[20]

It assumes that the temporary VAT cut on electricity bills ends in March 2027.[21]

A typical household that uses both gas and electricity would save around £130 each year as a result of these costs being removed, inclusive of the current 75% discount to the RO.[22] Considering the savings from the 75% RO discount, this intervention would represent roughly £30 of additional savings to the typical household, even including VAT coming back onto bills post-March 2026.

The intervention on policy costs in the 2025 Autumn Budget has had a positive impact on the spark gap. Energy UK estimates the 75% RO discount reduced the spark gap from 4.4:1 to 4:1.[23] Removing the remaining electricity policy costs from bills reduces the spark gap even further, down from 4:1 to

18 This is taken as an average of the previous four price caps, and applying the 2025 budgetary changes to energy bills, including the taxpayer subsidisation of 75% of the Renewables Obligation and cancellation of the Energy Company Obligation, to the three previous price caps.

19 Ofgem (2026), Final levelised cap rates model (Annex 9): 1 July to 30 September 2026

20 BBC (2026), Sizewell C could add £19 to yearly bills says watchdog

21 Prime Minister's Office, 10 Downing Street (2026), New PM cuts tax on household electricity bills to give breathing space on cost of living

22 Ofgem (2026), Policy cost allowance methodology (Annex 4); Energy UK analysis. A typical household as defined by Ofgem consumes 2,500kWh of electricity and 9,500kWh of gas.

3.6:1.[24] If fully funded through the Exchequer, it would come at a high cost to HM Treasury but would also ensure that households are protected from future price shocks as soon as possible. This would reduce the need for costly short-term government interventions to support household energy bills during future price spikes, potentially saving billions in public expenditure in the long run.

In the aggregate, the cost of these policies would remain broadly flat over the next decade, before dropping significantly in 2039 when the costs associations with the nuclear RAB could be recouped from energy bills, assuming Sizewell C development remains on schedule, as set out in **Figure 3**.[25] Without decisive government intervention to reduce the price of electricity and incentivise electrification, demand will remain subdued, risking a vicious cycle of rising network costs spread across fewer units of consumption driving electricity prices further upwards, while customers remain exposed to volatile gas prices.

Removing these levies would cost HM Treasury an additional £2.5 billion per year, taking total annual Exchequer funding for domestic policy costs to around £4.8 billion.[26] However, ending the electricity VAT cut in April 2027 would avoid approximately £1.4 billion of annual government spending.[27] Funding policy costs through taxation is more progressive than funding them through bills, as many households on lower incomes have high levels of electricity consumption. This change would also yield significant positive distributional benefits for fuel poor customers on direct electric heating, saving them approximately £170 annually.

The Government should also establish the levy control framework, announced in the 2025 Autumn Budget, by April 2027. This framework should provide scrutiny over any additional proposed levies and set out a clear approach to assessing how existing and future policy costs are funded. This should take into account factors such as whether levies pay for mature and operational energy infrastructure, their economic and distributional impacts, and their effect on the spark gap.

The levy control framework could also be used to support the proposals to remove policy costs from electricity bills. Ideally, all these levies would be moved to taxation in April 2027 to ensure the benefits to household affordability and energy security are achieved as soon as possible. However, given fiscal constraints, the framework could be used to determine a proportion of levies to move to the Exchequer in April 2027, with a commitment to gradually remove the remaining costs from electricity bills by April 2029. While this would mitigate the initial fiscal impact, it would reduce the near-term acceleration of clean heat adoption as well as associated jobs, which in turn would accelerate clean heat further, and is therefore recommended only as a second option.

23 This is taken as an average of the previous four price caps, and applying the 2025 budgetary changes to energy bills, including the taxpayer subsidisation of 75% of the Renewables Obligation and cancellation of the Energy Company Obligation, to the three previous price caps.

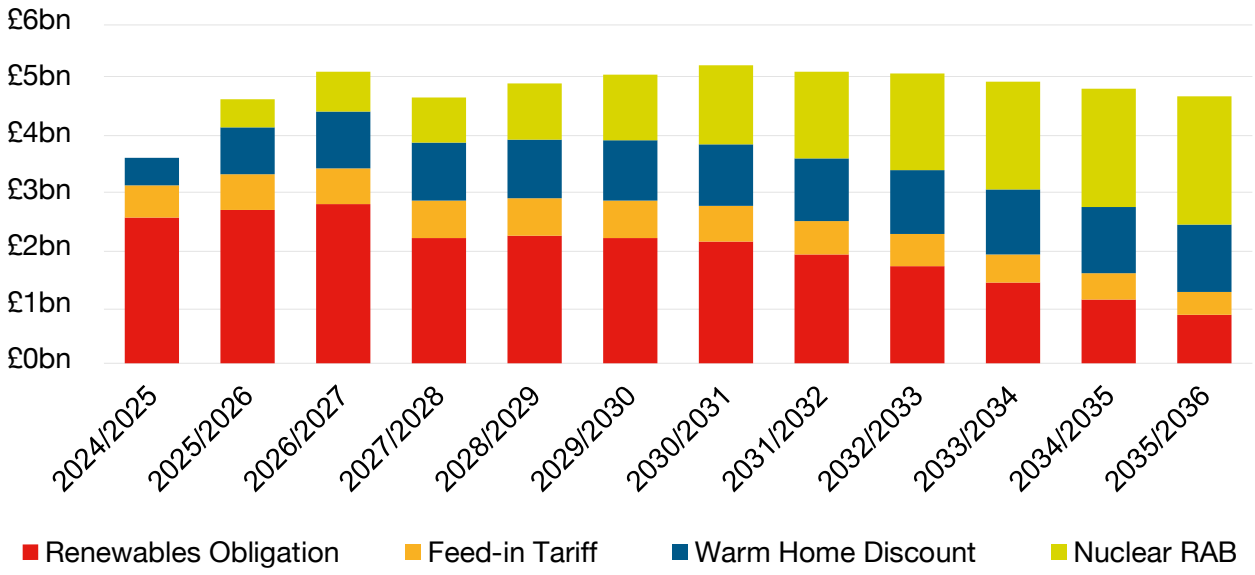
24 Ofgem (2026), Policy cost allowance methodology (Annex 4), Ofgem (2026), Final levelised cap rates model (Annex 9): 1 October to 31 December 2026; Energy UK analysis.

25 DESNZ (2026), Analytical annex: Impact of indexation options, OBR (2026), March 2026 Economic and fiscal outlook – detailed forecast tables: receipts, DESNZ (2026), Warm Home Discount; Energy UK analysis

26 Nesta (2025), Tax-free electricity

27 Nesta (2025), Tax-free electricity

Figure 3: Estimates for the domestic share of major policy costs[28]



Finance as an option to spread policy costs

If Government deems there to be insufficient fiscal headroom to move all the policy costs to Exchequer funding, an alternative option would be to create a financing mechanism.

This is highlighted in Energy UK and the Confederation of British Industry (CBI)'s report 'Cutting Business Energy Costs: A blueprint to boost growth'.[29]

Scan to read the report

This mechanism could be publicly or privately financed. It would help distribute the cost of levies over a much longer period, for example removing the costs for 10 years and then recovering them over the following 30 years, with interest.

In a scenario where this mechanism is publicly financed, it would create a financial asset on the Government's balance sheet, so would not impact public sector net financial liabilities, despite it requiring an increase in borrowing. This intervention would make it more straightforward to remove levies from electricity bills for a set period of time while maintaining fiscal rules. If it were privately financed, it would not require any government spending. However, it would incur a higher interest rate, which could cause high costs for future electricity customers when the levies return to energy bills.

Removing costs in the short and medium-term incentivises electrification, and this means that when policy costs are brought back onto bills in the longer-term, they will be shared over a higher volume of demand. Deferring these costs would also align them more closely with the period in which bill payers benefit from investment in grid infrastructure and renewable generation capacity, which will lower wholesale prices and system costs over the longer term.

28 DESNZ (2026), Analytical annex: Impact of indexation options, OBR (2026), March 2026 Economic and fiscal outlook – detailed forecast tables: receipts, DESNZ (2026), Warm Home Discount; Energy UK analysis

29 Energy UK and the Confederation of British Industry (2026), Cutting Business Energy Costs: A blueprint to boost growth

Move the gas standing charge onto the unit rate

Lowers the spark gap to 3:1

In combination with removing policy costs from electricity bills, Energy UK proposes removing the gas standing charge and recovering the costs by increasing the gas unit rate instead. Assuming policy costs had been removed, this would reduce the spark gap from 3.6:1 to 3:1. As a standalone measure, moving gas standing charge costs to the unit rate would save a typical (medium consumption) household roughly £10. Low-consumption households benefit more, to the tune of approximately £50, while high-consumption households would spend about £40 extra. For this reason, we recommend packaging this measure alongside removing policy costs from electricity bills, so that the vast majority of households save on their bills overall.

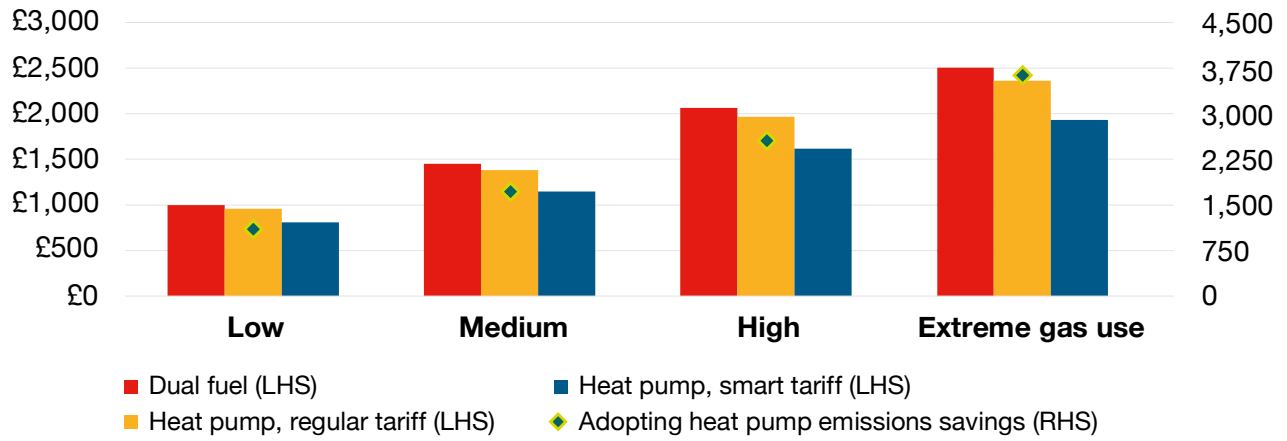
While moving gas standing charge costs to the unit rate reduces the headline spark gap substantially, its impact on incentivising electrification is slightly more nuanced. The change would reduce energy costs for households with lower-than-average gas consumption, lowering their potential savings from adopting clean heat. However, the reverse is true for high-consumption households, where the prize is biggest, both in terms of monetary savings and in reducing emissions, as shown in **Figure 4**.

For any household that would maintain a gas connection, such as to keep gas cooking equipment, it significantly improves the financial attractiveness of electrifying space heating as residual gas charges would be much lower. It would also help to reduce the negative impact that long waiting times for gas disconnections can have on clean heat adoption, as there would not be a cost to having the unused connection.

Therefore, despite reducing incentives for some households, the proposed change would likely have a material positive impact on the aggregate transition of gas heating to electric heating consumption.

As shown in **Figure 4**, following the implementation of the above proposals, all

Figure 4: Household bills by consumption tier across policy options with estimated emissions savings from switching to a heat pump[30]



30 Ofgem (2026), Review of typical domestic consumption values, DESNZ (2026), Greenhouse gas reporting: conversion factors 2026, Ofgem (2026), Final levelised cap rates model (Annex 9): 1 October to 31 December 2026, Ofgem (2026), Policy cost allowance methodology (Annex 4); Energy UK analysis. Uses Ofgem typical domestic consumption values for low, medium, and high profiles. Very high profile assumes 20,000kWh gas consumption and 3,800kWh electricity consumption. Uses a leading smart tariff for electricity costs after switching to a heat pump.

households would experience some savings by switching to a heat pump. Further, considerable savings can be achieved through adopting a smart tariff alongside a heat pump installation.

Beyond electrification, there are two potentially significant consequences of moving gas standing charge costs to the unit rate, namely materially higher cost recovery risk for energy suppliers and increased bills for high consumption households, some of which will be on low incomes or have medical needs. Energy UK only supports making this change once these issues have been addressed.

Energy suppliers have two key fixed cost components: certain network charges, and some operating costs that do not vary with the amount of gas supplied. Suppliers are already exposed to unfair cost recovery risk under the gas price cap as they must recover all network charges through the unit rate, despite themselves being charged a fixed cost per customer for some of those network costs. Moving fixed operating costs to the unit rate would exacerbate this risk by increasing the impact on suppliers of lower-than-expected consumption due to warm winters, energy efficiency improvements, or rationing – trends that have been seen consistently in recent years.

Therefore, various regulatory changes would need to be introduced first to mitigate supplier cost recovery risk from shifting gas standing charge costs to the unit rate, including:

- Reform gas network charging so that charges on suppliers align with how they charge customers, i.e. suppliers pay for all network costs per unit rather than per customer.
- Introduce an annual price cap true-up mechanism to address any material market-wide differences between forecast and actual consumption.
- Regular updates of Typical Domestic Consumption Values (TDCVs) so that price cap unit rates continue to reflect expected consumption levels.

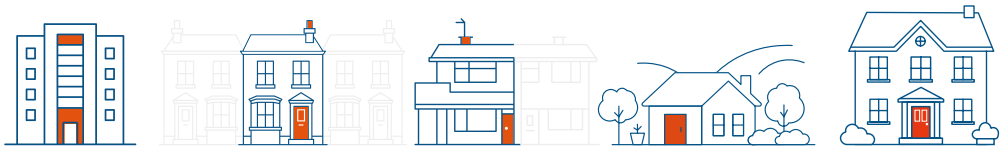
Further regulatory changes may also be required, and Government and Ofgem should work closely with industry to ensure this shift does not cause damage to the market. To allow sufficient time for the necessary changes to be implemented, the standing charge should only be moved to the unit rate from April 2028 at the earliest. To avoid exposing suppliers to undue cost recovery risk on fixed and other non-default tariffs, contracts starting before April 2028 should be allowed to maintain any gas standing charges for their duration.

The vast majority of households would experience energy bill savings through the combination of moving policy costs to taxation and shifting gas standing charge costs to the unit rate, including most dual-fuel households with higher-than-average gas consumption. However, some households that use substantially more gas relative to electricity may see their bills increase. This includes some low-income households and people that need to keep their homes consistently warm for medical reasons. For example, a household with typical electricity consumption that consumes more than 1.75 times the typical amount of gas would see its total energy bill increase.

However, this impact can be mitigated by the provision of better targeted support. As the shift of gas standing charge costs to the unit rate would not take place until

at least April 2028, it would align with implementation of Energy UK's recommended social discount, which would offer tiered and flexible energy bill rebates based on household income, health and energy consumption data.[31] It would also be delivered alongside proposals in the Warm Homes Plan to support low-income and high consumption households with transitioning to clean heat and other low-carbon technologies.

Figure 5: Different household profiles and the impact of Energy UK policy proposals on them[32]



Profile	Two-bedroom, purpose-built flat	Three-bedroom, terraced house	Large family, semi-detached house	Detached house in the Highlands	Household with special medical needs
Fuel(s)	Dual-fuel	Dual-fuel	Dual-fuel	Electricity only	Electricity only
Consumption level	Low	Typical	High	High	Very high
Baseline	£1,066	£1,493	£2,075	£1,637	£2,065
Saving from policy recommendations	£68	£41	£9	£89	£118
Opportunity from switching to a heat pump	£260	£344	£461		

31 Energy UK (2026), Improved Energy Bill Support: The case for a social discount

32 Ofgem (2026), Final levelised cap rates model (Annex 9): 1 October to 31 December 2026, Ofgem (2026), Policy cost allowance methodology (Annex 4); Energy UK analysis. Baseline bill is an average of four price caps up to Q3 2026 with a hypothecated removal of VAT on electricity and the RO discount applied backwards. Dual-fuel households follow Ofgem's typical domestic consumption values for different usage levels, the detached house in the highlands uses 6,100kWh and the household with special medical needs uses 7,916kWh.

It is important to note that the same principle cannot be applied to the electricity standing charge. The broad trajectory of steadily declining gas consumption is well understood. Gas networks investment is focussed on maintaining the existing system, meaning costs are relatively straightforward to predict. As such, Energy UK believes the risks associated with moving costs to the unit rate can be managed with the outlined reforms.

In contrast, forecasts for electricity consumption vary considerably, depending on the assumed adoption rates of clean heat, electric vehicles (EVs) and other low-carbon technologies.[33] Moreover, electricity networks are at the start of a once-in-a-generation expansionary investment period, making costs much more complicated to predict.[34] Therefore, attempting to recover fixed electricity system costs through the unit rate would cause unmanageable cost recovery risks for suppliers and network operators. Reducing the electricity standing charge would also increase the spark gap, disincentivising the electrification that is critical to delivering a more secure, lower cost energy system.

Driving down the domestic spark gap further in the 2030s

The recommended policies will lower the spark gap to 3:1 before 2030, incentivising electrification while reducing energy bills for almost all customers. However, to ensure that clean heat is the cheapest form of heat in all cases, the Government's long-term goal must be to achieve a 2.5:1 spark gap.

The National Energy System Operator (NESO) expects electricity demand to increase by 10% by 2030.[35] If electricity demand instead increased by 18% by 2030, in line with the Electric Engagement scenario, then this would reduce the bill increase for an average household by £20.[36]

With electricity network costs predicted to increase over the coming years, growing demand will also help mitigate their impact. **Figure 6** shows the estimated bill impact from higher network charges depending on what happens to total electricity demand.

As a whole, increasing demand for electricity over the next several years will help to spread fixed system costs over a larger number of units, further reducing the cost of electricity and incentivising additional demand growth.

Moreover, a growth in electricity consumption during the 2030s, as more households electrify their heating and car charging, would create greater headroom to increase the electricity standing charge. For households that have adopted low-carbon technologies, the standing charge would account for a smaller share of their total bill because of their higher electricity consumption, reducing the impact of recovering a greater share of costs through this mechanism. This would allow electricity unit rates to fall, lower running costs of clean heat and help to reduce the spark gap to below 3:1.

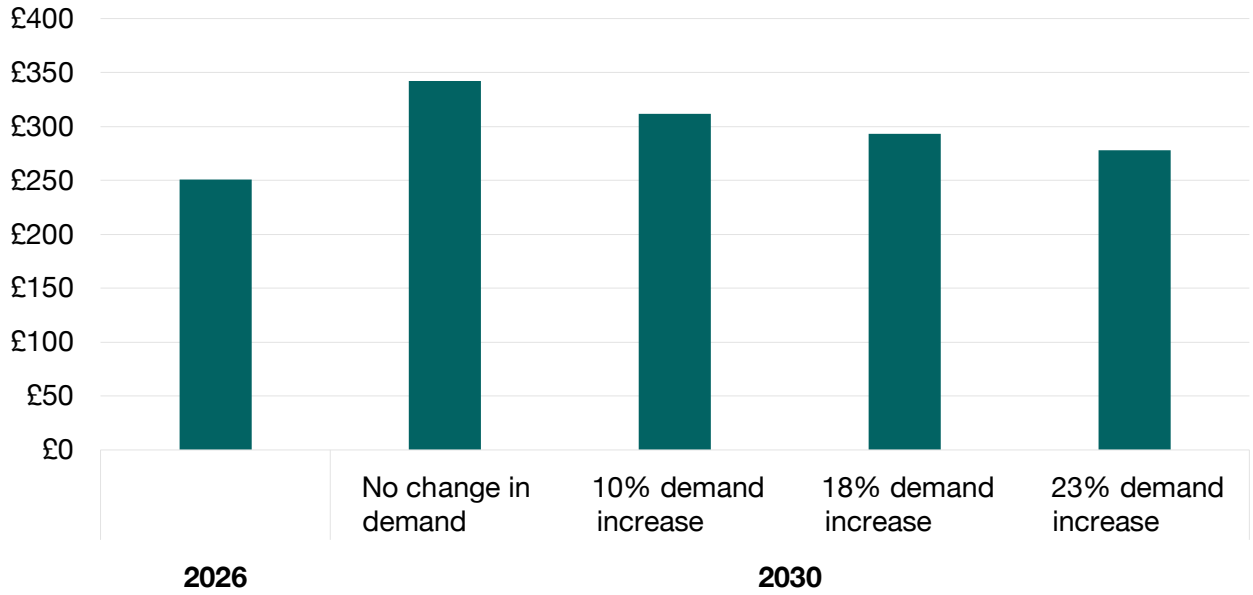
33 NESO (2025), Future Energy Scenarios: Pathways to Net Zero

34 Ofgem (2025), RIIO-3 Final Determinations for the Electricity Transmission, Gas Distribution and Gas Transmission sectors

35 NESO (2026), Ten Year Outlook 2026 Data Workbook

36 NESO (2025), FES: Data Workbook 2025

Figure 6: Indicative household network costs for 2026 and 2030 at different levels of total Great Britain electricity demand[37]



Bringing more flexible capacity onto the system, such as EVs, heat networks, heat pumps and batteries, helps to reduce system costs and mitigate infrastructure upgrades further. Removing as many fixed costs as possible from the electricity unit rate helps to strengthen price signals for demand flexibility. Improving markets to better accommodate and reward the mobilisation of large numbers of small flexible assets will further reduce system costs and bring down bills.[38]

Furthermore, the 'Build and Flex' model that will be implemented in the RIIO-ED3 price control period should help to reduce the spark gap. RIIO-ED3 is the upcoming price control framework set by Ofgem that will run from 1 April 2028 to 31 March 2033 and will regulate how much revenue the District Network Operators (DNOs) can earn, setting out their licence obligations and targets for the period. The Build and Flex model means DNOs will be incentivised to invest in necessary network reinforcements, but also to use flexibility services to reduce the risk of overbuilding new distribution network assets. This will help mitigate the increase in network costs by limiting the scale of required network reinforcements, while ensuring necessary network buildout is delivered first.

From 2031, there will be opportunities to reform the approach to the recovery of network costs, assessing how the cost of investment in the network can be recovered from bills over a longer timeframe, reducing the impact on energy bills.

37 Forecast costs are a total of transmission, distribution and balancing forecasts from https://www.electricitybills.uk/. Forecast demand levels from NESO (2026), Ten Year Outlook 2026 Data Workbook and NESO (2025), FES: Data Workbook 2025. Household bills calculated assuming 3,100kWh consumption.

38 Energy UK (2026), Energy UK Explains: How consumer-led flexibility works in power markets

A complete policy package for clean heat

Lowering the spark gap is just one step on the pathway to accelerating the adoption of clean heat in the UK. While lower electricity prices will help ensure running costs are more competitive than gas boilers, the lifetime cost of the technology needs to be considered.

The upfront cost of making the initial switch to a heat pump is much higher than that of installing a replacement gas boiler and is comparable to installing a new oil boiler. Currently, through the Boiler Upgrade Scheme (BUS), the Government subsidises the upfront cost of heat pumps in England and Wales by up to £7,500 for properties on the gas grid, and by up to £9,000 for those replacing oil or Liquified Petroleum Gas (LPG). In Scotland, the Home Energy Scotland grant offers £7,500, with an additional £7,500 of funding available as an optional interest-free loan. Rural and island properties can access an additional £1,500. Lowering the spark gap and developing the market for low-cost green finance will help create a pathway to a self-sustaining market for clean heat, independent of government subsidy.

These measures need to be underpinned by access to tailored and independent advice for consumers, and robust quality assurance standards that make sure systems are designed and installed to be as efficient as possible. This is critical to ensure that consumers have the confidence to invest in clean heat and other low-carbon technologies. Helping customers use their clean heating systems flexibly will also help reduce their bills even further, lowering their lifetime cost relative to a gas boiler, and bringing savings to the energy system more broadly.

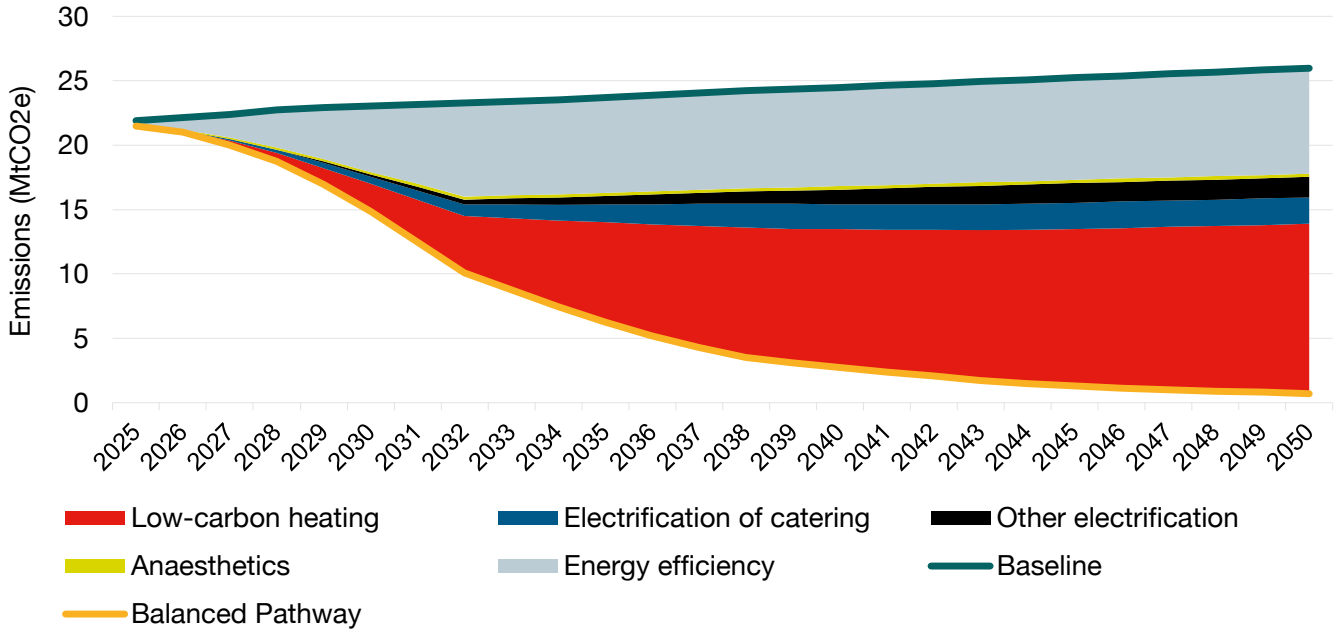
Reducing the spark gap for non-domestic users

It will be vital for businesses and public sector organisations to move away from gas to insulate them from volatile gas prices, improve energy security, and meet carbon targets. Gas is used disproportionately compared to electricity in the non-domestic sector with the majority used for space heating. The Non-Domestic National Energy Efficiency data shows that non-domestic buildings consume 1.3 times more gas than electricity.[39]

The electrification landscape is particularly challenging for non-domestic customers.

The vast majority of heat pumps are currently installed in domestic properties. The uptake of heat pumps and connection to heat networks in non-domestic buildings remains low, despite it representing a significant share of the UK's heat demand.[40] In its advice on Carbon Budget 7, the Climate Change Committee suggested that 88% of non-residential heating needs to be delivered through low-carbon sources by 2040, with heat pumps as the dominant technology. By 2050, the sector needs to almost completely decarbonise through rapid electrification.[41]

Figure 7: Sources of abatement in the Balanced Pathway for non-residential buildings[42]



39 DESNZ (2025), Non-domestic National Energy Efficiency Data Framework

40 HPA UK (2026), Heat pump sector calls for policy certainty to accelerate adoption in non-domestic buildings

41 CCC (2025) – Figure 7.9.2 Sources of abatement in the Balanced Pathways for non-residential buildings, The Seventh Carbon Budget

42 CCC (2025) – Figure 7.9.2 Sources of abatement in the Balanced Pathways for non-residential buildings, The Seventh Carbon Budget

Policies to drive the uptake of clean heat in the non-domestic sector have been inadequate to date, demonstrated by the fact that uptake of the previous non-domestic Renewable Heat Incentive (RHI) and for the BUS (which only applies to small applications up to a capacity of 45kWth) has been very limited.[43]

The Government has introduced the British Industrial Competitiveness Scheme and increased relief under the British Industry Supercharger through an uplift to the Network Charging Compensation Scheme, but these schemes only apply to a very small number of businesses. They are also insufficient to create the financial case for the supported companies to switch at scale.

As of today, based on Energy UK analysis of Cornwall Insight data, the spark gap ranges between 4.2:1 and 4.5:1 across the different types and size of businesses.[44]

Non-domestic electricity prices in GB are around 50% higher than the G7 median and yet there is no clear ambition, roadmap, or timeline for reducing electricity prices for the majority of non-domestic customers.[45] Network charges are expected to increase significantly in the years ahead and, in combination with substantial policy costs, this will mean that most clean heat projects will largely remain unviable in the years to come.

Without any policy change, the forecasted spark gap is expected to range between 3.9:1 and 4.3:1 in 2029/2030.[44] Although this is a slight reduction compared to 2025/2026, it will make no material difference to non-domestic heat electrification.

Low non-domestic clean heat adoption is driven by both high costs and non-financial barriers

The non-domestic spark gap for space heating and electrification of industrial processes varies significantly among businesses due to different building profiles and energy uses. Another influential factor is the conversion efficiency of various technologies used for different industrial and commercial processes and the range of temperatures required. This report considers the required spark gap for space heating only, using a range of heat pump technologies. Different technologies will be best suited to non-domestic buildings depending on their heating and cooling needs, existing building characteristics, location, and size, as set out in **Appendix 3** (page 31).

In many cases and locations, heat pumps will be the most viable and lower-cost option. There are various heat pump technologies that can be used in non-domestic buildings to provide both heating and cooling, requiring different levels of retrofit. In other instances, heat networks will be the only viable or lowest cost option.

The non-domestic spark gap also depends on the cost of energy that businesses can secure for gas and electricity. Energy prices vary significantly due to a patchwork landscape of support schemes and exemptions, but also by nature of bespoke contracts for non-domestic energy customers, which are negotiated on a number of factors including consumption levels, risk appetite and demand profiles.

43 DESNZ (2026), Boiler Upgrade Scheme Eligibility Criteria

44 Based on Energy UK analysis of Cornwall Insight data and forecasts

45 Department for Energy Security and Net Zero (2026), International non-domestic energy prices; Energy UK and CBI analysis. Note: Average difference to the median across 2023 and 2024.

46 Energy UK and CBI (2026), Cutting business energy costs – a blueprint to boost growth

In addition to facing greater operating costs due to high electricity prices, some clean heat systems can be expensive (both the equipment and installation), creating significant upfront capital costs.

The required electricity price for non-domestic buildings will depend on whether companies need the operating costs of a new clean heating technology to be equal to or lower than the current gas system (to pay back the higher upfront capital needed to install the clean energy system). Some businesses will have access to capital expenditure (CapEx) for new heating systems so will only require operating costs to be the same as gas systems, whereas others will need a payback through lower energy bills to justify the investment.

We have considered a range of heat pump technologies put in both efficient and inefficient buildings to assess the operational and CapEx support needed for clean heat adoption in different non-domestic buildings.

There are also two key non-financial barriers to the uptake of non-domestic clean heat:

1) Lack of policy certainty and regulation
In the non-domestic sector, there are no formal targets to drive the uptake of clean heat. In contrast, the domestic sector benefits from the £15 billion Warm Homes Plan (WHP), which includes regulatory mechanisms, such as Minimum Energy Efficiency Standards (MEES) requiring rental properties to reach EPC C by 2030 and has the Clean Heat Market Mechanism (CHMM).

The Future Building Standard should drive uptake in new non-domestic buildings as they will be required to deploy clean heat technologies and will not be allowed to use gas boilers. However, non-domestic MEES are unlikely to drive much retrofit activity as the regulations only apply to larger buildings and include a maximum seven-year payback period, which most clean heat technologies would fail to meet under current policies.[47]

The withdrawal of further funding for the Public Sector Decarbonisation Scheme has also had a significant negative impact on the installation of heat pumps in the non-domestic sector.

2) Landlord/tenant issues
Another issue for the non-domestic sector is the split incentives between landlords and tenants and different ways the capital cost and operating costs fall between them depending on the commercial arrangements. The landlord may need to fund the heat pump installation, while tenants receive most of the benefit through lower energy costs and improved comfort. Conversely, where energy is recharged through a service charge, tenants may question why they should contribute to capital works that increase the landlord's asset value.

As well as this overall economic split incentive there are wider landlord/tenant issues that can be a barrier:

- Disruption – retrofitting may require access to occupied spaces, ceiling voids, risers, roofs and plant rooms.
- Phased refurbishment – different tenants may refurbish at different times, making a coordinated whole-building strategy difficult.
- Different lease lengths – tenants with short leases may be reluctant to contribute to measures with a long payback period.

47 MEES regulations will require commercial rented buildings to reach EPC B by 2031 but will only apply to those above 1,000m2 and only require landlords to install measures with a seven-year pay-back period. DESNZ and DBIST (2026), Minimum Energy Efficiency Standards (MEES) in the non-domestic Private Rented Sector: interim response

Policy changes required

To increase the uptake of clean heat, actions need to be taken to cut the electricity prices, reduce upfront capital costs, and tackle non-financial barriers.

Cut electricity prices

Government needs to remove Renewables Obligation (RO) and Feed-in Tariff (FiT) costs from the electricity bills of all businesses by moving these into general taxation or creating an energy transition funding scheme, as outlined in the previous section. In total, this would cost an average of £4.8 billion annually until 2031, but will decline over the 2030s as the legacy schemes run down.[48] It also needs to abolish the portion of the Climate Change Levy charged on electricity, which would cost the Exchequer an average of £632 million per annum between FY2027/28 and FY2030/31.[49] As a result, across different business archetypes, electricity costs would fall by 12%-20%, and total energy costs would drop by 7%-20%.[50]

Alongside this, Government should offer targeted operational expenditure discounts to incentivise electrification. The scheme should focus on larger businesses that can easily access finance to fund investment but need support with electricity costs to enable them to achieve a 10% return on capital costs through energy bill savings.

There also need to be reforms to non-domestic network charges to better incentivise flexible electricity use, providing added cost savings to businesses who are able to shift when they use their heat pumps (beyond the wholesale market revenue benefit they may get if they are on a smart tariff or contract with wholesale price pass-through).

Reducing upfront capital costs

The Government should launch the Business Energy Upgrade scheme for SMEs to provide technical advice, as well as provide access to grants and low-cost finance for the installation of clean heat and other low-carbon technologies. As part of this, there would be a change to the BUS so it is extended to air-to-air (A2A) heat pumps for businesses and is equivalent to 50% of the CapEx required, regardless of the size of the heat pump.[51]

There also needs to be a re-introduction of the Enhanced Capital Allowance (ECA) scheme to support the uptake of low-carbon, highly efficient equipment. The ECA scheme was introduced to the UK in the early 2000s to incentivise businesses to adopt energy-saving and water efficient plant and machinery, with equipment (outlined in an Energy Technology List) eligible for 100% first-year tax relief. The Government ended this scheme in 2020. While businesses can still deploy the Annual Investment Allowance (AIA), where they can claim the full cost of plant and machinery from their profits before tax, eligible equipment does not have to be low-carbon or energy-saving, so the scheme essentially supports continued usage of fossil fuel technologies in UK buildings. This places even more pressure on the need for return on investment when it comes to low-carbon equipment.

48 Energy UK & CBI (2026), Cutting business energy costs: A blueprint to boost growth

49 Energy UK & CBI (2026), Cutting business energy costs: A blueprint to boost growth

50 Based on Energy UK analysis of Cornwall Insight data and forecasts.

51 Currently the BUS only supports the installation of air-to-water (£7,500) and water-to-water (£9,000) technologies up to 45 kWth but not A2A for businesses and support is capped. We propose that in the future, businesses could access a grant equal to current levels of support or 50% of the CapEx required (whichever is higher) and the scheme is broadened to A2A.

Tackle non-financial barriers

Provide policy certainty

The Government should set out an ambitious strategy for non-domestic electrification and outline their proposed interventions to accompany domestic policies outlined in the Warm Homes Plan. This is needed to provide the necessary certainty to support investment decisions by businesses and for the development of the non-domestic clean heat supply chain.

To drive the retrofit of non-domestic buildings, the Government should tighten non-domestic MEES, extending it to buildings above 100m² and increase the payback period threshold to 10 years.

Strengthening MEES will be key to ensuring landlords invest in clean heating technology. However, to enable the delivery of this greater ambition without placing too heavy a burden on landlords of smaller properties, those renting premises that are below 1,000m² of floor space should be able to access advice and low-cost loans through the Business Energy Upgrade scheme. This support should be limited to smaller property companies and private individuals.

How policy proposals address the spark gap and CapEx challenges

The policy proposals outlined above meaningfully cut electricity prices for all businesses and somewhat reduce the necessary upfront investment, making clean heat adoption more financially attractive. However, whether this is sufficient to incentivise businesses to switch will be partly dependent on how they view return on their investment. If they are simply looking to achieve heating cost parity with their existing gas boiler, then in some cases moving RO and FiT costs to taxation and abolishing the electricity CCL will be sufficient. However, if they consider total cost of ownership and aim to achieve a reasonable payback on the upfront investment, such as 10 years, then ECAs and substantial targeted electricity price discounts are required to drive adoption. This is demonstrated in the examples below.

The case for retrofitting the buildings with heat pumps under current electricity costs was also considered with the policy proposals outlined above. Overall A2A heat pumps in small, efficient buildings perform best, and air-to-water (A2W) heat pumps installed in a large, inefficient building would require the most government support to incentivise adoption.

Figure 8 shows that, under current prices, small buildings installing A2A heat pumps already benefit from operational savings (£475 a year with policy costs on bill, £590 a year if they are removed) compared to their current gas boiler running costs. However, the savings are too low to cover capital costs over seven years. If the business is provided with a grant and ECA on top of policy costs off the bill and they are able to pay back the investment over 10 years as per the proposals outlined in this report, they could benefit from annual savings of £355.

Figure 8: Annual heating costs under gas boiler vs A2A heat pump with and without apportioned CapEx, before and after policy proposals in a small, energy-efficient building

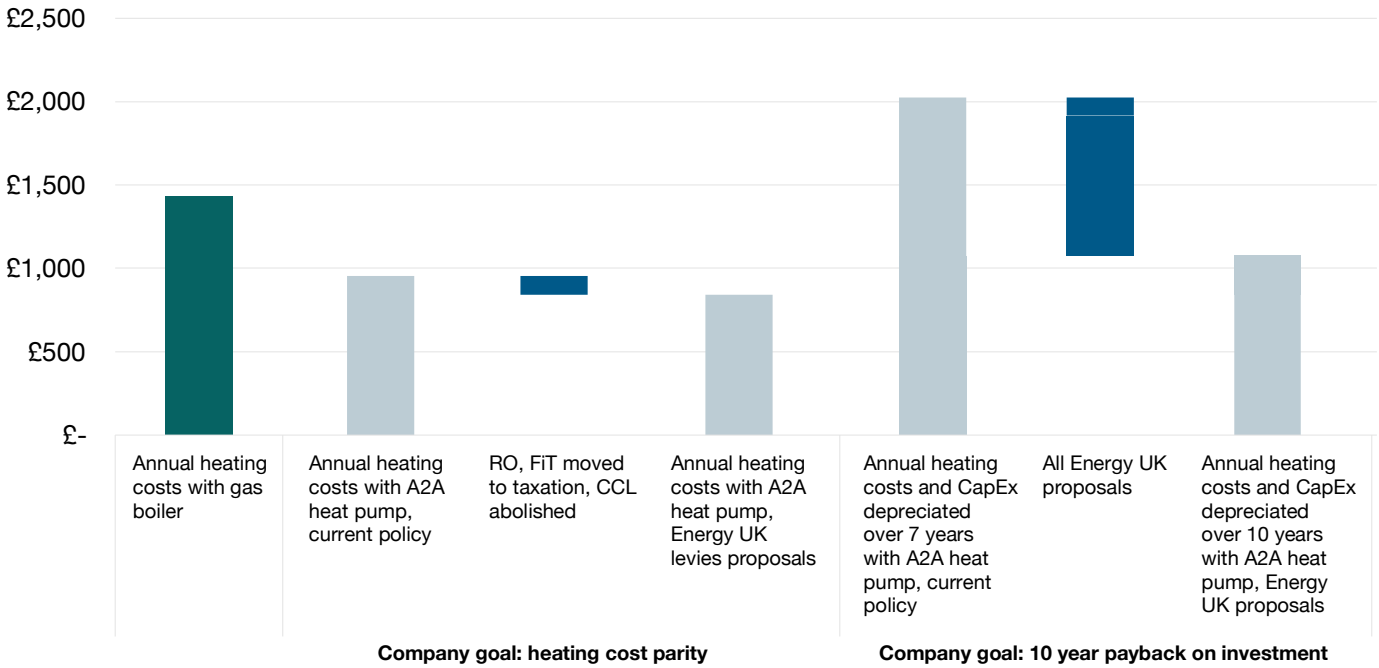


Figure 9: Annual heating costs under gas boiler vs A2A heat pump with and without apportioned CapEx, before and after policy proposals in a large, energy-efficient building

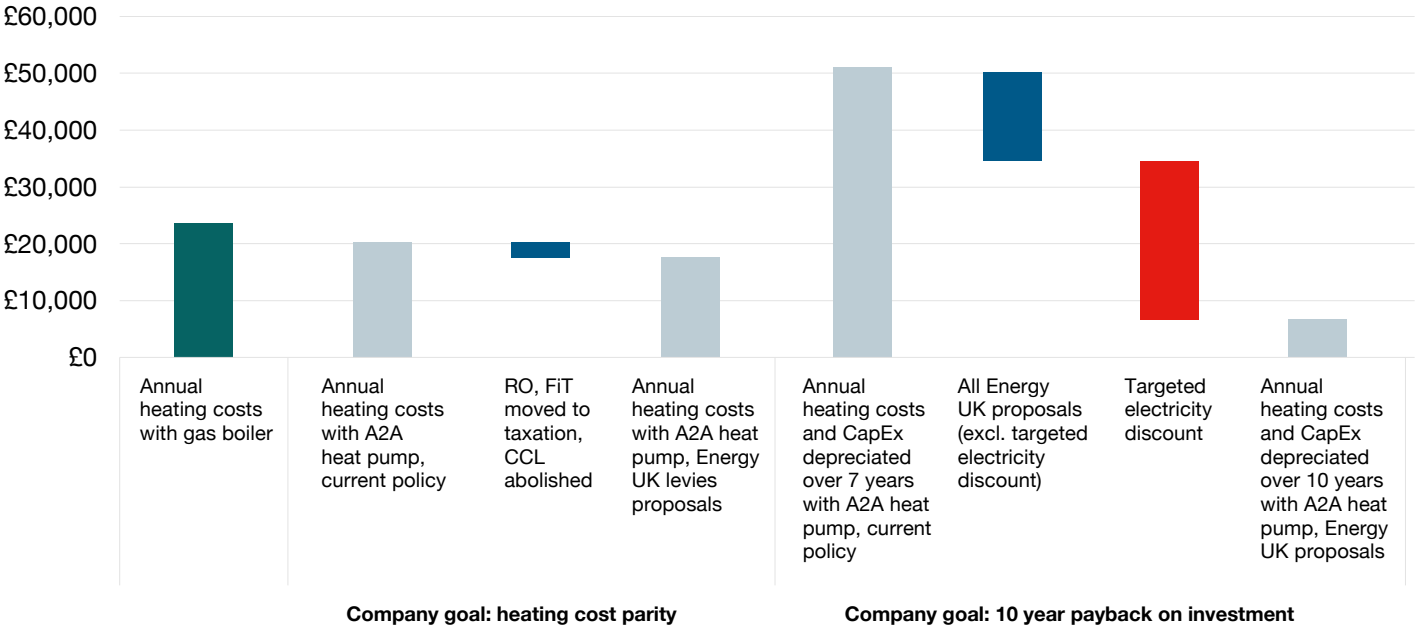


Figure 9 shows that, on an operational basis, an A2A heat pump in a larger building can also reap substantial savings for businesses (£2,650 with policy costs, £6,050 without policy costs). Under this scenario, taking policy costs off the bill would achieve a spark gap of 3.4:1 instead of 4.2:1 now. However, even with changes such as the removal of policy costs from bills and reintroduction of the ECA reducing the effective capital costs, electricity costs remain too high to pay back the capital costs over seven years. This is because larger buildings face disproportionate capital costs (as the installation becomes more complex) compared to small buildings and they would not benefit from a grant.

To enable the capital investment to be paid back over 10 years (achieve a 10% return on investment (ROI)) compared to a gas boiler, in addition to policy costs being removed and the ECA reintroduced, there would need to be further support to reduce electricity costs by £28,000 a year through a targeted electricity discount.

Figure 10 shows that, on an operational basis, an A2W heat pump in a large building is more expensive than a gas boiler by about £6,500, while moving RO and FiT off electricity bills and ending the electricity CCL would result in a small annual saving of £500. The spark gap would be lowered to 3.3:1 from 4.2:1.

However, policy changes such as the removal of policy costs from bills and reintroduction of the ECA are not enough to pay back the capital costs over 10 years, even for the most affordable heat pump.

To make a 10% ROI from bill savings compared to existing costs of running a gas boiler there would then need to be further support to reduce electricity costs by about £28,700 a year through a targeted electricity discount.

Figure 10: Annual heating costs under gas boiler vs A2W heat pump with and without apportioned CapEx, before and after policy proposals in a large, energy-efficient building

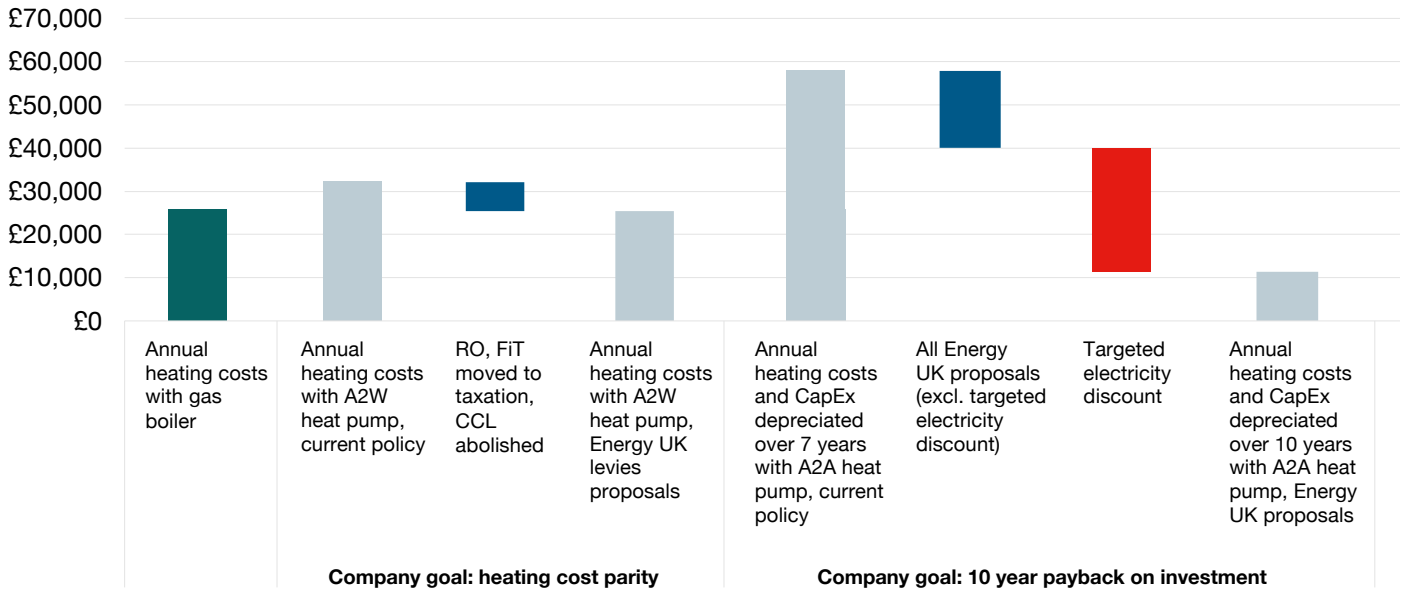
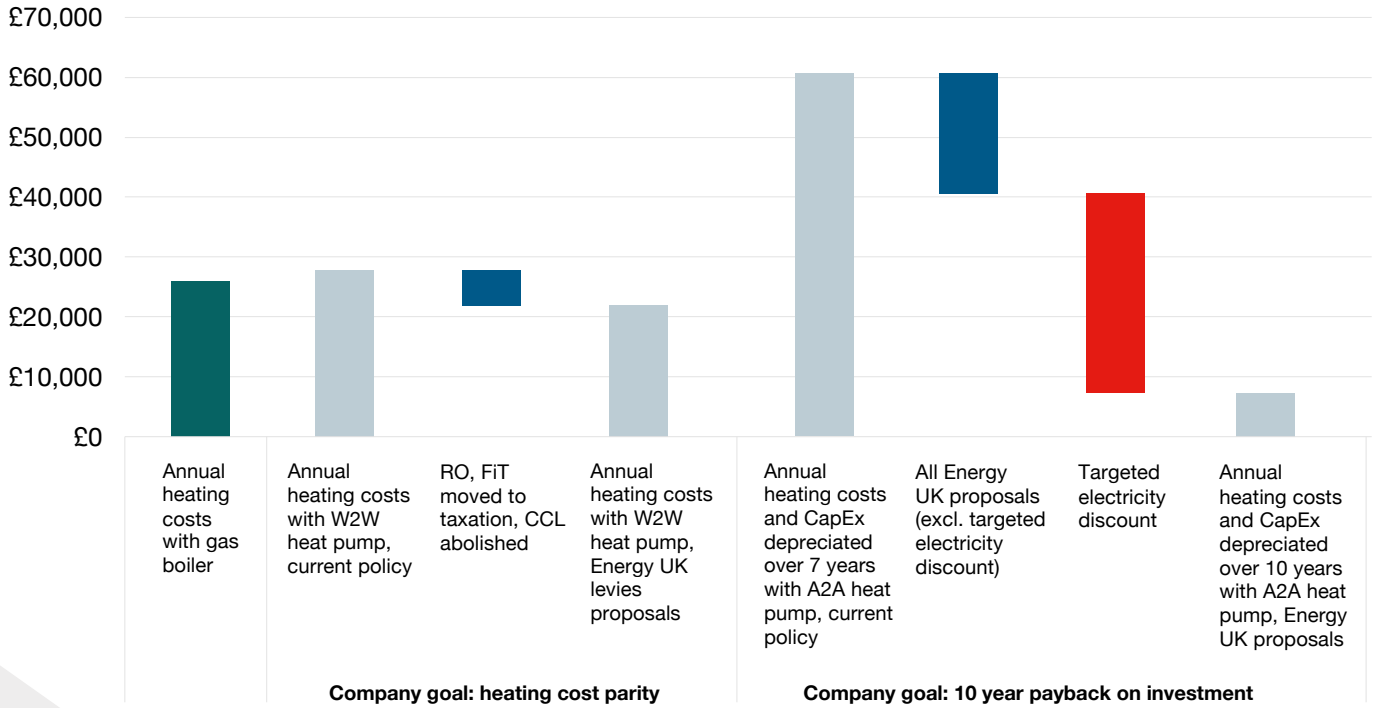


Figure 11 focuses on an inefficient building. This building type makes the case for heat pumps even harder due to higher capital costs and a lower seasonal coefficient of performance. Without policy changes, the heat pump would not save money in terms of running costs. Policy costs off the bill would save £4,000 a year, and the spark gap would lower to 3.3:1 compared to 4.2:1. However, due to higher CapEx costs, even when reduced by the reintroduction of ECA, there would need to be a reduction of around £33,300 a year in electricity cost through the targeted electricity discount support in order to pay back capital costs over 10 years and make a 10% ROI compared to a gas boiler.

Figure 11: Annual heating costs under gas boiler vs W2W heat pump with and without apportioned CapEx, before and after policy proposals in a large, energy-inefficient building

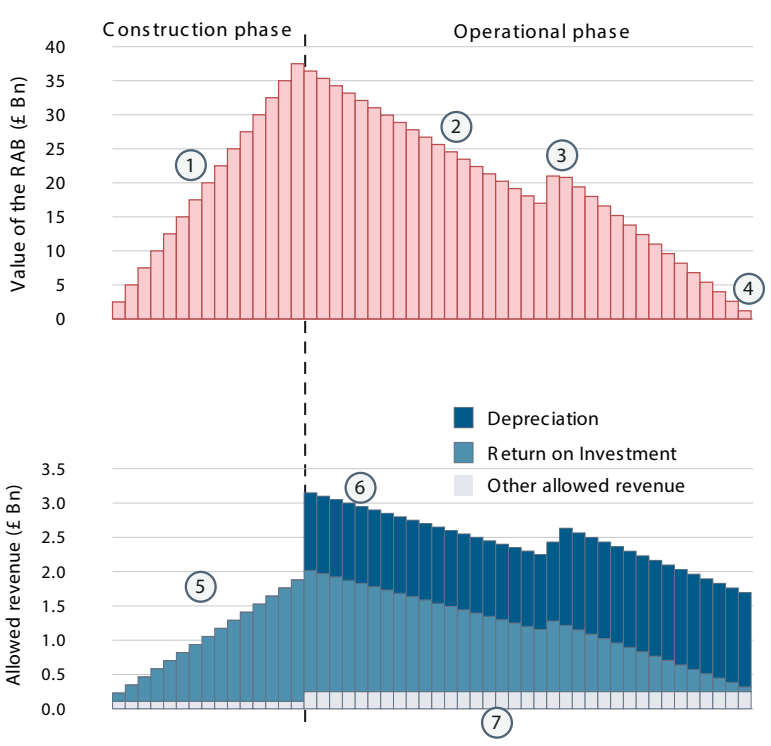


Appendix 1: Domestic

Appendix figure 1: Impact of policies on unit rates for gas and electricity

	Baseline	Policy costs off electricity	Policy costs off electricity and move gas standing charge to unit rate
Electricity rate (£/kWh)	£0.236	£0.209	£0.209
Gas rate (£/kWh)	£0.058	£0.058	£0.070
Ratio	4.04	3.58	3.01

Appendix figure 2: Projected cost of nuclear RAB distributed across energy bills[52]



1. The value of the RAB increases during the construction phase reflecting capital investment in the project.
2. The RAB decreases during the operational phase reflecting depreciation.
3. Additional capital investment, such as the refurbishing of equipment to extend its operational life, can be added to the RAB during the operational phase.
4. Depreciation reduces the RAB to zero by the end of the economic lifetime of the project.
5. Investors begin receiving a return on investment during the construction phase based on the size of the RAB and the initial weighted cost of capital.
6. During the operational phase investors recover their initial investment in line with a depreciation profile.
7. The allowed revenue also covers operating costs, contributions to the decommissioning fund, several other categories of cost, and adjustments to reflect any incentive schemes.

52 Consumer Scotland (2024), Public information note on nuclear RAB and Sizewell C

Appendix 2: Case studies of domestic and non-domestic clean heat solutions

1. Transforming retrofit in housing

Decarbonising the UK's social housing stock presents a significant challenge for housing associations, particularly where homes have ageing heating systems and existing infrastructure. A pioneering partnership between Mitsubishi Electric and social housing provider Sovereign Network Group (SNG) is demonstrating how innovative heat pump technology can help overcome these barriers.

SNG, which manages more than 84,000 homes for around 210,000 customers across London and southern England, piloted Mitsubishi Electric's Ecodan R290 high-temperature air source heat pumps as part of its wider retrofit programme. The approach is particularly significant for properties with existing microbore or small-bore pipework, which has traditionally presented challenges when installing heat pumps.

Using Ecodan R290 technology can allow existing radiators and pipework to be retained, reducing the need for extensive alterations and helping minimise disruption for residents. SNG reports that installations can take as little as just two days, around 40% quicker than a low-temperature air source heat pump installation.

The R290 system also uses natural R290 refrigerant, with a very low global warming potential, which can provide flow temperatures of up to 75°C, supporting its use in retrofit applications.

Importantly, SNG's strategy combines heating upgrades with a fabric-first approach, including insulation and airtightness improvements. This helps balance carbon reduction, energy efficiency, installation costs and resident comfort.

The partnership illustrates how retaining existing infrastructure, combined with high-temperature heat pump technology, can provide a practical pathway for large-scale social housing decarbonisation.

Read the retrofitting case study in full

2. Different heating technologies for office buildings

Exchange Quay, Manchester

Two similar buildings at Exchange Quay, Manchester, one of the largest office campuses in the North-West, were refurbished using different Mitsubishi Electric technologies. The main factor influencing the choice of technology was whether each building remained occupied during the refurbishment.

The first building, No.8, is a 10-storey office block that remained fully operational throughout the project. A cascaded A2W heat pump system was selected to replace the existing gas heating with minimal disruption to tenants. The system is made up of 12

Mitsubishi Electric CAHV-P500YB-HPB heat pumps, each providing 40kW of heating capacity. It now supplies both space heating and hot water, helping the building achieve an EPC rating of B.

Read the Building No.8 case study in full

In contrast, a different building in the area, Building No.7, was vacant during its refurbishment, allowing for a more extensive upgrade. The building's four-pipe fan coil chiller system was replaced with a City Multi VRF air conditioning system. Unlike A2W heat pumps, A2A systems require a dedicated ventilation and air distribution network, so installation is more disruptive in occupied buildings. The new system simultaneously heats and cools by recovering waste heat from areas requiring cooling and transferring it to spaces that need heat, significantly improving energy efficiency and helping to raise the building's EPC rating from C to A.

While both projects achieved improvements in energy performance, decarbonisation requires selecting the technology best suited to a building's specific circumstances rather than applying a one-size-fits-all approach.

Read the Building No.7 case study in full

3. Clean heating solutions for older, public estates

The Public Sector Decarbonisation Scheme (which has now closed for new entrants) has supported Salford City Council's estate with capital costs across its public sector buildings, upgrading more than 30 public buildings to lower their emissions.

Salford Civic Centre Heating Upgrade

The project involved replacing the building's ageing gas-fired heating and hot water systems with a modern air source heat pump solution as part of Salford City Council's wider programme to decarbonise its public estate. The old gas-fired heating plant and the gas-fired water heater were replaced with 11 Mitsubishi Electric CAHV air source heat pumps. Modular heat pumps automatically stage their output to match the building's heating demand, resulting in improved energy efficiency.

The Salford Civic Centre project demonstrates how a large, historic public building can be successfully decarbonised by replacing ageing gas boilers with air source heat pumps while retaining much of the existing heating distribution system. As a historic building, the installation of clean heating solutions shows that decarbonisation can be successful while still preserving the original features of the building.

Read the Salford Civic Centre case study in full

Salford Sports Village

Salford Sports Village installed four Mitsubishi Electric Ecodan CAHV-P500 air source heat pumps to replace its existing gas-fired heating system as part of a wider programme to reduce carbon emissions and improve energy efficiency.

The units were installed at the rear of the building, extracting heat from the outside air and upgrading it to deliver heating around the

building. The sports village required a system capable of providing both space heating and hot water for a busy leisure facility.

The system provides a robust solution for large commercial buildings with varying heating demands, reducing electricity consumption by producing only the heat required at any given time while maintaining occupant comfort.

Read the Salford Sports Village case study in full

4. Connecting non-domestic buildings to heat networks

Non-domestic buildings can benefit from connecting to a low-carbon heat network because it allows them to decarbonise heating without installing individual heat generation equipment on site. Heat networks can also connect a mix of new and existing buildings, allowing different building types to share the same low-carbon heat source.

Vital Energi – Queens Quay, Clydebank

An example of this is West Dunbartonshire Council's district heat network in Clydebank, Scotland's first major Water Source Heat Pump (WSHP), which uses water source heat pumps to extract heat from the nearby River Clyde, and pumps it to buildings through a network of buried pipes.

The network currently supplies heat to around 200 homes alongside several existing non-domestic buildings, including Clydebank Town Hall, Clydebank College, Clydebank Leisure Centre, the Titan Enterprise Business Centre and Aurora House council offices.

A single low-carbon energy source can provide heat to a diverse range of buildings while allowing the central plant to be optimised for demand. Two 2.65MW WSHPs were installed so that one unit can continue operating while the other undergoes maintenance during periods of low demand, improving resilience across the network.

Connecting existing commercial buildings to a heat network does, however, present challenges. Older buildings were often designed to operate with higher flow and return temperatures than modern low-temperature heat networks. While the WSHPs

can provide these higher temperatures if required, doing so reduces their efficiency. To address this, Vital Energi is retrofitting the existing buildings by modifying heating controls and, where necessary, upgrading heat emitters such as radiators. By doing this and enabling a site-wide uniform flow and return temperature, the heat pumps will have a higher coefficient of performance, making the overall system more efficient.

Because the WSHP is reliant on a tidal, saltwater river, Vital Energi also had to consider local environment requirements, such as average water temperature, seasonal water temperature, flow rates, and local wildlife. Vital Energi worked closely with Scottish Environment Protection Agency to ensure that the system would not damage the river's ecology.

Read the Queens Quay case study in full

Queen Mary University of London – Data Centre District Heating Project

Queen Mary University of London demonstrates how connecting a non-domestic building to a district heating network can make sense due to the needs of the building. As part of a wider programme to modernise its on-campus data centre, the University worked with Schneider Electric and Advanced Power Technology to transform its ageing infrastructure, identifying an opportunity to recover waste heat generated by its servers and use it to provide heating and hot water across its estate.

Before the upgrades, the University's data centre was experiencing reliability, scalability and availability issues. Ageing infrastructure and inefficient cooling systems resulted in excessive heat build-up within server racks, affecting operational performance and increasing the need for manual on-site maintenance. It also impacted the University's future research ability.

The data centre was near the local district heating system, so installing a heat recovery mechanism enabled Queen Mary to transfer waste heat and reuse it directly for heating and hot water across various buildings, including student accommodation.

By making productive use of waste heat that would otherwise have been lost, the University has reduced the amount of energy required to heat its buildings. The new energy-efficient data centre has provided the University with increased resiliency and processing power for its on-premises, large-scale research and intensive computing applications, helping it to provision for future expansion.

For further information, visit Schneider Electric

Appendix 3: Different clean heat and low-carbon technologies used in non-domestic buildings

Several types of heat pumps are available on the market, and selecting the right technology for a commercial building is dependent on several factors, such as:

- Volume and temperature requirements
- Hot water usage profile throughout the day
- Whether air conditioning is required
- Building fabric
- Location of building (e.g. whether it has access to water sources for water-based heating systems)

With the growth of high temperature heat pumps, which can heat hot water up to 90°C degrees, heat pumps can be used in commercial buildings with high peak demand (e.g. hotels, hospitals, leisure centres), without the need for reliance on a gas boiler. Combining a heat pump with other low-carbon technologies, such as solar, can also reduce the energy required from the grid to power the building. The case studies outlined in **Appendix 2** (page 27) demonstrate that the technology type is influenced by a range of factors in addition to the technical requirements.

The following technologies may be suitable for different existing non-domestic buildings:

A2W heat pump providing heating only
This technology uses warmth from the outside to heat buildings and their hot water supply. They work by transferring heat from the outdoor air to a refrigerant, which is compressed to increase its temperature. The heated refrigerant then transfers this heat to water and circulates it through the building's central heating system, supplying radiators, underfloor heating, and a hot water cylinder. A2W heat pumps are typically used in schools, apartment developments, healthcare buildings, leisure facilities, hotels and larger offices with central heating. They can replace or supplement boilers while retaining the building's water-based heating system, and are relatively straightforward to install.

A2A heat pump that also provides cooling
An A2A heat pump is a heating and cooling system that uses heat from the outside air to regulate the temperature inside a building. Unlike more familiar heating systems which use radiators or underfloor heating (such as air-to-water), A2A control the temperature through air vents. During winter, the heat pump extracts heat from the outside air and, even when temperatures are low, transfers it indoors to warm the building via a refrigerant liquid that is turned into a compressed gas to increase its temperature. During summer, the process is reversed, removing heat from inside the building and releasing it outdoors to provide cooling.

A2A heat pumps are most suitable for buildings where heating and cooling demands are lower, such as offices and hotels. Its simpler controls require less maintenance. Once installed, they are more likely to be cost effective, although refrigerant losses need to be monitored. However, it is worth noting that a separate system is required for hot water.

Water-to-water source heat pump
A water-to-water (W2W) heat pump uses heat energy from a direct water source to heat the building and its hot water supply. While finding the required water source can be a challenge, W2W heat pumps extract energy from water, turning it into heat.

If air source heat pumps are not suitable, W2W heat pumps can be a useful, alternative solution - for example, if there is limited roof space, sound restrictions, or simultaneous heating and cooling requirements. Water temperatures are generally more stable than outdoor air temperatures throughout the year, making them energy-efficient solutions. Some W2W heat pumps can also provide cooling by transferring heat from the building back into the water source.

These solutions are most suitable for larger buildings, campuses and developments with long, planned operational timeframes, such as hospitals, universities, centres and mixed-use developments. W2W heat pumps can also be used to heat district heat networks.

Connected to heat network
Heat networks (also known as district heating) supply heat from a central source to connected buildings via a network of underground pipes carrying hot water. Some modern heat networks can also provide cooling, allowing connected buildings to meet both heating and cooling demands through the same network. Heat networks can be an option, and in some cases might be the only viable option (for example due to heat network zoning regulations, or space constraints), for businesses to access low-carbon heating.

This includes a large range of systems, varying in size and design:

- Residential schemes, such as a single boiler in the basement of a block of flats providing heat to its residents.
- Large, district-wide schemes that stretch across city centres and connect to multiple buildings of different tenures, such as office blocks and hospitals.
- Shared ground loop systems that connect properties with their own individual heat pumps to a system of bore hole infrastructure, harvesting waste heat from the ground. The individual heat pumps can be specially designed small internal units that make this type of system viable for both space-constrained high-rise buildings, and those in low-density areas with larger outdoor heat pumps.

The central heat source can be supplied by a variety of technologies, including gas boilers, combined heat and power (CHP), large-scale heat pumps, geothermal energy, industrial waste heat, and energy-from-waste plants.

For more information on the benefits of these technologies, read Energy UK's 'Better Connected: Unlocking heat network potential'.

Scan to read the report

Connected to heat network that also provides cooling
District heating networks can operate at a range of temperatures to suit different applications. They are often referred to as first-to fifth-generation heat networks.

First- and second-generation networks operate at high temperatures using steam or high-temperature hot water and are still used extensively in industrial sites, but are not frequently used in town and city scale heat networks in the UK.

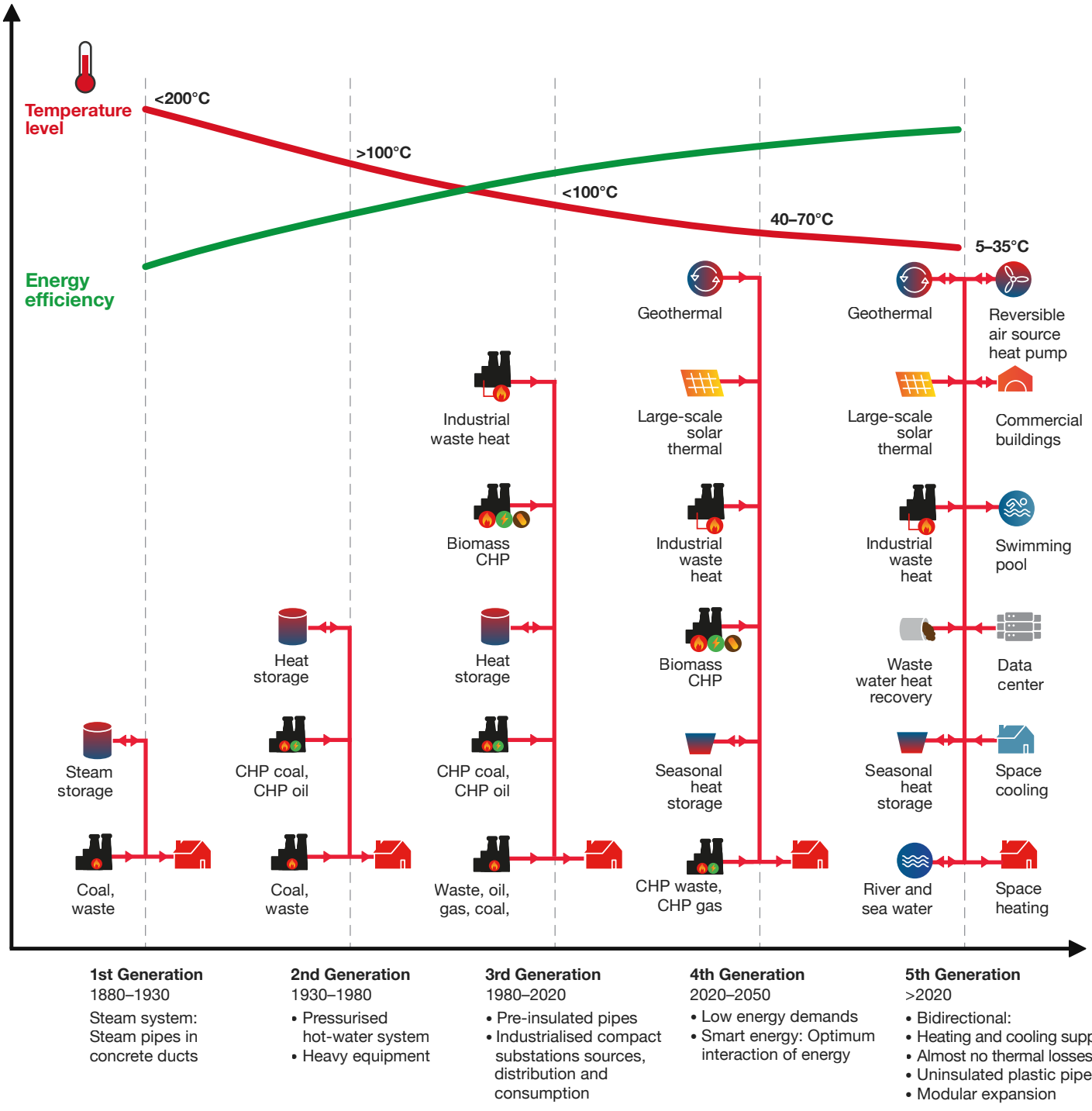
Third-generation networks, introduced in the 1970s, use lower-temperature hot water (typically 70–95°C) distributed through insulated pipes and are in use in the UK today.

Fourth-generation networks operate at even lower temperatures (typically 65–75°C), still at a high enough temperature to provide space heating and domestic hot water without the requirement for local boosting, reducing heat losses and improving compatibility with renewable and recovered heat sources such

as large heat pumps, geothermal energy and waste heat.

Fifth-generation networks distribute water at much lower temperatures (typically 10–30°C). Buildings connect to the network that is supplied by heat pumps (for heating) or chillers (for cooling), or reversible heat pumps (for both). These networks can share energy heat between buildings, which can be efficient if buildings have simultaneous heating and cooling demands.

Appendix figure 3: Visualisation of the evolution of district heating and cooling networks, from the first to the fifth generation of DHC networks.[53]



53 Energy and Buildings (2020), Quantifying Demand Balancing in Bidirectional Low Temperature Networks

Appendix 4: Calculating the spark gap for different non-domestic applications

General assumptions

The model does not consider the option of increasing gas prices but only considers a decrease of the electricity price required.

We use 2025/2026 electricity and gas prices for a typical large and small business including all non-commodity costs, and we assume the electricity standing charge only includes fixed network costs, therefore, the unit cost could be higher in practice. In reality, electricity prices will vary significantly between different businesses depending on their size, profile of their electricity use and connection size.

Electricity network connection costs are not included in the CapEx estimates as it is assumed that the installation will not require a larger capacity. However this may not be true for buildings that do not have air conditioning. We assume that the gas standing charge is removed once the company installs the heat pump, but this may remain if gas is needed for other purposes than heating. This would reduce the attractiveness of the heat pump and reduce the required spark gap even further.

We have assumed a 10kW peak heating requirement for a 'small' building and 200kW for a 'large building'. These figures are estimated assuming a likely space heating load of approximatively 50 watts/m^2 for a 200 m^2 building (small) and 4,000m^2 building (large). We use 21MWh for the space heating gas demand of a small building, and 486MWh for space heating gas demand of a large building.

We have taken the peak heating demand in kW and multiplied this by 2,066, in line with BS EN 14825 European standards, to estimate the total number of kWh of heat delivered into a building each year.[54] This standard specifies how the seasonal efficiency of heat pumps (amongst other technologies) is calculated. Although it ensures that performance is assessed under realistic seasons conditions, it does not fully account for local weather or building performance.

We ignore maintenance costs as they should be similar across all technologies, including gas boilers.

The capital costs are made up of the cost of the equipment as well as the design and installation costs. There are large variations in design and installation costs for different projects. We estimate the design costs are a function of the equipment costs: for small buildings, the design and installation cost for A2W and A2A heat pumps will be multiplied by two, and by four for the W2W heat pump.

For large buildings, the design and installation costs for A2W and A2A heat pump will be multiplied by 1.2. This is to account for the economies of scale resulting from designing and installing systems in larger buildings.

54 BS EN 14825 (2022): Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling, commercial and process cooling. Testing and rating at part load conditions and calculation of seasonal performance.

We also apply an additional 10% in equipment cost for inefficient small building and a 15% in inefficient large buildings compared to energy-efficient buildings in order to capture the lower cost needed as a result of retrofit measure undertaken.

There is also an important link to the MEES regulations, which are proposed to require commercial rented buildings to reach EPC B by 2031 but will only apply to those above 1,000m² and only require landlords to install measures with a seven-year payback period.[55] We have therefore modelled the spark gap required cover the CapEx within a seven-year and 10-year payback period as well as achieve the same running costs as an existing gas system. Ten years is the maximum required payback period for most businesses given that the life of a heat pump is only around 15 to 20 years.

Choice of clean heat technology

The choice of heat pump will vary depending on the application:

Air-to-Water heat pump (A2W)
An Air-to-Water heat pump can be used for both heating and domestic hot water systems, and can replace or supplement boilers while keeping the existing water-based heating system.

They are typically used in schools, apartment developments, healthcare buildings, leisure facilities, hotels and larger offices with central heating. They can be helpful to decarbonise whole buildings and some models have the ability to recover waste heat from other parts of the building where simultaneous heating and cooling demands exist. They are generally relatively straightforward to install, although for older buildings may stil result in disruption to occupants as the heating systems, such as radiators and piping, will require upgrading.

They combine a lot of different elements with Building Management System (BMS), so it can be harder for the different sections to pinpoint where a problem lies when it goes wrong. The seasonal coefficient of performance (SCOP) used for an A2W heat pump installed in a large efficient building for space heating is 3.25.

Air-to-Air heat pumps (A2A)
These can be designed for individual split systems for single rooms, multi-split systems for multiple rooms or larger Variable Refrigerant Flow (VRF) systems covering whole buildings. Some VRF systems also have the ability to recover waste heat when simultaneous heating and cooling demands exist. These application flexibilities coupled with A2A's ability to provide both heating and cooling make them a popular choice in non-domestic buildings such as retail, hotels and offices.

As these are packaged systems which encompass both the heating/cooling and air distribution components, they are usually the most cost effective and energy-efficient solution. However, they cannot easily integrate with existing water heating systems, so a separate system is often required for hot water.

This is often why the option of using a high temperature A2W system and keeping the existing heating system infrastructure is attractive even though it delivers lower efficiency than a retrofitted A2W system or

55 DESNZ and DBIST (2026), Minimum Energy Efficiency Standards (MEES) in the non-domestic Private Rented Sector: interim response

an A2A system. The seasonal coefficient of performance (SCOP) used for an A2A heat pump installed in both small and large buildings for space heating is 4.7.

Water-to-Water heat pumps (W2W)
These can be used when the air source heat pumps outlined above cannot be used. W2W heat pumps require a direct water source to provide a heating solution. They will be used instead of A2W when a suitable source of energy can be accessed (river, borehole or aquifer).

Although finding a suitable water source can be a challenge, W2W solutions can be a useful option in instances where there is a dependable source of water or waste heat, limited roof space, sound restrictions, or substantial simultaneous heating and cooling needs.

These units can be installed in the basement and can recover heat across the whole building. These systems are most suitable for larger buildings, campuses and building developments with long expected operating life. Typical applications include major offices, hospitals, universities, data centres and mixed-use developments. The seasonal coefficient of performance (SCOP) used for a W2W heat pump installed in a large inefficient building for space heating is 3.76.

However, in some cases a heat pump will not be technically suitable for a business or a connection to a heat network may be more cost competitive.

Heat networks
Heat networks can supply a wide range of buildings and can provide both heating and, in some cases, cooling. The Government's Warm Homes Plan recognises that heat networks will offer the lowest cost form of clean heat to more than 50% of the UK's largest towns and cities and are likely to supply almost 20% of the UK's heating demand by 2050 (up from around 3% today).[56]

Analysis conducted for the Heat Network Industry Council (HeatNIC) shows that networks can deliver 17% lower bills for large non-domestic buildings in densely populated urban areas compared to in-building air source heat pumps (assuming no subsidy support for the heat network, and pre-industry cost reductions for capital and operational costs).[57]

For a small building, we looked at an A2W and A2A heat pump replacing a gas boiler used for heating. These are the two most prevalent heat pump technologies for small buildings due to the combination of higher efficiency and usually low levels of disruption in the building. The range of heat pump technologies suitable for larger buildings is wider so we have also modelled W2W systems for them.

56 Department for Energy Security and Net Zero (2026), Warm Homes Plan

57 Energy UK and HeatNIC (2026), Heat Networks Driving local growth through a new economic model

Modelling building efficiency

Lower operating costs can be achieved if the energy efficiency of the building is increased and the wet system (the network of pipes and radiators or underfloor heating that use circulating water to warm a building) is replaced as part of a retrofit. Therefore, we have also considered whether or not the building is already efficient prior to the installation of the heat pump and what impact it has on the product's efficiency.

The difference between efficient and inefficient buildings is based upon the assumption that heat pumps will need to deliver water at a higher temperature in the inefficient building (65˚C in the inefficient building, versus 55˚C in the efficient building). However, A2A heat pumps have the same efficiency regardless of the efficiency of the building. Installation of heat pumps in inefficient buildings will also involve higher capital costs due to both higher equipment cost and higher design and installation cost.

Cooling

We note that although the seasonal coefficient of performance (SCOP) is the same with and without cooling, we consider that A2A heat pumps would also provide cooling as an additional benefit but have not modelled this.

The only consideration made for cooling in this study was whether a client/building would want a heating-only solution or heating and cooling solution – if they wanted heating and cooling, they would most likely choose a heat pump that could deliver both functions, which might affect its efficiency in one mode or the other (as noted above) and they would possibly be more likely to choose an A2A solution instead of an A2W or W2W.

The amount of heating a building needs when the external ambient temperature is low during the winter months is unaffected by whether that building has a cooling system installed or needs cooling during periods of warmer ambient temperature. We have not calculated the amount of cooling capacity needed for any of the buildings and have not calculated any potential energy usage required for cooling. This study is focused on delivering space heating and obtaining an ROI with various spark gaps against a gas boiler therefore we have ignored cooling load, capacity and energy usage even when the equipment has a cooling capability.

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