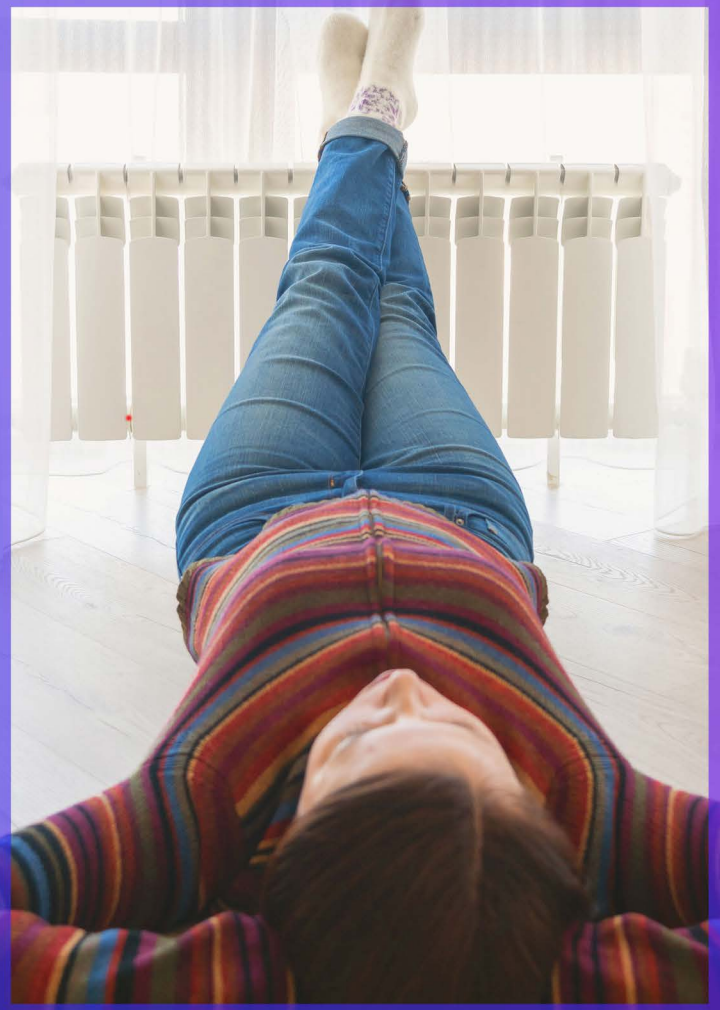
KPMG

# The heat is on

## Time for a new approach to solving the homes and buildings decarbonisation challenge



KPMG in the UK

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## Foreword

# Solving the homes and buildings decarbonisation challenge: Time for a bold new approach

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**The decarbonisation of homes and buildings is one of the most complex and most important challenges in the energy transition.**

The positive progress made in decarbonising electricity and facilitating the switch to electric vehicles will simply not be enough to meet our legally-binding carbon reduction targets and improving energy efficiency is the best way to get domestic energy bills down permanently.

There has been a stop-start approach to policymaking in this area and the UK has the least energy efficient building stock in Europe. So a step change is now needed to accelerate the uptake of low-carbon heating solutions and energy efficiency measures in the UK. It requires a fundamentally different approach to overcome the barriers to mass consumer adoption (cost, complexity and convenience), to drive more coordinated delivery, and to unlock much-needed private investment.

New institutions with clear mandates and responsibilities are needed to define, lead and coordinate action. Pioneering delivery partnerships, backed by local authorities, will be crucial to rolling out low-carbon solutions in a systematic, *place-based* way, while growing essential supply chains. Novel funding models will also be required to open new investment opportunities and attract private capital at scale in UK towns and cities.

These changes can't be achieved in isolation. It will require innovative solutions and new collaborations between policymakers, energy retailers, supply chains, financial institutions and local authorities.

As Head of KPMG's Energy and Natural Resources practice, I believe we all have a vital role to play in driving the energy transition together. This report sets out a bold delivery and funding model that has the potential to move the dial on decarbonising homes and buildings, and which lays the groundwork for the fundamental changes needed to accelerate the UK's progress towards net zero.

> "We all have a vital role to play in driving the energy transition together. It will require innovative solutions and new collaborations between policymakers, energy retailers, supply chains, financial institutions and local authorities."

# Executive summary

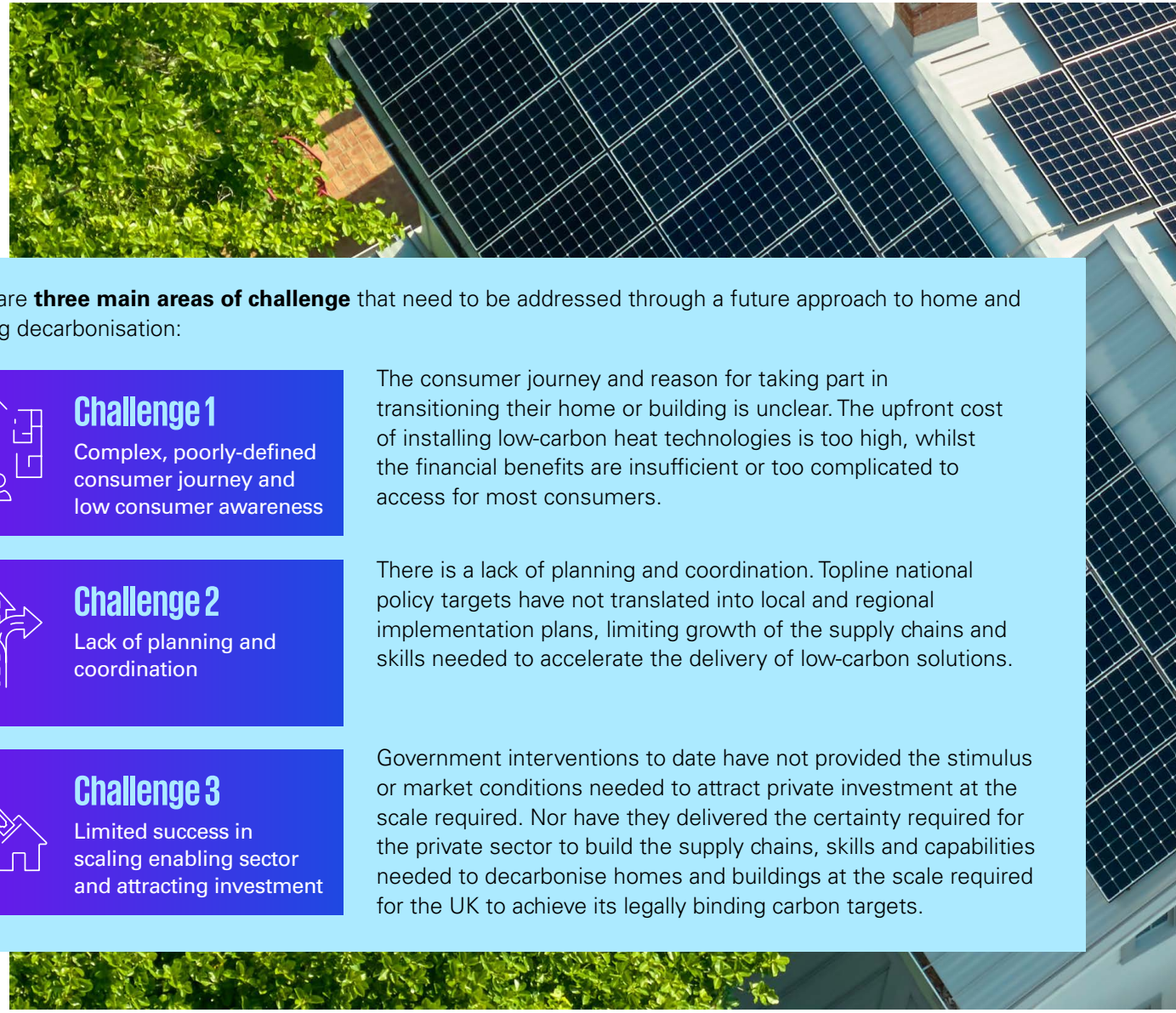
Energy use in homes and buildings makes up nearly 20% of carbon emissions in the UK, and it is also one of the most complex sectors to decarbonise. Improving the energy efficiency and decarbonising of our homes and buildings is an essential next step if we are to meet our legally-binding net zero carbon targets.

Greater energy efficiency is the best way to permanently bring down consumers' energy bills and can also reduce our dependency on imported oil and gas. But the UK starts from a position of having some of the least energy efficient buildings in Europe and therefore has much further to go to achieve the benefits of decarbonised and energy efficient homes.

**What has been attempted to date to address this challenge won't achieve the scale and pace needed and therefore a different model is required.**

Previous attempts have failed to deliver the transformation now needed. Numerous government interventions have been introduced over the last decade to promote the uptake of low-carbon heating and energy efficiency measures.

However, uptake of these measures has generally been poor, with policies lacking coherency, failing to fully engage consumers, being stop-start in nature and even if they were to meet their full potential, often targeting only a small percentage of homes and buildings.



There are **three main areas of challenge** that need to be addressed through a future approach to home and building decarbonisation:

### Challenge 1

Complex, poorly-defined consumer journey and low consumer awareness

The consumer journey and reason for taking part in transitioning their home or building is unclear. The upfront cost of installing low-carbon heat technologies is too high, whilst the financial benefits are insufficient or too complicated to access for most consumers.

### Challenge 2

Lack of planning and coordination

There is a lack of planning and coordination. Topline national policy targets have not translated into local and regional implementation plans, limiting growth of the supply chains and skills needed to accelerate the delivery of low-carbon solutions.

### Challenge 3

Limited success in scaling enabling sector and attracting investment

Government interventions to date have not provided the stimulus or market conditions needed to attract private investment at the scale required. Nor have they delivered the certainty required for the private sector to build the supply chains, skills and capabilities needed to decarbonise homes and buildings at the scale required for the UK to achieve its legally binding carbon targets.

**A new *place-based* delivery model built around consumer needs can move the dial.**

Because of the variability in local factors, such as the housing stock, grid constraints and resource availability, any future approach needs to be *place-based*, locally-led and democratically accountable through local government.

There needs to be a clear line of sight between national targets, through regional strategic energy planning and Local Area Energy Plans (LAEPs), all the way to the decarbonisation of homes and buildings for end consumers. Our proposed delivery model includes a street-by-street, area-by-area rollout programme to maximise the benefits of the 'neighbourhood effect'.

Consumers will be supported in retrofitting their homes with the low-carbon technologies recommended for them by their LAEP, which will be developed through widespread engagement local energy players such as energy networks, local businesses and community groups.

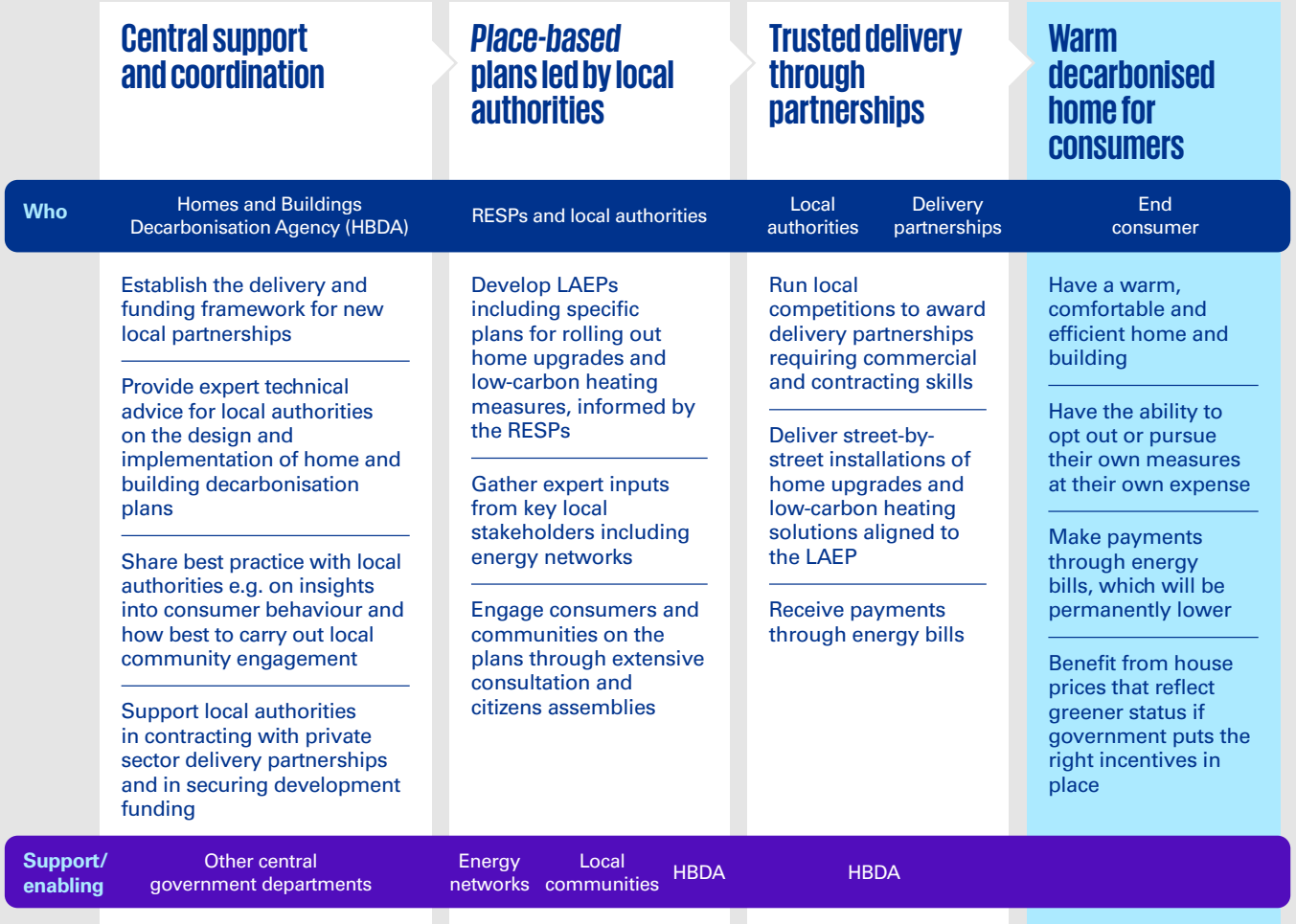
Consumers will also have the right to opt-out for those who don't wish to adopt these solutions.

To deliver the required step change, there is a clear need for central coordination and support for local authorities. So we recommend establishing a new Homes and Buildings Decarbonisation Agency, potentially building on the work of existing bodies to work with local authorities in rolling out measures to consumers.

Local authorities will select new delivery partnerships that bring together the technical expertise and financial backing to install low-carbon technologies and energy efficiency measures at pace and scale. This should be supported by national awareness campaigns to inform and educate consumers on the need for change and the benefits these changes can bring in terms of lower bills and greater comfort in the home.

This *place-based* model could also be applied to other local decarbonisation challenges such as rolling out heat networks and electric vehicle charging at scale.

Figure 1: **Proposed delivery model**



**The funding approach must remove the financial burden from consumers while delivering returns to attract private sector lenders and investors.**

The transition to net zero must be equitable. A model which allows for home decarbonisation to be delivered at no cost to the customer, funded through energy savings realised from the home decarbonisation measures will help to overcome some of the key barriers currently stalling home decarbonisation. It is vital that opting in to having measures installed in homes and buildings becomes the natural choice for end consumers.

Therefore, a robust approach to financing is essential, whereby any financial risk is borne by the delivery partnership and financial institutions.

Our proposed approach to a systematic, *place-based* and national rollout of home and building upgrades, will enable private lenders and investors to aggregate investment across a portfolio of properties, helping to attract low cost capital providers. This investment will be repaid through savings on energy bills as a result of the upgrades. Importantly, this investment will be tied to the meter, and therefore the property, rather than individual consumers.

Our analysis indicates that, based on current estimates, some initial government support (which has largely already been identified through funding commitments made by Labour and the Conservatives) will be needed to help in growing this market, even for 'able to pay' consumers, and gearing up supply chains. As efficiencies of scale and coordination are driven by industry in the longer term, commercially attractive returns for private lenders and investors will be achievable without the need for government support.

As well as initial support in the form of upfront grants to enhance the viability of new delivery partnerships, government should commence a phased transfer of the policy levies from electricity to gas over a 10 year period, to encourage the take up of low-carbon heating solutions and discourage the use of natural gas.

The government should also consider changes to the tax system which could also help to incentivise uptake through lower stamp duty or council tax rebates for those in more energy efficient, lower-carbon homes.

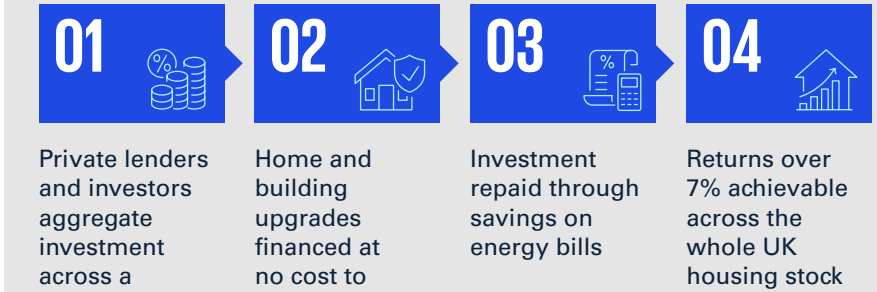
**Collaboration between central and local governments is essential to success.**

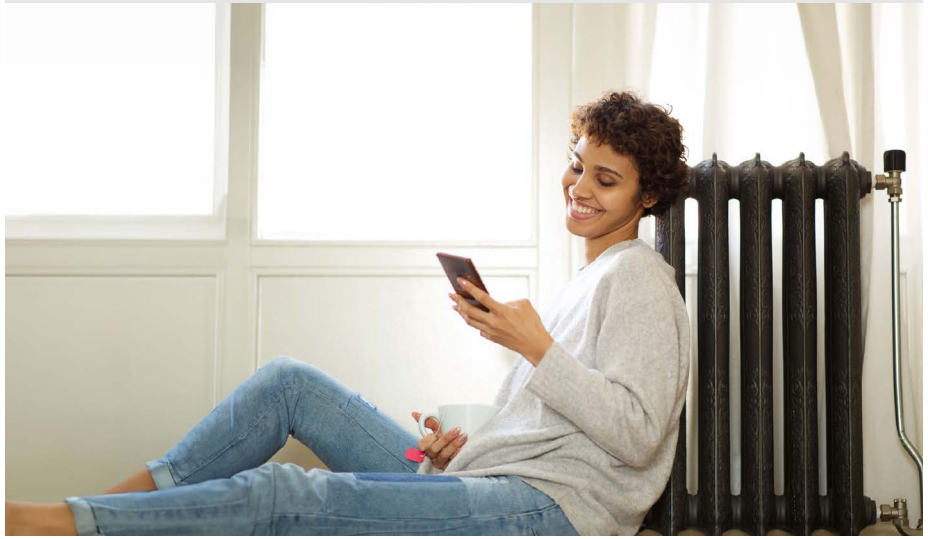
To make this approach a success will require collaboration between central government, local authorities, industry and financiers. It is essential that central government creates the support framework for this to happen via the creation of a Homes and Buildings Decarbonisation Agency.

**This approach will deliver the best outcomes at pace and scale to secure a greener, warmer and cheaper to run housing stock for our country.**

We acknowledge that home decarbonisation is a huge challenge, and this proposal is a step change is approach. However, investing in the decarbonisation of our homes and buildings also represents the best way to get bills down permanently, reduce our dependence on imported gas and the biggest opportunity for creating green jobs the country has today.

Figure 2: **Proposed approach to funding home and building upgrades**



Chapter

# 01 Time for a different approach

# Time for a different approach

**Decarbonising homes and buildings can deliver significant benefits to consumers, reducing their energy costs, increasing efficiency and safeguarding the environment. But given the current slow rate of progress, these benefits remain largely unrealised.**

With nearly a fifth of the UK's greenhouse gas emissions coming directly from heat and buildings, the decarbonisation of our homes is one of the biggest challenges we face in moving towards a net zero future[1].

Decarbonisation brings many benefits for consumers. Greater energy efficiency is the best way to permanently bring down consumers' energy bills and reduce our dependence on imported oil and gas. Importantly, improved home conditions are also better for our physical and mental health.

These benefits should not only be available to those who can afford the switch. Everyone should have the opportunity to have a greener, cheaper and healthier home.

Home and building decarbonisation is needed urgently

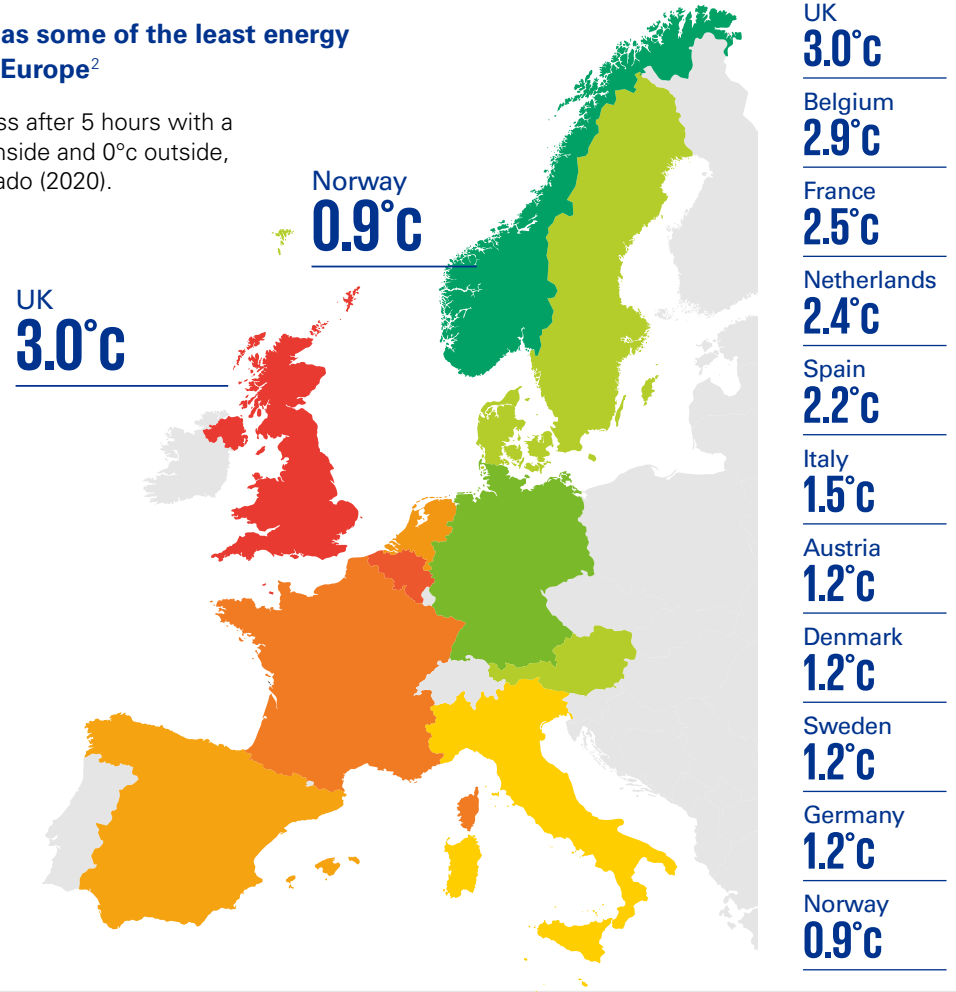
There are significant consumer benefits to delivering this

Homes and buildings are part of a wider system with numerous stakeholders which adds to the complexity

Current attempts to address this issue are not working. It requires a fundamentally different approach

Figure 3: **The UK has some of the least energy efficient homes in Europe**[2]

Home temperature loss after 5 hours with a temperature of 20°c inside and 0°c outside, based on a study by Tado (2020).



But our current state of play is far from ideal. The UK's housing stock is one of the oldest, most diverse and leakiest in Europe, with 17 million properties still below an Energy Performance Certificate (EPC) band C and despite multiple attempts to improve this over the last decade, an average EPC band D rating[3].

Some 85% of the 29 million homes in the UK are connected to the gas grid, accounting for one third of the country's total gas use[3,4]. The sizeable challenge of switching these properties to a low-carbon heating supply is exacerbated but the sheer diversity of our building stock which means there is no one size fits all solution[3].

As well as switching to low-carbon sources of heating to reduce emissions, energy efficiency measures are needed at scale to reduce energy consumption and resolve cold and draughty conditions[5].

The Heat and Buildings Strategy (2021) set the government's ambitions to improve energy efficiency and building standards, phase out new gas boilers from 2035 and reach a target of 600,000 annual heat pump installations a year by 2028, rising to 1.6 million by 2035.

However, by 2022, only 9% of this annual heat pump installation target was achieved, with deployment falling significantly short so far (see Figure 4).

> With nearly a fifth of the UK's greenhouse gas emissions coming directly from heat and buildings, the decarbonisation of our homes is one of the biggest challenges we face in moving towards a net zero future

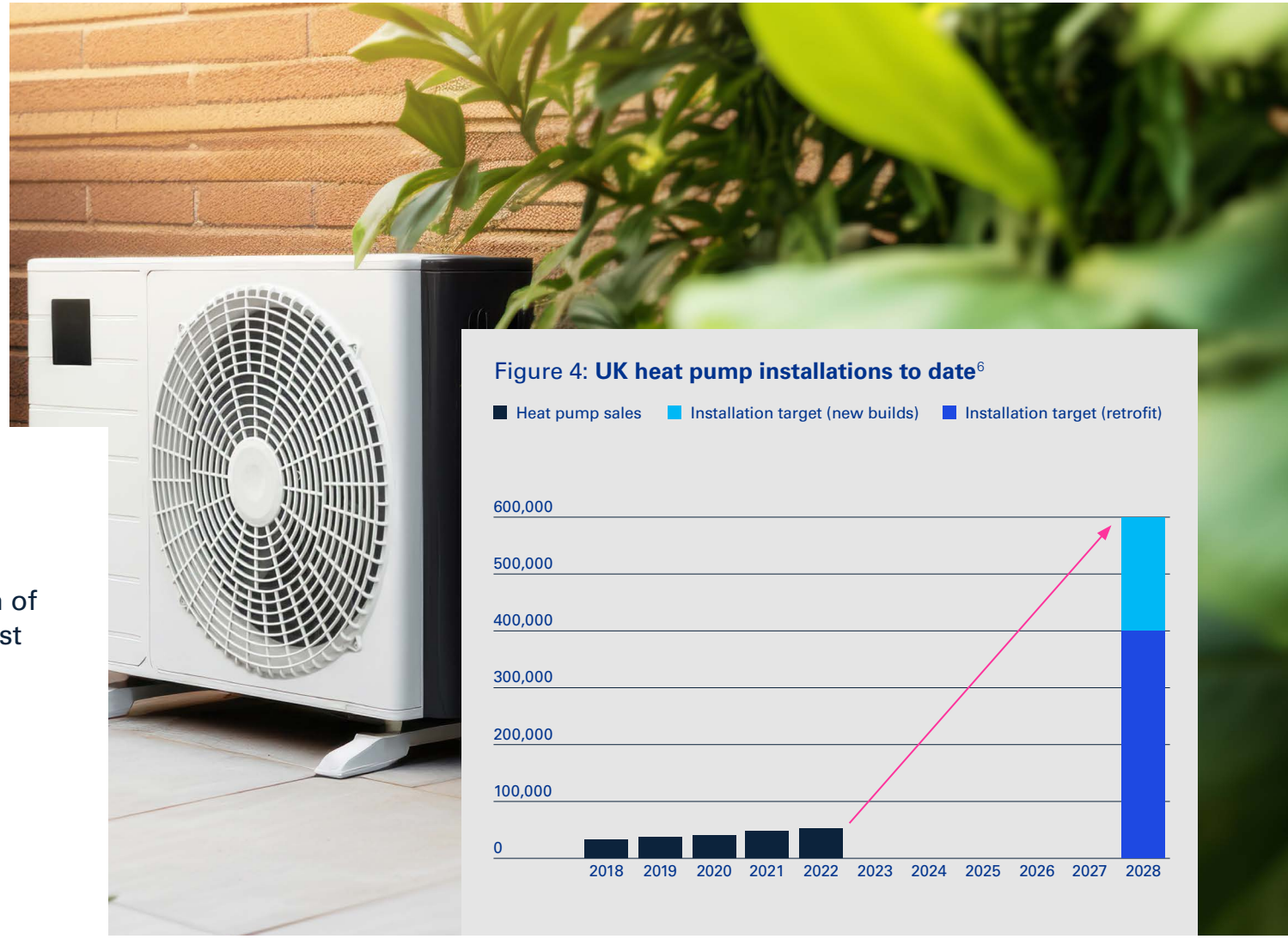


Figure 4: **UK heat pump installations to date**[6]

**Previous attempts have failed to deliver the transformation now needed and a different approach is required.**

Policymakers recognise that encouraging people to adopt energy efficiency measures and low-carbon solutions in their homes and buildings is essential. In attempts to kick start this transition, numerous interventions to promote uptake of clean heating systems and energy efficiency measures have been introduced over the last decade (see Figure 5).

However, these policies have had limited success in moving the dial on uptake. They have lacked coherency, failed to fully engage consumers, been stop-start in nature and, even if they were to meet their full potential, often targeted only a small percentage of homes and buildings.

The Energy Security Strategy, includes measures to increase installations of heat pumps. One of the most prominent is the **Boiler Upgrade Scheme (BUS)**, but this is currently way off target. Only 38% of its target was met in 2022-23, suggesting that subsidies alone are not enough to encourage consumer uptake[6].

Figure 5: **Delivery and funding mechanisms in the UK**

| | 2010 | 2013 | 2013 | 2014 | 2020 | 2022 |
|---|---|---|---|---|---|---|
| | **Feed-in Tariffs** (2010-2019) | **The Green Deal** (2013-2015) | **Energy Company Obligation (ECO)** (2013 – present) | **Renewable Heat Incentive (RHI)** (2014-2022) | **Green Homes Grant** (2020-2022) | **Boiler Upgrade Scheme (BUS)** (2022-2028) |
| | Customer-led | Customer-led | Government-led | Customer-led | Customer-led | Customer-led |
| | Solar PV | Insulation, heating, double glazing, draught-proofing, heat pumps and solar PV | Insulation, heat pumps, boiler replacements and solar PV | Heat pumps and biomass boilers | Insulation, heat pumps, double glazing, draught-proofing and heating controls | Heat pumps and biomass boilers |
| | Subsidy | Loan | Upfront payment | Subsidy | Voucher/grant | Voucher/grant |
| | Provided a guaranteed payment for power generated, to de-risk the installation small-scale generation | Assisted homeowners with loans for energy-saving improvements, repaid through savings on electricity bills | Promotes the installation of measures that reduce carbon emissions and fuel poverty for properties with an EPC rating D or lower, funded and led by energy suppliers | Provided a guaranteed payment for heat generated, to de-risk the installation of low-carbon heating systems | Provided grants of up to £5,000 (£10,000 for households receiving benefits) to reduce the upfront cost associated with the installation of energy-saving measures and home improvements | Offers upfront grants up to £7,500 to support with the upfront cost and installation of renewable heating to incentivise uptake |
| **Households targeted** | 750,000[7] | 14m[9] | n/a | n/a | 600,000[12] | 90,000*[13] |
| **Households reached** | ~1m[8] | 14,000[9] | 3.9m[10] | 113,000[11] | 47,000[12] | 30,000**[13] |

Notes: *heat pumps expected to install by 2025; ** heat pump voucher redemptions as of April 2024

**Home decarbonisation initiatives have had limited success in the last decade** (see Figure 5).

The **Domestic Renewable Heat Incentive (RHI)** and **Energy Company Obligation (ECO)** schemes were early mechanisms that began the low-carbon heating journey for some customers and largely achieved their targets. However, their reach remained limited, primarily supporting low-income households or 'early-movers' with access to upfront capital.

Other funding schemes like the **Green Heat Deal** and **Green Homes Grant Voucher** aimed to incentivise low-carbon heating, but they ultimately fell short. The Green Deal's pay-as-you-save scheme failed to properly resonate with consumers due to insufficient communication of its benefits and a lack of financial support.

The more recent **Green Homes Grant**, is another example of stop-start policymaking which failed to give the supply chain sufficient opportunity to gear up was cut short after only six months.

Most of these schemes are customer-led, requiring individual consumers to find approved installers, manage the installation process, and handle the payments process (through subsidies or upfront grants and voucher schemes). This approach is costly, inconvenient and disruptive for consumers.

With low levels of uptake, policy interventions struggling to engage consumers and a fragmented approach across the industry, there is no clear process on who should be switching, when, and to what solution.

To achieve our decarbonisation targets and deliver key benefits for both consumers and the industry, there needs to be fundamental, institutional change to how the UK approaches the decarbonisation of homes and buildings.

> "There was a high level of interest in the Green Homes Grant but many homeowners and installers had a poor experience of using the scheme. The Scheme did not deliver the expected number of home energy efficiency installations or support the expected number of jobs"
>
> **National Audit Office (2021)**

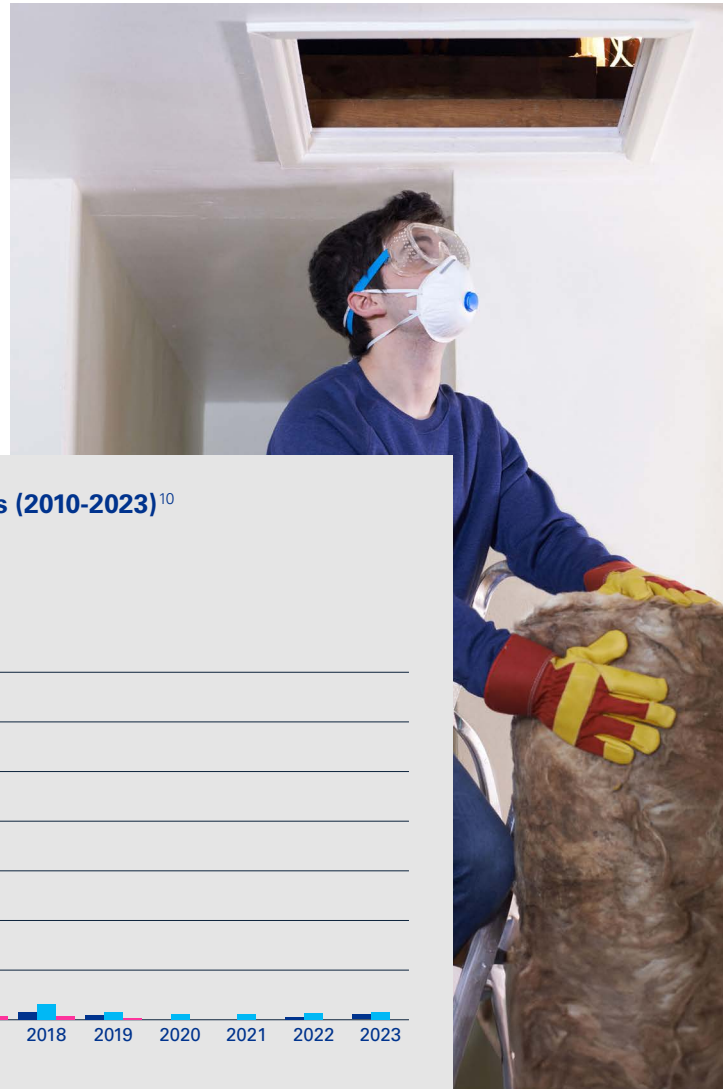
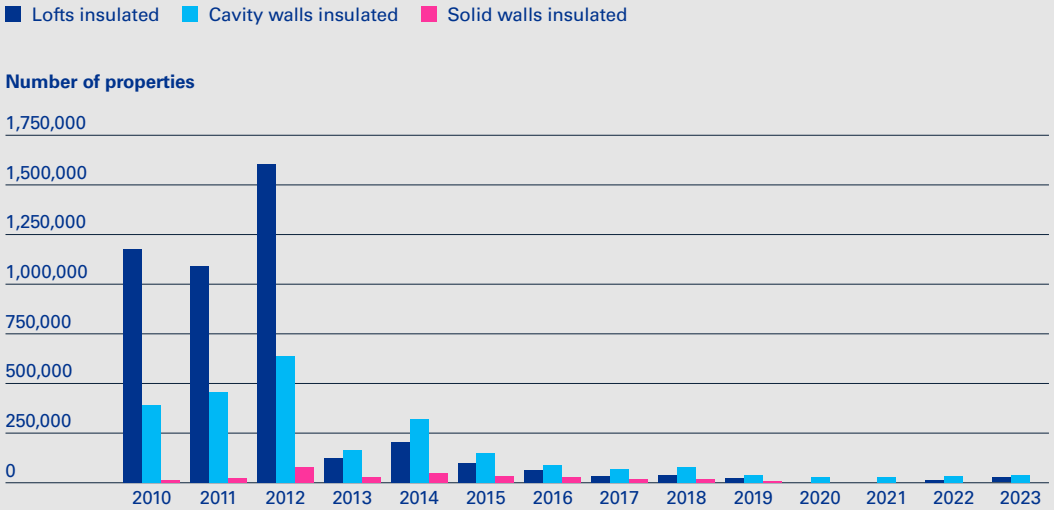


Figure 6: **Installation of energy efficiency measures (2010-2023)**[10]



Chapter

# 02 The critical challenges we must overcome

# The critical challenges we must overcome

The challenges impacting the success of home decarbonisation can be grouped into three broad critical challenge groups. All of these need addressing as a priority to accelerate the decarbonisation of homes and buildings.

## Challenge 1

Complex, poorly-defined consumer journey and low consumer awareness

Encouraging households to implement decarbonisation measures is not only about removing financial constraints. It also needs effective communication of the benefits and, crucially, a clear end-to-end consumer journey to guide people through the transition process.

**Consumers needs to be at the heart of home decarbonisation.**

The perceptions and willingness of consumers to adopt decarbonised solutions varies significantly based on a range of rationale and emotional factors.

Overcoming this hesitancy means guiding consumers through a series of steps to change their perceptions and nudge them towards a position where they actively want to decarbonise their homes.

An effective consumer journey needs to provide impartial and trusted advice on the why and how of home decarbonisation. The process needs to be affordable, ensuring the whole life financial cost to the consumer is minimised as far as possible. And it should be simple and convenient to manage, providing a one-stop-shop for advice, finance and supply.

Figure 7: **Guiding customers through the change process**[14,15]

**45%**
**don't believe it makes a difference**

### Step 1

**Why – I understand why I need to do something**

Currently, nearly half of the public (45%) are not even on step one – 'why'. This step is critical to drive mass adoption, but instead of communicating why such a change is desirable and beneficial, there has been an over reliance on generic net zero messaging.

**50%**
**don't have enough information**

### Step 2

**What – I have trusted guidance on what I need to do**

Consumers have a lack of knowledge and limited influence on their decarbonisation journey. The absence of a universal solution exacerbates the problem, as consumers don't know what the best option is, where to go for advice, or how to implement it. It is necessary to engage people early and provide a clear journey and signposting from the start.

**62%**
**perceive it to be too expensive**

### Step 3

**Affordability – It is affordable and makes sense financially**

For home and building decarbonisation at scale to be successful, it is important to win both the hearts and mind of consumers. At present, there is very little incentive for people to switch to low-carbon solutions for their home. To enable mass uptake, any incentive or intervention needs to minimise the costs and be affordable for all consumers.

**29%**
**too time-consuming**

### Step 4

**How – It is easy and I know how to manage the change**

The process of switching to low-carbon solutions today is too complex and time-consuming for consumers. They have to navigate a range of different and changing support schemes, as well as figuring out which suppliers they can trust to deliver the quality that is needed. The process needs to be clear and simple, with far less responsibility placed on individual consumers.

## Challenge 2

Lack of planning and coordination

The current model for decarbonising homes and buildings comprises a variety of different delivery and funding mechanisms that put the responsibility on individual consumers. Not only are these mechanisms complex, but many of the schemes also overlap, are specific to certain technologies, or are only available for a short period of time. This is a national problem that requires coordinated local solutions at scale.

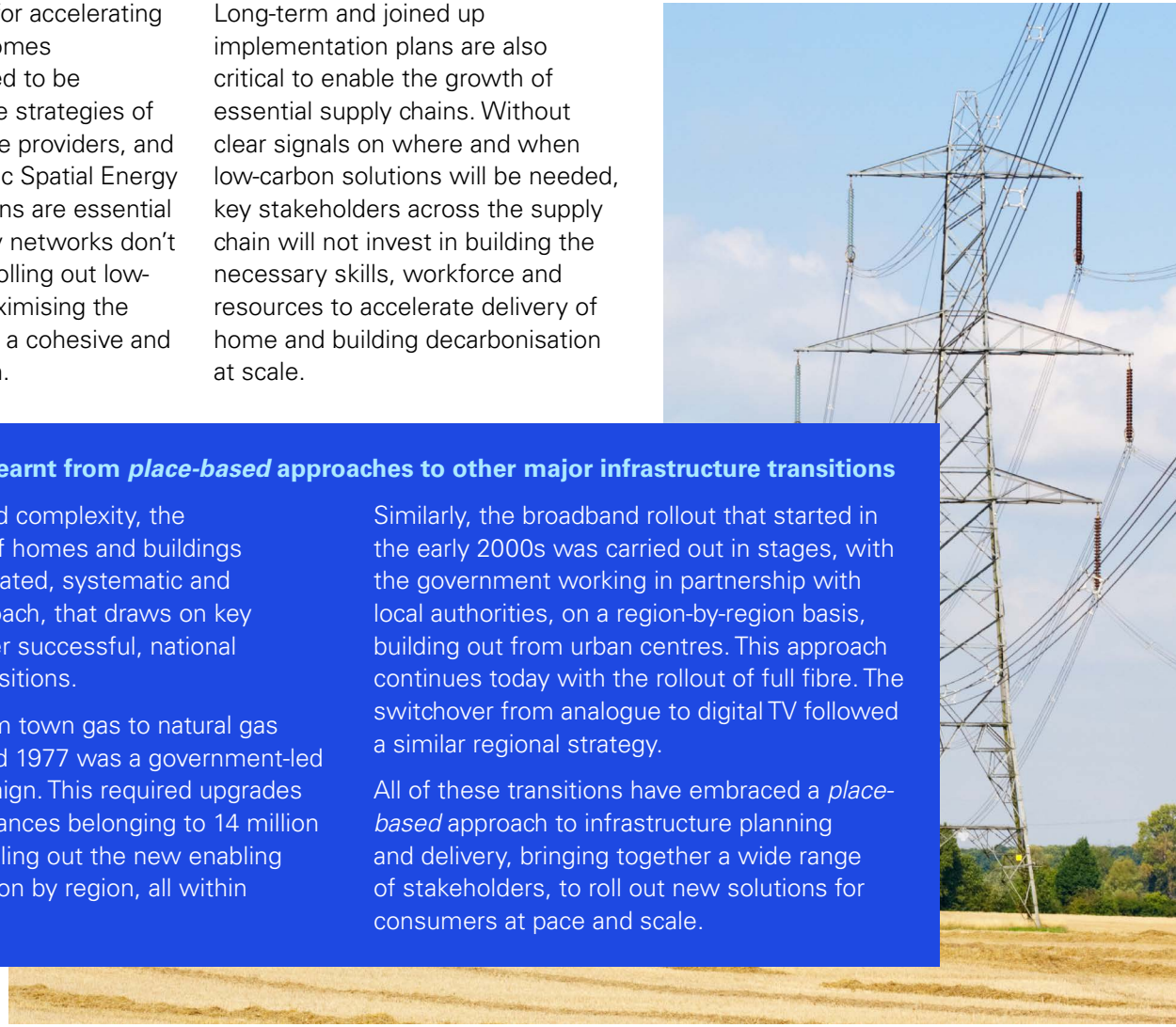
Homes and buildings decarbonisation policies to date have focussed on topline signals and targets, without providing effective implementation plans on how to actually achieve the targets. To deliver the step change that is required, there needs to be a joined up and long-term approach across national and local government, with a clear decision-making process, that coordinates all relevant stakeholders including the National Energy System Operator (NESO), networks, energy companies, delivery providers and consumers. This is essential to unlocking a *place-based* and systematic approach to decarbonising homes and buildings.

Rather than setting targets with very little in the way of a supporting implementation plan, national targets need to be translated into regional energy plans and fed into local area energy plans (LAEPs) developed by local authorities. To do this effectively, local authorities will need to build the necessary technical and commercial skills and capabilities.

Steps are being taken more broadly to enhance long-term energy system planning with the upcoming introduction of Regional Energy Strategic Planners (RESPs) and heat network zone coordinators, alongside Distribution System Operators (DSOs) taking an increasingly active role in strategic planning.

Any long-term plans for accelerating decarbonisation of homes and buildings will need to be synchronised with the strategies of enabling infrastructure providers, and the incoming Strategic Spatial Energy Plan. Coordinated plans are essential to ensure that energy networks don't become a barrier to rolling out low-carbon solutions, maximising the impact and delivering a cohesive and *place-based* approach.

Long-term and joined up implementation plans are also critical to enable the growth of essential supply chains. Without clear signals on where and when low-carbon solutions will be needed, key stakeholders across the supply chain will not invest in building the necessary skills, workforce and resources to accelerate delivery of home and building decarbonisation at scale.



### Lessons can be learnt from *place-based* approaches to other major infrastructure transitions

Given its scale and complexity, the decarbonisation of homes and buildings requires a coordinated, systematic and *place-based* approach, that draws on key lessons from other successful, national infrastructure transitions.

The transition from town gas to natural gas between 1967 and 1977 was a government-led nationwide campaign. This required upgrades to 40 million appliances belonging to 14 million customers and rolling out the new enabling infrastructure region by region, all within a decade[16].

Similarly, the broadband rollout that started in the early 2000s was carried out in stages, with the government working in partnership with local authorities, on a region-by-region basis, building out from urban centres. This approach continues today with the rollout of full fibre. The switchover from analogue to digital TV followed a similar regional strategy.

All of these transitions have embraced a *place-based* approach to infrastructure planning and delivery, bringing together a wide range of stakeholders, to roll out new solutions for consumers at pace and scale.

## Challenge 3

Limited success in scaling enabling sector and attracting investment

To achieve this scale of transition needed requires a significant growth in the sector to deliver it.

Scaling the supply chain is one of the main hurdles to deliverability and heat pump installation is already being impacted by supply chain constraints with over 100,000 customers waiting to have one installed[17].

Overcoming these supply chain constraints is both a major challenge and opportunity, with research by the CBI suggesting that, decarbonising homes and buildings could create up to 190,000 jobs by 2030[18]. However, clear, long-term signals from policymakers and industry are needed to give the enabling sector the confidence required to invest in building supply chains and creating new green jobs at scale.

Some estimates project over £250 billion of investment will be needed to fully decarbonise homes[19]. The 2024 Conservative manifesto pledges £6 billion investment in energy efficiency over the next three years, whilst Labour commit to providing £6.6 billion over the next parliament to upgrade five million homes through the Warm Homes Plan[20, 21].

However, even with sizeable public funding, it is clear that private sector capital will be needed at scale meet our net zero targets.

Despite past subsidies and grants aimed at supporting the rollout of home decarbonisation solutions, these interventions have largely not created the right conditions to attract the scale of private capital needed.

Local authorities have also lacked the development funding needed to bring private finance into towns and cities.

**Appetite from investors is not the challenge, but to attract this capital towards home and building decarbonisation we need to:**

**Create scale** – the fragmented nature of domestic real estate makes it difficult for low-cost capital providers to deploy funding. Aggregating properties is needed to deliver the necessary scale to attract private funding whilst also smoothing out variability of returns between properties.

**Establish the structures to monetise and securitise the benefits from retrofit** – to be affordable and attractive to customers, it should be possible to recover the capital cost of measures through the energy savings generated. Unlike the Green Deal, this should be done on actual energy savings realised as opposed to projected energy savings – overcoming one of the key concerns of customers regarding the achievement of purported energy savings. To achieve this, we need structures which allow for these benefits to be measured in a fair and transparent manner.

**Build the market confidence in the performance of projects** – funders need to have confidence that their investment will be repaid – this will include confidence that the technology will perform as intended for the duration of its estimated useful life and crucially that energy savings will materialise. A reformed version of the current EPC could be useful in building this market confidence.

Addressing these three major challenges promptly is crucial to accelerating the uptake of home decarbonisation solutions in the UK and hitting our net zero targets. In the rest of this report, we outline how policymakers could approach this challenge.

Chapter

# 03 Our model for delivering home decarbonisation at scale

# Our model for delivering home decarbonisation at scale

**A new *place-based* delivery model built around local consumer needs is critical to move the dial on home decarbonisation.**

As every area is different with variability in local factors such as the housing stock, grid constraints and resource availability, a locally-led and democratically accountable approach, driven by local government, is essential.

There needs to be a clear line of sight from national targets through to regional and local energy plans and ultimately the way that homes and buildings are decarbonised for end consumers. Our proposed delivery model includes a street-by-street, area-by-area rollout programme to accelerate the installation of low-carbon heating solutions and energy efficiency measures in homes and buildings at scale.

Consumers must be at the heart of the way that policies and plans are designed and implemented. Home decarbonisation should be streamlined for consumers, making it the natural choice to adopt the right solution, while removing any financial burden for doing so. To achieve mass rollout of home retrofits at pace, consumers need to be engaged and incentivised and trust needs to be built in those delivering the services. This is best done through a *place-based* approach, led on the ground by local authorities.

Whilst our proposed approach is primarily focused on accelerating the rollout of energy efficiency and low-carbon heating upgrades, this new model could similarly be applied to other local decarbonisation challenges, such as delivering heat networks and electric vehicle charging infrastructure at scale.

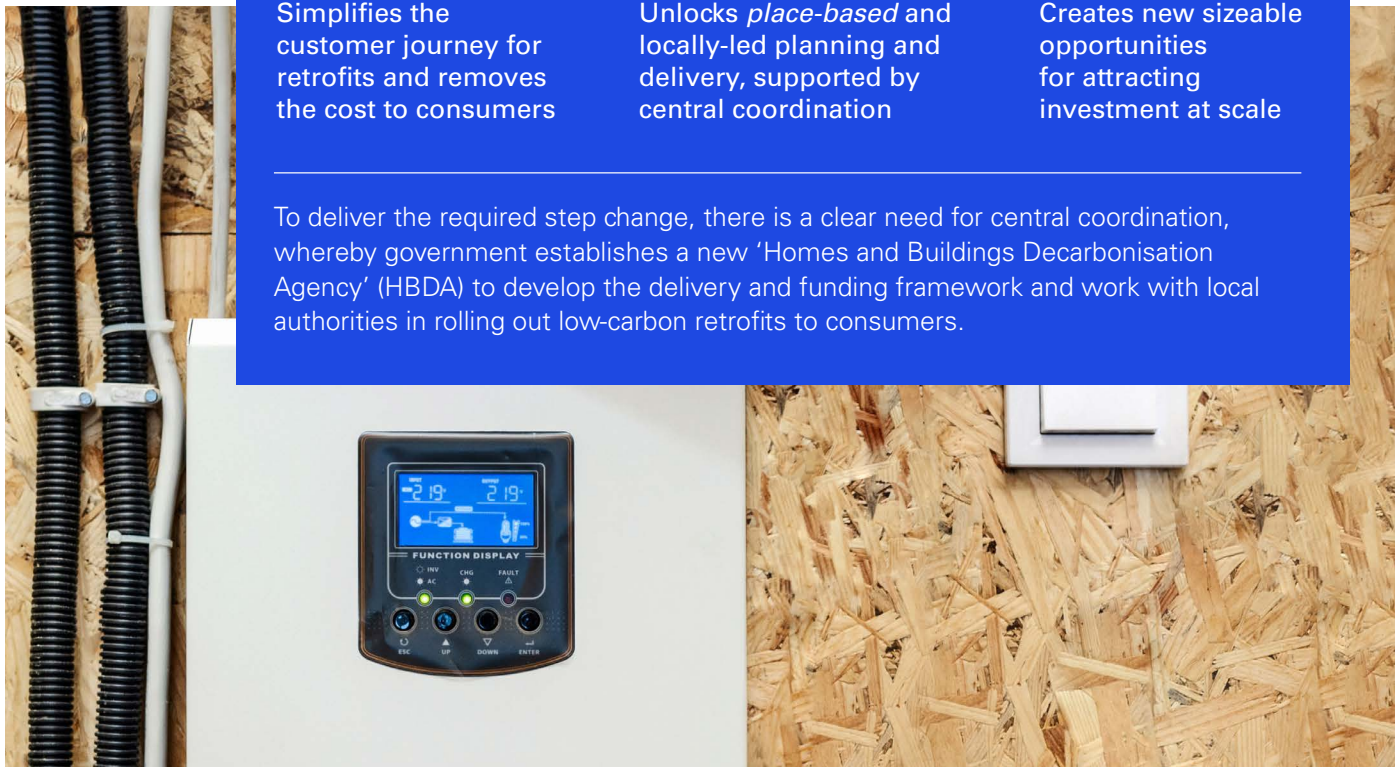
## Our proposed model

**01** Simplifies the customer journey for retrofits and removes the cost to consumers

**02** Unlocks *place-based* and locally-led planning and delivery, supported by central coordination

**03** Creates new sizeable opportunities for attracting investment at scale

To deliver the required step change, there is a clear need for central coordination, whereby government establishes a new 'Homes and Buildings Decarbonisation Agency' (HBDA) to develop the delivery and funding framework and work with local authorities in rolling out low-carbon retrofits to consumers.

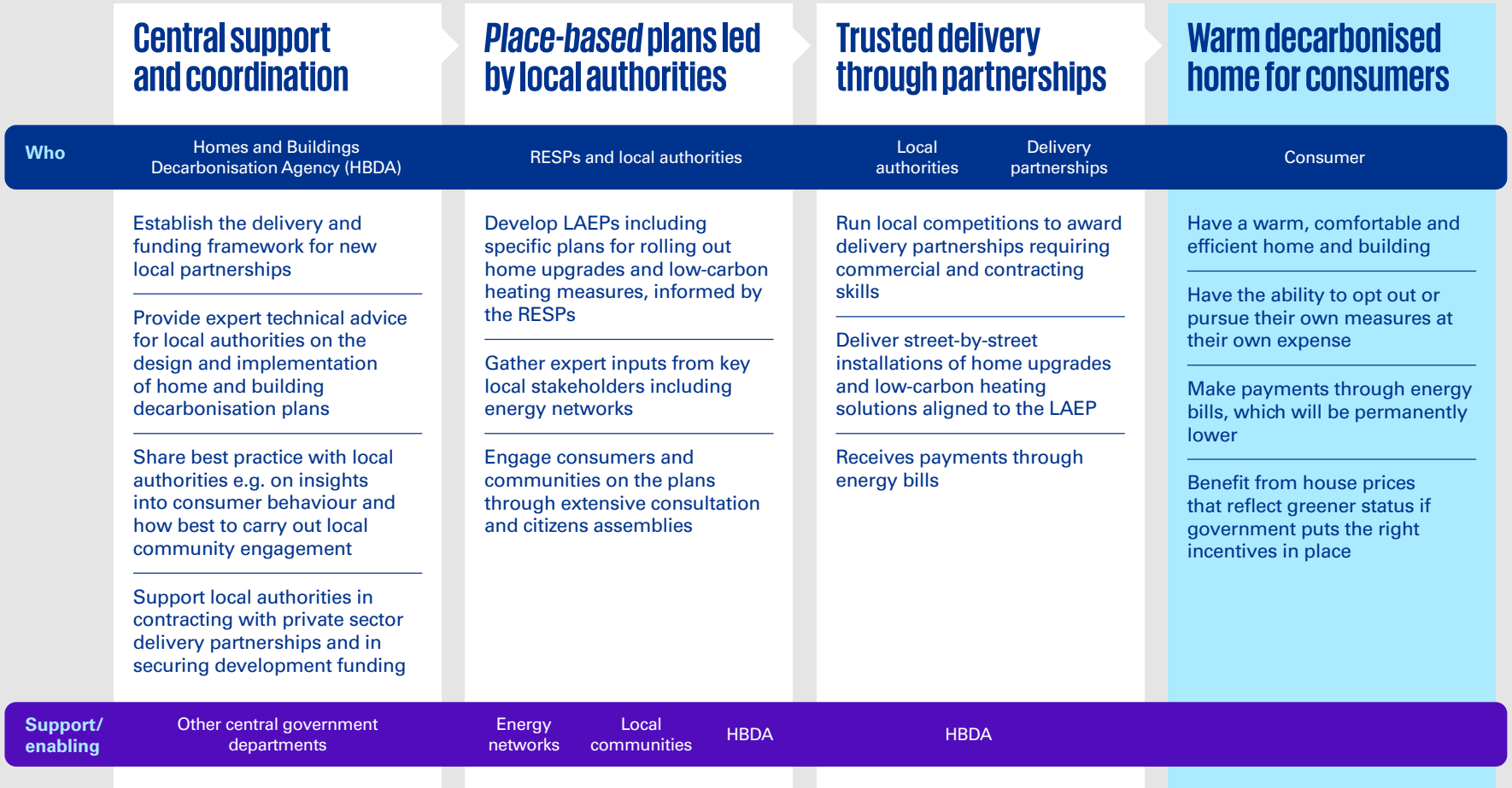


**The new Homes and Buildings Decarbonisation Agency could build on the capabilities of existing bodies.**

To perform its proposed role effectively, the HBDA will need the mandate and technical capabilities to support local authorities in rolling out measures to consumers.

Whilst we recommend establishing a new dedicated agency, alternatively, there are several existing bodies that could build on their current roles and take on the necessary responsibilities, such as the Energy Saving Trust, Carbon Trust or Energy Systems Catapult.

Figure 8: **Proposed delivery model**



**The new proposed model combines strategic and central coordination with locally-led delivery.**

Our proposed model involves the creation of new local delivery partnerships that bring together the technical expertise and financial backing to deliver home decarbonisation programmes at pace and scale in each locality. These partnerships will combine an organisation responsible for installing low-carbon solutions, a financial institution to provide the necessary funding and any critical supply chain providers.

The scope of each partnership and what needs to be delivered in practice will be defined by local authorities as a ringfenced and crucial element of their LAEP, focused on getting low-carbon heating and energy efficiency solutions into homes and buildings at speed. Local authorities will have an instrumental role in bringing together national decarbonisation policies and the work of other expert organisations with energy planning responsibilities, including RESPs and energy networks into coherent *place-based* plans and need technical capabilities. Consumers and communities must be engaged extensively throughout the development of these plans.

Local authorities will then consult and appoint the delivery partners through competitive procurements, enabling the partnerships to push on with delivery at pace and not get slowed down by scoping and planning. This will require local authorities to have the necessary commercial and contracting capabilities, and access to development funding to scope and run the procurements.

Unlike past schemes, the responsibility should not fall to individual consumers. Whilst consumer buy-in is essential for success, and they should have the opportunity to opt out, this new framework will need to be positioned as a national rollout programme with the benefits of a greener, cheaper and healthier home clearly articulated.

Homeowners should have the opportunity to pursue their own measures at their own expense, but these will not be supported in the same way as the least cost options recommended by the LAEP.

Running 'citizens assembly' style forums will be important to ensure the needs of residents and businesses are built into the plans from the outset.

For this novel model to succeed, it is crucial that a new national body is formed to provide central coordination of locally delivered decarbonisation programmes. The HBDA will be responsible for building the mechanics of the delivery and funding framework, supporting local authorities in accessing development funding and clearly defining the roles of organisations including local authorities, energy suppliers, delivery partnerships and financial institutions in meeting this decarbonisation challenge. It will also provide expert technical support to local authorities, sharing best practice and avoiding duplication of effort both in the design and delivery of new homes decarbonisation plans.

Figure 9: **Stakeholder ecosystem**

## Implementing a streamlined customer journey is key to success.

The process from the initial approach to installation should limit customer touchpoints and be as smooth as possible, while providing the consumer with trust in the quality of the programme and the supply chain throughout. Local authorities will be responsible for early consumer outreach, to help in building trust and credibility, before handing over to the delivery partnership that will guide consumers through the process going forwards. Trusted and consistent branding throughout the entire customer journey, promoted by the relevant local authority, will be essential in maintaining consumer confidence in the rollout programme.

Strong national awareness campaigns, supported by local engagement, will be pivotal to ensure that consumers are brought on the journey, and fully understand the benefits the solutions can offer them. These campaigns should draw on lessons learnt from other major infrastructure transitions to ensure an effective approach to educating and informing the public.

Figure 10: **Proposed customer journey**

### Engage

**Initial approach by local authority**

- Local authority, working in tandem with the RESP, develops the delivery plan and phasing to roll out low-carbon measures on domestic properties and small buildings as identified in the LAEP
- Engage consumers with personalised communications to raise awareness of the national home decarbonisation rollout programme, outlining the benefits and the energy solution(s) available to them
- Arrange an appointment for an engineer from the delivery partnership to visit the customer's property to survey the property and/or small building
- Share indicative timelines, costs and potential energy savings with the consumer through the local authorities to keep continuity and maintain trust
- Provide consumers the option to opt out

### Onboard

**Development of fully costed proposal and sale**

- Create the tailored energy improvement solution using the framework agreed with the relevant counterparties (local authorities, central government, financier, installation partner, etc.)
- Calculate and provide consumers with transparency on the pricing and repayment plan using the energy performance baseline
- Consumer review and signing of the energy improvement contract
- Consumer can choose to do things at their own expense if they prefer not to opt for the lowest cost option recommended by the LAEP

### Baseline

**Assessment of current energy performance of property**

- Obtain consent from property owner to perform detailed energy survey
- Conduct property-by-property survey
- Baseline performance of property using information gathered from survey and historical utilities meter/billing data

### Install

**Installation of energy solution/measures**

- Schedule installation dates with consumers
- Energy solution/measures installed on end-customer's property by installation partners
- Workmanship and equipment covered under warranty and performance guarantees

### Support

**Repayment of energy solution/measures via energy supplier**

- Capital costs for energy solution/measures are recovered directly through consumers energy (electricity/gas) bills
- Energy supplier to provide ongoing view on emissions saved on the consumers energy bill
- Costs for ongoing maintenance, repairs, and asset replacements are paid for by the delivery partnership
- End-consumer is financially better off as a result of having the energy solution/ measures installed on their property

**The financial burden should be removed from consumers to accelerate deployment of low carbon solutions.**

A model which allows for home decarbonisation to be delivered at no cost to the customer, funded through energy savings realised from the home decarbonisation measures will help to overcome some of the key barriers currently preventing homeowners in pursuing home decarbonisation – high upfront costs and uncertainty over purported energy savings.

**Home decarbonisation must be able to deliver commercially acceptable returns.**

The UK's homes and buildings stock is diverse in terms of size, age, energy efficiency and heating requirements. In developing our proposed model, we considered a wide range of property types, from two-bed flats to four-bed detached houses, to demonstrate how the level of investment required and potential returns will vary.

At present, within the current system of fragmented homeowner led delivery, and based on current costs, without significant government support, energy savings are generally unable to payback the upfront costs of installation.

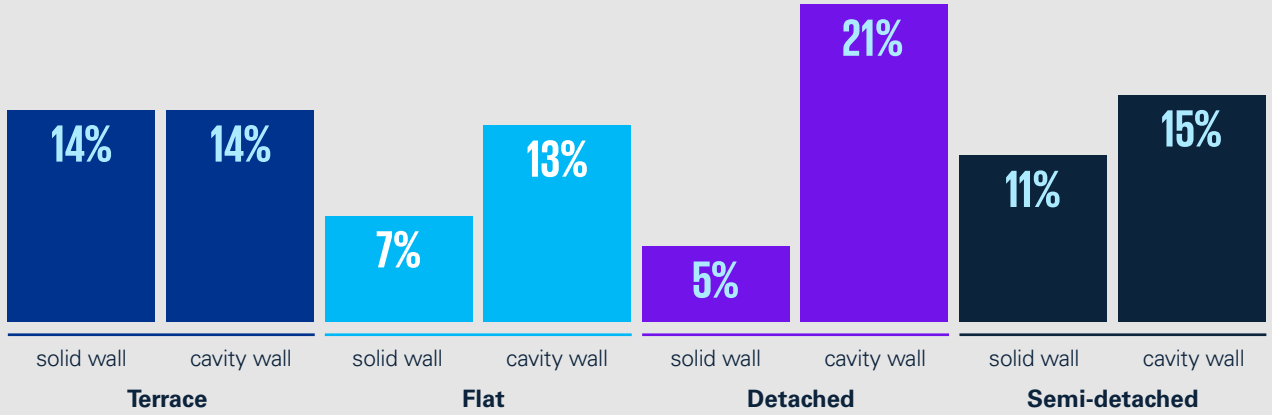
However, when taking a holistic view of the UK's homes and building stock, with targeted government intervention and realising benefits that come from a mass-rollout approach, commercially financeable rates of returns are achievable.

**New public-private partnerships are increasingly emerging to deliver local decarbonisation targets.**

Innovative public-private partnership models, like Bristol City Leap and the Coventry Strategic Energy Partnership, are increasingly being adopted by local authorities to accelerate the delivery of low-carbon energy solutions. Whilst these ambitious approaches are starting to drive meaningful change, their scope is at least initially built around decarbonising council land and buildings.

Therefore, a sharp focus on *place-based* solutions for homes and buildings is essential – and our proposed model addresses that need.

Figure 11: **Breakdown of UK homes**




Larger homes and buildings are more likely to have higher returns of investment in energy measure, primarily due to economies of scale.

Homes and buildings with higher energy demand are also more likely to have higher returns on investment, provided that the price differential between the low carbon energy source used to provide heat (e.g. electricity) and the alternative energy source (e.g. natural gas) is sufficient

Properties which require external/ internal wall insulation are likely to have the lowest returns on investment

The proposed new delivery model aims to provide the right mix of measures and policy interventions to decarbonise homes and buildings in an equitable way, while not being overly reliant on government support. It relies on a pragmatic approach to selecting measures and the right blend of incentivisation towards fuel switching.

Our proposed approach to a systematic, *place-based* and national rollout of home and building upgrades, will enable private lenders and investors to aggregate a portfolio of properties, enabling access to low cost capital providers.

Private financial institutions involved in each delivery partnership will be responsible for funding the home upgrades at no cost to the consumer. This initial investment will be repaid through savings on energy bills as a result of the upgrades.

Importantly, the customer does not bear the risk of energy savings that materialise – this risk is borne by the delivery partnership and financial institutions.

The investment should be tied to the property (through the meter), rather than individual consumers.

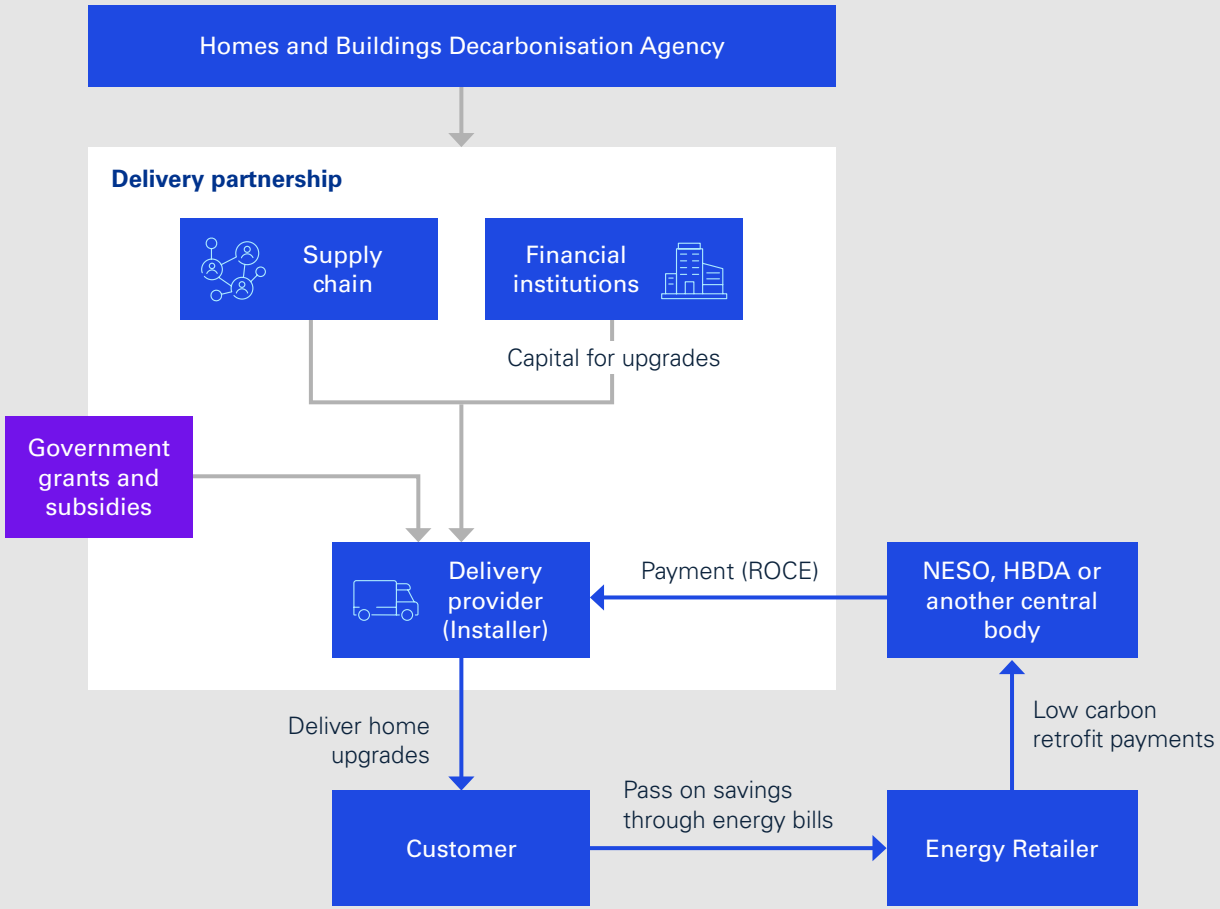
There will need to be some government support, even for the able-to-pay sector to help in getting this new model off the ground.

Consumers do not directly financially benefit from the energy savings on their bill – these savings are paid by energy retailers to a central body, which then passes these payments on to the delivery partnership as a return on their upfront investment.

NESO, HBDA or another central body would be well placed to play an important role in administering these payments to delivery partnerships.

The HBDA will be responsible for developing and establishing the funding mechanism and ensuring that it is working effectively.

Figure 12: **Proposed funding model**



**It is essential that the right government support is in place to enable this market to scale up.**

Bold decisions from government will be required to give the market the confidence to invest in infrastructure and capabilities.

Our analysis indicates that, based on current estimates, some initial government support will be needed to help in growing this market, even for 'able to pay' consumers, and gearing up supply chains.

This model will help to establish a strong and secure pipeline, allowing for scale efficiencies to be realised, reducing the upfront costs of installation, particularly in relation to heat pumps or connecting to a heat network. Looking across to other industries (such as solar PV) we can see that cost efficiencies of over 30% have been able to be realised when large scale programmes have been deployed.

As efficiencies of scale are driven by industry in the longer term, commercially attractive returns for private lenders and investors will potentially be achievable without the need for government support.

In parallel, we need to ensure that the cost of electricity (relative to gas) does not act as a barrier to realising the benefits of home decarbonisation. Government should commence a phased transfer of the policy levies from electricity to gas over a 10 year period, to encourage the take up of low-carbon heating solutions and discourage the use of natural gas.

Energy suppliers will also need to innovate to provide tariffs optimised to the requirements of heat pumps and heat networks, to ensure that energy cost savings can be maximised.

Figure 13: **Potential returns in the current state and the proposed future model**[11, 22, 23, 24]

Our analysis shows that if cost efficiencies associated with large scale deployment of home and building upgrades can be realised, similar to those achieved in other industries (such as solar PV), alongside a phased transfer of policy levies from electricity to gas and innovative tariffs from energy suppliers to optimise low-carbon heating solutions, then commercially attractive returns will be achievable without the need for long-term government support.

## Current state

**£9,700**
**Indicative upfront cost to the consumer** (heat pump and cavity wall insulation measures)


**£450-£550 per year**
**Indicative estimated energy bill savings**

**-5%**
**Indicative return on investment**

**Energy savings do not repay the upfront capital costs of the measures over their useful life**

## Future state

**£0**
**Upfront cost to the consumer** (heat pump and cavity wall insulation measures)


**£600-£700 per year**
**Indicative estimated energy bill savings**

Consumers do not directly financially benefit from the energy savings on their bill – these savings are passed to the delivery partnership as a return on their upfront investment

**+8%**
**Indicative return on investment**

Note: Pre-tax project returns on investment are calculated over a 30-year period

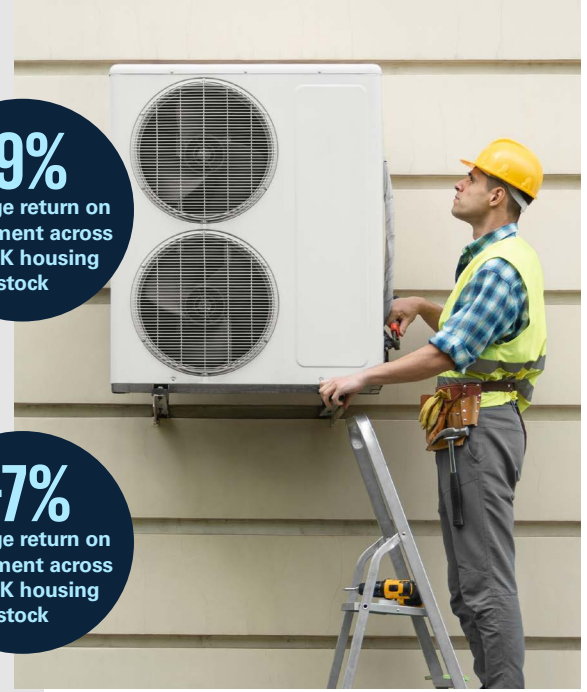
## Figure 14: **Potential returns if economies of scale are achieved**[11, 22, 23, 24]

Consumers do not bear the upfront cost or directly financially benefit from the energy savings on their bill. These are passed to the delivery partnership as a return on their investment.

| | Average estimates: | 2 bedroom home: Upfront cost | 2 bedroom home: Energy savings/yr | 2 bedroom home: Return on investment | 3 bedroom home: Upfront cost | 3 bedroom home: Energy savings/yr | 3 bedroom home: Return on investment | 4 bedroom home: Upfront cost | 4 bedroom home: Energy savings/yr | 4 bedroom home: Return on investment |
|---|---|---|---|---|---|---|---|---|---|---|
| **Current state** | **Heat pump** | £9k | £250-£350 | -14% | £9k | £350-£450 | -11% | £13k | £450-£600 | -11% |
| | **Heat pump + insulation (cavity wall)*** | £9k | £350-£450 | -9% | £10k | £450-£550 | -5% | £13k | £550-£650 | -4% |
| | **Heat pump + insulation (solid wall)** | £17k | £350-£450 | -10% | £19k | £450-£550 | -7% | £24k | £550-£700 | -6% |
| **Future state**** | **Heat pump** | £6k | £450-£550 | 4% | £6k | £550-£650 | 8% | £8k | £750-£900 | 8% |
| | **Heat pump + insulation (cavity wall)*** | £6k | £500-£600 | 6% | £7k | £600-£700 | 8% | £10k | £800-£950 | 8% |
| | **Heat pump + insulation (solid wall)** | £15k | £500-£600 | -1% | £16k | £600-£700 | 0% | £21k | £800-£950 | 1% |

* Insulation measures seek to supress energy demand, thereby enabling a more cost effective heat pump to be installed
** No government support included, but economies of scale are achieved

The total investment required will be around £160 billion, without any solid wall insulation, and around £230 billion with solid wall insulation. This equates to an annual investment of between £6.4 billion and £9.2 billion every year between now and 2050.



Government funding has already been allocated to a variety of support mechanisms (e.g. BUS, Social Housing Decarbonisation Fund, Public Sector Decarbonisation Fund and the Green Heat Network Fund).

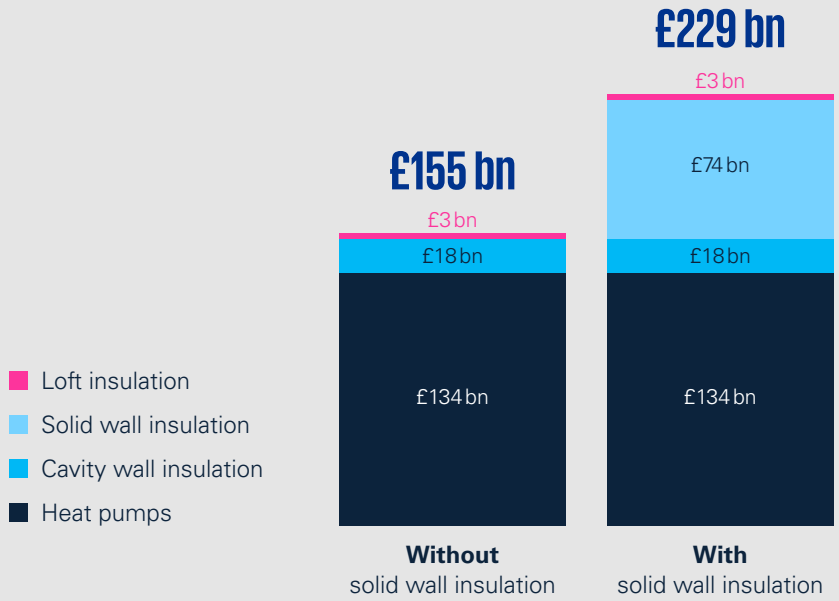
The 2024 Conservative manifesto pledges a further £6 billion investment in energy efficiency over the next three years, whilst Labour commit to providing £6.6 billion over the next parliament to upgrade five million homes[20,21].

If effectively deployed, this investment could help to unlock the additional investment required from the private sector – building confidence and scale in the market and reducing reliance on government support over the longer term. According to research by the CBI, it could also create up to 190,000 jobs by 2030[25].

However, rather than the traditional approach of fragmented grants, this new model presents an opportunity to rethink the approach to providing more coordinated and targeted government support.

The tax system should also be used to reward those investing in energy efficiency and low-carbon home upgrades, for example, through lower stamp duty or council tax rebates. This could in turn help to maximise consumer uptake.

Figure 15: **Estimated investment required to decarbonise the UK's homes and buildings**




**£64 bn**

The UK Green Building Council calls for a £64 billion investment over 10 years to upgrade the UK's low-income and social housing homes[26]

**£360 bn**

The Green Finance Institute estimates that £360 billion will be required to upgrade the UK's buildings by 2050[27]

**£12 bn**

The UK's Sixth Carbon Budget estimates that, in a 'Balanced Pathway', an average of £12 billion investment is required per year to decarbonise homes and buildings[28]

**Moving beyond the current disjointed approach to decarbonising homes and buildings to a coordinated, scalable and efficient delivery model has the potential to unlock a wide range of benefits.**

A nationally coordinated and locally delivered approach will bring a step change in the pace of rollout of decarbonisation solutions, overseen by the new, dedicated HBDA. Our model will ensure efficiencies of scale are realised and provide the certainty needed for businesses to build the supply chain and skills necessary to deliver it.

The proposed partnership-funded approach should give investors confidence on the national scale of the opportunity, helping to attract much needed investment.

Most importantly, a streamlined delivery and funding framework removes many of the current barriers to consumers, bringing a long awaited attractive option for switching to low-carbon solutions.

Chapter

# 04 What needs to happen next to deliver this step change

# What needs to happen next to deliver this step change

**This bold, new, *place-based* approach has the potential to solve the homes and buildings decarbonisation challenge.**

By overcoming the barriers that are hampering mass consumer uptake of energy efficiency and low-carbon heating solutions today, it could set the UK on course towards legally-binding net zero targets, bring energy bills down permanently and reduce our dependence on imported gas. If implemented effectively, it should attract private investment on a scale that the homes and buildings sector has long needed, whilst representing the biggest opportunity for creating new green jobs across the country.

This is a huge challenge. It won't be easy, but the benefits for consumers, communities and the energy system will be worth it. Unlocking locally-led delivery of home and building retrofits at a pace and scale not attempted before will require a wide range of stakeholders to come together collaboratively to deliver innovative solutions. Policymakers, local authorities, financial institutions, energy retailers and supply chains will all have a vital role to play.

Consumers must be at the heart of this new approach from design through to implementation, with sustained and extensive engagement underpinned by local, democratic accountability.

We will need to learn by doing together, rapidly progress pilots, and gear up supply chains, whilst continuously improving the approach. Getting the right balance of initial government support will be essential to help supply chains grow, achieve efficiencies of scale and ensure that the potential returns from this new model attract significant private investment.

Establishment of a new HBDA will be critical in sharing expertise and best practice, enabling local stakeholders to drive progress on the ground.

The heat is on, but this bold new delivery and funding approach will unlock the step change needed to ensure greener, warmer and cheaper to run homes and buildings for consumers across the UK.

Key actions that stakeholders including policymakers, financial institutions and supply chains should take now to play their part in delivering this step change and accelerate the decarbonisation of homes and buildings are set out in Appendix 1.

# Appendix 1 Key actions for stakeholders

Stakeholder:

## Policymakers

### Set up a new national home and buildings decarbonisation delivery body

- Recognise there is a case for a new national body to drive a coordinated approach to decarbonising homes and buildings
- Form the new national body with a primary responsibility to develop and manage a new delivery and funding framework for decarbonising homes and buildings
- Build the capabilities the body will need to operate effectively, including technical skills in low-carbon heating and energy efficiency, public engagement and communication skills and commercial and contractual skills to support arrangements between local authorities and delivery partnerships

### Introduce a systematic local level delivery framework for installing low-carbon heating and energy efficiency measures

- Commit to implementing a new delivery and funding framework to accelerate the rollout of low-carbon heating and energy efficiency measures, with clear implementation timescales
- Define the roles and responsibilities of relevant stakeholders including local authorities, delivery partnerships and consumers in line with the proposals in this document

### Provide clear and compelling incentives for consumers to adopt low-carbon solutions, beyond the factors that customers already benefit from in existing schemes

- Evaluate the incentives for consumers to adopt low-carbon heating solutions and energy efficiency measures (i.e. reduction in emissions, higher EPC ratings, energy savings, feel-good factor)
- Build these incentives into the new delivery framework and the associated consumer engagement and awareness plan
- Ensure the tax system rewards those installing energy efficiency and low-carbon home upgrades through lower stamp duty or council tax rebates

### Develop a long-term consumer engagement and awareness plan

- Build a comprehensive, national consumer engagement and awareness plan that is driven primarily through local authorities and energy retailers, removing the onus on the customer to find reliable information
- Work with all stakeholders with consumer touchpoints to ensure consistent and clear messaging

### Establish long-term policy signals on existing funding programmes and targets

- Set clear, long-term timeframes for existing schemes including the BUS and ECO that enable industry and supply chains to plan effectively
- Provide clear and robust policy signals on future targets and mandates to switch from gas boilers to low-carbon heat alternatives

Stakeholder:

## Financial institutions

### Develop financial incentives for property owners

- Understand the key financial levers that could be used to incentivise property owners to install decarbonisation measures, building on learnings from existing offerings such as green mortgages and cashback rewards and low interest loans for home energy improvements
- Develop a sector-wide understanding of how the net zero readiness of a property can affect its valuation, and how this can de-risk lending against the property

### Push central government for the required legislation to create the right market conditions for investment at scale

- Work closely with policymakers to raise awareness of the market conditions, regulation and frameworks required to unlock investment in homes and buildings at scale

Stakeholder:

## Supply chain (delivery partnerships, infrastructure providers and networks and energy retailers)

### Participate in the design and implementation of a new delivery framework and partnerships for decarbonising homes and buildings

- Engage with policymakers, local authorities and financial institutions on the design of new frameworks and delivery partnerships to establish the business models needed to accelerate investment in the homes and buildings sector
- Support policymakers in developing a new, technology-agnostic and *place-based* delivery framework
- Participate in new delivery partnerships to support the rollout of a national home and buildings decarbonisation delivery plan

### Build a workforce ready to close the skills gap on home and building decarbonisation

- Build action plans for developing the capabilities needed to install low-carbon solutions at scale, to meet the targets of a new national delivery framework
- Establish the training facilities required to train new and upskill existing engineers and technicians at scale – the workforce employed in building retrofits may need to double from 200,000 today to over 400,000[29]

### Engage with *place-based* energy planning

- Support development of enabling network infrastructure by aligning *place-based* delivery plans for decarbonising homes and buildings to the work of RESPs and LAEPs

### Align with policymakers on consumer engagement and awareness plans

- Work closely with policymakers to develop compelling consumer engagement materials that build awareness, debunk myths and raise the profile of homes and buildings decarbonisation

### Enhance green tariff offerings that incentivise consumers to switch to low-carbon technologies

- Expand green tariff offerings which incentivise customers to opt for low-carbon technologies through price signals or technology-specific tariffs

# Appendix 2
# Modelling assumptions

To provide an estimate of the investment required to decarbonise homes and buildings, and to calculate Internal Rate of Return (IRR) for private investors, we modelled 21 scenarios based on three types of housing.

We assessed the measures that are applicable to be installed for these properties, modelling scenarios with layered solutions. The solutions we have included are: air-to-water heat pumps, cavity wall insulation, solid wall insulation and loft insulation.

### Portfolio of assets which vary based on size and the measures installed

- Size: 2, 3, 4-bedroom homes
- Measures: heat pump only, varying insulation measures and solar PV

### Our approach to modelling

- Take median annual gas consumption based on number of bedrooms (base energy use)
- Calculate annual heat demand by adjusting for heating efficiency of a gas boiler (83%)
- Apply insulation benefits based on published data on savings (excluding hot water demand)
- Adjust for increased efficiency of a heat pump (300%) (revised energy use)
- Apply central domestic forecasts for gas and electricity retail prices to base and revised energy usages
- Analyse expected capital costs and energy savings over 30 years across the 21 scenarios to determine an aggregated IRR (taking account of replacement costs

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