

CHEAPER BILLS

WARMER

HOMES

An independent plan from a cross sector group of UK industry experts. A bold and transformative ten-year program to 'future-fit' the UK's homes to tackle the long-term causes of the cost-of-living crisis, bring economic prosperity, improve quality-of-life, and address climate change.

OCTOBER 2022



“This is an important contribution to mapping out a workable strategy to upgrade the nation’s homes. It’s ambitious, and rightly so - we’re in a climate and energy bill crisis. Putting local authorities at the heart of delivery and taking a staged approach to scaling up, would give industry, national government and households the chance to get behind the plan and make it work for everyone”.

Louise Hutchins, Head of Policy and Public Affairs for UK Green Building Council

“As a broad-based and respected coalition, the EEIG advocates for an ambitious, long-term national retrofit programme to be implemented to rapidly improve the UK’s ageing, energy-wasting building stock. There has never been a more important time to cut household bills, improve our energy security and create green skills and jobs whilst building a resilient supply chain. We welcome this new ambitious report which adds well-crafted ideas and analysis to support a credible pathway towards this aim.”

Sarah Kostense-Winterton, Chairman, Energy Efficiency Infrastructure Group (EEIG)

“We urgently need a National Renovation Strategy to kickstart the retrofit revolution and, against the backdrop of the cost-of-living crisis, make warm homes affordable for all as well as reaching the UK’s goal of net zero emissions by 2050 to address the climate and ecological crisis.

This timely report maps out how this strategy could be delivered through a wide-ranging package of grants, tightening building regulations, tackling fuel poverty and building the retrofit supply chain to support green jobs and skills as well as driving the market for green finance.”

Gareth Griffiths, Chief Executive, Ecology Building Society

“It is great to see a report genuinely getting to grips with the scale of the problem. We are especially supportive of the fourth point of this plan, which addresses housing standards, focussing on moving the EPC system to a ‘pay for performance’ model. This will be essential to ensure all households get the home retrofit promised.”

Steven Heath, Technical Director (Northern Europe), Knauf Insulation



SPONSORS

This project has kindly been sponsored by the following organisations:



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Project background

Our homes are the foundation for our lives and our economy. A transformative national effort to make our homes ‘fit for the future’ would be a prudent investment offering huge and urgently needed benefits. To permanently address the cost-of-living crisis, improve the future health of the UK public, ensure a better quality of life for all, deliver long term economic prosperity, quality homegrown jobs all around the UK, and deal with causes and spiralling impacts of climate change, a program to ‘future-fit’ UK homes is unavoidable.

This fully independent project convening cross-sector experts and professionals, sets out a ten-year program to do just that. The project team have developed a credible plan to ‘future-fit’ most UK homes over 10 years. The project findings were developed over four separate threads of work: local implementation, policy and regulation, finance, and skills and supply chain. It is based on wide ranging existing research, case studies and new evidence (see references and case studies). New and bespoke household energy modelling of the proposed policy program, and the subsequent impacts, was undertaken by Parity Projects.

We aim to inspire political leaders, industry, local councils, and citizens about the potential of modernising our homes. With a strategic view of the approach for and impact of such a program, we hope to inform and inspire UK decision makers and the public at a critical time for our country.

This report and how to use it

The report aims to develop a plan for a credible and deliverable program, outlining the roles, policies, interventions, investment, and timeframe for delivery. However, all parts of society will need to be involved in and convinced of this national transformation. Therefore, we aim to make a compelling case to individual households, and the nation at large.

To achieve this, the report is set into different sections, the tone of each reflecting these different audiences and goals. Each section is intended to stand on its own, and so could be pulled out to use for different purposes, but also be read in sequence, starting at a higher level and building to more detail and complexity.

General disclaimer: The costs and existing policies referred to in this report are accurate at time of writing (September 2022), and any cost projections have been drawn from leading independent sources. However, the authors acknowledge that this is a fast-changing landscape, and some of the underpinning assumptions may change unexpectedly even in the near-term after publication.



Content

PROGRAM OVERVIEW

Describing the program, how it works and its benefits, for non-expert audiences.



SECTION 1: WHAT THIS MEANS FOR HOUSEHOLDS

pages 6-12
IN A NUTSHELL

What it means for households to have a home 'future-fit' as part of this program, how it works and the benefits.



SECTION 2: WHAT THIS MEANS FOR THE NATION

pages 13-18
IN A NUTSHELL

The impacts of delivering this 'home future-fit' program for the UK as a whole.



SECTION 3: HOW WE DO THIS - SUMMARY

pages 19-27
Summarising what it will take to deliver this program and deliver the above benefits for households and the country.

DELIVERY PLAN

The detail of how the program will be delivered, for industry, councils, experts, leaders, and other parties interested in the detail of implementation.

SECTION 4: A SIX POINT PLAN FOR DELIVERING THIS PROGRAM

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Point 1: A National strategy, through Local Delivery

Point 2: Tackle fuel poverty through energy efficiency

Point 3: A funded offer for every household

Point 4: Fix broken housing standards

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→Policy costs and revenue impacts

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SECTION 5: CONCLUSIONS FOR DELIVERY

pages 66-67





THE UK HOMES FUTURE-FIT PROGRAM: WHAT THIS MEANS FOR HOUSEHOLDS

WHAT 'FUTURE-FIT' MEANS FOR HOUSEHOLDS

IN A NUT SHELL

MONEY IN HOUSEHOLD'S POCKETS

→ **Saving the average household at least £779 a year, for decades to come,** with the most at-risk households benefiting from the biggest savings, up to £4,464. A long-term solution to the cost-of-living crisis.

→ **No household would have to pay from their own pocket.** Instead, measures are funded through a mix of repayments from energy savings and grants for lower income households. Ensuring a suitable offer for everyone, regardless of circumstances.

A HOME FIT FOR THE FUTURE

→ Every UK home is made 'fit for the future'; efficient, comfortable, healthy, safe, convenient, and eco-friendly. Bringing our homes into the 21st century.

→ Achieved through a whole-home upgrade, or 'future-fit', improving homes' efficiency, and installing better heating systems, solar panels, and smart technologies with minimal disruption.

LOCAL DELIVERY FOR LOCAL BENEFIT

→ Made easy and accessible to all, through 'future-fit one stop-shops' nationwide, to roll this out in local areas and offer packages to suit all types of household.

→ Revitalising local economies and communities driving an average of £671m investment in each local authority area; managed and delivered by local people, creating high quality local jobs.



most at-risk
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Money in our pockets

Saving the average household at least £779 a year, for decades to come, with the most at-risk households benefiting from the biggest savings, up to £4,464. A long-term solution to the cost-of-living crisis.

By future-fitting homes, less energy will be needed to keep them warm, cool and the lights on— meaning lower bills. For the average home, this would be a saving of around £779 but for the worst performing homes currently at EPC F and G, upgrading to a C could be an average saving of £4,464 or more per year.

For lower income households, or those in the 46% of the country facing fuel poverty, average bills would be 30-37% lower. Helping keep households out of fuel poverty.

As the program is rolled out over 10 years, this will secure lower bills and protect homes against the long-term structural drivers of the cost-of-living crisis, such as fluctuations in international energy prices. Other financial mechanisms will be needed to address the short-term impacts of the cost-of-living crisis.

No household would have to pay from their own pocket. Instead, measures are funded through a mix of repayments from energy savings and grants for lower income households. Ensuring a suitable offer for everyone, regardless of circumstances.

Whether social housing, private rented or owner occupied, the cost of a home 'future-fit' will be paid for via a 'blended finance mechanism', proving a mix of suitable options for each home:

- 1) Zero interest loans** with repayments tied to the property, not the individual, paid back automatically through a contribution from energy bill savings, never from household savings.
- 2) Loans supplemented by public grants for lower income homes**, with the most at need receiving a greater contribution from grants, and so greater savings.
- 3) For those who can pay, low interest financing** for wider enabling or home improvement works.

Public investments will also be made in UK manufacturing and supply chains to help bring down the cost of installing new low carbon heating systems to be the same as a boiler.

Driving down bills in Stretford Road estate, retrofits included the replacement of wall and loft insulation, along with new party wall insulation, all of which was tightly quality controlled to ensure the best possible performance of the home.



A home fit for the future

Every UK home is made efficient, comfortable, healthy, safe, convenient, and eco-friendly. Bringing homes into the 21st century.

A future-fit home will be a better place to live. Using energy efficiently, kept at a comfortable temperature all year around, staying dry and draft-free. Keeping homes healthy, safe against the impact of future heatwaves, and convenient to run and maintain with high quality modern systems that guarantee quality and performance within the home.

Whether we live in one of the millions of cold, damp, drafty and expensive to run homes in the UK; or whether we are proud of our home but interested in improvements to bring it up to date and improve quality of life, this program will ensure the British public have some of the best housing in the world, fit for the 21st century.

“These technologies are cost effective, proven and highly reliable”

Achieved through a whole-home upgrade, or ‘future-fit’, improving homes’ efficiency, installing new heating systems, solar panels, and smart technologies with minimal disruption.

Trained and vetted local professionals will work to plan and deliver a whole-house future-fit. Installing multiple building fabric measures like insulation, modern windows and draft exclusion to keep homes dry and stop energy wastage. Once homes are made energy efficient, homes will benefit from new zero-carbon heating systems such as heat pumps (where appropriate), rooftop solar panels, and smart control systems. Also measures to protect against heat waves, such as window shutters. These technologies are cost effective, proven and highly reliable, and processes and regulations in place to make sure work is done to the highest quality, with energy savings guaranteed. Householders will also be provided the systems and education needed to manage their new homes effectively. Together, reducing the amount of energy homes need to import and the costs of living.

Heating

- Air source heat pumps
- Ground source heat pumps
- Smart heating controls
- Updated central heating system

Operation

- Smart 'Home Energy Management Systems' to integrate technologies and enable 'demand side management'
- Education for householders on how to manage home

THE FUTURE-FIT HOME

Hot water

- Cylinder jacket
- Cylinder thermostat
- Waste water heat recovery

Adaptation

- Window shutters
- Blinds and other shading

Windows and doors

- Replacement glazing
- Secondary glazing
- High performance doors

Infrastructure

- Connect to district heating network where suitable

Lighting

- Energy efficient light bulbs
- Smart lighting controls

Microgen and renewables

- Solar photovoltaics
- Solar hot water

Insulation

- Cavity wall insulation
- Solid wall insulation
- Loft or roof insulation
- Room in roof insulation
- Under-floor insulation
- Party wall insulation



500,000
new and
exciting
careers

Local delivery for local benefit

Made easy and accessible to all, through ‘future-fit one stop-shops’ nationwide, to roll this out in local areas and offer packages to suit all types of households.

‘One-stop-shops’ will offer end-to-end support to undertake a whole house ‘future-fit’. Including advice, assessing the needs of each house, financing, installation of measures and oversight, simplifying the process for households.

Delivered through local area-based programmes going from street to street engaging with households, reaching households at the doorstep, via TV and social media, the wider community, and neighbours. Identifying and targeting fuel poor households as a high priority in areas with low incomes and low energy performance.

Hundreds of these ‘future-fit one-stop-shops’ will be established and managed by local authorities, staffed by local people and involve local businesses and community groups; offering a tailored support package that suits their situation, for instance on accessing finance and taking advantage of new regulatory drivers and fiscal incentives. Other households may wish to pick and choose the right time to future-fit their home, such as at key transition points like refurbishments, the sale or renting of a property or at any point just for the sake of saving energy.

Revitalising local economies and communities driving an average of £671m investment in each local authority area; managed and delivered by local people, creating high quality local jobs.

The area-based roll out of home ‘future-fits’ will represent a significant investment in local economies, driving an average of £671m in total for each local area across the UK, when combining total public and private investment. Creating 500,000 new, exciting, and careers spread evenly across all regions of the UK. Long-term, quality jobs for the young and those already employed, growing local economies, and enhancing prosperity. By harnessing the ingenuity of local civil society, industry & councils, to roll this out in a way that suits each local area, it will bring communities together.



THE UK HOMES FUTURE-FIT PROGRAM: WHAT THIS MEANS FOR THE NATION

THE BENEFITS OF THE FUTURE-FIT PROGRAM FOR THE UK...

IN A NUT SHELL

→ A once in a generation national effort to modernise the UK's most important asset: our homes. Upgrading 23.5m households in just ten years.

→ Dealing with the long-term drivers of the cost-of-living crisis by significantly reducing energy bills over 10 years, eventually saving over £25bn/year, helping to permanently address the scourge of fuel poverty in the UK.

→ A prudent national infrastructure investment of £222bn over ten years, £60bn of which from the public sector, which, combined with tax measures will result in an increase in UK GDP of **£361bn** by 2034.

→ Levelling up across the whole of the UK, by investing in low-income areas and leveraging local communities.

→ Expanding the UK's newest and most exciting sector, with 500,000 diverse and home-grown green-career opportunities.

→ Making the UK a world leader on climate change, delivering **22%** of the UK's green-house gas reduction targets



A once in a generation national effort to modernise the UK’s most important asset: our homes. Upgrading 23.5m households in just ten years.

Delivering a whole-house future-fit for the majority of UK homes, integrating improvements for comfortable, safe, sustainable and crucially, low-cost living. Including multiple building fabric measures, new heating systems and controls and the adoption of rooftop solar panels. Supporting households to greatly reduce energy wastage ensuring that 26.2m homes are EPC C or better, saving a total of £112bn in energy costs by 2034.

Ensuring that the UK’s homes are fit for the 21st Century, this is a national program, we which we can all get behind and be proud – Bringing together and galvanising households, industry, government, councils, and community groups to deliver this UK wide transformation. Like other collective efforts for the good of the country and that from part of our national identity, such as the formation of the NHS, this program will be something we can all be proud of. The installation of energy efficiency measures has collapsed in the last decade from around 2.25m insulation measures in 2012 to <100,000 in 2021^[1]. The UK’s homes are colder, draughtier, damper and lose heat three times faster than in most other European countries^[2]. Of the 31,100 excess winter deaths in 2012/13 – 30-50% were due to cold homes^[3]. Spending £10 billion on ‘poor’ housing in England alone would save the NHS around £14bn over this 10 year programme^[4]. It’s time to bring UK homes into the 21st century.

Spending
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Saving
UK homes

**£25bn
annually**

Dealing with the long-term drivers of the cost-of-living crisis by significantly reducing energy bills over 10 years, saving households £25bn/year, helping to permanently address the scourge of fuel poverty in the UK.

The UK is in the grip of a “cost-of-living crisis”, in large part due to the combination of 1) energy being wasted when heating homes, 2) high cost of energy – Customers are already experiencing annual energy bill increases of up to £708. Prior to the prize free, by January 2023 energy bills were forecasted to reach £4266^[5], putting nearly half of UK households in fuel poverty. This is a national emergency.

Reducing bills by ending wasted energy in homes is single most impactful intervention for addressing the cost-of-living crisis, and would transform the lives of millions of British people by:

- **Saving UK homes £25bn annually**
- **By 2034, we expect 10.1m fewer people to be in fuel poverty, with at least 3.5m a direct result of the programme**

A prudent national infrastructure investment of £222bn over ten years, £60bn of which from the public sector, which, combined with tax measures will result in an increase in UK GDP of £361bn by 2034.

An investment in the British economy, which would pay for itself over the long term – This program would require an £222bn investment over 10 years, £60bn of public funds to leverage £164bn in private sector investment. The net benefit would far out way this however. Indeed, using research into similar programs implies a net benefit of around £361bn for the UK economy^[6]. This is not money out of the door, but investing in our shared physical infrastructure - our homes - with a return on investment for decades to come.

Improve government finances – The same research indicates that for every £1 of public money invested in this program, the UK government will recoup £1.43 through tax and budget savings revenue due to enhanced economic prosperity^[6].

Reduce our dependence on volatile foreign energy imports to heat our homes – We currently spend £20bn a year on volatile foreign gas imports, mostly for heating homes. By reducing energy waste and shifting to electric heating this program will help end that.

Expanding the UK's newest and most exciting sector, with 500,000 diverse and home-grown green-career opportunities.

This transformative national program will create new and exciting, home-grown green careers. To deliver this programme, 260,000 new workers will be needed, with new skills and opportunities in this exciting area of innovation and social change. Many of the 223,000 strong existing workforce will also need retraining. This will also lead to 230,000 'indirect' jobs in the wider supply chain spread out around the country, creating around half a million new jobs in total

This transition will need to be just and inclusive, with a focus on diversifying the sector – To ensure the existing workforce is not left behind £100m would be invested in retraining existing workers, and £400m for training new workers so that the sector can double in size and also appeal to young people, ethnic minorities, women, and disabled workers (currently only 15% of workforce represents these groups).

Raft of interventions needed to ensure this workforce in place – This will take time but is possible with a whole range of apprenticeships and vocational training for a new 21st century career of delivering climate ready homes, new courses for existing training programs, combined with labour market reform.



£100m
would be invested in
retraining workers,
and **£400m**
for further training

Levelling up across the whole of the UK, by investing in low-income areas and leveraging local communities.

This national program of regeneration and transformation, using an area based approach, would have local communities at its heart –

Delivered a coalition of local business, community groups, charities, civil society, and citizens. Convened and led by local authorities, who'll be provided with the funding, capacity and independence needed to deliver and create programs that work for their areas.

Levelling up all UK regions – This investment and its impacts will be spread across UK regions, with £671m leveraged per local authority area, making a huge contribution towards levelling up.

The role of government is to convene, empower, and facilitate – not dictate – investing to unleash the communities and the private sector, making use of legacy engineering's skills in former industrial regions.

Making the UK a world leader on climate change, delivering 22% of the UK's greenhouse gas reduction targets

£671m
per local
authority
area

This program will help the nation meet our legally binding emissions targets – Existing homes produce 20% of the UK's CO₂e and use 35% of its energy ^[1]. This program is one of the single biggest interventions to

address the UK's GHG emissions, reducing emissions from homes by 218 million tonnes of CO₂ by 2034, or 22% of the required savings from the fifth and sixth carbon budget reductions (2028-2037) under the UK's Net Zero targets. These changes are beyond the scope of the vast majority of UK households to implement on their own, and so this programme is vital for dealing with the climate crisis.

It will also protect us from the increasingly dangerous effects of climate change – These impacts are already being felt by households, with extreme heat waves likely to increase in regularity and severity. Future-fit homes will remain cooler and prevent avoidable deaths and discomfort.





THE UK HOMES FUTURE-FIT PROGRAM: HOW WE DO THIS – A SUMMARY

Where we stand today

Bold policy is needed to renovate the UK’s housing stock, to avoid billions of pounds in wasted energy bills, huge carbon emissions, re-energise industry and build public confidence. What is needed now is a long-term plan to transform the housing stock and to create hundreds of thousands of jobs – providing certainty to industry and reassuring the public that the government is committed to this process.

A recent study of 80,00 European Homes found that **a UK home loses heat up to three times as fast** compared with some Western European neighbours such as Germany

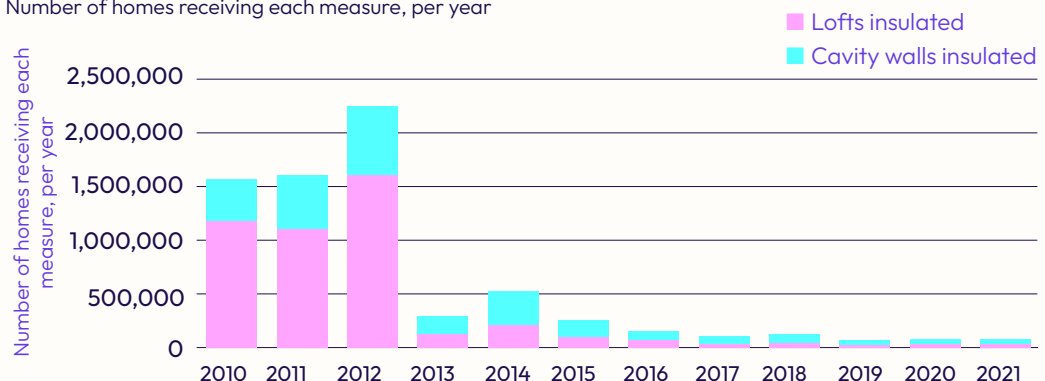
The UK is in a devastating “cost-of-living crisis” largely driven by energy bills. Consumer price index (CPI) inflation is expected to reach 10% in 2022 with Universal Credit set to rise by only 3.1% – a real term cut for those on the lowest incomes. Due to increases in wholesale gas price, in April 2022, Ofgem increased the domestic energy price cap by 54%, and a further 82% increase was planned for October. Cornwall Insight estimates this will again increase from an average £3,554 in October to £5,341 in April 2023 [5]. This would represent the worst hit to household budgets since the second world war.

The UK has some of the least efficient homes in Europe. The installation of energy efficiency measures has collapsed in the last decade (see Figure) [1]. This has led to higher energy bills and severe public health impacts. 54% of UK homes remain at or below Energy Performance Certificate (EPC) ‘D’. A recent study of 80,00 European Homes found that a UK home loses heat up to three times as fast compared with some Western European neighbours such as Germany [2]. While the UK Government’s 2017 Clean Growth Strategy included a target for all homes to reach EPC band “C” by 2035 and all fuel poor homes by 2030, there are currently insufficient policies in place to meet these aims.

This national crisis needs a credible plan that with strong leadership will deliver. The UK has delivered deep transformations before to our great national benefit such as the establishment of the NHS, the post-war social housing programme, and the rollout of gas central heating. However, this will need bold leadership from government, providing direction, resources, coordination, and certainty. This requires a strategy with the vision, measures, and interventions equal to the task. Small nudges and business-as-usual just won’t meet this challenge in the remaining timeframe.

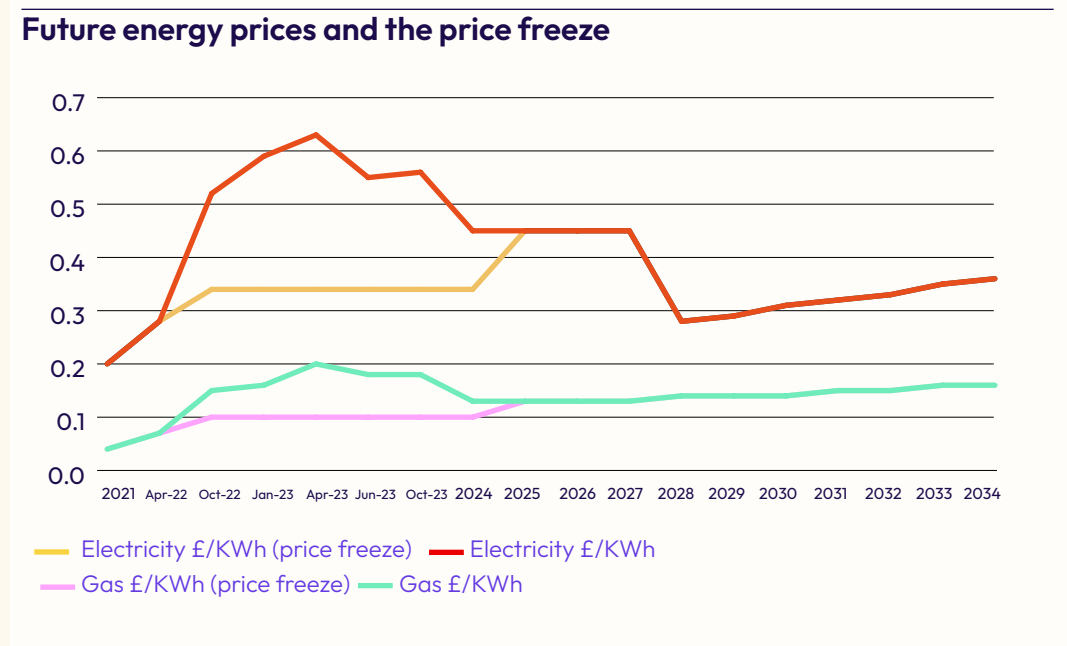
UK home efficiency improvements plummeted in 2013

Number of homes receiving each measure, per year



Energy prices expected to remain high throughout 2020's

On the 8th of September, the new UK government set out plans to freeze energy price increases to around £2,500 for the average bill payer from the 1st of October 2022. This would mean an Electricity Unit rate of 34.00p per kWh and a Gas Unit rate of 10.30p per kWh until October 2024. While this is welcome news, unfortunately, we expect high prices to return from 2024. Using the latest projections from Cornwall Insight ^[5], energy bills are expected to remain elevated through the 2020s. As shown in the chart, we assume that electricity bills eventually recover to their April 2022 levels, due to the increasing adoption of low-cost renewables, Cornwall Insight ^[14] expects gas prices to remain elevated throughout the next decade. The impact of this price freeze on the price assumptions used in this report is shown in the figure below.





A six-point plan to retrofit 23.5 million homes

What follows is a 10-year blueprint for how these goals can be achieved to deliver a great UK homes upgrade. Following the recommendations of the National Retrofit Strategy^[7], this requires a long-term, sophisticated, and multifaceted plan including wide reaching and systemic reforms, and a broad range of instruments and initiatives. This strategy must recognise the complexity of the residential energy system, involving a vast number of organisations and relationships which influence the behaviours of private homeowners. We suggest the deployment of six key policy pillars, that should be begun as soon as possible, and developed and strengthened over three phases. If any one of these areas is absent, the strategy may be liable to fail.

-  **1 A National Strategy, through Local Delivery** – A National Retrofit Taskforce with the remit to deliver this 10+ year program, setting policy and convening stakeholders. Local one-stop-shops around the country, driving ‘area based roll out’ and offering an end-to-end service providing a tailored ‘future-fit’ for every home, resulting in local investment and regeneration. Led by local authorities and involving local civil society, private and third sectors.
-  **2 Tackle fuel poverty by reducing energy wastage** – By improving the building fabric of our homes through government grants and minimum energy efficiency standards (MEES).
-  **3 A financed renovation for all** – A blended financing model using zero interest loans secured to the property, and grants, and fiscal incentives making this attractive at key life stages.
-  **4 Fix broken housing standards** – Updating the EPC system, improving standards and compliance, protecting households, and moving to a ‘pay for performance’ requirements on installers.
-  **5 Create half a million green jobs** – A just transition for existing workers, plus huge new training programs and career opportunities for a new workforce.
-  **6 Decarbonise heat** – Creating an enabling framework for low carbon heat systems to drive down costs.

Phased delivery

A transition on this scale – with reforms to industry practices and standards, and the need to build capacity in government, local authorities, and industry – must be approached in stages. The decade-long implementation of these six policy pillars would therefore be delivered over three broad phases and would continue through the 2030s. The program has been designed for initiation in 2024. However, should the UK government decide to start sooner, we propose that the range of existing programmes, such as Home Upgrade Grant, Local Area Delivery Program, should be upscaled in 2023 prior to this programme fully commencing.

PHASE 1: 2024-2027

Prepare the UK for a national transformation and start helping those most in need first

Preparing the UK for this program of transformation – The UK does not currently have the capacity to upgrade 23.5 million homes, and so the first ‘enabling phase’ will need to address this, building the foundations that will allow the program to bear fruit as it ramps up:

- **Super charge existing fuel poverty programs** with more funding (e.g. ECO, Home Upgrade Grant, Local Area Delivery Program) to ensure we don’t lose existing positive momentum
- **Making the case to households and the country** by communicating with the UK public and industry, explaining this program, addressing concerns, and making the case for this change.
- **Set up national and local delivery structures** – Establishing the new institutions and relationships necessary to shape and drive this 10 year + programme.
- **Capacity building for industry and local authorities.** Building the skills and workforce to deliver whole house ‘future-fits’ and local authority capacity to manage and drive the program locally.
- **Establish the necessary regulatory and policy landscape** to start driving change and allowing households and industry time to plan for future changes.
- **Building a home-grown supply chain** so that the core technologies, such as heat pumps, can be made here and so that costs come down substantially over time.

Early roll out to focus on most in need – While roll out will be slower than in latter stages, the most in need households don’t have time to wait, so the available delivery capacity will prioritise them.

PHASE 2: 2027-2030

Main program of UK-wide accelerated roll-out

Program led delivery of home ‘future-fits’ reaches full capacity – Rate of homes ‘future-fitted’ increases significantly after Phase 1, following establishment of industrial, governmental, and social infrastructure to expand the area-based delivery program to deliver at the scale needed.

Government maintains momentum through continued funding and leadership, implementing policy timetable outlined in Phase 1, cementing industry and household confidence.

Increased levels of households ‘future-fitting’ their homes independently due to increased public familiarity, lowering price of solutions like heat pumps, and established policy landscape.

PHASE 3: 2030-2034+

Transition to a self-sustaining market

The vast majority of ‘high-risk’ homes will have been ‘future-fitted’ the low-income area based roll out will start to phase down

Increasingly self-sustaining transition regulations, cultural shift and market maturity mean households and industry have had time to prepare, and the shift to heat pumps reaches national scale. Uptake is now largely market led.

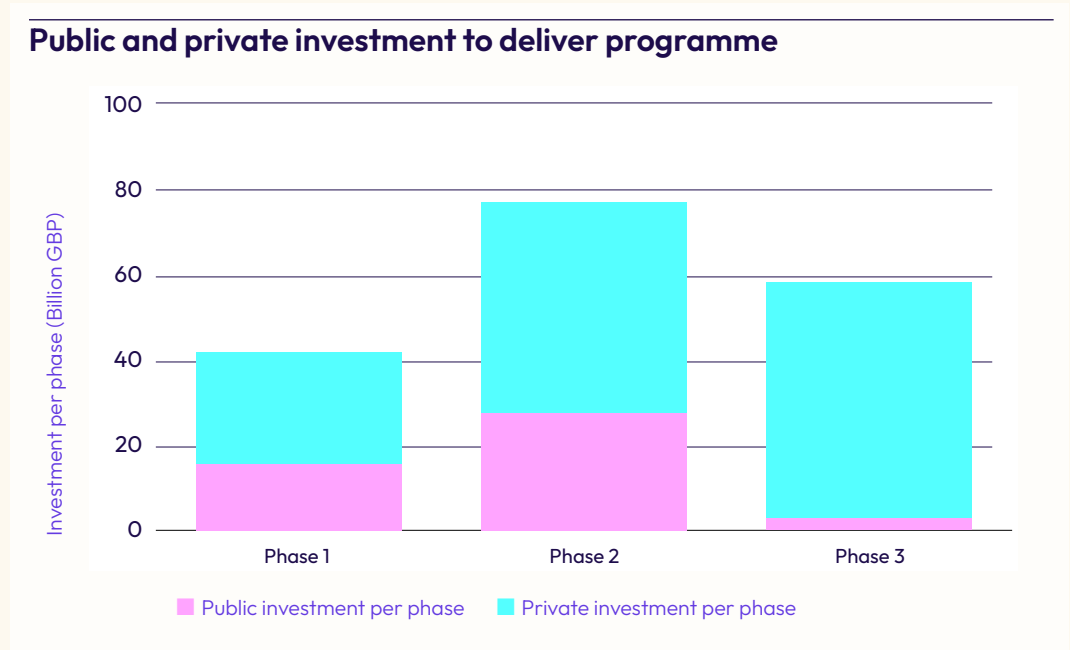
Delivery continues through 2030s and beyond adoption of heat pumps and other low carbon heat continues apace with continuation of key support mechanisms and minimum standards driving uptake through 2030s so that these technologies become the norm for the construction industry.

A dual approach to reach all homes: Targeted area-based roll out combined with market-based policies - With 23.5 million homes to reach a combined approach is needed, making use of local area-based roll out to target the homes most in need, particularly in the earlier phases of the program, reaching 9.2m homes. Alongside regulations and incentives such as MEES, to stimulate householder led uptake of measures where it suits the household, such as at the point of sale of a home. Reaching 6.2m homes.

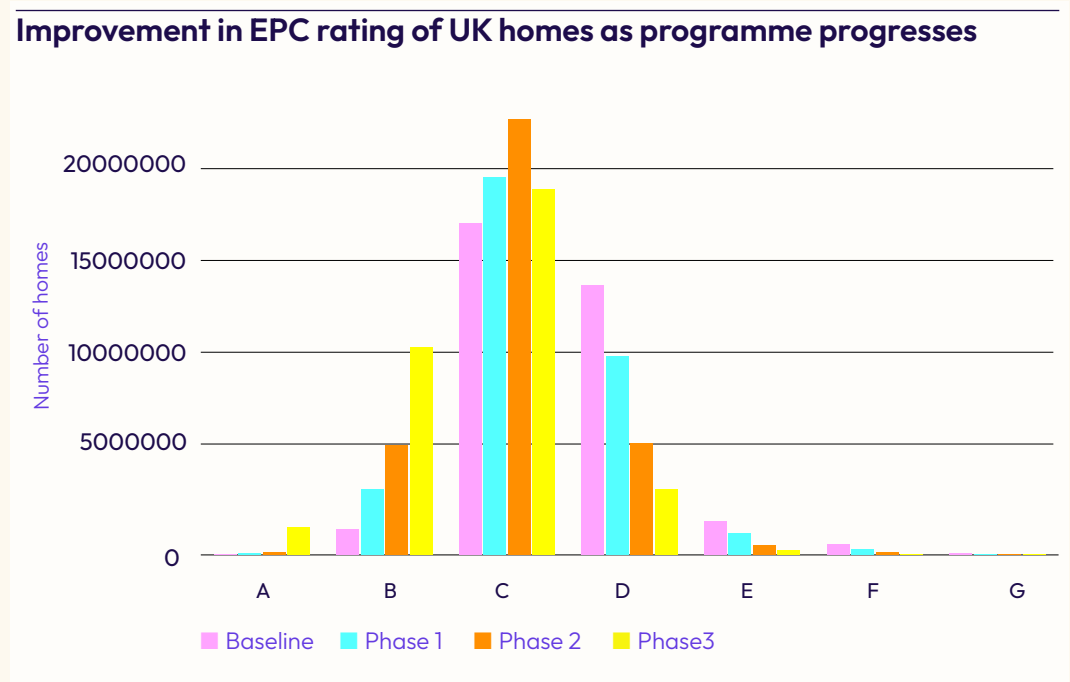
The following table summarises the suggested policies and key interventions from government for each of these six pillars, for each phase of the program.

Point	Phase 1 - Capacity building & focusing on most in need	Phase 2- Main program of support scaling up	Phase 3- Self-sustaining roll out
Description	Build capacity, bring down cost, train supply chain, help those who need it most, set out regulatory landscape to allow industry to plan	Fast paced majority roll out of gov funded programmes now that local gov and industry have capacity.	Regs & market drive increasingly self-sustaining transition as people have had time to prepare. Major adoption of heat pumps
	2024 - 2027	2027 - 2030	2030 - 2034+
1. National plan, local delivery	Establish structure and build capacity <ul style="list-style-type: none"> - £1bn for local authorities to set up area-based delivery units - Establish National Retrofit Taskforce - National public relations campaign - Procure national EPC and stock data 	Strengthen oversight <ul style="list-style-type: none"> - £500m for local area-based delivery units - Whole house plan for all homes - Building renovation passport roll out 	Maintain delivery <ul style="list-style-type: none"> - £500m for local area-based delivery units
2. Tackle fuel poverty by reducing energy wastage	Target most in need: <ul style="list-style-type: none"> £15bn low-income fabric grants 2025 - MEES "C" all social housing 	Scale up delivery: <ul style="list-style-type: none"> - £30bn low-income fabric grants - 2028- MEES "C" all PRS 	Transition to self-sustaining market: <ul style="list-style-type: none"> - £3.5bn low-income fabric grants - 2030 - MEES "C" owner occupiers (on sale) - 2030- MEES "B" all social housing
3. A Financed renovation for all	Set the necessary financial and fiscal landscape to carry program forward: <ul style="list-style-type: none"> - Zero interest loans to 'future-fit' your home - 5% VAT on retrofit led renovation up to £5,000 - Variable stamp duty based on EPC - Move levies from electricity bills into taxation 		
4. Fix broken housing standards	Set a new landscape: <ul style="list-style-type: none"> - De-privatise housing standards and enforcement - Reform EPC's - Minimum performance standards for heat pump installations 	Start market modernisation: <ul style="list-style-type: none"> - Require pay for performance in new homes and social housing retrofits 	Embed market modernisation: <ul style="list-style-type: none"> - Require pay for performance in all new retrofits
5. Create 500,000 Green Jobs	Deliver a just transition: <ul style="list-style-type: none"> - £300m for new training and apprenticeships - £100m to retrain existing workforce 	Keep building capacity: <ul style="list-style-type: none"> - £50m for training and apprenticeships 	Keep building capacity: <ul style="list-style-type: none"> - £50m for training and apprenticeships
6. Build a Low carbon heat market	Support and build market: <ul style="list-style-type: none"> - £4.5bn for heat pump grants (750,000 heat pumps) - Require energy suppliers to offer smart heat tariffs 	Grow to market maturity: <ul style="list-style-type: none"> - £4.5bn for heat pump grants (2.25m heat pumps as costs drop as market reaches scale) - asses results of any large scale hydrogen trials 	Mandate market transition: <ul style="list-style-type: none"> - Ban on gas and oil boilers from the early 2030's (leading to 1.6-1.8m heat pumps installed per year) - co-ordinate with industry to respond to results of hydrogen trials
Capital investment summary	£15bn low-income fabric grants (£20k cap) £4.5bn for heat pump grants (750,000 heat pumps) £1bn capacity building and local delivery Leveraged private investment: £32bn Total: £52bn	£30bn low-income fabric grants £4.5bn for heat pump grants (2.25m heat pumps) £500m capacity building and local delivery Leveraged private investment: £60bn Total: £96bn	£3.5bn low-income fabric grants £500m capacity building and local delivery Leveraged private investment: £69.5bn Total: £73bn

The impact of these policies has been modelled in detail and will transform the UK. The resulting roll out across the UK housing stock is summarised in the following charts, showing the total capital investment per phase and the impact on the UK’s energy performance certificates. As can be seen from the first chart, public investment is front loaded to the first two phases, with private investment taking over in Phase 3 as delivery becomes more market led.



This leads to a massive reduction in energy bills, with 11m homes raised to an EPC C or above rating, virtually eliminating the worst performing EPC bands.





THE SIX POINT PLAN TO DELIVER THIS PROGRAM

T NATIONAL PLAN, LOCAL DELIVERY

Delivering this radical programme requires a joined-up strategy, that integrates a national policy framework with an engagement strategy and local delivery models, to ensure every household receives a compelling offer.

This strategy, while focussed on the whole of the UK, must recognise the important and necessary involvement of the devolved administrations, ensuring a degree of self-determination and autonomy over some elements of this programme.

The key elements of this delivery model are summarised in the following diagram. We estimate putting in place the structures and systems for this National Plan and Local Delivery would require around £50m per 500,000 homes retrofitted, or around £2bn for the programme we outline in this report (note this does not cover the cost of measures, which is covered elsewhere).

<p>NATIONAL RETROFIT TASKFORCE</p>	<p>National body with remit to deliver 10+ year program</p>	<ul style="list-style-type: none"> → Reporting to central Government → Provide independent oversight → Developing and driving recommend policies 	
<p>HOUSEHOLD ENGAGEMENT STRATEGY</p>	<p>Programme to engage all UK households with 'future-fit' agenda</p>	<ul style="list-style-type: none"> → A 'Great Homes Upgrade': campaign using TV, print and social media → Community outreach: building on the existing trusted relationships 	
<p>LOCAL ONE STOP SHOPS</p>	<p>Area based delivery units providing end-to-end service</p>	<ul style="list-style-type: none"> → Run by local authorities, involving civil society, SMEs and third sector → Providing advice, co-ordinating supply chains, adminisering finance and quality assurance with a single point of contact and call-off support 	
<p>A TAILORED 'FUTURE-FIT' FOR EVERY HOME</p>	<p>A future fit home offer tailored to circumstances and life stage</p>	<ul style="list-style-type: none"> → A fully funded 'future-fit' home offer → A Whole House Plan detailing the key measures and upgrades → Building Renovation Passports: a digital logbook to track progress through time 	



National Retrofit Taskforce

Achieving the promise of this report and tackling the multiple policy challenges, requires a coordinated strategy. To deliver this vision, we, and the New Economics Foundation (NEF) argue that the UK government should create a National Retrofit Taskforce^[8], having the following key roles:

- Overarching statutory responsibility for delivering the fuel poverty and able to pay strategy
- Responsible for the planning and delivery of the interim EPC targets and net zero goal to ensure agreed national targets and carbon budgets are met
- Engage key stakeholders, including, Government, Third sector, Industry and Consumer groups
- Work with devolved administrations in the design and implementation of the wider programme, noting that some of this agenda is more advanced in Wales, Scotland and Northern Ireland
- Procure national EPC and housing stock data as a priority through a central Information Hub (collection point for best practice advice and guidance) and a Data Warehouse (repository for property-level data and information)
- Work across government departments to monitor progress towards the delivery of the targets through an overarching remit
- In partnership with local democratic representatives, set up, support, and monitor an area-based delivery programme specifically designed for local circumstances, helping to deliver wider benefits to communities
- Reporting to central Government through a nominated minister and cabinet committee

Household Engagement Strategy



This programme must engage all UK households with a compelling offer, regardless of tenure, income, or life stage. This requires an engagement strategy that is both tailored to the households unique circumstances and integrated into a visible and long-term national programme. At its core this ‘Great Homes Upgrade’^[9] campaign must ensure that there is an offer for everyone with complexity taken away from the individual and risks and costs reduced through collective action. We propose the household engagement strategy would have the following features:

- **A national ‘Great Homes Upgrade’ campaign:** previous large national infrastructure programmes, such as the switch from town gas to natural gas, the digital television transition and the smart meter rollout involved a long-term public relations campaign, which informed the country about the change and outlined its benefits to create a shared national sense of purpose.
- **Community outreach:** reaching most UK households and undertaking internal and external upgrades to their homes requires a trusted relationship. A successful retrofit programme should therefore build on existing trusted relationships within communities, such as through sports clubs, faith groups and local campaigning organisations to engage all citizens.
- **Mixed tenure area-based programmes:** local area-based programmes are needed from street to street engaging with households, offering whole house ‘future-fits’, managed, and delivered by a local one stop shop. This will require multiple engagement channels, including at the doorstep, via TV or social media or their wider community, neighbours.
- **Targeted fuel poverty programmes:** fuel poor households, should be identified and targeted as a high priority based on improving understanding of areas with high levels of low income and low energy performance. We suggest this is done by both the mixed tenure area-based programmes alongside a national fuel poverty programme, which can offer immediate support to households poorly serviced by the area-based programmes.
- **Market based uptake:** In parallel households who wish upgrade their homes either as part of a refurbishment that was already planned, at the point of sale, or just for its own sake will be offered a tailored support package including the access to finance and fiscal incentives, and regulatory drivers, to future-fit at key transition points like refurbishments or the sale or renting of a property.

Local one-stop-shops



To deliver this programme, we argue an ‘Area Based Delivery’ model for delivering retrofit and regeneration activity is needed in local areas – as recently outlined by Friends of the Earth^[10], and currently being delivered by Retrofitworks CIC, this “one-stop shop” delivery model would have multiple functions: informing and engaging communities, coordinating the supply chain, administering government grants and finance, providing quality assurance and redress services, and collaborating with the pre-existing network of community actors and intermediaries. Drawing on trials of retrofit one-stop-shops across Europe, this would provide an integrated and tailored offer to owner occupiers, landlords and tenants: providing advice, energy audits, financing and delivering quality assured retrofits. Depending on local experience and capacity, these different roles and functions may be performed by different actors. However, we expect a central coordinating role for local authorities to:

- **Develop local area-based strategies** for retrofit led regeneration, based on a neighbourhood or street by street approach
- **Engage local communities on the benefits** of retrofit and re-generation through marketing and outreach services
- **Provide a single point of contact** for information, energy audit, financing, and project delivery
- **Be flexible to the needs and requirements of households**, with individual services on a call off basis
- **Provided by dedicated project managers/retrofit coordinators** providing end-to-end support
- **Administer scheme financing** and ensure there is a financial offer for all
- **Provide independent arbitration service** for contractual disputes
- **Educate households** in how to use their future fit home most efficiently





A tailored ‘future-fit’ for every home

Every household must have an offer that works for them, whether in acute fuel poverty, moving house, undertaking wider improvement works or replacing a broken boiler. This means a targeted package of support, funding and incentives for those on low incomes and those in more affluent areas. Fuel poverty programmes must work in parallel to supporting those who wish to upgrade their homes either as part of a planned refurbishment, at the point of sale, or just for its own sake. Each home will require a whole house plan, tailored to both the home and its occupants, modelling the current condition of the home, the appropriate measures to be implemented and the order they should be undertaken. Progress should then be tracked through new Building Renovation Passports, which provide a digital logbook of improvements through time:

- **A ‘future-fit’ offer for everyone:** including appropriate advice, finance and fiscal incentives, and regulatory drivers, to future-fit at key transition points like refurbishments or the sale or renting of a property
- **Whole house plan:** develop a bespoke Whole House plan for all UK homes – detailing the steps and measures required to meet future EPC and net zero targets
- **Building Renovation Passports:** develop digital logbook of retrofit interventions and progress through time which is stored in the Data Warehouse



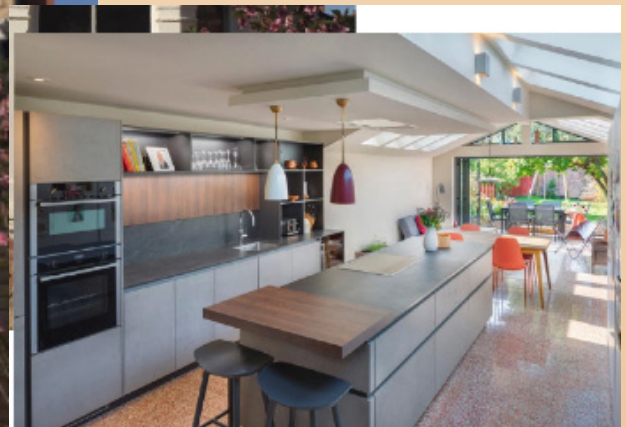
Community led One-Stop-Shops Retrofitworks & Cosy Homes Oxfordshire

**TRIED +
TESTED**

RetrofitWorks is a cooperative of small to medium enterprises and local 'advocate' partners, delivering reductions on CO² emissions and energy bills in homes while stimulating the local economy and improving the health and well-being of residents. The Retrofitworks one-stop-shop transforms the traditional piecemeal approach, using a bespoke online management and procurement platform, which allows property owners to receive 3+ comparable quotes from local companies, creating competition and value for money whilst ensuring a high quality end-to-end service.



→ **Cosy Homes Oxfordshire is a local partnership between the Low Carbon Hub, National Energy Foundation, and RetrofitWorks. During the pilot phase they launched our whole retrofit service, engaging with over 550 Oxfordshire homeowners, delivering 233 home assessments, 220 Whole house plans engaging with over 90 contractors, with 23 current live retrofits in the Oxfordshire area.**



2 TACKLE FUEL POVERTY



Fuel poverty is defined in England as households who have above average heating bills, who, when paying these bills fall below the poverty line. Energy inefficient housing is a major driver of fuel poverty. Prior to the 2022 price cap rises, 43% of homes in Energy Performance Certificate (EPC) Bands “F” and “G” were fuel poor compared to only 5% in bands “B” to “C” ^[11]. However, recent estimates^[12] suggest that 6.32 million or 26.7% of English households entered fuel poverty from 1 April 2022, and prior to the price freeze announcement was estimated to reach 8.2 million following October’s price rise, and 12 million by January 2023^[13]. At least one third of households are expected to be in fuel poverty next year. This will create misery for millions of families each winter, with many forced to choose between heating and eating. Therefore, any plan to reduce carbon emissions must put the needs of those living on the lowest incomes and in the worst homes first. We propose the following steps to achieve this:

Make bills cheaper, fairer and support the electrification of heat

Residential electricity prices are four to five times higher than gas prices. This is partly driven by legacy policy costs at around £155 of the average electricity bill. This results in low earners paying a higher relative share of their income. We propose moving these policy costs into general taxation. Indeed, Germany has recently announced a 43% reduction in these levies and plans an eventual phase out to drive the adoption of heat pumps and reduce bills. Further, by removing the 5% VAT on energy bills we expect a further £205 a year of savings on average.

The positive impacts will be:

- **Will reduce bills immediately addressing the cost-of-living crisis:** the average fuel bill would decrease by £360 per year
- **Will address inequality** by shifting these costs to those who can most afford them
- **Will make urgently needed electrification of heat much easier to deliver** by reducing the running costs of heat pumps compared to gas and making using heat pumps more competitive relative to artificially cheap cost of operating gas boilers for heating.
- **Any shift in levies should be directly covered by government**, to ensure continued funding for existing and legacy policies

Invest £53bn in low-income homes

The UK should drastically increase the scale of investment in energy efficiency and target this investment at those most in need. Unlike previous fuel poverty policies these grants should be funded through general taxation, reducing their regressive impact on energy bills. We propose that £48.5bn should aim to raise low-income homes to EPC “B”, offering up to £20,000 for those in most acute fuel poverty. With a further £4.5bn available for heat pumps in low-income homes. Our modelling suggests that these first two policies alone would save those in receipt of the full grant £1,964-3,327/year in energy bills and the wider programme would reduce fuel poverty by a total of 59% across all phases.

Supercharge funding for existing fuel poverty programs

The UK has a range of existing programs working to deliver home energy efficiency, such as the Energy Companies Obligation (ECO), and Local Authority Deliver (LAD) schemes. To cancel these programmes would be hugely disruptive, delaying planned delivery of critical measures to fuel poor households in the short term. Therefore, this funding should be initially used to supercharge existing programs to ensure continuity for industry and households, prior to the scale up of the Area Based Delivery schemes.

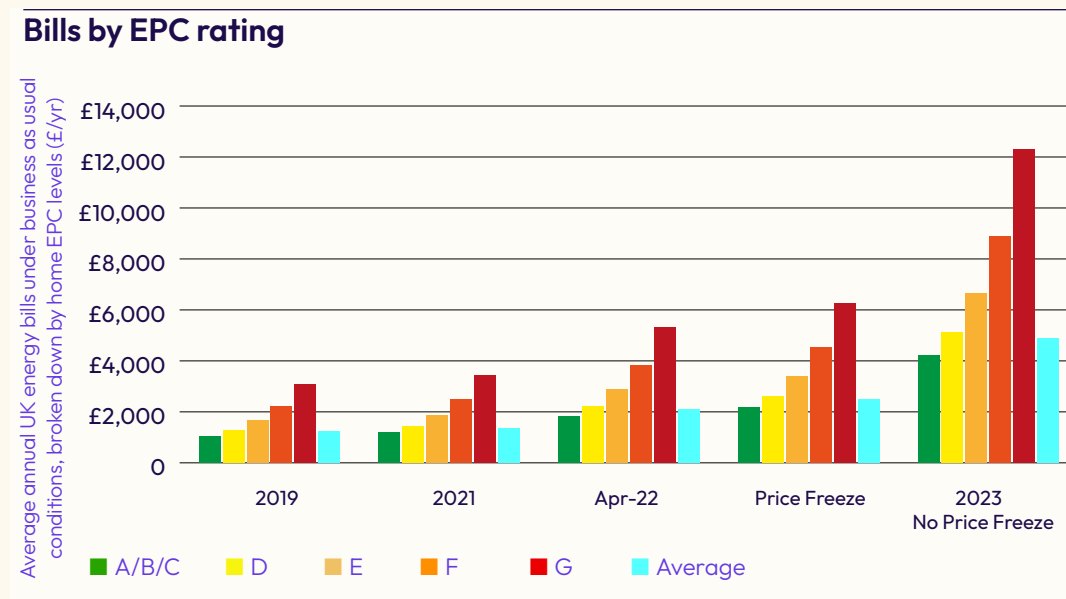
All homes for sale or rent achieve EPC “C” by 2030

In 2019 just 10% of fuel poor households lived in a property of EPC Band “C” or better. Better insulation and more efficient heating are therefore crucial to alleviating fuel poverty. We argue that a regulatory approach is required to ensure all homes are brought to minimum energy efficiency standards (MEES) of EPC “C” by 2034. MEES would mean that a property could not be rented or sold if it does not meet a certain energy performance level. We propose that social housing should be the first sector to be regulated to this standard, followed by the private rented sector and eventually owner-occupied properties – the largest tenure. This staged approach should ensure time for property owners to plan these works and for supply chains to scale:

- **MEES Social Housing:** EPC “C” 2025, EPC “B” 2030
- **MEES Private Rented Sector:** EPC “C” all tenancies 2028
- **MEES Owner Occupiers:** EPC “C” all sales 2030

Impact on Fuel Poverty

A core objective of this programme is to reduce spiralling energy bills, which are already driving millions into poverty, with the worst yet to come. As shown in the figure, prior to the price freeze, the average home expected to be paying £3,853/year in from the autumn and an average £4,891 in 2023, while around 71,000 EPC G rated (2.4% of stock) will need a shocking £12,283/year. Clearly impossible for most households.

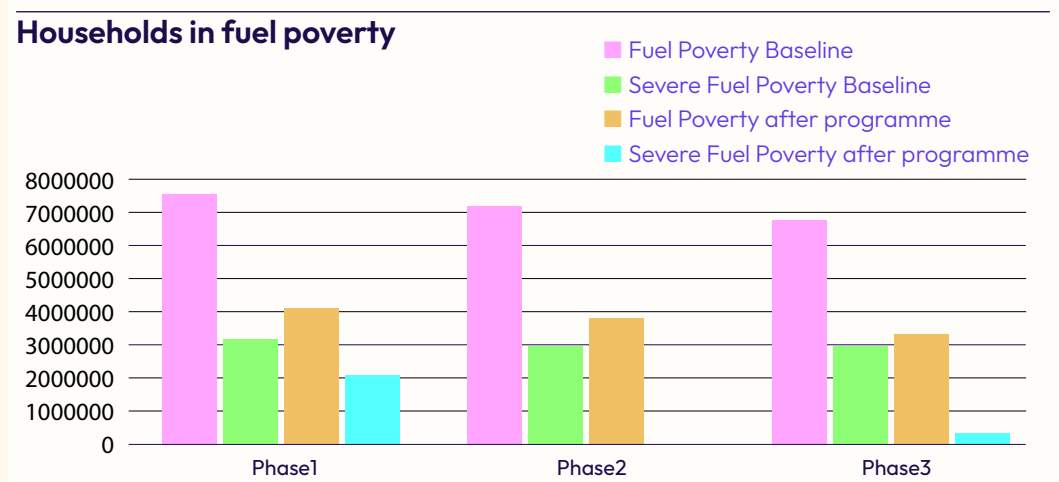


However, the impact of the price freeze on this 10-year retrofit programme and long-term fuel poverty is minimal. Firstly, because Phase 1 Scenario starts in 2024, we would only see 10 months of the current 2-year price cap freeze (ending October 2024) on our pricing assumptions. This also means that our modelling assumptions and resultant savings ignores

the huge, expected price spike in 2023. Meaning that the average impact on kWh prices is minimal over the first, 4-year phase. Secondly, in terms of savings for homes, the price freeze would only affect 10 months of savings for those homes, able to be retrofitted in January–October 2024. Given that the Warmer Homes, Cheaper Bills programme follows an S curve deployment, the number of homes that would see a difference in their savings for these first 10 months is extremely small, relative to the total number that will be retrofitted.

Fortunately, we expect the proposed fuel poverty policies and wider programme to have a major impact on bills. We assume the area-based fuel poverty programme targets 2.9m of the worst affected households in Phase 1, saving households an average of £1,042 a year, with the £360 saving from the removal of VAT and levies kicking in immediately, with homes eligible for up to £20,000 in grant funding. In Phase 2 & 3, this programme fully scales to reach an additional 6.5m homes. Alongside this, the wider programme improves a total of 7.96m homes by the end of Phase 1, saving around £15.3bn in energy bills, an additional 8.9m homes are treated in Phase 2, with annual savings of £22.7bn; with Phase 3 reaching 6.7m homes (some are retrofitted a second time, particularly with heat pumps), with annual savings bill savings reaching £25bn by the end of the programme.

As shown in the chart, the combined impact of these policies is to significantly reduce fuel poverty. Adopting the >10% of household income fuel poverty threshold for simplicity, we observe a 46% reduction in fuel poverty in Phase 1 versus the baseline. While we expect fuel poverty to naturally decrease in Phase 2 as the price crisis eases and incomes increase, we see fuel poverty 47% and 51% lower in Phases 2 and 3 respectively. We also see a massive 44% then 97% and 89% reduction in severe fuel poverty (>20% of household income) in Phases 1, 2 & 3 respectively. However, due to the extremely high cost of energy in Phase 1 the average home in the bottom income decile is still paying 20% of their income on fuel bills during this period. These findings therefore strengthen the case for immediate targeted financial support for these households, in addition to the policies outlined in this report.





“From day one, Knauf brought a level of quality control we haven’t previously experienced in other projects. The measurement service is the first time we have been offered any certainty that our homes have actually been improved.”

Sarah McClelland,
Environmental
Manager, Great
Places

Driving down bills, driving up comfort

Stretford Road Estate, Trafford: A partnership between Great Places Housing Association, Knauf Energy Solutions and Knauf Insulation.

**TRIED +
TESTED**

Stretford Road is an estate of 28 houses built in the 1970’s using traditional construction methods. By 2018 Great Places realised something wasn’t right. Numerous complaints from residents about how expensive they were to heat, led them to focus on how the properties were performing for the residents in reality.

Great Places called in Knauf Energy Solutions, who were able to identify the causes of the poor performance and advise how to fix it. Using Knauf Energy Solution’s sensor tech & machine learning, the actual performance of each property was measured before and after retrofit.

The retrofits included the replacement of wall and loft insulation, along with new party wall insulation, all of which was tightly quality controlled to ensure the best possible performance of the home. By focusing on outcomes, the measured improvement in performance rather than chasing notional EPC ratings, Great Places were able to give residents genuinely warmer homes that were more affordable to heat.

KNAUFINSULATION

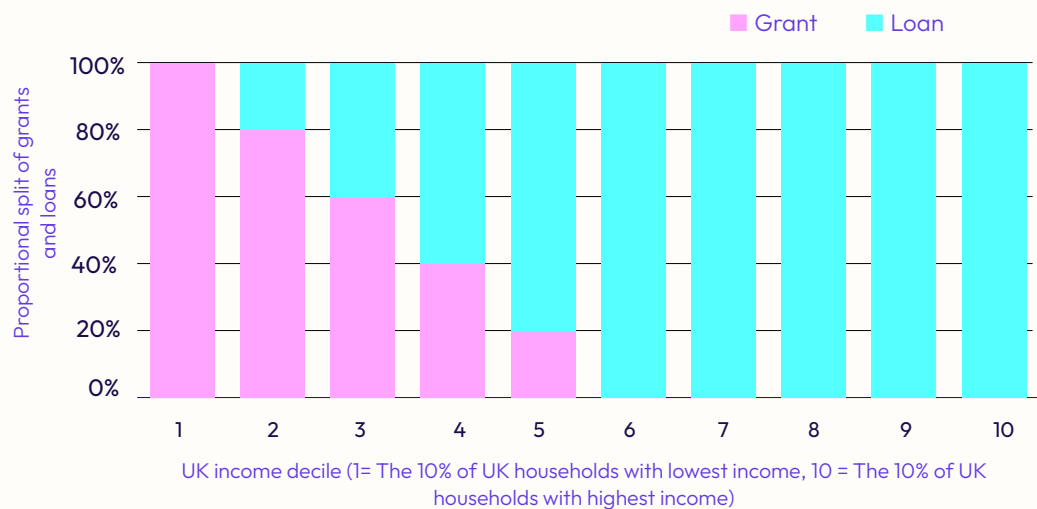
3 A FINANCED RENOVATION FOR ALL



Historically the UK government has implemented short-term energy efficiency programmes with complex eligibility requirements. This fragmented funding environment has been difficult for households to navigate, and undermined certainty and investment from industry.

As shown in the chart below, we propose the government simplifies the current grant landscape to offer a single blended funding offer of incentives, grants, and loans, which covers the full cost of a home 'future-fit', with a sliding scale of free and 'financed' elements for those in higher fuel cost/income bandings. This would gradually replace the piecemeal landscape of today.

Cost of home ‘future-fit’ are covered by a blend of zero-interest loans and grants for low income homes



A ‘future-fit’ at no up-front cost: Zero interest loans

Zero interest retrofit loans would provide access to finance while avoiding the high cost of debt that characterised past loan programmes. By linking these loans to the home rather than the individual, the debt stays with the home when moving – also solving the split incentives between landlords and tenants. These loans should be sufficient in scope and scale to fund the full range of measures necessary and adopt a sliding scale of grant to loan-based on a household’s energy affordability. Based on this evaluation of other successful international low/zero interest loan schemes, we expect a new finance mechanism would need to have the following features:

- **A zero-interest rate.** This could be achieved with minimal state subsidy using the borrowing powers of the National Infrastructure Bank in a similar approach to Germany’s KfW which could issue low-cost AAA bonds, with loans handled by retail banks
- **Debt tied to the property, not the individual.** Using a channel such as energy bills or council tax solves the split incentive issue and can also be modulated should a household’s income change. This is especially important for the private rented sector, but also may draw in owner-occupiers who may consider moving before loans are fully repaid
- **Provide financing for wider enabling or home improvement works.** Retrofit measures are rarely undertaken in isolation, and typically require a range of enabling works, which may not directly contribute to energy savings. Schemes that have also provided financing for wider home improvement works have typically been more successful.

Help when moving home: Energy Saving Stamp Duty

We propose that Stamp Duty Land Tax (SDLT) is reformed to reflect the EPC level of the property, centred around a baseline of EPC “C” that improves over time. SDLT is a strong option for incentivising retrofit because it impacts at the point of sale – a time when renovation often takes place. SDLT is currently charged on all property purchases above £125,000. Energy saving SDLT would see house buyers receive a discount if a property is above a given energy efficiency standard or pay a higher rate if its performance is poor. A home that attracts lower stamp duty becomes a more attractive proposition for buyers, and could potentially sell faster, which in time could strengthen the link between energy efficiency and property prices. Based on homes’ SAP rating, it would be relatively straightforward to develop a model that was revenue neutral for the government. A key element of such a system would see a rebate offered for any household that undertook energy efficiency work within a set period (12-18 months) of purchasing a property. We expect this policy would have the following features and impacts:

- Be designed to be revenue neutral for government
- Leverage average of around £3,200 in investment per property purchased
- Lead to around £2bn/ year in total investment, nearly £20bn over program life

Help when renovating: 5% VAT on retrofit led renovations

There is a huge opportunity to undertake energy improvements in the existing £44 billion a year household renovation, maintenance, and improvement (RMI) market. While VAT of 5% already applies to the installation of certain energy-saving measures, other RMI works to a private residence are subject to VAT at 20%. To stimulate demand for retrofit, government could extend the 5% VAT rate to cover wider RMI works under a certain cost or eligibility ceiling, provided a certain EPC rating was achieved. Contractors could offer reduced quotes for wider works which include energy efficiency, driving an approach that would be more ‘supply chain led’. A similar scheme has been in operation in France for several years the ‘crédit d’impôt pour la transition énergétique’ (CITE). We propose the scheme would have the following features and impacts:

- A 15% reduction in VAT on renovation work which can be spent on energy efficiency measures, capped at £5,000 per property
- Lead to 3.3m additional homes retrofitted and at least £893m/ year investment



Realise the sale value of efficient homes: Green Mortgages

Mortgage affordability assessments are based on the applicant's ability to repay. Whilst a significant proportion of household outgoings relate to energy costs, current underwriting methods use arbitrary techniques to determine these costs. Green Mortgages – such as Ecology Building Societies' C change mortgage – promote actual energy usage data in these underwriting calculations. Thus, lenders may provide increased lending for more efficient properties at reduced interest rates—as the higher disposable income reduces the risk of default. Indeed, two EPC bands, could equate to around £4,000 in additional mortgage finance. Further, by requiring mortgage lenders to disclose the EPC rating of their portfolios, this may create a 'green premium', increasing property values for the most efficient properties, also providing additional borrowing for retrofit measures. We propose the following policy interventions to stimulate this Green Mortgage market:

- Stimulate market to increase private lending for retrofit improvements
- Mandate mortgage lenders to use actual EPC in their affordability underwriting assessment
- Require disclosure of EPC rating spread of lenders mortgage portfolios

Green mortgages with lower interest rates

Ecology Building Society's C-Change Green Mortgage

TRIED + TESTED

Ecology Building Society has been providing green mortgages for over 40 years. They reward sustainable building, renovation and development of energy efficient properties through their unique 'C-Change' mortgage discounts for homeowners building or converting sustainable homes, or undertaking renovation and retrofits.

The discounts reduce the mortgage rate based on the property's energy performance or environmental impact and, once the build has been certified to the relevant standard, are applied for the remaining term of the mortgage.

C-Change retrofit discounts are available for properties undergoing significant renovation works that will improve the energy efficiency. A 0.25% discount off Ecology's Renovation Mortgage rate is awarded for each EPC grade improvement. E.g. For an improvement in the EPC rating from E to B, a discount of 0.75% applies on the mortgage for the duration of the loan following certification of the improvements. A discount of 1.25% is available for properties renovated to the Passivhaus EnerPHit standard and 0.75% for the AECB Retrofit Standard.

For more information about Ecology's C-Change discounts please visit <https://www.ecology.co.uk/mortgages/c-change-discounts/#retrofit>



4 FIX BROKEN HOUSING STANDARDS



Retrofit measures have the potential to deliver not only energy savings, but also improved property values, internal comfort, air quality, health and wellbeing^[15]. However, there is significant evidence of a large negative ‘performance gap’ between modelled energy savings and realised outcomes^[16]. More insidiously, well-meaning insulation programmes have occasionally led to damaging ‘unintended consequences’ including worsened air quality, moisture build up, health issues and structural damage^[15]. The Grenfell Tower tragedy has shown that current Building Regulations enforcement and fire prevention methods may also not be fit for purpose, and that the outsourcing of the enforcement and compliance with Building Regulations has led to a race to the bottom. We propose the following steps to address these issues.

Take back control of housing standards, quality assurance and enforcement

A recent report^[77] Professor Luke Bisby from the University of Edinburgh outlines how ‘the independence and rigour of building control activities was continuously eroded due to changes resulting from the introduction of privatised building control via approved inspectors’, the report says. ‘A culture shift in building control had gradually occurred, from one of building control actors “policing” developers to one of them “working with clients” under commercial duress. This resulted in a “race to the bottom” in the resulting practices within the construction industry, leading directly to tragedies’ such as the Grenfell tower disaster. Also, councils currently lack the resources to enforce housing standards. For example, only >6% of councils across England and Wales have taken enforcement action for the existing MEES for the private rented sector at EPC “E”. While the Building Safety Programme seeks to overcome some of these issues, we believe more systemic reforms are required. We propose the following steps to address these issues:

only
>6%
of
councils

across
England and
Wales have
taken
enforcement
action for the
existing MEES
for the private
rented sector
at EPC “E”

- **Bring Building Control services back into council control** and properly resource local authorities to provide these services
- **Increase resourcing for MEES** enforcement, adopting emerging best practice and coordinate between, Environmental Health and Trading Standards teams
- **Develop an effective national MEES compliance and enforcement database and tools.** We estimate these aims could be delivered across the UK for <£10m annually.
- **Require the use of independent Retrofit Coordinators** on all multi-measure retrofit projects above a certain scale and complexity to ensure appropriate measures and procedures are followed

Make EPC’s fit for purpose

The Energy Performance Certificate (EPC) system remains the backbone of domestic energy efficiency policy. EPCs are divided into two metrics, the Energy Efficiency Rating (EER) which reflects the cost of delivering a home’s fixed energy services, and the Environmental Impact Rating (EIR), which is based on its impact on carbon emissions. These metrics are based on a Standard Assessment Procure (SAP) score of 1-100, divided into an EPC range of A-G. The EER A-G is the more commonly used metric when discussing EPC’s. While designed as a simple shorthand for a home’s energy performance, EPC’s in their current form are viewed as a problematic compliance tool and means of delivering net zero goals, due to the following issues:

- **Accuracy:** EPC assessments can cost as little as £80 and are often based on a shallow and superficial energy audit and currently take no account of a home's actual energy use
- **Carbon:** the main EER rating is an affordability rather than a carbon metric, and thus takes no account of a home's carbon emissions. The EIR carbon metric currently also contains outdated assumptions around the carbon content of grid electricity
- **Cost:** EPCs involve static assumptions on electricity and natural gas prices – which have changed substantially recently – leading to potentially misleading outcomes. Further the current assumptions in the SAP and EPC methodology may unfairly penalise the adoption of heat pumps.
- **Energy Demand:** Improvements in EER and EIR metrics are currently not designed to directly reduce a home's energy demand, nor prepare it for the installation of a heat pump.

Therefore, in future EPCs must provide a trusted, accurate and reliable measure of a building's energy performance, and move from a reflection of the features of a building to the true measure of 'in-use' building performance. We propose a future government undertakes a review and implement series of reforms to the EPC system, such that EPCs should:

- **Be Heat Pump Ready:** EPCs as a compliance framework must ensure homes are suitable for lower temperature heat and have a focus on a home's energy demand via the inclusion of a heat loss or kWh/m² metric.
- **Reflect actual performance:** EPCs should in future be paired with smart meters to reflect the historical and real time performance of a home in terms of running costs, energy use and carbon emissions. This includes the operation of heat pumps, who's predicted, then historical, seasonal coefficient of performance (COP) should be displayed in the EPC. This data could be made easily available via a digital portal which could only be accessed by the homeowner.

Guarantee savings for households

The current retrofit offer of estimated cost savings, without performance or ongoing maintenance guarantees, means uncertain benefits for the customer and provides limited trust on installation quality. Unsurprisingly, this approach has resulted in low demand for whole-house retrofits, and risk aversion from the lending community. There are emerging examples – such as the Energiesprong initiative – which offer measured or guaranteed performance set against an agreed baseline prior to the intervention. With the rollout of smart EPCs which measure energy performance in real time, it will be increasingly possible to offer

performance assured renovations, with contractors obliged to meet minimum energy saving requirements. We propose the following staged approach:

- Mandate minimum measured and verified seasonal coefficient of performance (COP) on grant funded heat pump installations
- Trial ‘pay for performance’ models at scale in new homes and retrofits in the social housing sector with a view to mandating them in the late 2020s
- Incentivise ‘pay for performance’ retrofit outcomes in all area based retrofit projects with contractual penalties and customer redress for underperformance, with goal to eventually require from 2030

Ensure homes are climate resilient

Recent statistics indicated that 3.6 million living rooms in England had overheated during the summer of 2018^[18] and, more recently in July 2022, the UK experienced its hottest temperatures on record when the mercury rose to more than 40 degrees. Any plan to renovate the UK’s housing stock must therefore ensure that overheating risk is factored into the project. Indeed, well-designed homes with highly insulated envelopes that are comfortable and energy efficient in the winter months are also good at keeping the heat out in the summer, and technologies such as air-source heat pumps (ASHP) and mechanical ventilation and heat recovery systems (MVHR) can also aid cooling.

The new Part O of the Building Regulations requires all properties to demonstrate mitigation measures for limiting overheating. Until now this was previously a part of the SAP calculation however it’s long been criticised as being too simple and crude of a method. The previous SAP method used a steady-state methodology, incorrect assumptions on operative profiles and optimistic natural ventilation inclusions for assessing summer overheating. We therefore propose that:

- All retrofit projects are required to consider their impact on overheating risk through adoption of basic design principles as outlined in Part O of the Building Regulations
- Future iterations of the SAP methodology adopt a more comprehensive approach to assessment of overheating risk



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Guaranteed energy savings using off-site, modular construction

Energiesprong Nottingham

Originally developed in the Netherlands, an Energiesprong retrofit approach involves the rapid delivery and installation of off-site manufactured, insulated wall and roof facades, integrated with renewable heat systems and photovoltaic panels as well as ventilation and controls. The retrofit 'solution provider' offers a 30-year energy performance guarantee (based on set internal temperature) for annual net-zero energy consumption, with specified energy usage limits, alongside an upstream financing package.

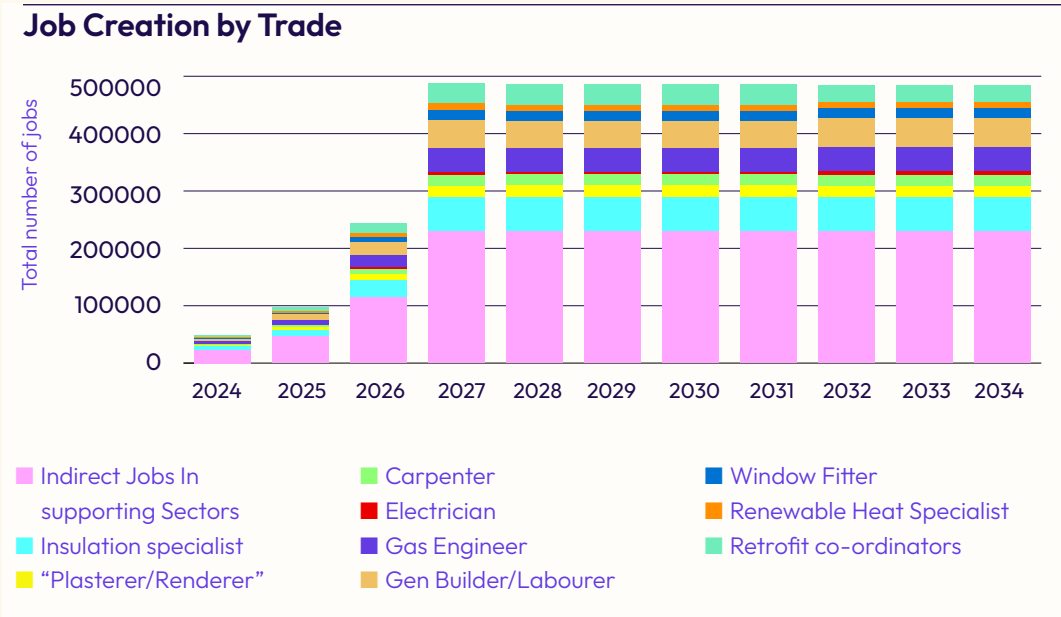


- Wall, floor and roof panels are manufactured off-site, where, along with new modular heating and ventilations systems they are then craned into position. This significantly reduces disruption and the time onsite, with examples from the Netherlands complete in as little as 24 hours.
- The initial target market has been the social housing sector, where scale is considered to be easier; with terraced and homogeneous built forms common.

5 CREATE HALF A MILLION GREEN JOBS



Delivering this agenda will require hundreds of thousands of new skilled professionals. Using data from Retrofitworks area-based initiatives, we estimate this would see an initial ~25,000 new tradespeople employed in year 1, peaking at ~260,000 in year 4, in addition to those in the existing RMI sector. Further, we expect that this level of retrofit activity would create at least 230,000 indirect jobs in related supply chains. This transition will need to be delivered in a just and inclusive way to ensure the existing workforce is not left behind and that a sector which aims to double in size is also appealing to young people, ethnic minorities, and women.



Train a 300,000 strong retrofit workforce

The UK is amid a skills shortage and currently lacks sufficient capacity to undertake the full scale of this programme. The stop-start nature of government funding and policy in this space, has also harmed trust, capacity, and appetite for SME construction firms to expand and take on new workers. Following discussions with industry experts during the consultation for this report, and the ‘Building on our Strengths’ report by the Federation of Master Builders and CREDS ^[27] – a period of at least three years was thought to be required to train up the supply chain to full capacity. This will also require substantial increases in funding for FE colleges and for businesses to support the uptake of new apprentices into the workforce. We propose the following key policy measures to achieve this:

- Earmark £400m of new public funding for new training and apprenticeships, in further education colleges and academic courses (this is part of the total £60bn of public investment)
- The Construction Industry Training Board (CITB) and the apprenticeship system should be comprehensively reviewed, and a reform programme instituted, including an increased share of public funding for firms to take on trained apprentices
- A foundation course in buildings and energy should be integrated into construction training and this skillset should become a requirement of delivery of more complex retrofit projects
- Training thousands of qualified and accredited ‘Retrofit Coordinators’, responsible for overseeing the assessment of dwellings as well as the subsequent specification, monitoring, and evaluation of energy efficiency measures
- A focus on supply chain innovation, through the adoption of modular solutions, offsite manufacturing and other emerging construction practices and techniques

A 'just transition' to retrain the existing workforce

Many existing contractors will be involved in delivering the retrofit scenarios we set out above. Existing trades are often insufficiently skilled in key issues such as moisture, ventilation, thermal bridging, and sequencing of works. Many, especially heating engineers, will also require retraining in new technologies including solar thermal, heat pumps and low temperature heat. Ensuring that there is a demand for trained apprentices will also require upskilling and professionalisation of the industry, through new mandatory qualifications. We propose the following key policy measures to achieve this:

- £100m for on-the-job retrofit training for existing tradespeople (part of the £60bn in total public investment) and those moving out of high carbon sectors to retrain to work in this new sector.
- Re-training requirements in key subsectors and a licence to trade should be introduced for all construction firm owners. By applying the licence to the firm, not the individual, there would still be employment opportunities for all.

Champion and diversify the sector

Doubling the size of the RMI workforce will require recruitment beyond the demographics currently working in the sector. Unfortunately, the UK building industry still has an image problem, with a recent survey of ~2000 young adults, only 3% of respondents stated they were considering construction as a potential career path ^[19]. Chartered Institute of Building (CIOB) statistics indicate that the construction sector is still only 15 % female (<2 % on-site), only 6 % black Asian and ethnic minority, and has just 6 % disabled workers ^[20]. Making the sector more appealing to these groups and young people will require a new narrative about what these careers entail, which is backed up by reality. We believe that it is time for the SME building industry to move into the 21st century, through a process of modernisation and professionalisation, including the following steps:

- Develop a national public relations campaign surrounding retrofit and the green careers as outlined in this report
- Ensure best practice equality diversity and inclusivity (EDI) and reduced casualisation of workforce in local government retrofit procurement and for larger firms
- Support of unionisation of the SME building sector to ensure greater employment rights and protections for, holiday pay, sick pay, pensions, childcare support and on-the-job training and career development

**TRIED +
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Creating quality green jobs, through local apprenticeships

City Building (Glasgow)

City Building (Glasgow) Limited Liability Partnership (LLP), are a council owned building and retrofit company, formed in 2006 from the original Direct Labour Organisation (DLO) of Glasgow City Council. What sets City Building apart are the strong social ethos and good employment practices that guide its 'business model'. Whilst operating as a successful business and making a substantial contribution to Glasgow City Council (reported to be £5-6 million a year), it is run as a social enterprise and its operations are not driven by profit. Rather, the priority is given to sustaining the current model and training new staff.



→ **Compromising quality and labour standards. All staff are directly employed and nurtured for the long term. With the current Executive Director and the plumber trainer having both started as apprentices, and now have been with the organisation for 44 years.**

“trade unions have played a significant role within City Build, with unionisation rates of nearly 100%”



6 BUILD THE MARKET FOR LOW CARBON HEAT



The Committee on Climate Change estimates that to meet binding emissions targets, the UK must install 900,000 heat pumps per year by 2028, with at least 1.4 million installations per year by 2035. However, recent research by the Regulatory Assistance Project^[21] highlights the current cost challenges for installing heat pumps. Due to high capital costs ~£10,000 and the relatively high cost of electricity the total cost of ownership under current market conditions is 55-73% higher for ASHP, However, heat pumps have the potential to create bill savings and have a lower cost of ownership than gas boilers, requiring the following policy changes:

Funding to reduce the cost of heat pumps

The current high capital cost of heat pumps will need to be driven down, via a subsidy programme, which delivers cost reductions and reduces the level of support over time. This will require building of a home-grown supply chain, ensuring heat pumps are made in the UK. The RAP report estimates financial support for heat pumps is likely needed until at least 2030, with sustained support for low-income households close to 100% of the capital cost and tapering support for the able-to-pay sector. We estimate this policy would require approximately £9bn in government funding through the 2020s, with at least 50% earmarked for low-income households.

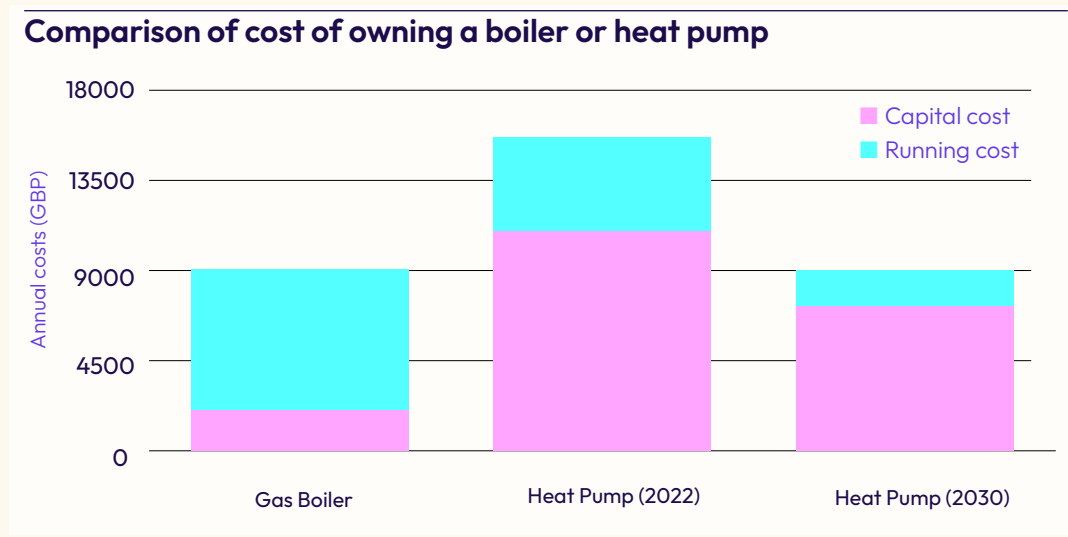
Make suppliers reward flexibility

Intermittent renewable electricity has created price volatility in wholesale electricity markets. However, the flexible use of demand side assets such as EVs or heat pumps can capitalise on this volatility and shift demand outside the evening peak. By running heat pumps flexibly on a time-varying tariff, savings of up to 50% can be achieved with minimal need for the household to manage the heat pump’s operation. Modelling by Sero^[22] suggests that smart operation an ASHP could save £189/year in a 3-bed semi-detached, £140/year in a 3-bed terrace and £661 in a four-bed detached home. These findings suggest all households should be offered competitive smart heat tariffs when adopting heat pumps, ideally where heat pump cost optimisation was undertaken by the supplier.

In summary these policies would:

- **Heat pump grants:** reduce install costs by 30% by 2030
- **Shift levies into taxation:** Reduce electricity costs by ~£155/year
- **Reward flexibility through smart tariffs:** further reduce heat pump running costs by at least 10%

These policies would have the impact shown in the chart, on the total cost of ownership by 2030.



With these measures we estimate the total cost of ASHP ownership would be between only 1% higher and 24% lower than the fossil alternatives for the most common house types.

Ban new fossil heat by the early 2030's

There is broad consensus that meeting climate targets will eventually require a moratorium on new fossil fuel heat in existing homes. Assuming the above measures are taken, and heat pump total ownership costs reach a parity with oil and gas boilers, this transition should be achievable without increasing bills, and may result in savings based on current gas price projections. The UK Government will prohibit the installation of fossil fuel heating in new homes from 2025. We believe this date should be in the early 2030's for all homes, potentially as early as 2030, in a similar manner to petrol and diesel cars, with incentives and measures in this program making the adoption of heat pumps highly attractive and commonplace. The table overleaf^{f[23]} outlines the date of the fossil heating phase out of some other European countries.

Align this program with roll out of district heating

In parallel to this program, as part of wider low-carbon heating infrastructure development, the UK will be aiming to make use of district heating networks (DHN) in high density urban areas. As this program rolls out, it will:

- When 'future-fitting' homes in high density areas, connect to existing local DHN's for heating where available and suitable
- Coordinate with wider DHN roll out programs for suitable areas to create pockets of DHN ready homes where future DHN's are planned.

The roles of electrification and hydrogen in decarbonising heat

As we move towards zero-carbon heating, the last decade has seen substantial debate over the relative futures roles of electrification and hydrogen as alternatives to natural gas. At this stage it is likely that electric heating via heat pumps will play a very significant role, for a range of reasons. Electrification of heating is highly efficient due to heat pumps having effective efficiencies of around 300%, compared to a boiler being around a maximum of 92%. The electricity transmission and distribution system is already in place, and the large-scale use of electric heating via heat pumps has been demonstrated in countries like Finland.

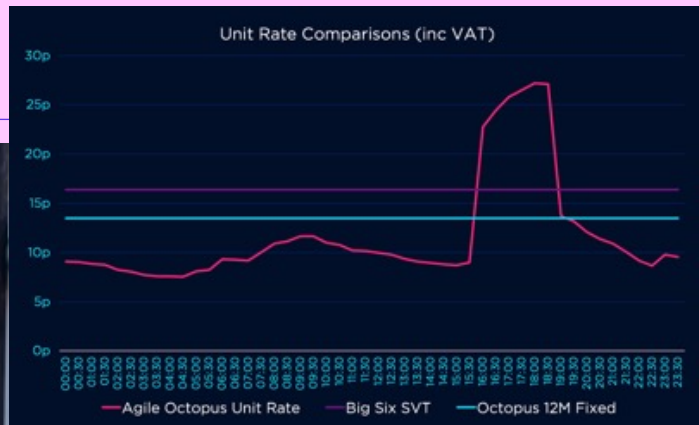
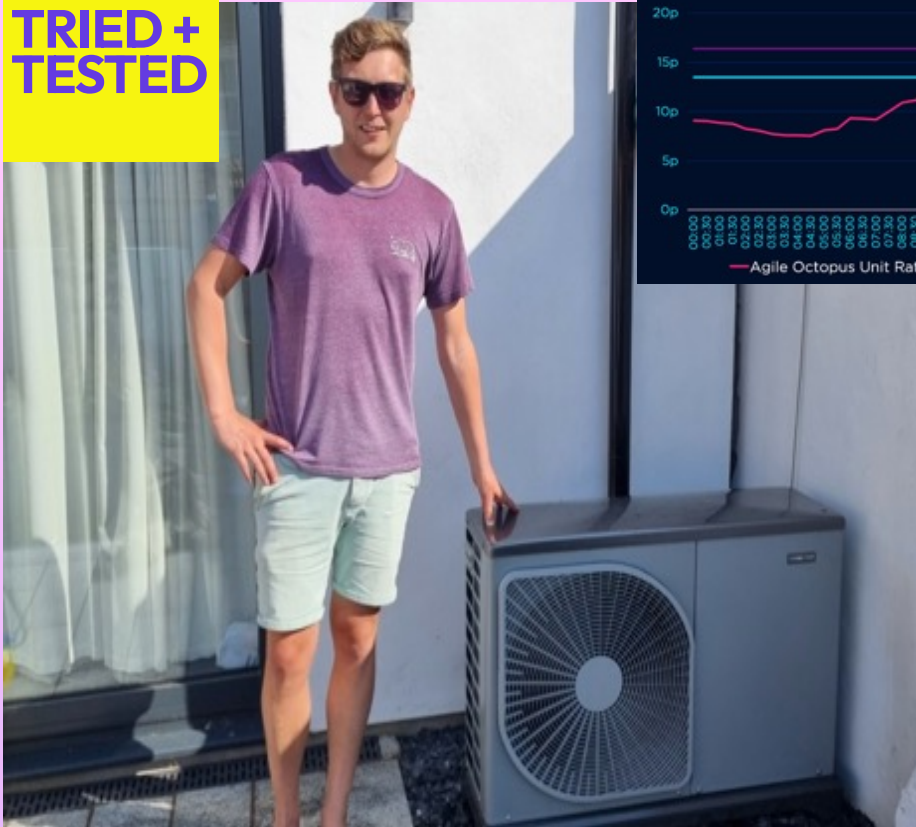
Green-hydrogen will most likely be a vital solution for the power sector, helping balance a grid reliant on large amounts of intermittent generation,

Country	Install ban date	Notes
Denmark	2013 [new] 2016 [All]	Since 1 January 2013, the installation of oil-fired boilers and natural gas heating was banned in new buildings in Denmark, applying to existing buildings in district heating areas in 2016
Finland	2024 [all]	Finland plan a stepwise phase-out of fossil oil heating in general from 2030 onwards.
France	2022 [new]	For single-family homes will de facto exclude systems using only gas For collective housing, the transition will occur between 2022 and 2025. Leaving the possibility of installing gas heating if the dwellings are very energy efficient. Then, from 2025, the threshold will be reduced
Germany	2026 [All]	In Germany, the installation of mono-fuel fossil boilers is banned from 2026
Norway	2020 [All]	In Norway, the use of mineral oil for heating of buildings is prohibited since 2020. Norwegian homeowners had to replace their oil boilers before 2020.
Sweden	2024 [all]	Sweden has already largely phased out all forms of fossil fuel heating, not connected to district heating networks

but at this stage the scale of its role in home heating remains to be determined. Hydrogen heating isn't an option for UK households at this point in time since there is no large-scale manufacture of 'green hydrogen' and currently no hydrogen ready transmission infrastructure. To understand its suitability for home heating large scale trials would be needed.

If industry were to undertake these trials, and they demonstrate that hydrogen heating is a viable option, for instance in areas located close to points where green hydrogen can be readily manufactured, then its deployment would need to be considered, likely in Phase 3 of this program, ensuring that the 'future-fit' being offered to homes was aligned with hydrogen roll out efforts in certain areas.

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“this magic box in the garden provides your heating, it’s supporting decarbonisation and you’re no longer burning gas imported from across the world. Think how virtuous you’ll feel in the knowledge that the warm water from your shower has been warmed using (at least in part) heat in the air or ground!”

Richard’s heat pump journey

Richard is an energy policy researcher, who in 2018 installed a heat pump in his Cornish home – and hasn’t looked back. **“It’s pretty obvious that in order to decarbonise heating, we’re going to need a lot of heat pumps. Air-source, ground-source, air to air, air to water, big ones connected to heat networks – all may have a role in making the most heat out of low carbon electricity”**

Although he managed a lot of the process himself, Richard says there’s already good support for getting quotes: “You can get quotes for heat pump systems for free. For ease, I’d advise going to an installation company who are ‘Microgeneration Certification Scheme’ (MCS) registered although indirect accreditation routes are available where you employ an installer who works under an MCS umbrella scheme. You can find accredited companies geographically here: <https://mcs-certified.com/find-an-installer>.” Richard has also been able to make considerable savings, when compared to his old boiler, through the use of a flexible time of use tariff, running his heat pump outside of the peak hours. Since the gas price crisis, Richard has been insulated from some of the cost increases, as his system can be paired with his rooftop solar panels.

INTEGRATION WITH WIDER DECARBONISATION AGENDA

Coordination with other low carbon infrastructure programs, ensuring an integrated national strategy

This program to ‘future-fit’ our homes interfaces with other key elements of UK infrastructure, such as transport and electricity generation, and so a ‘cross sector delivery strategy’ will need to be developed. In the early stage of program delivery, we expect the National Retrofit Taskforce to coordinate these efforts. While it is beyond the scope of this report to consider these relationships in detail, some key areas include:

- **Impact of electrification of heat on the UK power sector** – our scenario’s adoption of heat pumps leads to an 11% of extra electricity demand per year by 2034, and an increase in peak electricity demand. The UK power sector will need to develop in tandem to ensure this demand is met through low carbon power sources. Power transmission and distribution systems may need to be reinforced in places to cope with this increased and more variable demand.
- **Importance of increased national renewable electricity for home electrification** – A large part of the recent increases in energy costs are due to changes in the wholesale gas price, which is driven by international markets. Shifting to greater levels of domestic renewable energy would decrease UK exposure to these price shifts and help keep electricity costs down, making the shift to electric heating more economically attractive. Also higher levels of renewable electricity will ensure lower carbon emissions associated with electricity used to heat homes, helping reduce the impact of UK homes on climate change.
- **Electrification of transport** – As the transition to electric vehicles gathers momentum there will be an increased level of at-home charging. Installing EV charging in homes could be included as part of the home ‘future-fit’ to minimise household disruption and reduce net delivery costs.
- **Decentralised energy** – The deployment of this program will need to be coordinated with the parallel expected roll out of decentralised energy systems both at the local and household level.

POLICY IMPACTS

Shifting environmental and social levies into general taxation, would **reduce the average electricity bill by around £155**, while removing the 5% VAT on energy bills would **save an additional £205 for the average bill payer**

The fuel poverty program would average around £9,000 investment per high risk home, leading to an **average of £711 savings a year for the homes affected**

The housing stock modelling undertaken by Parity Projects, analysed the impact of specific policies on the overall deployment of measures, their impact on energy bills, carbon emissions and EPCs. What follows is a breakdown of these impacts by policy measure, showing their sequential impact and highlighting the importance of a broad mix of measures to target different objectives and segments of the market.

Energy market interventions

The first set of policies - the energy market interventions - have the advantage that their impact on energy bills could be felt almost immediately. Shifting environmental and social levies into general taxation, would reduce the average electricity bill by around £155, while removing the 5% VAT on energy bills would save an additional £205 for the average bill payer, resulting in a total saving of £360 a year for 29 million households. These two policies - if continued for the duration of the programme - would generate around £103.3bn of bill savings, however we expect neither to reduce the UK's carbon emissions.

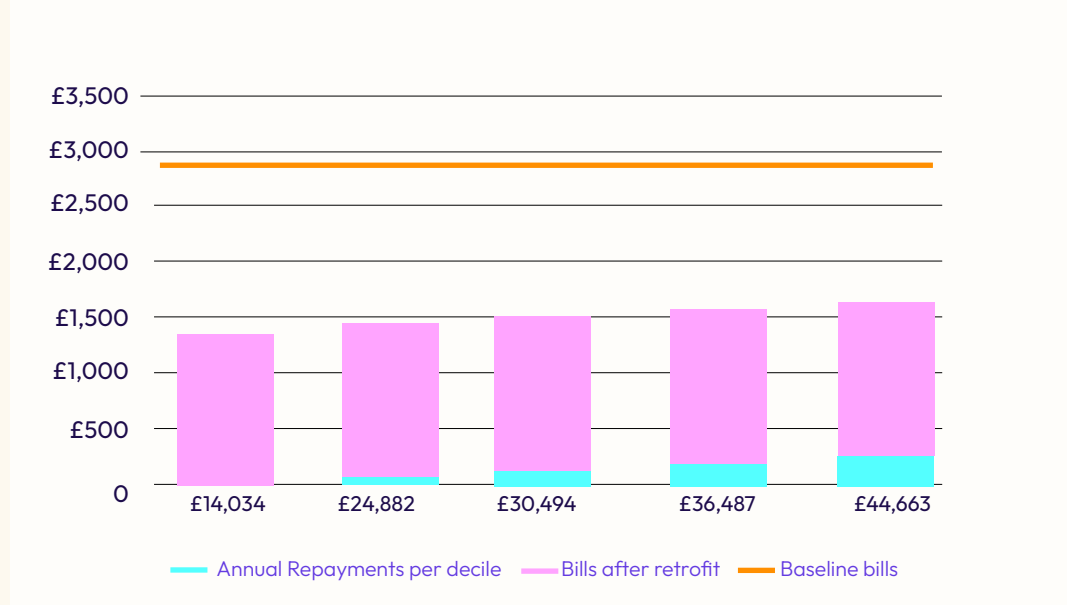
Retrofit fiscal incentives

Both the retrofit fiscal incentives - the 5% VAT on renovations which improve energy efficiency and Energy Saving Stamp Duty (ESSD) would involve changes to the tax regime to incentivise the uptake of retrofit measures. Similarly, to the previous policies, we imagine these policies to have a continual impact and run for the duration of the programme. Assuming investment only equivalent to the VAT savings, this policy is expected to drive an average of £456/year savings per home and affect 3.3 million homes in total. The ESSD policy has a bigger impact, saving an average of £572/year and impacting 6.2 million homes. These policies would contribute to reducing the Carbon emissions from homes by 10.2% by 2034.

Fuel Poverty Programme

The fuel poverty programme aims to provide targeted support of up to £20,000 to lower income households. Due to the unprecedented number of homes expected to be in fuel poverty, we have modelled this programme being eligible to households in the bottom 50% of the income distribution, with a blended finance mechanism involving grants and 25-year zero interest loans. Leveraging a total of £82.5bn investment over 10 years, this programme reduces emissions from homes by a total of 8.3% by 2034. With an average of around £9,000 investment per home, leading to an average of £596 savings a year for the homes affected, and a total of £25bn savings by 2034. The figure shows the average Phase 1 impact on household incomes by household income decile, following the blended finance model.

Average Bill Savings in Fuel Poverty Programme



Minimum Energy Efficiency Standards (MEES)

The MEES are intended to provide regulatory backstop or the ‘stick’ that follows the ‘carrot’ of the previously listed incentives. We therefore expect these policies to be a strong motivating factor for voluntary action in advance of their implementation. For these reasons we expect the MEES at EPC “C” to have a relatively modest total impact compared to the previous policies. Leading to 1.36m, 1.77m million and 941,503 additional retrofits in the social, private rented and owner occupier sectors respectively, and saving an average of £626, £620 and £911 for impacted households in each respective sector. The MEES at EPC B for social housing are expected to have a larger impact, improving 3.95m social housing units to a very high standard of energy efficiency from 2030, saving £1.3bn annually for these households, or around £331 each. Together these policies are expected to save around 4% of annual household CO² emissions.

Low carbon heat

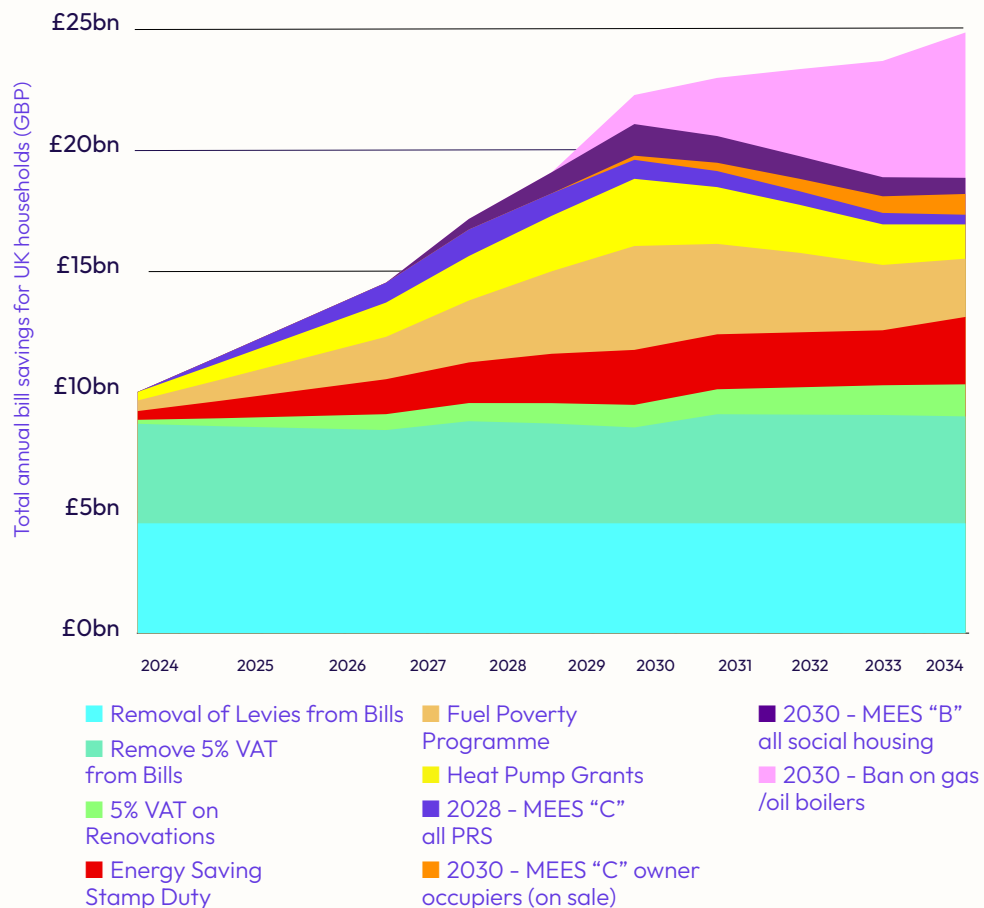
The proposed policy framework is also designed to prepare the UK’s housing stock for the rollout of low carbon heat, improving the building fabric and ensuring that homes are suitable for lower heat flow temperatures. In addition, the £9bn heat pump grants are intended to prime the UK market for a market led adoption from 2030, driving down costs through scale economies, building a UK supply chain and upskilling the heating industry. We therefore expect the first £4.5bn of heat pump grants to deliver only around 750,000 installations in Phase 1, which are mostly off gas grid. When factoring the high costs of heating oil, the expected reduction in the relative cost of electricity, the removal of levies, and an assumed flexible heat tariff saving of 10%, we see a substantial saving of £1,887/year for these early adopter homes.

we expect these homes to see an **£854/year saving** following the installation of a heat pump

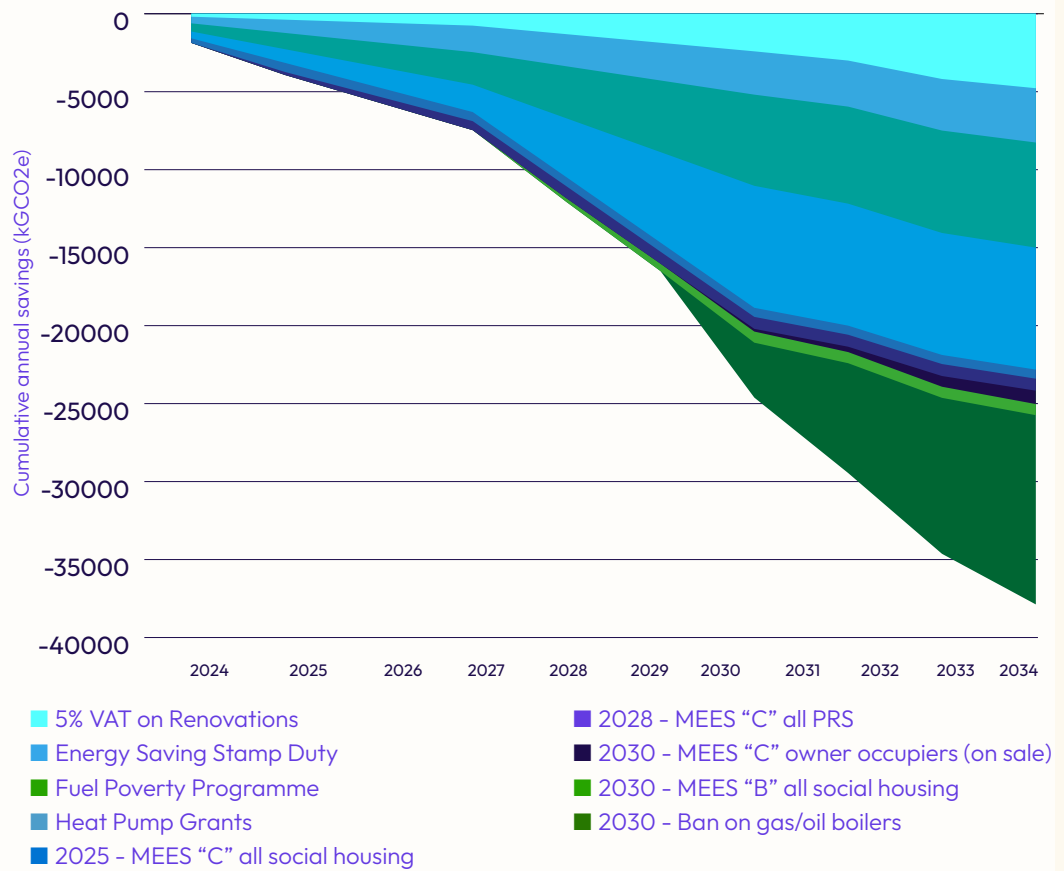
In Phase 2 we expect the £4.5bn to support the installation of 2.25 million heat pumps, as costs reduce and experience increases. Phase 2 uptake is dominated by on-gas grid homes, however, due to the changed market conditions previously outlined, we expect these homes to see an £854/year saving following the installation of a heat pump. With the energy market conditions shifted in favour of heat electrification and the heating industry upskilled, Phase 3 sees the mass rollout of heat pumps from 2030 onwards. This leads to mass market uptake with around 1.68 million heat pumps installed annually to 2034 and beyond. This rollout of heat pumps provides the bulk of the carbon savings from this programme, with the UK electricity grid close to fully decarbonised, we expect these 9.7 (about 33% of UK homes) million heat pumps to save 31% of the UK’s household carbon emissions.

The combined policies in this programme lead to a cumulative £222bn in capital investment, which drives a total of £25bn in energy bill savings annually throughout the 2030s and 2040s. This leads to a total reduction in emissions from homes of 53% vs the do-nothing baseline. This would constitute a cumulative saving of 218 million tonnes of CO2/yr by 2034, or 22% of the required savings from the fifth and sixth carbon budget reductions (2028-2037) under the UK’s Net Zero goals. The impacts of these policies on energy bills and carbon emissions are summarised in the figures below.

Annual Bill Savings



Annual Green House Gas emissions savings due to future-fit program



POLICY COSTS AND REVENUE IMPACTS

This program would lead to a **net gain of £22.7bn** in government revenues over the period

Capital investment

The implementation of this strategy will require significant funding for the low-income grants, heat pump subsidy, area-based programme, fiscal incentives, data gathering, and education and training required to deliver them. We estimate the National Retrofit Taskforce to have relatively modest costs, similar to the Zero Carbon Hub, with the total National Plan and Local Delivery to cost £2bn over the decade, with most of this money funding the local one stop shops. Ensuring there is a sufficient workforce demands a significant additional investment in training. We therefore propose that government supplement current CITB funding^[24] with an additional £100m per year for the first phase, and subsequently £100m thereafter. Finally, the costliest aspect of the strategy would be the grant funded programmes. As mentioned above we assume at £48.5bn of capital spending is allocated to the low-income programme, which leverages a total of £80.5bn in investment. We also assume a heat pump subsidy programme, totalling £9bn. These costs amounting to £60bn are outlined in the table below.

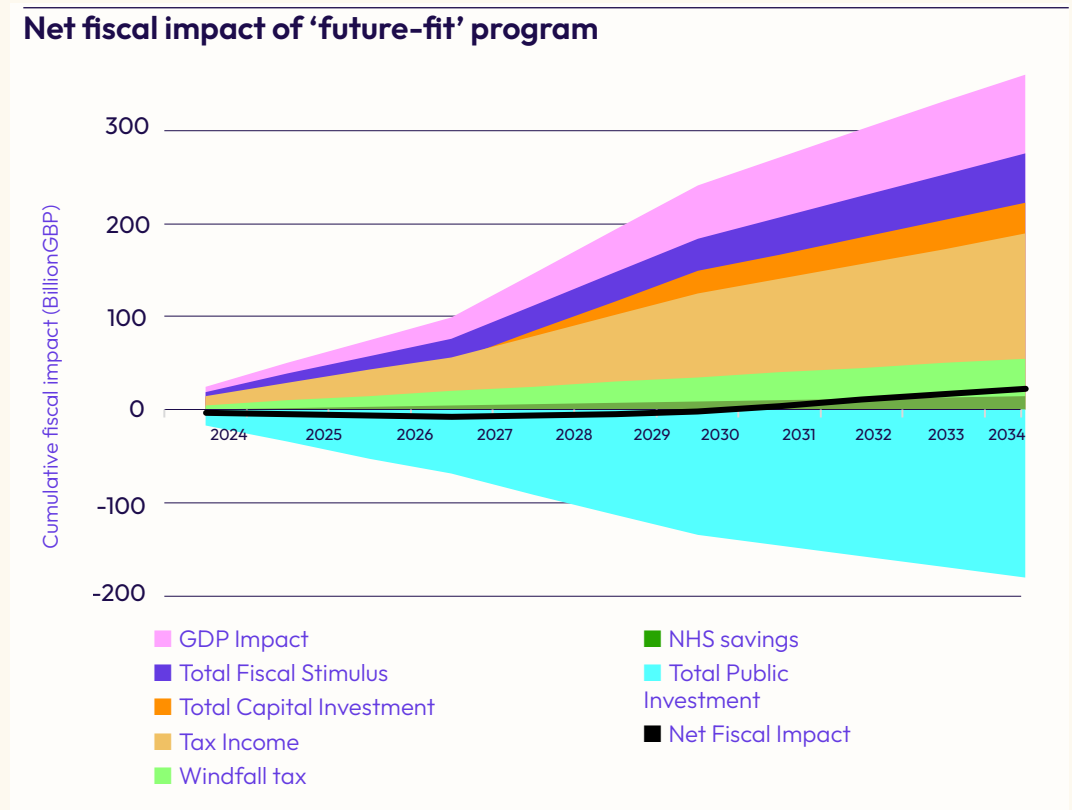
Public Capital investment for the programme

Policy	Phase 1	Phase 2	Phase 3	Total
Area based programs	£1,000,000,000	£500,000,000	£500,000,000	£2,000,000,000
Education and Training	£300,000,000	£100,000,000	£100,000,000	£500,000,000
Heat Pump Grants	£4,500,000,000	£4,500,000,000		£9,000,000,000
Low Income Grants	£15,000,000,000	£30,000,000,000	£3,500,000,000	£48,500,000,000
Total				£60,000,000,000

Implications for government revenues

Although the investments presented above represent a cost to the exchequer, the proposals set out in this report drive increased economic activity and reduce energy imports – especially gas – which would deliver increased tax receipts. Indeed multiple studies including from Cambridge Econometrics^[3], Frontier Economics^[25], the New Economics Foundation^[26] and the University of Leeds^[6], suggest a carefully designed national retrofit programme could lead to a net-increase in revenues for the government, much like other large infrastructure projects. Indeed, our modelling suggests that the government investment is self-financing over the long term. Based on the mix of policies, regulations and incentives outlined, we see a 2.85 to 1 ratio of private vs public investment over the period. When combined with the additional stimulus effect of the cuts to VAT, and using

assumptions from a University of Leeds macroeconomic modelling study^[6], we expect an additional £361bn in GDP over the 10 year period of the programme. These cumulative effects are summarised in the figure below, leading to a net gain of £22.7bn in government revenues over the period.



This is based on the following assumptions.

- **Capital Investment:** the total capital investment is expected to reach £222bn by 2034
- **Public investment:** in addition to the £60bn in capital investment, we assume that the government continues the 5% VAT cut and removal of environmental and social levies from electricity bills throughout the modelled period.
- **GDP impact:** these combined effects lead to a total fiscal stimulus of £275bn, leading to a GDP increase of £361bn
- **Net fiscal impact:** the increased economic growth leads to a higher intake of income tax, VAT, national insurance and corporation tax payments, amounting to £120bn growth in tax receipts through the period. We also assume that as fossil fuel prices remain high the government maintains an annual excess profits levy (windfall tax) on energy companies for the duration of the programme raising £5bn/year. In addition, we expect there to be a saving of at least £1.4bn/year on NHS budgets, due to improvements in public health



THE UK HOMES FUTURE-FIT PROGRAM: CONCLUSIONS FOR DELIVERY

- 1. Our homes are the foundation for our lives and our economy.** A transformative national effort to make our homes ‘fit for the future’ would deliver huge and urgently needed benefits.
- 2. This means a deep transformation of our homes and a new relationship with them** – Every UK home should be made ‘fit for the future’; efficient, comfortable, healthy, safe, convenient, and eco-friendly.
- 3. The UK is in the grip of a “cost-of-living crisis”, this program is vital for addressing it for the long term** – Requiring a massive increase in funding and attention for insulating the UK’s leaky housing stock.

- 4. Achieving this is a national program we can all get behind and be proud of, needing collective and sustained determination.** With a range of stakeholders, sectors and political perspectives all taking part.
- 5. This requires bold public investment but will deliver long term economic prosperity** – Investing £60bn public money over 10 years, leveraging £164bn from private sector, driving a net benefit for the UK economy of £361bn, and improving the government balance sheet.
- 6. Unlocking this transformative change requires expanding the UK’s newest and most exciting sector to work in, with diverse and home-grown green-career opportunities.** As it currently has a massive skills gap, this will require hundreds of thousands of new skilled professionals in a short period.
- 7. This transition must be just and inclusive,** with a focus on diversifying the sector, requiring a significant overhaul of, and investment in, the construction industry.
- 8. Delivery requires innovative new business models** – This will require a radical rethink of the business model through which retrofit is delivered and best practice examples of ‘one-stop-shops’ providing a whole house retrofit through a single point of contact will need to become commonplace.
- 9. This can only be done with bold government intervention and leadership.** This program is complex, involving integrated policies and processes across multiple sectors and stakeholder groups. We propose a six-point plan to achieving this:
 - I. Pillar 1: A National strategy, Local Delivery
 - II. Pillar 2: Tackle fuel poverty
 - III. Pillar 3: A funded offer for every household
 - IV. Pillar 4: Fix broken housing standards
 - V. Pillar 5: Create half a million green jobs
 - VI. Pillar 6: Decarbonise heat
- 10. We strongly advise that UK decision makers take this to heart and implement the recommendations as soon as possible.** The cost of inaction, and the gains that can be won by being bold, makes this plan unavoidable. We must act now as delaying will only make meeting this challenge harder.

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**Our homes are the foundation
for our lives and our economy.**

Be bold.

**Make a transformative
national effort to make our
homes 'fit for the future'.**

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