September 2025

Beyond the Warm Homes Plan

A National Retrofit Programme for people and planet

CIAT

Through the Spending Review 2025, the Labour Government has allocated £13.2 billion to deliver their manifesto commitment to a Warm Homes Plan. The Warm Homes Plan aims to tackle fuel poverty, delivering improvements to five million homes over the parliament. This ambitious programme could bring real benefit to many households facing fuel poverty. However, the challenges facing the UK's built environment go beyond high heating costs.

The Chartered Institute of Architectural Technologists (CIAT) is calling for a holistic programme to retrofit the UK's existing housing stock, delivering upgrades which not only address energy efficiency and fuel poverty, but tackle other pressing challenges such as climate change and resilience, air pollution and public health risks.

The 25 recommendations in this paper outline a comprehensive, practical and broad-based National Retrofit Programme, underpinned by holistic design, and funded through grants and low-interest loans, that will enable everyone to benefit from the security provided by a high-quality home.

Building on the foundations of the Warm Homes Plan, the National Retrofit Programme provides government with blueprint to ensure the UK's built environment is fit for the future.

Summary of Recommendations

Recommendation 1
The Warm Homes Plan currently in development should be broadened to National Retrofit Programme which seeks to address five key objectives together:

I. Reducing emissions from residential buildings, in line with the UK's legally binding net zero commitments, alongside energy and water demand.
II. Improving the resilience of UK housing stock to climate risks, including overheating and flooding.
III. Ensuring that homes are healthier (e.g., reducing risks from excessive cold, excessive heat, noise and air pollution).
IV. Lowering the costs of heating, cooling or otherwise running homes.
V. Ensuring that homes are comfortable, accessible and form part of well designed, cohesive communities.

Recommendation 2
Interventions delivered through the National Retrofit Programme should apply a principle of "no detriment", such that if they will lead to worse outcomes against any of the key objectives, which cannot be offset by other, complementary improvements, they should not be delivered.

Recommendation 3
To reduce overheads and improve efficiency, a single authority or unit within government should be responsible for delivering the National Retrofit Programme. The Programme should be developed with cross-governmental support but must be led by and accountable to a single minister.

Recommendation 4
The National Retrofit Programme unit should work with local government, housing providers and charities, delivering long-term, funded support which can leverage private investment and achieve the broad reach and scale required to transform the UK's homes.

Recommendation 5
Current and future support for housing stock improvements should be combined into a single, unified National Retrofit Programme, with a clear brand identity and a single digital point of access for all support, in order to reduce complexity for households.

Recommendation 6
Wherever possible, individuals should not need to proactively seek out support but should be automatically flagged as eligible (for example as a result of receiving means tested benefits) and contacted automatically with an offer of support.

Recommendation 7
A broad range of professionals and organisations – including but not limited to energy companies, local authorities, housing associations, health services, teachers, social workers, and job centres – should be able to refer a household for support via the National Retrofit Programme.

Recommendation 8
To streamline funding flows, current private funding streams should be redirected into a centralised National Retrofit Programme pot, pooled with government funding, and managed by the National Housing Bank, which is used to co-fund all government retrofit support.

Recommendation 9
Within the available funding envelope, government should set broad eligibility criteria for access to grant support, to ensure that households most in need can benefit from support. Grounds for eligibility could include living in a deprived community, receiving or being eligible for means tested benefits or demonstrating that household income falls below the fuel poverty low-income threshold.

Recommendation 10
For households not eligible for grant support, government should work with the National Housing Bank and commercial financial institutions to deliver low interest "micro-mortgage" funding to cover the full costs of domestic energy efficiency retrofit works, to ensure that high upfront costs are not a barrier to uptake.

Recommendation 11
Low interest loan-based funding should be made available to social housing providers and private landlords to enable them to meet or exceed minimum energy efficiency standards obligations, where costs exceed minimum energy efficiency standards cost caps and available grant funding.

Recommendation 12
The National Retrofit Programme team should work with local government, charities, social housing providers and community groups, to explore the potential for at-scale retrofit interventions (such as local heat networks and community solar panels). A particular focus will be needed on outreach to households living in privately owned or rented accommodation.

Recommendation 13
At the outset of every programme retrofit, an appropriately qualified and competent building design professional (such as a Chartered Architectural Technologist, Architect or Chartered Building Engineer), should holistically assess the property and recommend measures to improve the performance, resilience, health and comfort of homes, in line with the programme objectives, targeting an energy efficiency of Band C and zero operational emissions as a minimum. The designer should be independent from the contractors undertaking works, to avoid conflicts of interest.

Recommendation 14
For grant funded improvements, designers should be empowered to recommend measures which go beyond the scheme's minimum standards, where the economic and social benefits of the improvements outweigh the costs. For retrofits funded by loan-financing, designers should provide "silver" and "gold" options, which would deliver better performance, which the household could choose (weighing the benefits against the additional costs of loan repayment).

Recommendation 15
All retrofits delivered through the National Retrofit Programme should include a building performance evaluation following completion, to ensure that measures are delivering the target outcomes, and to address any issues with the installation or operation of measures, giving residents and the broader public confidence in the works.

Recommendation 16
All works delivered through the National Retrofit Programme should be accompanied by a "home instruction manual", advising households on how to get the best performance from their upgraded homes.

Recommendation 17
Government should extend the current zero VAT rating for energy saving measures (ESMs) such that all ESMs are zero rated, regardless of who purchases or installs them, and whether they are installed as part of wider works.

Recommendation 18
Building design and construction professionals should proactively promote domestic retrofit measures as part of any wider home improvement works, enabling wider uptake while minimising disruption to households.

Recommendation 19
Government should implement a reduced rate of VAT for all renovation work on existing buildings, and on materials reclaimed from previous constructions, in order to encourage retrofit and circular materials use.

Recommendation 20
Government should implement reduced rates of stamp duty land tax for the most energy efficient homes, on a fixed term basis. This will incentivise energy efficiency improvements as part of home upgrades and will create a market for more efficient homes.

Recommendation 21
Government, employers, educators, training providers, professional institutes and trade associations should launch a coordinated national campaign promoting careers in sustainable design and construction.

Recommendation 22
Government should improve workforce data and monitoring, to identify specific skills gaps and evaluate the efficacy of policy interventions designed to stimulate workforce expansion.

Recommendation 23
Government should ensure that all competent professionals are supported to contribute to the National Retrofit Programme on an equal basis, encouraging fair competition through procurement.

Recommendation 24
Government should work with trade associations and professional bodies to ensure households can easily identify competent professionals to design and deliver domestic retrofits, working through the single digital point of access.

Recommendation 25
The National Retrofit Programme should include effective dispute resolution pathways to ensure that households can easily address any problems with work, without additional costs.

Why the UK needs a National Retrofit Programme

"The energy shock of recent years has highlighted the urgent importance of improving energy efficiency in British homes. Labour will invest an extra £6.6 billion over the next parliament, doubling the existing planned government investment, to upgrade five million homes to cut bills.

"The Warm Homes Plan will offer grants and low interest loans to support investment in insulation and other improvements such as solar panels, batteries and low carbon heating to cut bills. We will partner with combined authorities, local and devolved governments, to roll out this plan. Labour will also work with the private sector, including banks and building societies, to provide further private finance to accelerate home upgrades and low carbon heating. We will ensure homes in the private rented sector meet minimum energy efficiency standards by 2030, saving renters hundreds of pounds per year. Nobody will be forced to rip out their boiler as a result of our plans.

"Labour will save families hundreds of pounds, slash fuel poverty, and get Britain back on track to meet our climate targets. Our plan will mean good skilled jobs for tradespeople in every part of the country."

Change: Labour Party Manifesto 2024

1. The UK's housing stock is in urgent need of revitalisation. A safe, secure and healthy home is foundational to almost every aspect of life, but all too often, residential buildings in the UK are not providing that foundation. As of 2023, 47.5% of homes did not reach energy efficiency rating (EER) band C,[1] while two thirds of households live in draughty, damp or overheated homes.[2] The proportion of non-decent homes in the UK is higher than in European comparator countries, at 15%.[3] Nearly 3 million households are in fuel poverty (in a house with an energy efficiency rating (EER) below band C and in relative poverty after housing costs). [4]

2. The impacts of poor-quality homes can be profound. Cold, damp and mouldy homes have been linked to asthma, respiratory diseases, cardiovascular illness, allergies and poor mental health, and are thought to be a contributor to excess winter deaths.[5] Conversely there are already an estimated 2,000 heat related deaths in the UK per year, and as the UK warms, overheating will pose an increasing risk, particularly in poorly ventilated or shaded homes.[6] These risks are greatest for vulnerable groups, including children, older people, and people living with pre-existing health conditions. Poorly glazed homes can be particularly susceptible to noise pollution, which can contribute to sleep disturbance, cardiovascular and metabolic problems and even cognitive impairment in children.[7] Gas central heating, if faulty, can lead to carbon monoxide poisoning, while solid fuel heating creates significant indoor air pollution, especially in poorly ventilated spaces, which is a major public health risk.[8] Poor housing has been estimated to cost the NHS around £2.5 billion per year,[9] and the wider economic cost of these health impacts can be significantly higher.

3. The impacts of poor housing intersect with and exacerbate other forms of disadvantage. Living in poor housing can lower productivity or contribute to poor educational outcomes. High heating costs can reduce resources available for transport or social interaction and can make it harder to afford healthy food.[7] Ultimately, poor housing weakens communities and the UK's social fabric.

4. Housing is also an important contributor to the interlinked environmental crises facing the UK including climate change, air and light pollution. The residential buildings sector is currently the second highest-emitting sector in the UK, accounting for 12% of UK greenhouse gas emissions (52.2 MtCO2e) in 2023.[10] Just 5% of homes have low carbon heating systems.[2] Additionally, 38% of particulate matter emissions in the UK and 22% of sulphur dioxide emissions result from domestic burning (for example for heating).[6] Nor are UK homes resilient to changing external conditions. One in five UK homes already experience overheating, even during relatively cool summers, while 1.8 million homes are at risk of flooding.[11] These risks will increase as the climate warms. Housing also contributes to high levels of water use, with 12 out of 17 regions projected to be facing severe water stress by 2040.[12]

5. We cannot simply knock down existing homes and replace them with higher standards of newly built properties. Such an approach would be very expensive, in both financial terms and in embodied carbon, and the UK does not have sufficient workforce or housing capacity to allow for such a massive undertaking. Around 80% of the homes that will be in use by 2050 are already built. It is therefore essential that these homes are made fit for the future.

6. Government is already investing in improving the energy efficiency of homes, with a focus on measures which help reduce fuel poverty across both social and private housing. Since 2013, around 4.5 million energy efficiency measures (EEMs) have been installed across properties in Great Britain, through government support schemes, with around 420,600 installed in 2024.[13] This is clearly a significant undertaking, but 29 million homes will need retrofitting by 2050 purely to deliver the UK's net zero commitments;[2] the UK Climate Change Committee's "balanced pathway" calls for a 66% reduction in emissions from domestic buildings by 2040.[10] As such, it is clear that a far larger programme is now needed. And while this will require significant up-front investment, doing so can deliver significant benefits, including improving public health, reducing UK greenhouse gas emissions, and lowering fuel costs.

7. The Labour Government has allocated £13.2 billion to a Warm Homes Plan to upgrade five million homes by 2030, delivering improved energy efficiency and lowering bills. However, CIAT believes that the Government should go further, utilising these resources to deliver homes that are not only warm, but sustainable, healthy, comfortable and affordable, and scaling up funding and ambition over the long term, to ensure the UK remains on track to meet the recommendations of the Climate Change Committee, and that everyone can benefit from a healthy, efficient and sustainable home.

Objectives – a holistic plan

8. Large-scale renewal of the UK's housing stock will present challenges but also offers opportunities to look at homes more holistically than has previously been the case. The Labour Party manifesto indicated that the focus of the Warm Homes Plan (due to be fully launched by October 2025) would be on improving energy efficiency in heating homes. But this approach misses other key priorities. Focusing too heavily on any one priority, whether that be decarbonisation, warmth, fuel poverty or health, could lead to negative unintended consequences for other priorities.

9. Cavity wall and loft insulation are among the most popular home energy saving measures (ESMs), for example accounting for 43.6% of measures installed under the Energy Company Obligation (ECO) scheme.[13] Such measures are typically less costly and disruptive to install and have minimal operating costs (unlike other measures such as low carbon heating systems), meaning that capital expenditure can be recouped in five to ten years.[14] However several recent cases have highlighted that insulation installed improperly, or without commensurate improvements in ventilation, can cause serious damp problems, which may cause health problems or damage building structure.[15] And without improved ventilation, these homes may also be at increased risk of overheating in summer.

10. Conversely, in its *Seventh Carbon Budget*, the Climate Change Committee recommended a 66% reduction in emissions from residential buildings by 2040, to be delivered primarily through the widespread roll out of low carbon heating systems (such as air source heat pumps). The Committee does recommend completing coverage for loft insulation and achieving 87% coverage for cavity wall insulation, but these improvements deliver just 5 MtCO2e of emissions reductions against the baseline by 2050, compared to around 50 MtCO2e of reductions through low-carbon heating systems. Other major fabric interventions, such as solid wall insulation, are not recommended at all, due to high upfront costs.

11. In other words, the Committee does not recommend a fabric first approach, on the basis that, in most homes, this is not the most cost-effective way to deliver net zero. However, this means that households may continue to face poorly insulated, cold and damp homes. And because heat pumps work less efficiently in poorly insulated homes, energy bills for these homes could increase significantly, exacerbating fuel poverty and inequality.

12. It is clear that to deliver the best outcomes for individual households and for the UK as a whole, a holistic National Retrofit Programme is needed, which seeks to improve all elements of the performance of UK homes, lowering bills, reducing negative climate and environmental impacts, improving resilience and ensuring that homes provide comfortable, accessible and healthy environments. To effectively deliver these broad benefits to the largest possible number of households, this scheme must be design-led, flexible, affordable and accessible, learning lessons from past schemes, such as the Green Deal, which were less successful than hoped.[16]

13. Given the scale and complexity of a such a programme, a dedicated delivery authority or unit within government will be needed to ensure success. This unit should be supported across government, with buy-in from the Ministry for Housing, Communities and Local Government (MHCLG), the Department for Energy Security and Net Zero (DESNZ), HM Treasury and the Prime Minister for a long-term, shared policy vision. The delivery unit will need to be led by, and accountable to a single minister.

14. To achieve the Programme's objectives for scale, the national delivery unit will need to work in partnership with local government, as well as with housing providers, charities and others. Crucially, it will need to be underpinned by a long-term funding commitment, enabling the programme to scale up sustainably. The Climate Change Committee has estimated that retrofitting the UK's housing stock to deliver net zero will cost around £250 billion over the next 25 years.[10] Government investment, including the existing £13.2 billion Warm Homes Plan commitment, must therefore be leveraged to secure private and commercial investment over the long term.

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Principles – an accessible plan

Reducing scheme complexity and enabling access

15. At present, national policy support for the delivery of domestic retrofit improvements is divided between a wide range of programmes, including the Boiler Upgrade Scheme, the Great British Insulation Scheme, the Warm Homes: Local Grant, the Warm Homes: Social Housing Fund and the smart export guarantee. In addition, energy providers deliver the Energy Company Obligation scheme directly to households, and private finance providers deliver the Green Deal. Other schemes, most notably the Green Homes Grant, have been launched only to be withdrawn.

16. These schemes all deliver different benefits to different cohorts with different eligibility requirements and funding; a household might be eligible for one scheme, but not another. In this fragmented landscape, households may find it challenging to determine which scheme is most appropriate for them, what support might be provided and how that support can be accessed. This complexity is exacerbated by poor promotion and communication of available support.

17. This landscape may present particular challenges for deprived households, who may for example lack the time or resources to understand their entitlements and identify the most appropriate scheme. Households with poor English language skills or low digital literacy are also at-risk of exclusion. Administering multiple schemes also creates additional overheads and inefficiencies for government.

18. It is therefore important that access to support for home improvements be as streamlined as possible, with a unified National Retrofit Programme brand identity, single digital point of access and scheme advice helpline which allow people to easily access the right support. Additionally, funding flows should be rationalised, with both government and private financing being funnelled to the newly established National Housing Bank, which can then manage all allocations of funding.

19. Given the broad impacts of poor housing, a wide range of public sector bodies and other organisations may have opportunities to identify households who would benefit from home retrofit support. This might include educational bodies, employers, health and social services, charities and energy providers. To maximise uptake of support, all these professionals and bodies should be able to refer households for support. Uptake could be further enhanced by enabling the National Retrofit Programme team to directly contact households referred into the programme (subject to appropriate consents), helping to identify the support available. Where appropriate, this approach could be automated.

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Eligibility and targeting

20. Most current support schemes target fuel poor households, who will be least able to invest in improving their own homes. Within a constrained financial envelope, such targeting maximises the benefits in terms of reducing fuel poverty, with lower greenhouse gas emissions seen as a welcome, but secondary, by-product in many cases. However, given the scale of need, the barriers to a purely commercial retrofit model, and the wide benefits of such improvements, there is a strong case for a broader approach.

21. The Climate Change Committee has made clear the need to decarbonise UK housing almost entirely over the next fifteen years. For example, the Committee estimates that, by 2030, the UK will need to be installing around 450,000 heat pumps per year, and 1.5 million per year by 2035 (compared to just 60,000 in 2023).[7] This is a significant expansion in a short timeframe.

22. Home retrofit interventions can have very high upfront costs, creating barriers to uptake. Cavity wall insulation can cost £1,000-£4,500,[12] the median cost of an air source heat pump funded through the Boiler Upgrade Scheme since 2022 has been £13,000, and a ground source heat pump has cost almost twice that.[17] Around 8.5 million UK homes have solid walls, but only around 10% of these are insulated;[18] the costs of solid wall insulation are far higher than cavity wall insulation.[19] Without financial support, many households will find these ESMs unaffordable, and other policies, such as the planned ban the sale of new gas boilers, will face significant opposition if households are not supported to meet the higher costs of low carbon alternatives. The evaluation of the current Boiler Upgrade Scheme, conducted under the previous administration, but published following the 2024 General Election, found that 35% of those who upgraded their boiler through the scheme found it difficult to meet upgrade costs not covered by the BUS grant, while 23% cited high upfront costs as a reason that they had not upgraded without the scheme support.[20]

23. Although robust data is lacking, the costs of installing ESMs such as heat pumps in newer homes (which already meet higher performance standards) are likely to be lower (perhaps in the low thousands of pounds). However, it is still important that these homes achieve the best performance possible, reducing energy demand and enabling healthier, more comfortable lives. Many households will be satisfied with the performance standards of these newer homes and may not realise further improvements are achievable. As such, they will have weaker incentives to invest in further upgrades and even lower costs may still present a barrier to uptake of ESMs.

24. Additionally, it has been estimated that every £1 of investment in home retrofit could deliver £6.90 in economic activity, significantly contributing to economic growth.[21] Importantly, this growth would be distributed across the whole country, supporting thousands of skilled jobs embedded within local economies; the Climate Change Committee has estimated that installation and maintenance of low carbon heating and other energy efficiency measures (in new and existing properties) could support as many as 120,000 - 230,000 additional jobs by 2030.[22] That is before considering the wider social and economic benefits delivered through improved housing, such as improved productivity and lower healthcare needs.

Scheme financing

25. In this context, government should seek to deliver as large a programme of home energy efficiency improvements as possible, maximising the impact of the £13.2 billion already allocated to the Warm Homes Plan. This is both essential to achieve legally binding net zero obligations and beneficial to delivering core priorities of the current Government, including economic growth, strengthened communities and improved health.

26. For fuel poor households who own their own home a grant-based model with broad scheme eligibility criteria is most appropriate, so that households do not "fall through the net" for support; it is clearly preferable to be overly generous than to exclude some fuel poor households due to the complex eligibility requirements. Criteria should include living in a deprived community (based on the English indices of deprivation), receiving or being eligible for means tested benefits or demonstrating that household income falls below the fuel poverty low-income threshold.

27. Grant funding cannot, however, realistically be provided on a universal basis. For higher-income households, a mix of means-tested grants and low interest loans for should be deployed, such that up-front costs are not a barrier to retrofit works. The newly established National Housing Bank could deploy a share of its £22 billion budget to provide low risk "micro-mortgages", in partnership with commercial financial institutions. This micro-mortgage model would provide security to lenders, who would hold a share of the property equity until the loan is repaid and could be reimbursed from sale or inheritance values in the event of default, without risking the household losing their home.

28. Centralising funding through the National Housing Bank would also be attractive to the Treasury. Contributions from energy providers would boost government receipts, and loans to households would be counted as an asset within public sector net financial liabilities, effectively helping government to lower debt and comply with fiscal rules.[23] Loan financing should also be made available to social housing providers and private landlords, for implementation of ESMs which go beyond the requirements of minimum energy efficiency standards, or which would otherwise be unaffordable under current cost caps, providing a carrot to complement a stick of minimum energy efficiency standards. Where social housing remains publicly owned, government should lead by example, bringing homes up to the highest possible quality standards through direct investment.

29. To further drive uptake, government should explore reform of energy pricing models, taxes and subsidies, which currently incentivise gas over electricity for domestic heating (though such reform would be outside the scope of the National Retrofit Programme).[24]

At-scale interventions

30. Crucially, this loan-based model means that the quality of more homes can be improved than would be possible through grants alone, bringing benefits to households and wider society. Expanding demand for home retrofits will help grow the market, lowering costs and delivering economies of scale.

31. Place-based interventions, such as heat networks, or the installation of solar panels along all the roofs in a terrace, have the potential to deliver greater benefits, more cost-effectively and with reduced disruption, so should be favoured wherever possible. These at-scale interventions could be particularly valuable for private homes, which are lagging behind social homes in terms of EPC ratings (which may be taken as a proxy for broader housing quality).[25]

32. Coordinating such interventions across private homes can be more complex, requiring the agreement of multiple different parties. Collaborative action between the National Retrofit Programme team, local government, community groups and charities will therefore be needed to reach these households and deliver retrofit interventions at scale.

Recommendation 9
Within the available funding envelope, government should set broad eligibility criteria for access to grant support, to ensure that households most in need can benefit from support. Grounds for eligibility could include living in a deprived community, receiving or being eligible for means tested benefits or demonstrating that household income falls below the fuel poverty low-income threshold.

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For households not eligible for grant support, government should work with the National Housing Bank and commercial financial institutions to deliver low interest “micro-mortgage” funding to cover the full costs of domestic energy efficiency retrofit works, to ensure that high upfront costs are not a barrier to uptake.

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The National Retrofit Programme team should work with local government, charities, social housing providers and community groups, to explore the potential for at-scale retrofit interventions (such as local heat networks and community solar panels). A particular focus will be needed on outreach to households living in privately owned or rented accommodation.

Implementation – a deliverable plan

A design-led approach

33. To ensure that public spending represents good value for money, the Government's recent Fuel Poverty Strategy consultation sought views on a cost-effectiveness principle for the strategy.[26] CIAT supports a cost-benefit ratio approach, rather than an absolute cap for grant funding. This allows for the installation of more costly measures which deliver greater levels of benefits (including both direct financial benefits and wider social and economic benefits such as improved productivity, reduced ill-health and lower greenhouse gas emissions).

34. Every building differs in context, design, materials, construction and usage patterns. It is therefore not possible to define which measures deliver best value for money or are most appropriate in every case. Instead, identifying cost effective and high-impact interventions across multiple interconnected objectives will require specialist design expertise.

35. CIAT therefore recommends that independent architectural design, conducted by a properly qualified, competent professional (such as a Chartered Architectural Technologist, Architect or Chartered Building Engineer), be a key step in home retrofits supported through the National Retrofit Programme. The designer may also act as Retrofit coordinator (as detailed in the British Standards Institute (BSI) PAS 2035:2023 - Retrofitting Dwellings for improved Energy Efficiency), although this role could also be fulfilled by another competent professional. Recommended works should be delivered by a separate competent retrofit installer (in line with PAS 2030:2023 - Installation of Energy Efficiency Measures in Existing Dwellings) to avoid any perceived or actual conflicts of interest.

Performance improvement targets

36. For households funding work through grant support, the designer should develop a holistic programme which aims to achieve at least EPC band C and zero operational emissions (assuming a decarbonised electricity grid supply), without detriment to building health or comfort. However, designers should be empowered to recommend measures which target higher standards of performance, resilience, health and comfort, where the value of these benefits exceeds the higher costs. Such measures could include (for example) rooftop solar photovoltaics, enhanced glazing to allow full spectrum light and additional sound insulation, or nature-based interventions such as providing shading from trees or adding green roofs. Designers could also be empowered to target enhanced performance standards such as Passivhaus or the WELL Building Standard. In these cases, where recommendations are accepted by the household, they should be fully funded and implemented.

37. For individuals seeking loan-based support, an independent retrofit design should again be integral, with designers providing an option for a minimum improvement, up to the same standards of at least EPC band C and zero operational emissions (assuming a decarbonised electricity grid supply), without detriment to building health or comfort. However, in this case designers should also provide "silver" and "gold" options, which achieve higher housing quality standards, with households having the option to pay the difference themselves (including with additional loan financing, subject to provider agreement). Households should be given flexibility to implement interventions on a phased basis, in order to minimise disruption.

Flexible, evidence-based design

38. All recommendations should be evidence-based, drawing on an understanding of the building's current performance and the experiences of occupants (this may be informed by an EER as well as by building performance evaluation methodologies), and should be aligned with BSI PAS 2035:2023 Retrofitting Dwellings for improved Energy Efficiency.[27] Additional relevant standards should be adhered to as appropriate,* and industry best practice, such as the LETI Climate Emergency Retrofit Guide,[28] and the Sustainable Traditional Buildings Alliance Responsible Retrofit Guidance Wheel,[29] should also be considered.

39. Importantly, while retrofits should align to relevant standards, the National Retrofit Programme must also take a flexible view of which measures are funded. A "fabric first" approach will normally be more cost effective and result in more comfortable, healthy homes with lower energy requirements. As such, competent designers would typically seek to improve building fabric (for example, providing insulation, ventilation and shading) before considering other interventions (such as low carbon heating or solar panels). However, there may be circumstances in which substantially improving building fabric is either unfeasible or not cost effective, in which case designers should be empowered to recommend alternative interventions. Designers should also be empowered to recommend larger interventions (such as the installation of shared heat pumps or heat networks or installing solar panels across a whole terrace), which deliver benefits for more households, while being installed more efficiently and with lower per household costs.

Post-retrofit evaluation, support and follow-up

40. Actual performance of measures can often differ substantially from theoretical or modelled performance. This can be due to numerous factors, including model limitations, changes during installation, and how measures are used. The National Retrofit Programme should therefore seek to mitigate any performance gaps, to deliver the best outcomes for households.

41. To ensure that measures have been installed to the required standard and to provide a mechanism for addressing any issues with the work, building performance evaluation should be integrated to the programme, with the designer leading or coordinating follow-up engagement with the household at set intervals after completion of works. For example, technical assessments and occupant surveys could be conducted three and twelve months after completion. These would monitor the performance of measures and the experiences of occupants, providing an opportunity to ensure that ESMs are installed properly and working well and giving households confidence and trust in the work. This would also allow for continuous quality improvement in building design, ensuring that the programme delivers best value outcomes as it scales up.

42. The evaluation of the Boiler Upgrade Scheme has found that 17% of scheme customers were dissatisfied with the handover of their new system, with some interviewees highlighting overly technical written material and inadequate explanation of how to programme and use their new system.[19] To support households to make the best use of new and potentially unfamiliar systems, all retrofits should be delivered with a "home instruction manual", providing guidance on the most effective ways to use the home to deliver the best performance.† This should touch on both the technical elements of the home, and also how to better work with natural elements (for example, when to open windows or close shutters to avoid overheating). Manuals should be both physical and digital and should be written to be easily understood by households, who may lack technical knowledge. Building performance evaluations should provide households with opportunities to address any outstanding questions they may have about the measures and guidance in the manual.

*Relevant standards may include:
- BS 7913:2013 (Conservation of historic buildings)
- BS 40101:2022 (Building Performance Evaluation)
- BS 5250: 2021 (Management of moisture in building)
- BS EN 16883:2017 (Conservation of cultural heritage – guidelines for improving the energy performance of historic buildings)
- BS 40102 (Health and wellbeing, thermal comfort, indoor air quality and overheating in buildings) (forthcoming)
- BS 40104 (Assessment of Dwellings for Retrofit) (forthcoming)

† BSRIA has developed relevant guidance on preparing home user guides. See BSRIA, *Building Manuals and Building User Guides - Guidance and worked examples (BG 26/2011),* (July 2011).

Recommendation 13
At the outset of every programme retrofit, an appropriately qualified and competent building design professional (such as a Chartered Architectural Technologist, Architect or Chartered Building Engineer), should holistically assess the property and recommend measures to improve the performance, resilience, health and comfort of homes, in line with the programme objectives, targeting an energy efficiency of Band C and zero operational emissions as a minimum. The designer should be independent from the contractors undertaking works, to avoid conflicts of interest.

Recommendation 14
For grant funded improvements, designers should be empowered to recommend measures which go beyond the scheme's minimum standards, where the economic and social benefits of the improvements outweigh the costs. For retrofits funded by loan-financing, designers should provide "silver" and "gold" options, which would deliver better performance, which the household could choose (weighing the benefits against the additional costs of loan repayment).

Recommendation 15
All retrofits delivered through the National Retrofit Programme should include a building performance evaluation following completion, to ensure that measures are delivering the target outcomes, and to address any issues with the installation or operation of measures, giving residents and the broader public confidence in the works.

Recommendation 16
All works delivered through the National Retrofit Programme should be accompanied by a "home instruction manual", advising households on how to get the best performance from their upgraded homes.

Retrofit affordability

43. As noted above, there are significant financial barriers to the uptake of energy efficiency and other domestic retrofit measures. While grants and loans can help close this gap, other measures will likely be needed to realise the full potential of the Warm Homes Programme.

44. Since 2022, certain energy-saving materials used in home retrofits have been zero VAT rated (rather than the typical 20% placed on other construction materials).[30] This policy is intended to encourage the wider uptake of ESMs. However, there are several complexities in the scheme which have limited its impacts.

45. Firstly, VAT exemption is only available to contractors. "Self-installations" are not eligible for the exemption, and if a client supplies a product to a contractor to install, 0% VAT applies to installation only, with VAT charged on the purchase of the product at the standard rate. Additionally, while measures installed in isolation are zero rated, most people do not install such measures in isolation, and if they are installed as part of a large programme of works, the exemption cannot be claimed, even for the explicitly energy saving measures.

46. This means that, if a homeowner adds an air source heat pump during the course of a wider renovation (such as a loft conversion, extension, or kitchen replacement), VAT would be charged on the heat pump at the standard rate. The only way to secure the exemption would be to install the heat pump as an entirely separate job, which might require providing separate invoices, sourcing supplies separately, demonstrating a clear time difference between the works and demonstrating that the ESMs are not dependent on the wider renovation work. This adds complexity, inefficiency and increased overheads, undercutting the benefit of the VAT exemption.

47. Importantly, broader home improvements often provide a hook for households to make housing quality and energy efficiency improvements, (or for professionals to raise this possibility with households who might not otherwise have considered it); 35% of upgrades delivered through the Boiler Upgrade Scheme happened as part of a wider renovation,[19] and Building Regulations already mandate that buildings be brought into compliance with modern energy efficiency requirements when major works, such as extensions, are undertaken.[31]

48. Making these upgrades VAT-able reduces the likelihood that they are taken-up as "add-ons" to the otherwise planned renovations. The Federation of Master Builders estimates that VAT costs put off roughly 4 million households a year from renovating their homes.[32] Addressing these issues could therefore unlock significant numbers of home energy efficiency improvements, bringing downstream benefits across the whole economy. It would also mean that government grants or private financing could be proportionately lower per household, such that more households could be supported from the same total funding envelope.

49. Given the lower embodied carbon of retrofit compared to new build, government should also explore the potential for a reduced rate of VAT for all renovation work on existing buildings, regardless of whether this improves the energy efficiency of the building. A similar approach should be considered with regards to reclaimed materials, to incentivise materials reuse over the use of virgin materials. Appropriate steps should be taken to ensure construction products reused in this way meet required standards, and it may be necessary to implement such an exemption only after reforms to construction product regulations are implemented.

50. To further incentivise investing in the quality of a property, government should consider reduced rates of stamp duty land tax for more homes with higher EERs (which may be taken as a proxy for broader housing quality), for a fixed period of five to ten years. Under this model, a homeowner could invest in improving the quality of their home, which should also increase the property's value. They could then sell the property at a higher level which reflects the value added by the quality improvements without narrowing their range of potential buyers. At the same time, a buyer could look to purchase a more expensive, higher-quality home, offsetting the higher property cost with lower stamp duty liability. This would ensure that sellers can repay any outstanding retrofit costs and make home retrofits more attractive during the period of the stamp duty reduction and help stimulate the market for better quality homes.

Recommendation 17
Government should extend the current zero VAT rating for energy saving measures (ESMs) such that all ESMs are zero rated, regardless of who purchases or installs them, and whether they are installed as part of wider works.

Recommendation 18
Building design and construction professionals should proactively promote domestic retrofit measures as part of any wider home improvement works, enabling wider uptake while minimising disruption to households.

Recommendation 19
Government should implement a reduced rate of VAT for all renovation work on existing buildings, and on materials reclaimed from previous constructions, in order to encourage retrofit and circular materials use.

Recommendation 20
Government should implement reduced rates of stamp duty land tax for the most energy efficient homes, on a fixed term basis. This will incentivise energy efficiency improvements as part of home upgrades and will create a market for more efficient homes.

Programme roll-out

51. To effectively deliver a National Retrofit Programme, it will be necessary to gradually scale-up programme delivery, starting with limited roll out to ensure adequate workforce and address any operational or implementation challenges, before growing rapidly and then levelling off at a high level (following a typical "S-curve"). The Construction Leadership Council has detailed one such delivery trajectory, to implement retrofit measures in 27.3 million homes over 20 years, and a similar pathway would be appropriate here.[33]

52. However, rather than artificially limiting access, for example to specific cohorts or geographies, which would create winners and losers, it may be possible to manage the Programme's growth organically. The review of the Boiler Upgrade Scheme found that 65% of installations were prompted, at least in part, by the availability of grant funding.[19] As such, it may be possible to limit or induce demand by limiting or targeting promotion, while still allowing anyone who needs support to access it. And by making it clear that the programme is to be sustained for the long-term, government can avoid a rush of applications which could overwhelm the programme.

Workforce skills and capacity

53. It is widely accepted that the built environment sector faces significant workforce pressures, across all specialisms and at all levels. Without action to address these shortfalls, a large-scale National Retrofit Programme may not be achievable, particularly given the Government's parallel commitment to deliver 1.5 million new homes, and the need to also decarbonise non-domestic buildings. As already noted, installation and maintenance of low carbon heating and other energy efficiency measures (in new and existing properties) could require 120,000 - 230,000 additional jobs by 2030,[7] while over 200,000 professionals may be needed to deliver retrofits of historic buildings.[34] The Construction Leadership Council has estimated that 500,000 professionals will be needed to deliver a comprehensive national retrofit strategy.[28]

54. Investing in this workforce will enable the UK to secure a global leadership position and realise the benefits of the net zero transition across the UK, and the Government is taking steps to support this workforce, with the goal of recruiting 100,000 more construction workers per year by the end of the Parliament.[35] Funding commitments include £100 million to deliver 40,000 construction industry placements, and £40 million for construction foundation apprenticeships,[36] while DESNZ has committed to train up to 18,000 retrofit installation professionals over two years, through the Warm Homes Skills Programme.

55. At the same time, the private sector is increasing its support for built environment skills. For example, the National House Building Council is launching 12 new multi-skill training hubs, with the aim of training 3,000 skilled and site-ready tradespeople each year. [37] Establishing a long-term, large scale National Retrofit Programme will provide clear and sustained demand for these skills, giving businesses confidence to invest in the workforce.

56. These investments are welcome but is likely that additional targeted support will be needed to address specific retrofit and building performance skills shortages as the National Retrofit Programme scales up. Government should therefore invest in improving workforce data and monitoring. This will enable coordinate workforce planning and demand-led support, with additional targeted interventions, such as increasing funding for specific training programmes or overseas recruitment of particular professionals, rolled out to address emerging issues. Any such actions should be continually monitored and refined, and should be underpinned by active promotion of sustainable design and construction careers, delivered in partnership between government, employers, educators, training providers, professional bodies and trade associations.

Professional competence

57. It is also vital that professionals delivering the National Retrofit Programme have the appropriate competencies (skills, knowledge, experience and behaviours) to deliver retrofits, whether they are experienced professionals or new entrants to the built environment sector, and that households can be easily paired with competent design professionals and contractors to deliver the programme. Current programmes often utilise the TrustMark scheme, however this scheme has several weaknesses. TrustMark guidance does not routinely make reference to the importance of holistic design in domestic retrofits, participating in programmes has proven complex for professionals, and registered providers have not always met the quality standards that clients rightly expect, undermining confidence in the scheme.

58. Competency requirements should be set to protect homeowners and give them confidence in the programme. Exactly what competencies are required to deliver a retrofit programme will depend on the nature of the retrofit, but at a minimum, designers and retrofit coordinators should be Chartered Members of relevant Professionals Institutes (such as CIAT, RIBA, CIOB or RICS), and should be certified as having the competencies laid out in PAS 2035:2023 for retrofit coordinators. Similarly, retrofit installers should be certified to PAS 2030:2023 and, where appropriate, Microgeneration Certification Scheme (MCS) standards. Beyond this, government should work with TrustMark (or alternative quality schemes) and professional institutes to strengthen quality assurance, and to identify and align standards to other relevant competency frameworks, such as the Construction Leadership Council *Roadmap of Skills for Net Zero: Competencies for Domestic Retrofit*,[38] and the Construction Industry Council *Competence frameworks for the built environment – Core criteria for sustainability competence – Code of practice*.[39] Additional recognition should be provided to professionals with particular expertise, such as Chartered Environmentalists, or specialists in traditionally constructed buildings.

59. At the same time, government must ensure that appropriately competent professionals can easily contribute to the programme on an equal basis. Scheme certification requirements must focus on demonstration of relevant competencies, rather than specific professional titles, encouraging competition rather than favouring a particular profession. This focus on competencies should also be reflected within the scheme's structures and resources. For example, rather than talking about involving an architect (a protected title) to design interventions, the Programme might talk about a design phase and an installation phase, delivered by accredited designers and contractors.

60. It is essential that Programme participants can easily identify the professionals with appropriate skills to design and install measures. One of the challenges reported with the short-lived Green Homes Grant was that a combination of complex processes, limited timeframes and uncertain demand meant that there was a shortage of competent installers approved through the scheme, which undermined delivery.[40] Barriers persist even for the well-established Boiler Upgrade Scheme, with one in five households reporting difficulties finding professionals to install upgrades when the household wanted.[23]

61. Robust competency requirements for participants, have the potential to deter prospective designers and contractors from participating. Participation in the National Retrofit Programme must therefore offer sufficient benefits to these professionals to make meeting these competence requirements worthwhile. That means the scheme must deliver long-term, reliable demand. Additionally, the Programme must be designed to reduce barriers to matching households and designers/installers, through the single digital point of access and advice helpline.

Dispute resolution

62. Finally, the review of the Boiler Upgrade Scheme has found that around 10% of households raised complaints about their installation experience.[23] Even with strengthen competency requirements, it is inevitable that there will be some cases where a retrofit goes wrong, or where disputes arise between parties. The National Retrofit Programme must provide households with straightforward mechanisms for addressing concerns or resolving disputes about the quality of works delivered through the programme. This should include alternative dispute resolution methodologies which avoid legal action, as well as adequate provision for compensation or remediation, to ensure that no household is left out of pocket as a result of participating in the scheme.

Recommendation 21
Government, employers, educators, training providers, professional institutes and trade associations should launch a coordinated national campaign promoting careers in sustainable design and construction.

Recommendation 22
Government should improve workforce data and monitoring, to identify specific skills gaps and evaluate the efficacy of policy interventions designed to stimulate workforce expansion.

Recommendation 23
Government should ensure that all professionals are supported to contribute to the National Retrofit Programme on an equal basis, encouraging fair competition through procurement.

Recommendation 24
Government should work with trade associations and professional bodies to ensure households can easily identify competent professionals to design and deliver domestic retrofits, working through the single digital point of access.

Recommendation 25
The National Retrofit Programme should include effective dispute resolution pathways to ensure that households can easily address any problems with work, without additional costs.

Conclusion

63. With competing priorities vying for attention, it would be easy for the Government to slip into siloed thinking, delivering a Warm Homes Plan which prioritises cutting fuel bills, and brings tangential benefits in emissions reduction, but which does little to address the wider impacts of the homes in which we live.

64. Alternatively, the Government could take the opportunity to think bigger, using the foundation of the Warm Homes Plan funding to develop a holistic approach which cuts across traditional boundaries to deliver a built environment of which the UK can be rightly proud. The legacy of such a scheme would be profound and enduring, transforming the UK's housing stock, and delivering a range of social, economic and environmental benefits. The blueprint laid out in this paper is not the only potential route to achieving this goal, but CIAT believes it is both ambitious in its scope, and realistic in its implementation.

65. The Institute therefore calls on the Government to act on the 25 recommendations laid out in this paper to deliver the quality homes people deserve in an advance, modern economy. But whether the Government follows this plan to the letter, or goes down an entirely different route, CIAT and its membership will continue to support a high-quality built environment which delivers the best outcomes for people and planet.

About CIAT

The Chartered Institute of Architectural Technologists (CIAT) is a global membership qualifying body for Architectural Technology. It exists as a not-for-profit organisation to lead, represent and promote Architectural Technology and to set and maintain the standards for education, practice and professionalism.

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