

Financing home improvements

Technical briefing

Summary of key issues
and solutions to inform
the Good Home Inquiry

June 2021



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About the Good Home Inquiry

Around 10 million people in England currently live in a home that presents a serious threat to their health and safety – defined by the government as ‘non-decent’ homes.

The Good Home Inquiry, commissioned by the Centre for Ageing Better, will provide an evidence-based analysis of England’s housing policies to determine the causes of, and solutions to, the poor quality of so much of our housing. The Inquiry is led by an independent panel and chaired by David Orr CBE.

The need to act is urgent. We have an ageing population, with one in four of us expected to be aged over 65 by 2050, and yet the UK’s housing stock is the oldest in Europe, and the least suited to deal with the adaptations needed to accommodate the changing needs of an older population.

The quality of our home is critical to our physical and mental health and wellbeing. Poor quality housing costs the NHS £1.4bn a year and has proved to be a factor that determines the likelihood of contracting COVID-19. Indeed, areas of the country where there is high incidence of COVID-19 map very closely to areas with the poorest quality or most overcrowded housing. Similarly, ethnic minority communities that are most likely to experience overcrowded or low-quality housing are also most likely to experience poor health outcomes related to housing.

Climate change offers a once in a generation challenge to transform our homes, and it is also a huge opportunity for us to rethink what a home can be. The UK government has legally enshrined its commitment to reach net zero carbon emissions by 2050, and it cannot do that without addressing the problem of low-quality housing. Despite the daunting scale of the task ahead of us, the retrofit challenge also represents an enormous opportunity to create multiple benefits by acting to improve and adapt our homes at the same time.

The increasing use of digitally enabled technology within the home means that anyone left without a good internet connection or the skills to make use

of it will be left at a disadvantage. This will be particularly true if some of the ‘virtual’ services that have been brought in due to the pandemic become commonplace in a post-COVID world. Digital connectivity will therefore be as much a part of what makes a good home as warmth, comfort and safety.

Financing solutions must be found in three key areas: maintenance and repairs; adaptations for ageing populations; and energy efficiency works. To pay for all of these, we need to develop a variety of innovative financing models – a combination of loans, grant, and third-party funding – and encourage better collaboration between industry and homeowners to bring about the changes required and unleash investment.

The benefits of good homes are wide, ranging from good health, financial stability and independent yet socially connected living. That is why investing in the maintenance and upgrade of our housing stock is not a philanthropic act, but rather a vital investment in a key piece of the nation’s infrastructure.

The Inquiry, launched in July 2020, will run until autumn 2021. Inquiry Chair, David Orr CBE, is joined by a panel of three leading experts – Lord Victor Adebawale CBE, Vidhya Alakeson, and Pat Ritchie CBE – bringing a diverse range of experience and expertise.

The Inquiry supports the Centre for Ageing Better’s goal that by 2030 more people aged 50 and over will live in homes that support them to live healthy and fulfilling later lives.

About the Centre for Ageing Better

The UK’s population is undergoing a massive age shift. In less than 20 years, one in four people will be over 65.

The fact that many of us are living longer is a great achievement. But unless radical action is taken by government, business and others in society, millions of us risk missing out on enjoying those extra years.

At the Centre for Ageing Better we want everyone to enjoy later life. We create change in policy and practice informed by evidence and work with partners across England to improve employment, housing, health and communities.

We are a charitable foundation, funded by The National Lottery Community Fund, and part of the government’s What Works Network.

Introduction

This briefing examines how existing or new investment models could be used to help bring the 4.3 million homes that are currently still classified as non-decent up to compliance. This will include eliminating serious hazards, improving thermal comfort, addressing disrepairs and providing modern facilities, which are the four main reasons for homes being non-decent.¹

However, the Good Home Inquiry also wants to move beyond decent homes² to examine how we can improve digital connectivity and accessibility as well as to achieve wider comfort (such as space, light, air quality etc.). Financing such improvements is a key piece of the puzzle.

The briefing will focus in particular on energy-efficiency upgrades as these provide a significant opportunity for existing and new financial mechanisms to deliver home improvements at scale.

In addition, the UK government's net zero emissions target presents an opportunity to make our homes warmer and cheaper to heat, both of which are clearly aligned with the Inquiry's own ambitions.

The Inquiry is seeking to understand what financial solutions are available to home owners who wish to invest in the upgrade of their homes to a good standard. It will reflect on different finance needs, from small repairs and adaptations to comprehensive, whole house upgrades. A fundamental requirement is to understand existing business cases for investing in good homes and how they could be improved to become investable at scale. In this context, this briefing looks at options for government interventions such as smart taxation and regulation.

The central question is: What changes in the financing landscape can be instigated to significantly increase investment in our housing stock and how can we capitalise on the substantial opportunity associated with the decarbonisation (net zero) agenda?

We also want to capture existing financing options and examine how they can be used to help achieve the broader goals the Inquiry has set itself.

1 <https://www.ageing-better.org.uk/sites/default/files/2020-01/Non-Decent-Homes-fact-sheet.pdf>

2 The decent home standard only sets out minimum requirements; good homes are comfortable, flexible, efficient and likeable. The concept of a good home is explained further in the main Inquiry report.

Executive summary

The UK has some of the oldest and least energy efficient housing stock in the world. Over 26 million homes need to be upgraded to make them fit to live in in the 21st century. This seismic challenge leaves us with a stark choice: either do nothing and be left with stranded assets or commit to a major investment programme. This paper makes the case for investment and suggests new financing models that could bring this investment about.

A good home is one that is warm in the winter and cool in the summer, provides hot water, is safe and accessible, and which has good digital and social connectivity. These are not competing priorities but are all equally important and inter-dependent. Furthermore, devoting resources to improve our homes is not a philanthropic act, but rather a vital investment in a key piece of the nation's infrastructure.

There are currently 4.3 million properties classified as falling short of the Decent Homes standard, the government's benchmark for a suitable home. To bring these homes up to that minimum standard requires an investment of £32 billion, with the majority of that investment needed for private sector housing. In fact, nearly two thirds (62%) of 'non-decent' homes are owner occupied. However, investment to improve these homes must be a mix of private and public money, with our housing stock viewed as a national asset, particularly in the context of the UK's ambitious climate change targets.

Financing solutions must be found in three key areas: maintenance and repairs; adaptations for ageing populations; and energy efficiency works.

To pay for all of these, we need to develop a variety of innovative financing models – a combination of loans, grant, and third-party funding - and encourage better collaboration between industry and home owners to bring about the changes required and unleash investment. Part of the challenge will be to redress the uneven distribution of costs (to home owners) and benefits (to UK plc), while government must provide long-term strategic leadership in policy and regulation to allow the industry to invest in innovation.

Financing initiatives must be scalable, so that work to improve individual homes can be aggregated, making these initiatives attractive to larger investors. We should consider ideas such as performance contracting (e.g. guaranteed in-use home energy, water and air quality measures) and precision engineering with off-site manufacturing.

Targeted finance could be provided through a reimagined ‘Green Investment Bank’, modelled on Germany’s KfW³. This could significantly accelerate investment in home improvements, with subsidy linked to performance.

Key to all of this would be an overarching body - a Good Home Agency - that could play the role of intermediary between home owners, government and investors, bringing together professional advice, design solutions and tailored finance packages.

3 The German Kreditanstalt fuer Wiederaufbau (KfW) is widely recognised as international best practice. Their interest subsidy approach linked to achieved and verified performance is explained further in the main paper.

Investing in the improvement of our housing stock: What is the problem?

Our 26 million homes are the oldest and worst performing in Europe. Decades of underinvestment, both in the private and public sector⁴, have led to a deterioration of our housing stock which has left many homeowners with hidden maintenance debts and tenants enduring poor quality, cold and draughty homes.

Buildings in disrepair, with poor insulation and inefficient heating systems, pose health risks and are much more expensive to run compared to high performing homes. Whilst for some homes a designation as listed building⁵ or the location within a conservation area, may at first sight make essential improvements more difficult, there are equally millions of homes that can only benefit – both aesthetically as well as in performance terms – from whole-house upgrades.

The massive increase in home-working and home-schooling in response to the Covid-19 pandemic has highlighted the need for more and better usable spaces in our homes. And whilst we may wish to go back to pre-pandemic life, some significant changes to our work, life, school and leisure patterns are likely to stay. There is therefore an opportunity to build a recovery that creates jobs, improves health, saves money and reduces the environmental impact of our residential buildings.

At an individual home level, investment requirements range from small repairs (<£1,000), medium-level adaptation and replacement upgrades (<£10,000) to larger, holistic solutions (£10-£30k) which might incorporate multiple measures or whole-house solutions (some of which could exceed

4 Investment by local authorities and social housing providers to improve their stock condition to the decent homes standard is reflected in the – on average – better performance of their homes. However, even in the social housing sector there are still 500,000 homes failing the decent homes standard. <https://www.ageing-better.org.uk/sites/default/files/2020-03/Home-and-dry-report.pdf>

5 There are fewer than 500,000 listed buildings in the UK and that includes non-residential buildings.

£30k). Whilst some financial support is available for very targeted groups of people (e.g. Disabled Facilities Grant) and other single measures also exist (e.g. Green Homes Grant), the majority of home owners will need to finance the investment themselves. It is essential that large-scale financing solutions are made available so that these improvements can be made.

For the purpose of this paper we will be looking at home improvements – excluding extensions and conversions – in three broad categories:

1. **Maintenance & repairs** – covering work required to maintain the original property with its heating, hot water and energy supply systems; compliance with the decent home standard falls into this category
2. **Adaptations** – covering any changes to the property in response to specific needs of its residents, including adaptations for an ageing population and to support independent living
3. **Efficiency upgrades** – covering investment in the upgrade of heating, hot water and energy systems of the property as part of the decarbonisation (net zero) agenda

1. Maintenance & Repairs

Investment in maintenance & repairs is the most basic level of investment needed to keep our homes habitable. Whilst social housing providers (local authorities, ALMOs and housing associations) and larger professional landlords tend to have responsive and planned maintenance as well as major repairs programmes resulting in better performing homes overall, there are significant maintenance issues in the owner-occupier sector as well as the small-scale ('accidental' or 'amateur') landlords' sector. Owner-occupiers in particular have built up a hidden maintenance debt that results in further deterioration, and thus devaluation, of their properties. But maintenance issues still persist across all tenures and are most pronounced in the 4.3 million homes that are classified as falling below the decent homes standard.

The most common reason for homes being non-decent is the presence of a serious hazard (58%; 2.48 million homes), followed by lack of thermal comfort (1.5 million homes). A further 810,000 homes are in a state of disrepair and another 515,000 lack modern facilities.⁶ Whilst research prepared for the Centre for Ageing Better found that one third of the non-

6 <https://www.ageing-better.org.uk/sites/default/files/2020-01/Non-Decent-Homes-fact-sheet.pdf>

1. Maintenance & Repairs

decent homes could be repaired for less than £1,000⁷, there is considerable variation in repair cost by tenure: for owner-occupiers the average repair cost to bring their homes to decent homes standard is £7,774⁸; a similar amount of £7,521 applies to private landlords' properties; but this cost is significantly lower for local authority homes (£5,488) and housing association homes (£4,252).⁹

Table 1: Investment required by tenure to repair all 4.3 million non-decent homes

Tenure	% of non-decent	Non-decent homes ¹⁰	Average repair cost	Total investment
Social renters (LA)	4.9%	211,738	£5,488	£1.16 billion
Social renters (HA)	6.5%	278,426	£4,252	£1.18 billion
Private renters	27.4%	1,182,170	£7,521	£8.91 billion
Owner-occupiers	61.2%	2,640,768	£7,774	£20.52 billion
				£31.77 billion

7 Centre for Ageing Better, 2020: Home and Dry. <https://www.ageing-better.org.uk/sites/default/files/2020-03/Home-and-dry-report.pdf>

8 English Housing Survey 2018/19: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/898172/2018-19_EHS_Stock_Profile_and_Condition.pdf

9 English Housing Survey 2018/19: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/898172/2018-19_EHS_Stock_Profile_and_Condition.pdf

10 <https://www.gov.uk/government/statistical-data-sets/live-tables-on-dwelling-stock-including-vacants> = Table 119; data for 2018

Significant progress is already being made in the **social housing sector** with local authorities, ALMOs and housing associations bringing their housing stock to decent homes standard.¹¹ However, there are still almost 500,000 homes in the social rented sector that need investment totalling £2.34 billion, notwithstanding post-Grenfell fire safety compliance requirements, which will also have to be financed. In the absence of a targeted funding programme these costs will have to be covered under local authorities' and housing associations' annual operational budgets.

A much larger investment of close to £9 billion is required in the **private rental sector**. Whilst the Landlord and Tenant Act (1985)¹² imposes a duty to repair on landlords, enforcement is not easy. Particularly in local housing markets where demand outstrips supply, tenants might fear retaliatory evictions in case of complaints about poor conditions in their homes.¹³ Alongside legal remedies and contractual rights under the tenancy agreement, there is also local authority assistance available for improvements and repairs. This includes applications to local authority renewal assistance systems and the disabled facilities grants where applicable. With significantly reduced funding available to local authorities, the options for financial help (e.g. through renovation grants) have diminished. Instead, home repair loans are available from public sector bodies (in some local authority areas), social enterprises, mutuals and private lenders. Most of these loan and mortgage products are available to private landlords as well as owner-occupiers.

11 In the last ten years the number of non-decent homes has been more than halved in social rent (MHCLG live tables on dwelling stock, Table 119). However, the initial target under the Decent Homes Programme that all social housing should meet the decent homes standard by 2010 was not achieved and even the extended target of achieving 100% decent homes by 2018/19 was not met.

12 <https://www.legislation.gov.uk/ukpga/1985/70/section/11>

13 A good summary analysis is provided by Shelter in a 2014 report 'Safe and decent homes': https://england.shelter.org.uk/professional_resources/policy_and_research/policy_library/policy_library_folder/report_safe_and_decent_homes and also on their website: https://england.shelter.org.uk/legal/housing_conditions

Table 2: Available finance offers¹⁴ for repairs, renovations and home improvements

Lender	Type of lender	Product	Loan value	APR representative
Lendology	Social enterprise (CIC)	Home Improvement Loan ¹⁵	Max. £20,000	4.2%
		Energy Efficiency Loan ¹⁶	Max. £20,000	4.2%
Ecology Building Society	Mutual	Renovation Mortgage ¹⁷	Up to 90% of property value	3.8%
		Energy Improvement Mortgage ¹⁸	Up to 90% of property value	4.3%
Nationwide Building Society	Mutual	Home Improvement Loan ¹⁹	£7,500 - £25,000	Starting at 2.9%
BNP Paribas	Investment bank	Home Improvement Loan ²⁰	Variable	Variable
Barclays	Investment bank	Home Improvement Loan ²¹	£7,500-£15,000	5.5%

Some of these lenders also provide loans specifically for energy efficiency upgrades (e.g. Ecology Building Society, Lendology). As cold homes are the second most common Category 1 hazard in non-decent homes²², finance for energy upgrades is included in this section. However, these finance products could equally be included in a later section on efficiency upgrades.

14 Although a personal loan could equally be used there are some finance offers in the market that are particularly aimed at home improvements. The list is not exclusive and there may be other offers available.

15 <https://www.lendology.org.uk/what-we-do/home-improvement-loans/>

16 <https://www.lendology.org.uk/what-we-do/energy-efficiency-loans/>

17 <https://www.ecology.co.uk/mortgages/residential-mortgages/renovation/>

18 <https://www.ecology.co.uk/mortgages/residential-mortgages/energy-improvements/>

19 <https://www.nationwide.co.uk/products/loans/home-improvement-loans>

20 <https://bnpparibas-pf.co.uk/our-solutions/home-improvements>

21 <https://www.barclays.co.uk/loans/home-improvement-loan/>

22 Cold homes are the second most common Category 1 hazard in non-decent homes. https://www.housinglin.org.uk/_assets/Resources/Housing/OtherOrganisation/non-decent-homes-guide-final-1.pdf

Owner-occupied properties make up the largest proportion of non-decent homes, not only in absolute numbers (3.8 million homes) but also in repair cost (a total of over £29 billion). Just over 61% of households living in non-decent homes are owner-occupiers. And this percentage rises to 78% for households headed up by someone over 55 years.²³ A sizable proportion of these homeowners may struggle financially to maintain or repair their homes, particularly given that about 18% of households living in non-decent homes are living in poverty²⁴.

However, there are also those who do have sufficient income or assets to be able to afford these repairs. This group is restricted not by affordability, but by issues such as a lack of impartial information and advice, or difficulties in finding trusted tradespeople. A professional intermediary, such as the Good Home Agency, could provide solutions to this ‘able-to-pay’ group of home-owners.

Whilst younger people are more likely to have used a mortgage to buy their homes, more than half (63%) of owners over 65 own their home outright, equating to 5 million homes.²⁵ Furthermore, mortgage payments by homeowners over 65 are on average the smallest compared of all age groups.²⁶ This suggests that taking out a repair or renovation mortgage secured against the asset should be a viable option to improve homes for many older owner-occupiers. As an alternative, unsecured loans are also available, including offers that do not discriminate on age grounds²⁷. With average repair costs of £7,774, mortgage or loan finance arranged over a five year period would result in monthly payments of £143.60.²⁸

Where loan or mortgage finance is not available because owners cannot afford regular repayments, there might still be other options to finance the repair and maintain the home to a good standard.

For properties where residual debt is lower than the property value, a secondary charge could be attached to the property for the value of the

23 <https://www.ageing-better.org.uk/sites/default/files/2020-01/Non-Decent-Homes-fact-sheet.pdf>

24 This figure is across all tenures, not just owner-occupiers – so can only be used as a proxy in the absence of more detailed data. English Housing Survey (2018/19) – data table DA3203: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/898488/DA3203_Decent_Homes_-_households.xlsx

25 English Housing Survey (2018/19) – data table FA2301: <https://www.gov.uk/government/statistical-data-sets/owner-occupiers-recent-first-time-buyers-and-second-homes> Table FA2301

26 £108 mean payment per week. English Housing Survey (2018/19) – data table FA2511: <https://www.gov.uk/government/statistical-data-sets/owner-occupiers-recent-first-time-buyers-and-second-homes>

27 Lenders take into consideration the age of a loan/mortgage applicant in relation to their risk assessment and pricing. Under the Equality Act 2010 this is an allowed exemption for financial businesses.

28 Based on 4.2% APR; 60 months repayment; loan amount £7,774.

1. Maintenance & Repairs

repair/maintenance cost (plus applicable interest) which is paid off when the property is sold or becomes part of an estate settlement. As the repair cost is fixed at the time of carrying out the works, this finance option would be more proportionate compared to equity release schemes as it would still allow for repayment without compromising ownership of the asset.

In some cases, down-sizing or trading the property for a more suitable home might be an option. In such a case, the repair responsibility passes on to the new owner who may be in a stronger position to pay for the necessary works. However, the state of disrepair would be reflected in the property value. For some home-owners, in particular those who bought under the Right-to-Buy but struggle to maintain the property in good condition, a local authority buy-back scheme with secured tenancies could be an option that would allow residents to retain local neighbourhood ties and provide financial stability through regulated (social) rent whilst potentially releasing some equity at the same time. Whilst this might seem expensive in the context of constrained local authority budgets, it could provide a long-term sustainable solution for property assets that would otherwise only deteriorate further and potentially cause harm to their residents. Furthermore, publicly owned homes could secure a good socio-economic mixture within local housing markets. In more subdued housing markets, a combination of local authority ownership of homes and renewal programmes could prevent negative equity.

Small scale and more ad-hoc financial assistance may be available from local authorities in the form of limited grants or directly funded repair services. Although local authorities have a duty to address unsatisfactory housing conditions, there are no longer any mandatory grants available for low-income homeowners.²⁹ For some repairs, there are specific grants available, in particular for heating systems (e.g. grants under ECO3 and/or local variations of the 'boiler on prescription' scheme or similar locally funded initiatives).

Finally, there is also the option for a revival of private sector housing renewal programmes³⁰; however, in the current economic climate it seems unlikely that significant public sector funding would become available to finance such a programme. Nevertheless, with the consequent public health benefits of good quality housing stock, the Inquiry would argue that a long-term, strategic investment programme, in which homes become a national

29 Housing disrepair: Improving non-decent homes. Care & Repair (2019): https://www.housinglin.org.uk/_assets/Resources/Housing/OtherOrganisation/non-decent-homes-guide-final-1.pdf

30 Under the Housing Grants, Construction and Regeneration Act 1996 local authorities had powers to give grants or loans, or provide labour and materials to help homeowners, private landlords and tenants to repair or renovate their homes. Following the Regulatory Reform Act 2001, the Regulatory Reform (Housing Assistance) (England and Wales) Order 2002 revoked these powers in July 2003. <https://commonslibrary.parliament.uk/research-briefings/sn01617/>

infrastructure priority, would produce a net economic benefit for UK plc. In particular, the elimination of cold homes (with direct savings realised in the NHS) would have a positive impact on the economy.

The £32 billion of finance needed to bring all our homes to the decent home standard must be a combination of small, medium and large scale investment. It will require a combination of cash, debt finance and grants (including measure-specific grants). Addressing only small scale repairs (<£1,000) to bring about a third of all non-decent homes to a compliant level is a start but falls short of the overall target.

The biggest challenge remains in privately owned homes. And there are as many solutions for this cohort as there are home owners. Finance requirements and household income profiles cannot be determined categorically based on statistical data sets but require a case-by-case assessment to identify the best suitable financing option – another core role and argument for a Good Home Agency.

2. Adaptations

With an ageing population we need to ensure our housing stock is adapted to provide for independent living for life. Most people over 65 live in mainstream housing and will – at some point – need home adaptations that improve the accessibility, usability and comfort of their property.³¹ Only 9% of our existing homes is adapted with all four accessibility features (level access, flush thresholds, wide doorways, entrance level toilet).³²

For people who need support with daily living because they are older, disabled, or have a long-term health condition, local authorities have a duty to carry out a care needs assessment.³³ On the basis of this assessment suitable adaptation measures are identified, and in the case of minor adaptations (e.g. handrails, security features such as a door intercom or lights, raised toilet seats, easy to turn handles for taps, slip mats etc.) these could then be provided and paid for (<£1,000) by the local authority. For major adaptations (e.g. shower room, widening doorways, or lowering kitchen worktops etc.) applications can be made to the Disabled Facilities

31 Adapting for ageing: Good practice and innovation in home adaptations. Centre for Ageing Better (2018): https://www.ageing-better.org.uk/sites/default/files/2018-10/Adapting-for-ageing-report_CfAB_O.pdf

32 English Housing Survey 2018/19: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/898205/2018-19_EHS_Adaptations_and_Accessability_Fact_Sheet.pdf

33 <https://www.nhs.uk/conditions/social-care-and-support-guide/care-services-equipment-and-care-homes/home-adaptations/>

2. Adaptations

Grant (DFG).³⁴ The DFG is available to owner-occupiers and landlords (if they have a disabled tenant) and the grant can be up to £30,000 depending on household income and savings (in some circumstances a higher grant can be awarded if the cost of the home adaptation is more economical compared to other solutions).

However, many people may wish to adapt their homes in relation to safety and comfort measures which are outside the very specific scope of DFG or care needs. Equally, there will be a number of owner-occupiers who are not eligible because of their household income and savings. For these people, home improvement loans (see section 1 above) would be a suitable financing route.

One area that older people are likely to invest in is improved light. Whilst fabric alterations (such as more or larger windows and light wells) may not be feasible mainstream solutions, artificial light improvements can be achieved at small cost and with great flexibility (e.g. natural daylight floor or socket plug lamps). Improved lighting also significantly reduces fall risk; installing wireless (electric cables are a significant fall risk), motion sensing lighting is a quick and inexpensive way to enhance independent living. Automatic night lights in key locations (e.g. stairs, hallways, bathroom), touch lamps (touch activated lamps are easier to operate for people with arthritis or loss of finger flexibility and strength) and specialist lamps (e.g. reading lights) also play a role in creating safer, brighter and more comfortable homes. LED lighting technology allows for these upgrades to be run at very low energy, while the ongoing cost of long-life bulbs is very low.

Looking at home adaptations in a more systemic way, there are options to combine measures. At an individual house level for example, wet rooms could be installed as part of a whole-house retrofit which improves energy efficiency (see section 3). This has already been successfully demonstrated as part of the Energiesprong programme to meet the performance requirements (e.g. a shower significantly reduces hot water demand). Equally there are examples of properties being reconfigured, such as two terraced homes being merged and then split into two fully accessible flats at either floor level³⁵. And for multi-storey apartment buildings there may be an option to improve accessibility by adding an elevator, which could be paid for by an added storey on top of the building. This would work particularly well in areas of high housing demand.

Certain other home adaptations are closely related to health & wellbeing. These include ambient assistive living technologies, tele(health)care, home automation and improved digital connectivity to aid social interaction. These

34 <https://www.gov.uk/disabled-facilities-grants>

35 This is particularly attractive for the very common 2-up/2-down terraced houses where the existing internal staircase is most often very narrow and steep.

adaptations require reliable broadband connectivity and devices (infrastructure) as well as applications (user interface). Although a larger proportion of these user-centric adaptations are temporary and personal (e.g. mobile devices and apps), some infrastructure elements (e.g. home automation, broadband connectivity/bandwidth) remain with the property. In particular, fibre broadband provision provides multiple benefits to the home owner in the long term.

At present, one in ten adults in the UK is still digitally excluded; this percentage rises to 40% for those aged 70+.³⁶ During the Covid-19 lockdown, the digital divide - that is the gap between people who have full access to digital technologies and those who do not - has widened.³⁷ This had a negative impact on people's ability to manage their medical care (e.g. online appointments and consultations, prescription services, health advice, Covid-19 apps), to arrange day-to-day provisions (e.g. online shopping) and to overcome the challenges of physical distancing (e.g. staying in touch with family and friends during lockdown periods). For children, home schooling and online learning have become critical; with 9% of households containing children that do not have access to a laptop, desktop or tablet, the attainment gap between disadvantaged children and their peers has widened.³⁸ Whilst some emergency measures (such as broadband providers temporarily removing data and speed caps for all customers and Government provision of devices to disadvantaged children) have been taken, the need for a long-term investment in universal upgrades is still there. The Good Things Foundation in their "Blueprint for a 100% digitally included UK – for a post Covid-19 economy" recognises internet access as an essential utility, like electricity. It argues that a £130 million investment over four years would help 4.5 million people to become digitally included. With a £15 return on every £1 invested in digital skills and inclusion there is a strong, net-positive business case.³⁹

3. Efficiency upgrades

This briefing focuses its attention in particular on home improvements to deliver efficiency upgrades in relation to heating, hot water and energy use. This is because we see investment in this area as a 'triple win', delivering economic, societal and environmental benefits.

36 <http://www.broadbanduk.org/2020/06/02/ofcom-publishes-digital-exclusion-analysis/>

37 <https://post.parliament.uk/covid-19-and-the-digital-divide/>

38 <https://post.parliament.uk/covid-19-and-the-digital-divide/>

39 <https://www.goodthingsfoundation.org/sites/default/files/blueprint-for-a-100-digitally-included-uk-0.pdf>

3. Efficiency upgrades

Investment models can be based on directly traceable savings (reduced energy cost, savings to the NHS, foregone investment in grid upgrades and increased security in energy supply – and potentially also carbon cost⁴⁰) that can be monetised. If efficiency upgrades are combined with other home improvement measures (such as adaptation for independent living) there is a significant opportunity for financing them at scale.

To meet the UK's climate change targets the country's building stock needs to be nearly completely decarbonised by 2050.⁴¹ Direct emissions from residential buildings result primarily from the use of fossil fuels for heating. Therefore, we need to achieve a near-full decarbonisation of heat for our homes through improved energy efficiency and low-carbon heating technologies.⁴²

As an interim step to 2035, an investment of £85.2bn would be required to reduce our households' energy consumption by a quarter.⁴³ This investment would deliver direct and indirect benefits⁴⁴ totalling £92.7bn – a net present value of £7.5bn. Resulting economic activity could sustain between 66,000 and 86,000 jobs annually across the UK.⁴⁵

So, at the macro-level this investment not only makes sense but is also economically viable (net positive). However, we are faced with an uneven distribution of cost and benefits at the micro-level. While a large proportion of the benefits accrue to UK plc in the form of, for example, increased economic activity or savings to the NHS as a result of improved home performance, the costs tend to sit with the individual home owner. To overcome this barrier we need to look at options to redistribute cost and pass on societal benefits to the millions of home owners who will need to be the key to achieving energy efficient homes with low-carbon heat.

To date, most business cases for home retrofits have been based on assumed energy savings and payback periods related to single measures installed. All too often this has resulted in a negative return on investment or artificial curtailing of otherwise integrated delivery by introducing investment caps (such as the so-called 'Golden Rule' in the failed Green Deal). Whilst the wider economic, societal and environmental impact is generally acknowledged, this has not been translated into monetary returns to the investor.

40 In some European countries carbon prices for domestic energy use have already been introduced, namely Sweden (since 1991) and most recently Germany (since 2021).

41 <https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/1730/1730.pdf>

42 <https://d423d1558e1d71897434.b-cdn.net/wp-content/uploads/2019/05/Net-Zero-Technical-report-CCC.pdf>

43 <http://www.cied.ac.uk/wordpress/wp-content/uploads/2018/06/CIED-Warm-Home-Report.pdf>

44 Such as reduced energy use, reduced carbon emissions, improved air quality and comfort.

45 <https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/1730/1730.pdf>

Energy savings from reduced demand: if we take the £30 billion that British households spent on gas and electricity in 2018⁴⁶ and aim for a 60% reduction in energy consumption that a holistic package of home improvement measures could achieve that would give £18 billion to invest.⁴⁷

As an absolute figure this may sound huge, however, with an average dual-fuel energy bill of £1,184 per year for a typical consumer⁴⁸, a 60% reduction in consumption would only lead to an annual cost saving of about £700. A corresponding investment of c.£20k⁴⁹ to achieve the energy upgrade would therefore need almost 30 years in repayment – and that’s not even including the cost of finance.

Even with such crude arithmetic it is clear that direct cost savings from reduced energy consumption are not sufficient to achieve the mass scaling of the retrofit market that the UK so desperately needs to bring its homes into the 21st century. We therefore need to look at and reallocate the benefits that reduced household energy demands brings at national level.

Whole-house vs single measure: At an individual house level we recommend a whole-house approach with a costed pathway to net zero. The investment case can be much improved as single measure compound costs are significantly more expensive (see Appendix 1, section b for more detail).

Furthermore, the carbon already invested in the asset (embodied carbon) is very often not taken into consideration when comparing whole house retrofits with ‘demolish and rebuild’ options. Whilst some institutional landlords (such as housing associations or large professional landlords) may have taken a holistic view on both embodied and operational carbon, they too may have been unable to monetise improvements. Except for where properties are contaminated (such as where asbestos is found), the embodied carbon element is likely to sway the environmental balance in favour of retrofit over demolish and rebuild, even in the worst performing housing stock.⁵⁰ Alas, the investing home owner (both individual and institutional) at present is unable to capture the monetary value of the

46 https://www.ofgem.gov.uk/system/files/docs/2019/11/20191030_state_of_energy_market_revised.pdf

47 It is acknowledged that households in fuel poverty, very often also living in the worst performing homes, are forced to choose between warmth and food, thus often underheating their homes. The immediate impact of a home (energy) improvement is therefore most likely to be comfort take (e.g. heating all rooms) rather than direct financial savings.

48 State of the Energy Market 2019 (Ofgem report). https://www.ofgem.gov.uk/system/files/docs/2019/11/20191030_state_of_energy_market_revised.pdf

49 Cost to achieve significant energy savings vary by building type and measures needed. The £20k figure is based on projects implemented to date and estimates from large housing providers, e.g.: <https://www.insidehousing.co.uk/news/housing-association-says-zero-carbon-will-cost-20000-per-home-66885>

50 Embodied carbon can account for between 30-70% of a building’s total lifecycle emissions. <https://www.arup.com/perspectives/publications/research/section/net-zero-carbon-buildings-three-steps-to-take-now>

3. Efficiency upgrades

embodied carbon savings arising from retrofit.

The retrofit business case should account for embodied carbon as well as operational carbon. For homes to benefit from the embodied carbon premium we must ensure they are fit for the future. If we only focus on carbon / energy efficiency we will fail to bring homes to a good standard as they may still have access issues or health hazards; and for some properties the comfort adaptation required may require something beyond a retrofit approach. Within some areas, increased density that would be possible through demolish-rebuild could still outweigh the loss of embodied carbon in existing homes.

In Appendix 1 we have looked in more detail at extending existing business cases to capture the wider societal, economic and environmental value that will redress the imbalance between the cost and benefit of residential retrofit. This could achieve a step change from the current grant-dependency of disjointed retrofit schemes in favour of market-driven holistic home upgrades that improve comfort, reduce emissions and energy demand, and increase the attractiveness of our homes, thus enhancing the value of our residential assets.

The key findings for a strengthened retrofit investment case are:

- To monetise and transfer societal benefits to the investing home owner (redress current imbalance of cost and benefits)
- To remove the split incentive for landlords, in particular in social housing where rents are regulated (e.g. introduce comfort remuneration; 'warm rents' replacing utility bills)
- To align business cases to whole-house upgrade plans (in one step or over stages) as single measure are more expansive and potentially mutually exclusive if not planned
- To close the retrofit performance gap through in-use assessment and performance contracting
- To embed direct cost savings from energy efficiency upgrades in the asset throughout its lifetime, including forward selling
- To capture property value uplift

An essential component of a sound investment case for home efficiency upgrades is the fair distribution of costs and benefits. Thus, a key mechanism to move away from piece-meal, grant-dependency in retrofit would be to monetise and transfer societal benefits (such as job creation, savings in the NHS, reduced emissions) to the investing home owner. This could be achieved through smart taxation linked to performance or the introduction of carbon prices for residential energy use.

The good home bonus: smart taxation

To incentivise and enable owner-occupiers to set up their homes on a pathway to net zero, government could develop a smart taxation framework that links home performance to taxation. Both the current stamp duty land tax and council tax are linked to property valuation, reflecting local markets but not overall quality of the home.⁵¹ Introducing an adjustment factor based on building performance would capture the intrinsic value of more (energy) efficient homes.

To avoid pushing the wrong consumer response (e.g. carbon offsetting instead of home improvement⁵²) the metrics for taxation need to be carefully considered. It is the carbon and energy savings directly resulting from installed measures that should benefit the home owner. A simple measure would be to set performance bands for net space heat demand and associated carbon emissions.

For example, a new build home, compliant with UK Building Regulations Part L, would have a space heat demand of 46 kWh/m²year with a SAP rating of B 87 – this building would emit 16.37 kgCO₂/m²year.⁵³ So, an average house with a median floor space of 99 m²⁵⁴ would use 4,554 kWh/year in energy just for heating and emit 1.6 tCO₂/year. For an average flat (median floor space 43 m²) this would be 1,978 kWh/year in heating energy with an emission of 704 kgCO₂/year.

This new home (compliant to UK Building Regulations) should form the baseline reference with no (factor 1) or only a small⁵⁵ additional tax incentive (factor 0.9). Worse performing homes could be assigned a malus factor, either by EPC bands or across the range of all homes. Better performing homes could be grouped into bands, for example in Table 3:

51 A similar proposal has been put forward by UK GBC <https://www.ukgbc.org/wp-content/uploads/2019/12/UKGBC-Submission-to-BEIS-Select-Committee-Energy-Efficiency-Inquiry.pdf>

52 One of the cheapest ways to increase EPC ratings is to add even a small solar panel to the building.

53 <http://transition-zero.eu/wp-content/uploads/2017/08/Performance-Requirements.pdf>

54 <https://www.ons.gov.uk/peoplepopulationandcommunity/housing/methodologies/adminbasedstatisticsforpropertyfloorspacefeasibilityresearchenglandandwales#geographical-analysis-of-median-floor-space>

55 To encourage investment into existing homes a small incentive factor of maybe 0.9 might be justified.

3. Efficiency upgrades

Net space heat demand [kWh/m²year] - this pushes fabric improvement (insulation and air tightness)	Adjustment factor	Impact on council tax⁵⁶ [GBP]
Net heat demand >50 (majority of existing homes)	1.2	364
40 < Net heat demand ≤ 50 (UK Building Regulations compliant new build home)	1 (0.9)	0 (-182)
30 < Net heat demand ≤ 40	0.7	-545
0 < Net heat demand ≤ 30 (Energiesprong or Passivhaus)	0.5	-909

Additional factors, such as minimum heat generated from renewables for space heating and hot water as well as minimum renewable energy generated for in-house use appliances, could push further towards net zero emissions.

A similar adjustment scale could be introduced for Stamp Duty to incentivise the decarbonisation of heat.

A different, but equally workable approach, would be to introduce carbon pricing for heat. As mentioned above, such a system has been in place in Sweden since 1991 with a current cost of 115 EUR/tonne CO₂, thus setting a clear pathway for the country to be carbon neutral by 2045. The most recent example is the German CO₂-pricing system which came into force on 1 January 2021, introducing an initial CO₂-price for heat at 25 EUR/tonne, rising to 55 EUR/tonne by 2025 and then post 2026 index-linked to actual emissions.⁵⁷

⁵⁶ The calculation uses the £1,818 average Band D council tax for England set by local authorities in 2020/21 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/905425/Council_tax_levels_set_by_local_authorities_in_England_2020-21.pdf

⁵⁷ <https://www.bundesregierung.de/breg-en/issues/nationaler-emissionshandel-1685054>

What are the options for solutions? What are the routes to achieving change?

Whilst investment in the repair & maintenance of our homes and in adaptations are important, the foundations for a pathway to universally good homes will need to go further. A home in good repair is only the basic building block. And with more homes being adapted to changing life circumstances, and with new homes being built to a fully inclusive standard, progress can be made. However, arguably the biggest opportunity is in holistic home improvements that would bring our housing stock to a good and comfortable standard, not just for now but for decades to come. Social housing providers can play a leading role in proof-of-concept and proof-of-market solution development (e.g. initiatives such as Energiesprong) but owner-occupiers also need to be incentivised to invest both individually and at scale.

For a home improvement market to grow and mature, persuading home-owners to purchase good home makeovers as a desirable product is essential. Proliferation of solutions and lack of opportunities for mass-customisation risks losing the benefits of standardised procurement and innovation. Trailblazing initiatives, such as Ecofurb⁵⁸ by Parity Projects⁵⁹ should be seen as a blueprint for a one-stop show for home makeovers⁶⁰, starting with a whole-house assessment (including energy performance as well as any health & safety hazards of non-decent homes), professional solution design and procurement, leading to quality-controlled installation and independent verification. Adding tailored financial advice, which could be provided by the Good Home Agency, to this initiative would complement the package. Leading industry players who are prepared to break new ground by changing the way they offer their products will reap the benefits by becoming early market movers (e.g. ENGIE Zero⁶¹ offers whole house retrofits with guarantees on reduced carbon emissions and reduced energy bills).

58 <https://ecofurb.com>

59 <https://parityprojects.com>

60 The main market segment for Ecofurb is home-owners in the able-to-pay sector. Adding tailored financial advice that would combine home owners own cash with loans and grants as appropriate could extend the customer base.

61 <https://www.engie.co.uk/places/engie-zero/>

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The challenge is to evidence the market potential. This requires a business case (finance), willing home-owners to invest (demand), industry ready to deliver (supply) and a supportive environment (policy and funding interventions). A Good Homes Agency⁶² could act as a market maker and intermediary to bring demand and supply together. With these two key market actors in place and an investable business case, finance will follow.

However, we cannot turn on home improvements at scale overnight. There will inevitably be a ramping up period involving smaller scale investment before a mature market emerges. In financing terms this means there will be a period of insufficient pipeline with low demand that follows from successful early demonstrators. Institutional financiers usually seek investment opportunities at a speed and scale that is not achievable with home improvements in the early growth phase. Furthermore, contrary to investment in new homes, the upgrading of existing homes does not immediately or necessarily create new asset value, against which the investment could be secured. Social impact investors may accept a higher risk level and smaller investment scale. Crowdfunding, philanthropic or Social Impact Tax Relief (SITR)⁶³ investment might help to scale from early to mature market.

Annual (early) market volume: even with an optimistic⁶⁴ 1,000 homes upgraded at a cost of £30k per home (the upper end of the efficiency improvement investment scenario for impactful multi-measure, whole house upgrades) the resulting investment volume of £30 million is comparatively small for institutional investment. Closed-end residential real estate funds⁶⁵ for comparison would often have a minimum £10 million single deal volume (and single project volumes of £500k-£1m which is significantly larger than the £30k individual home upgrade), while Real Estate Investment Trusts (REITs)⁶⁶ seek even greater annual investment volumes. Even more specialised

62 Funding for the Good Home Agency could and should come primarily from public sources but could and should be co-invested by industry. The Good Homes Agency needs to be independent and long-term to deliver good homes as an infrastructure asset for the country. Funding for the agency is comparatively small to the investment needed in our homes. How it could be set up and funded is explored in a separate paper.

63 SITR is similar to the Enterprise Investment Scheme (EIS) aimed at High Net-Worth Individuals (HNWI).

64 Pilot schemes are at best fewer than 100 homes, but most often 10-20 properties; an early market uptake of 1,000 individual homes, particularly by owner-occupiers, is therefore an optimistic market assumption. This is also a reflection on the lack of qualified installers which will need time to address.

65 Closed-end residential real estate funds are property investments for which the investment amount, conditions and terms are known in advance. They would, for example, be used to finance a specific project. Term times typically would be 10-12 years and the investment is locked up in the asset for the term.

66 A real estate investment trust (REIT) is a company that owns, operates, or finances income-generating real estate. Modelled after mutual funds, REITs pool the capital of numerous investors. This makes it possible for individual investors to earn dividends from real estate investments without having to buy, manage, or finance

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REITs investing for social impact, such as ReSI⁶⁷ increased their portfolio by £46 million to acquire 162 new homes in the last financial year alone.⁶⁸

Considering that current whole-house upgrades delivered by large, professional landlords at best come in batches of low 100s of units over multi-year periods, it is evident that the home improvement market at present is too small and has too low returns for institutional investment. Achieving significant demand aggregation becomes even more challenging with a multitude of owner-occupiers each with their own very small-scale project (i.e. an individual house). Demand aggregation, therefore, would be essential to attract finance at scale. Existing retail / consumer finance (e.g. the Renovation Mortgage from Ecology Building Society or the BNP Paribas Home Improvement Loans etc.), combined with existing publicly funded/ capitalised offers (e.g. Lendology⁶⁹ Home Improvement Loans), are a good stepping stone but they are still considered niche products for a small market.

A better financing approach might be to replicate the German KfW⁷⁰ model: an investment bank set up by the government to provide subsidised loans to home owners as they invest in the upgrades of their properties. The initial starting point for their home improvement lending portfolio was energy-efficient new build but energy-efficiency renovations were added soon after. To determine the level of (interest) subsidy, the KfW established their own methodology and ranked properties by energy performance (n.b. there are six levels of KfW efficiency houses – a parallel, more stretching KfW efficiency standard with four levels is also in place for new homes).⁷¹ All KfW home improvements products are primarily loan finance with public grant used to subsidise interest, which is linked to achieved efficiency performance (see Appendix 2 for overview).⁷² Thanks to the current low interest rate environment⁷³ and debt relief, KfW loans are also accessible for lower income homeowners, although repayment of the loan element is essential to the

any properties themselves.

67 Residential Secure Income plc (ReSI plc) invests in shared ownership and other affordable residential asset classes (such as local authority housing, retirement rental and care homes).

68 ReSi plc Annual Report 2020: https://440f6752-42aa-40f0-aba0-c14fa12eea39.usrfiles.com/ugd/440f67_d966cbe9783447589d678d8a674c9b2d.pdf?dn=ReSI%20plc%20Annual%20Report%202020.pdf

69 Lendology have a current loan book value of £6.8m.

70 The KfW was founded in 1948 to finance the reconstruction after WWII. It is publicly owned (80% by the Federal Republic and 20% by the German States). The focus on energy efficiency in buildings (both new and existing) was formalised in the context of 2004 energy regulation which included the KfW efficiency standards.

71 <https://www.kfw.de/inlandsfoerderung/Privatpersonen/Bestandsimmobilie/>

72 An overview presentation of KfW residential improvement programmes is available at <http://jaspersnetwork.org/download/attachments/26411157/Dominik%20Bach.pdf?version=1&modificationDate=1600072079000&api=v2> - more detailed information (some only in German) at <https://www.kfw.de/kfw.de-2.html>

73 0.75% APR as at March 2021 with debt relief as shown in appendix 2.

What are the options for solutions? What are the routes to achieving change?

model. KfW has extended its products to include grants for construction supervision (both energy-efficient new homes and refurbishment), age-appropriate conversion and has become more holistically engaged in developing future-proof neighbourhoods by also providing individual loans for EV-charging stations at residential buildings (a programme for owners, homeowner associations, tenants and landlords alike). With this range and breadth of financial products it has become the lender of choice for home owners and has driven a significant market uptake in Germany.

Establishing a similar development bank in the UK - either publicly owned (KfW is 100% state-owned) or publicly backed - could bring about a step change in the home improvement market. The UK Green Investment Bank, which was established under government ownership in 2012 and privatised in a £2.3 billion deal in 2017⁷⁴, could be used as a blueprint for a Green Investment Bank 2.0. The Green Finance Institute among others argues the case for a new national investment bank⁷⁵ and the then energy minister said in July 2020 that “he expects the government to set out how it plans to create a successor to the Green Investment Bank ‘in the not-too-distant future’”.⁷⁶ Existing (publicly funded) local lenders (such as Lendology) could potentially become part of such a national development bank to deliver finance solutions at the local level. The Good Home Agency could then advice home owners and tailor financing solutions in conjunction with professional design and implementation support to grow and mature a home improvement market that will bring multiple benefits to us as individuals as well as to society at large.

Another option to access capital for home improvements might be an adaptation of the French Livret A savings account. Livret A is a regulated investment that provides financial benefits (for example 100% deposit protection and tax-free interest) and with an interest rate set by the state (0.5% currently).⁷⁷ As of January 2021 the total investment in Livret A was almost 333 billion EUR.⁷⁸ The largest proportion (c.60% of Livret A holdings) is centralised in the Caisse de Depots et Consignements (CDC) which finances investment in social housing, including renewal programmes. The non-centralised investments (c. 133 billion EUR) must be used by banks to lend to SMEs (80%) and to finance energy saving measures in existing

74 The privatised successor body is the Green Investment Group. <https://www.greeninvestmentgroup.com>

75 <https://www.greenfinanceinstitute.co.uk/the-uk-needs-a-second-green-investment-bank-to-help-investors-decarbonise/>

76 <https://www.theguardian.com/environment/2020/jul/15/uk-government-planning-new-green-investment-bank>

77 <https://www.service-public.fr/particuliers/vosdroits/F2365> and <https://www.economie.gouv.fr/particuliers/livret-a> - an overview in English is available at <https://www.french-property.com/guides/france/finance-taxation/banking/savings/regulated-savings-accounts#>

78 <https://www.francetransactions.com/le-saviez-vous/livret-a-montant-total-encours.html>

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buildings (10%).⁷⁹ This legal requirement translates into over 13 billion EUR that can be invested at low interest rates and over the long term in the upgrade of existing buildings. And as of 20 September 2020, regulatory changes also allows for the centralised (CDC) savings to be used to finance energy efficiency (“transition écologique et énergétique”).⁸⁰ A dedicated ‘home improvement’ ISA (deposit protection and taxation very similar to French Livret A) might be a solution to consider.⁸¹

79 <https://www.economie.gouv.fr/livret-a-relevance-transition-ecologique-energetique-territoires#>

80 <https://www.economie.gouv.fr/livret-a-relevance-transition-ecologique-energetique-territoires>

81 The main benefit would be the state guarantee on deposits combined with low interest rates (2021 UK ISA interest rates are <0.4% AER variable) which would allow for on-lending to home owners at attractive rates.

APPENDIX 1: Energy efficiency upgrades as investment model to achieve home improvements

Retrofit investment case

A solid and investable business case is a basic requirement for any finance package. Even though the investment required to bring our homes to net zero is very significant, there is no shortage of capital on the market, including from social impact investors who are more prone to consider the societal and environmental benefits of their investment. When the business case is further strengthened through quality assurance (e.g. independent design and verification) and performance contracting (e.g. guarantees), the costs of finance, which is currently a potential barrier, will go down due to significantly reduced investment risk. Through this process, a quality home upgrade programme can become investable at scale for mainstream financial institutions.

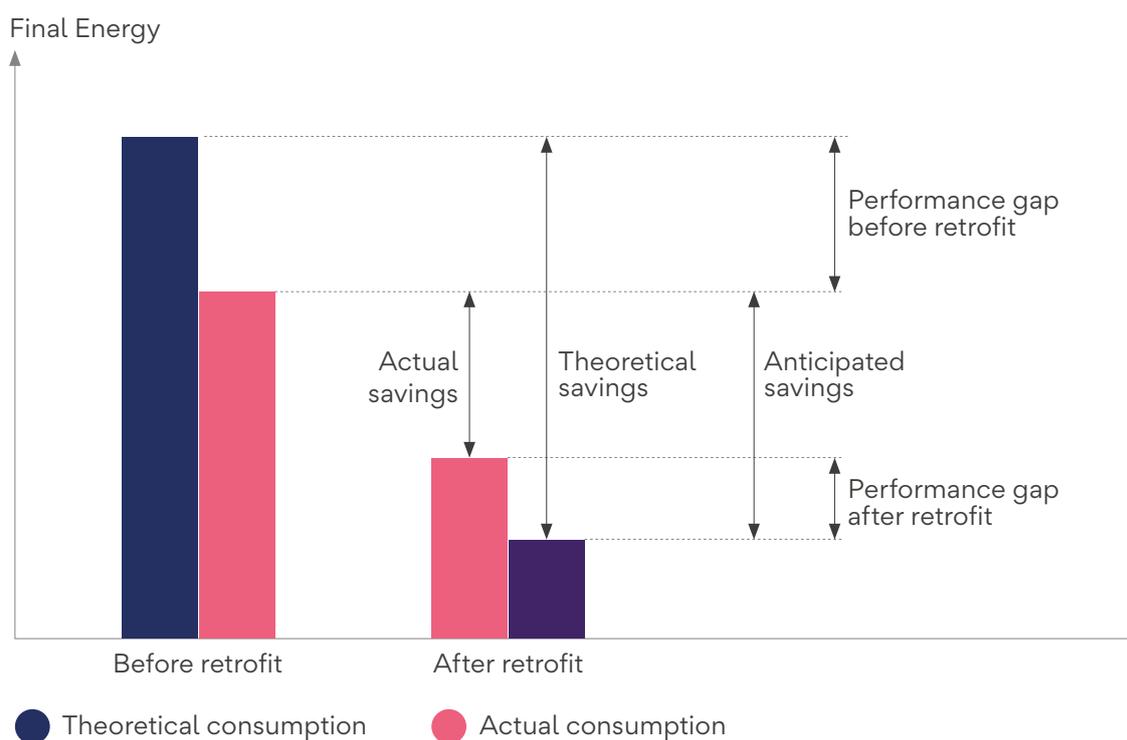
The main requirement for a step change in the approach to upgrading our homes is an investment case that rebalances the allocation of costs and benefits between home-owners and the state. With a strong and realistic business case we can achieve long-term investment that is no longer grant-dependent and thus provides safeguards and longevity against short-term policy interventions that can be politically driven. This will provide industry with a long-term market opportunity to invest in innovation (improving quality and reducing cost) and skills development (ensuring delivery capacity at scale and to good quality).

Analysing current investment cases for retrofit the following issues need to be resolved:

- a) Performance gap: direct energy (cost) savings are significantly less than anticipated from theoretical assessments such as EPCs – the business case needs to be calibrated to only account for actual savings

The direct cost savings from more energy efficient homes benefit the current owner-occupier.⁸² Research across a large sample of retrofitted buildings, however, gives evidence that there is a significant performance gap before and after retrofit. This leads to a compound negative impact on the business case as buildings before renovation often consume less than expected (prebound effect)⁸³ and after renovation they consume more than expected (rebound effect).⁸⁴ This is illustrated in the following diagram⁸⁵:

Figure 1: Differences between the theoretical and actual energy consumption, before and after energy retrofit



82 Different business models are becoming available to address the split incentive for tenanted properties, e.g. for regulated rent the introduction of a comfort charge and for market rent an option to increase rent. These are not explored in detail here as the Inquiry focuses primarily on the owner-occupier sector.

83 This can be a combination of underheating due to fuel poverty and underestimated actual building performance (particularly in survey-based assessments of existing dwellings using Reduced Data SAP); research analysis of almost 35,000 residential buildings gave evidence that actual energy use in EPC G was 43.5% less than theoretical energy use, 25.2% less for EPC F and 16.6% less for EPC E. Conversely, actual energy use for EPC B (the equivalent to compliance with current UK building regulations) was almost 20% higher than theoretical energy use. Source: COZZA, Stefano, et al. & Office fédéral de l'énergie. GAPxPLORE: Energy Performance Gap in existing, new, and renovated buildings: Learning from large-scale datasets. Berne : Office fédéral de l'énergie, 2019

84 <https://archive-ouverte.unige.ch/unige:129181/ATTACHMENT01>

85 Diagram from <https://archive-ouverte.unige.ch/unige:129181/ATTACHMENT01> page 59

Better building data and increased accuracy in assessment (e.g. EPC – see related criticism outlined in the environment paper) before renovation (ideally combined with actual energy data/running cost) and performance verification after renovation (e.g. in-use monitoring) would reduce the gap between theoretical and actual savings.

b) Cost of improvement: whole-house versus single measure(s)

Current business cases for retrofit often look at the cost of single measures rather than establish a whole-house concept that would provide significant cost savings. These cost savings are not only opportunity cost (e.g. cost of scaffold put up for roof repair/replacement whilst at the same time not installing solar PV/solar thermal is wasted cost) but also sunk cost (e.g. single measures installed that need to be removed for any subsequent upgrade). A whole-house approach with a costed pathway to net zero (see environment paper) would ensure cost savings can be realised against single measure compounds.

As an example, most analyses will add up all individually costed measures from an EPC (the recommended improvement options) to arrive at a total cost to move homes to higher EPC bands⁸⁶:

Table 4: The costs to move to EPC bands

		Potential rating						
		A	B	C	D	E	F	G
Current rating	A	£7,110						
	B	£10,919	£4,263					
	C	£20,437	£12,302	£4,937				
	D	£32,915	£18,588	£12,746	£6,244			
	E	£40,451	£23,542	£17,156	£11,357	£5,152		
	F	£44,933	£29,237	£22,873	£18,823	£13,070	£6,303	
	G	£47,163	£31,879	£26,791	£23,866	£20,077	£19,745	£15,461

Source: Savills, EPCs (MHCLG)

86 https://www.savills.co.uk/research_articles/229130/304623-0

This calculation suggests that an improvement by one EPC band costs in excess of £10,000 which is significantly more than the maximum investment of £7,500 for owner-occupiers under the recently launched Green Homes Grant (grant cap at £5,000 to cover two-thirds of the home improvement cost). Similarly to the Green Deal there is a twofold risk: first that the government (interim) target of EPC C⁸⁷ is not achieved and secondly – probably with an even worse impact – that whole-house upgrades are curtailed by artificial grant caps.

Research by Savills shows that the largest savings can be achieved by upgrading the least energy efficient homes through four low-cost improvements.⁸⁸ However, we must not lose sight of the longer term net zero target. We should grasp the opportunity of low-hanging fruits but be aware that the pathway to net zero is an endurance race not a sprint. The Green Alliance’s ‘Reinventing Retrofit’ report points out that “continuing to only target the least cost[ly] measures, instead of innovating to reduce the cost of all the energy efficiency measures needed to achieve the EPC Band C goal by 2035, could raise annual public spending on energy efficiency from £640 million to as much as £2.3 billion.”⁸⁹

Innovation in approach, serialisation/industrialisation and mass customisation of solutions such as Energiesprong reduce whole-house retrofit costs significantly. Strengthened by a long-term policy commitment, the market opportunity for industry could become so significant that increased investment in innovation, skills and off-site manufacturing would bring performance-assured whole-house retrofit into the affordable mass market space.

Another example is the integration of separate energy technologies (e.g. ventilation, hot water boiler, heat pump, distribution board and meters) into a single hub for one house which can thus be mass-produced and procured at scale. This has already more than halved the installation cost and with the next (3rd generation) hub there is potential for cost to be cut to a fifth compared to the single-measures.⁹⁰

These substantial cost reductions can only be achieved with a long-term, scalable market. Small scale, short-term government interventions distract suppliers and thus are a major barrier for innovation and sustained job

87 Earlier (2016) calculations by Cambridge Econometrics and Verco put the cost to get every home to EPC C at £4.6k on average, however, their calculation (which also uses individual EPC measures added up to arrive at total cost) introduced a cap of £10k maximum investment per property which results in 15-16% of homes not reaching EPC C https://www.housingnet.co.uk/pdf/Building-the-Future-Final-report_October-2014_ISSUED.pdf

88 Loft insulation, cavity wall insulation, low energy lighting and insulating hot water cylinders. <https://www.savills.co.uk/blog/article/300856/residential-property/environmentally-thinking---boost-your-epc-to-boost-the-value-of-your-home.aspx>

89 https://www.green-alliance.org.uk/resources/reinventing_retrofit.pdf

90 https://www.green-alliance.org.uk/resources/reinventing_retrofit.pdf

creation. The Green Alliance concludes: “The government’s approach to retrofitting homes to date has been incremental and expensive, with the last major effort to address it, the Green Deal, closing in 2015 after only two years, having failed at great cost to achieve its aims.”⁹¹ There is a risk that without a long-term strategy and commitment the new Green Homes Grant is set to repeat the same mistakes.

- c) Running cost of properties: embed direct cost savings from energy efficiency upgrades in the asset throughout its lifetime, including forward selling

Once a property is upgraded the cost savings from improved energy efficiency accrue on an annual basis. Home-owners investing up-front in their retrofit will need to consider the payback period (the longer the payback period the better the business case) and how their ROI could be safeguarded should the property be sold during that period. At present there is little evidence that a better performing property attracts a higher price in the market, though this is starting to change (see below). A direct uplift in property value equal to or above the investment required to improve the energy efficiency of our homes would be the easiest way to make the business case work. Whilst this may become more common in future (particularly when compliance with legally binding energy performance targets render the worst-performing homes unsellable) we need to look into short to medium-term solutions to allow forward selling of the property-embedded energy savings resulting from a retrofit.

The 2014 Mortgage Market Review (MMR 2014) encouraged lenders to take into consideration not only the purchase price of a property but also the running cost; unfortunately the practice is to look at the running cost (actual bills) of the property that the purchaser is moving out of and not the one they are moving into – actual bill data or in-use performance EPCs would enable the lenders to accurately account for running costs of the newly purchased home. Reduced running costs resulting from energy efficiency upgrades have a direct positive impact on the risk profile and should therefore reduce the cost of the mortgage. In turn, this would allow for a higher price to be paid for the asset itself (see below on property value uplift). When implemented at scale this mechanism would lead to an uplift in valuation of high-performing homes.

The concept is similar to ‘warm rents’, a tool implemented in many EU-countries to give consumers a fair comparison between prospective properties by forcing the landlord to display not just the rent element but also the running cost element when advertising their properties (the legal EPC requirement is a woefully inadequate attempt in the UK to mirror this principle as it only provides an abstract and theoretical assumption of energy demand not actual cost).

91 https://www.green-alliance.org.uk/reinventing_retrofit_press_release.php

An example from a German real estate website, advertising an apartment with net rent (“Kaltmiete”) and total cost of occupation (“Warmmiete”).

Luisenpark - 4 Zimmer		
1.800 € Kaltmiete (netto)	99,7 m ² Wohnfläche	4 Zimmer
2.250 € Warmmiete		

- d) Property value uplift: there is increasing evidence that the market value of properties increases when they are more energy efficient

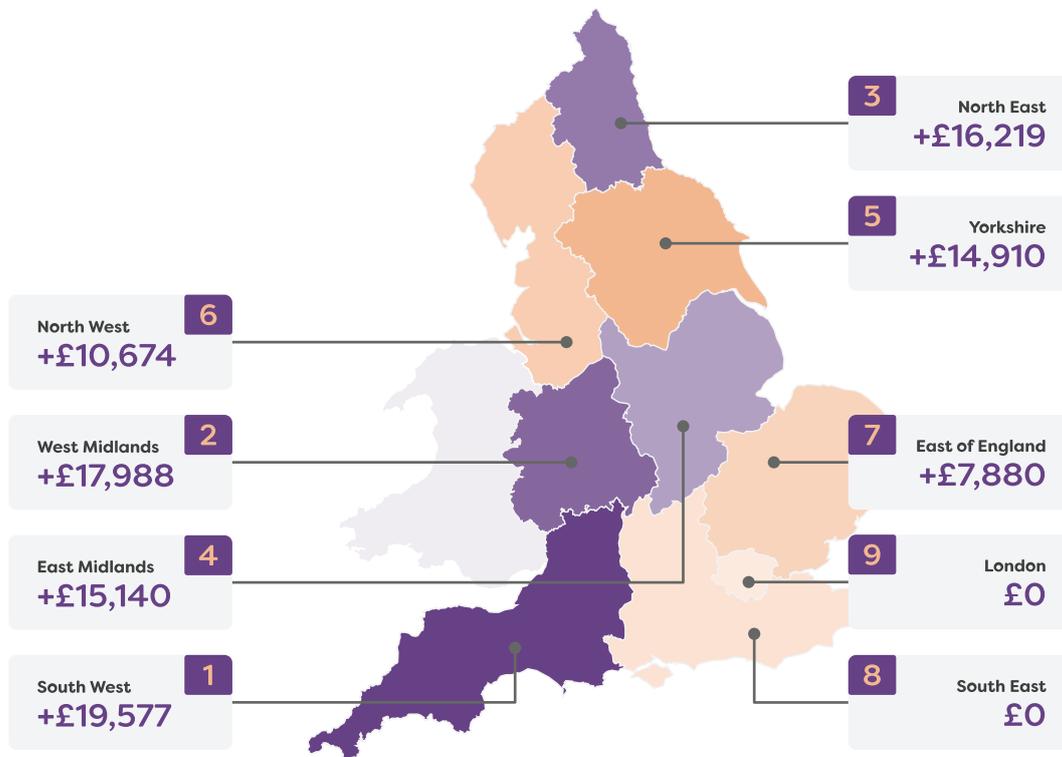
The principle of property valuation is that the valuer reflects market conditions, so by definition it is reactive rather than pro-active. However, valuers also need to take into consideration emerging risks and trends that should be reflected in the current and future value of a property. Whilst there is early evidence that better performing properties attract a higher market value this has not yet translated into a mainstream requirement to connect energy efficiency to residential value. Research undertaken by RICS concludes that “the evidence points towards energy efficiency beginning to impact on value, though this is a small impact compared with traditional value drivers.”⁹² A recurring issue is the lack of reliable data for valuers as evidence suggests that EPCs (the closest data point valuers would currently have on energy performance) may not provide accurate information.⁹³

92 <https://www.rics.org/globalassets/rics-website/media/knowledge/research/insights/energy-efficiency-and-residential-values.pdf> page 4

93 <https://www.rics.org/globalassets/rics-website/media/knowledge/research/insights/energy-efficiency-and-residential-values.pdf> page 7

However, recent UK data-based quantitative analysis from Savills Residential Research⁹⁴ indicates that the value differential can be as high as 30.5% between properties in EPC band G to B.⁹⁵ That differential narrows down to less than 4% for properties between band C and E which illustrates that there is little to be gained in value from an upgrade to EPC Band C (the current UK government target for 2030/35). So, whilst for the vast majority of homes (83% of all residential properties are in EPC Bands C-E⁹⁶) there is not much of a value difference, the evidence begins to point to ‘brown discounts’ (negative value impact in F/G-rated properties, potentially becoming stranded assets) and ‘green premiums’ (EPC A/B). When looking at regional housing markets it becomes evident that in areas where demand exceeds supply the EPC has no impact on the property value at all.⁹⁷

Figure 2: Median house price increase from EPC D to A/B



94 <https://www.savills.co.uk/blog/article/300856/residential-property/environmentally-thinking---boost-your-epc-to-boost-the-value-of-your-home.aspx> - and using Savills data for own further analysis

95 Interestingly Band G to A only shows a value differential of 28.5% which suggests that other valuation factors play a more dominant role – this was also observed in a comparative research paper “What will you pay for an “A”?” which discovered for the UK market a negative correlation between property value and an EPC A upgrade (this was the only case in Europe): https://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies/2017/6-buildings-policies-directives-and-programmes/what-will-you-pay-for-an-a-a-review-of-the-impact-of-building-energy-efficiency-labelling-on-building-value/

96 Data extracted from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904850/D1_-_Domestic_EPCs.xlsx

97 <https://www.moneysupermarket.com/gas-and-electricity/value-of-efficiency/>

Figure 3: Average price for 1,000sq ft 3 bed property at a national level – EPC ratings compared



Source: Savills research using Land Registry and EPC

Providing valuers with more reliable and agile tools (such as the NABERS building rating⁹⁸ which is reviewed on an annual basis compared to EPCs which are valid for 10 years) could further strengthen the retrofit business case by taking proper account of value uplift, particularly when the home upgrade is assured by energy performance contracting.

- e) Economic growth, reduced energy demand, reduced emissions: capturing societal benefits; and foregone investment in national energy infrastructures

Good homes are a national asset and should be an infrastructure priority for societal investment as well as providing a good investment for individual home-owners.

Upgrading the energy efficiency of our homes not only has a direct positive impact on the owner (through direct energy cost savings and increased comfort) but also on society through increased economic activity (job creation, business growth), reduced energy demand (leading to greater security of supply, foregone investment to upgrade generation and grid upgrades) and reduced emissions (GHG emission targets, cleaner air, improved health). These benefits need to be fairly accounted for in the individual home owner’s business case and we need to establish mechanisms to redistribute these wider societal benefits.

98 See relevant section in environment paper and <https://www.nabers.gov.au/about/nabers-international/uk>

Economic growth: £10m invested in deep energy retrofit generates 160 jobs – if we spend the same amount on energy bills that only generates 90 jobs and if that energy comes from fossil fuels we are down to only 15 jobs.⁹⁹ Taking an EPC C rating as interim target, the retrofit market in England and Wales alone is worth an estimated £304 billion.¹⁰⁰ This level of investment would provide a significant incentive to develop skills by industry and create future-proof jobs. Even the most cost-effective measures (‘low-hanging fruit’) to upgrade our homes to be fit for 2035 would be an investment of £85.2 billion¹⁰¹ – this could sustain between 66,000 to 86,000 jobs annually across the UK.¹⁰² Therefore, energy efficiency investments in our homes should be established as a national infrastructure priority. Leading the way, the Scottish government’s decision to make energy efficiency a national infrastructure priority in 2015, underpinned by a 20 year strategy and investment programme, is based on the recognition of the many benefits of energy performance that improved buildings can bring.¹⁰³ Scotland’s Energy Efficiency Programme (SEEP) was launched in 2018 with a one-year transition plan (mainly to conclude existing smaller grant programmes), leading to a long-term plan to decarbonise heat by 2040. This programme is underpinned by at least £10 billion in public investment.¹⁰⁴

Reduced energy demand: if we take the £30 billion that British households spent on gas and electricity in 2018¹⁰⁵ and aim for a 60% reduction in energy consumption that a holistic package of home improvement measures could achieve that would give £18 billion to invest.¹⁰⁶ As an absolute figure this may sound huge, however, with an average dual-fuel

99 Federal Ministry for the Environment, Nature Conservation and Nuclear Safety: Green Recovery, Berlin 2009. https://web.archive.org/web/20150414190014/https://www.germany.info/contentblob/2618342/Daten/676538/BMU_GreenRecovery_DD.pdf and more detailed report and figures in http://www.bmub.bund.de/fileadmin/bmu-import/files/english/pdf/application/pdf/studie_klimadeutschland_en.pdf - the job multiplier for retrofit varies according to the local market, a more recent toolkit developed by the C40 uses a range of 13-28 jobs created for every 1m EUR invested in retrofit: https://www.c40knowledgehub.org/s/article/The-Multiple-Benefits-of-Deep-Retrofits-A-toolkit-for-cities?language=en_US

100 <https://www.savills.co.uk/blog/article/300856/residential-property/environmentally-thinking---boost-your-epc-to-boost-the-value-of-your-home.aspx>

101 <http://www.cied.ac.uk/wordpress/wp-content/uploads/2018/06/CIED-Warm-Home-Report.pdf>

102 <https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/1730/1730.pdf>

103 <https://www.gov.scot/policies/energy-efficiency/>

104 <https://www.gov.scot/publications/national-infrastructure-priority-energy-efficiency-scotlands-energy-efficiency-programme/>

105 https://www.ofgem.gov.uk/system/files/docs/2019/11/20191030_state_of_energy_market_revised.pdf

106 It is acknowledged that households in fuel poverty, very often also living in the worst performing homes, are forced to choose between warmth and food, thus often underheating their homes. The immediate impact of a home (energy) improvement is therefore most likely to be comfort take (e.g. heating all rooms) rather than direct financial savings.

energy bill of £1,184 per year for a typical consumer¹⁰⁷, a 60% reduction in consumption would only lead to an annual cost saving of about £700. A corresponding investment of c.£20k¹⁰⁸ to achieve the energy upgrade would therefore need almost 30 years to be repaid – and that’s not even including the cost of finance. Even with such crude arithmetic it is clear that direct cost savings from reduced energy consumption are not sufficient to achieve the mass scaling of the retrofit market that the UK so desperately needs to bring its homes into the 21st century. We therefore need to try to reallocate the benefits that reduced household energy demands brings at national level.

As an example, the BEIS Select Committee on energy efficiency stated that “total energy use could be reduced by an estimated 25 per cent by 2035 through cost-effective investments in energy efficiency and low carbon heat – equivalent to the annual output of six Hinkley Point Cs.”¹⁰⁹ With a 35-year contracted strike price of £92.50/MWh the National Audit Office estimates that the top-up payments¹¹⁰ for the Hinkley Point C nuclear plant will cost the taxpayer £30 billion (in 2016 prices).¹¹¹ At almost the same cost (£85.2 billion – see page 1)¹¹² we could have achieved 25% energy savings in our homes – and that would make not just one but six Hinkley Point Cs obsolete.

Reduced emissions: our existing homes account for about 20% of all carbon emissions and in absolute terms greenhouse gas (GHG) emissions from homes have remained relatively stable between 1990 and 2017.¹¹³ Most of the reduction in GHG emissions have been due to grid (supply) decarbonisation but not demand reduction and on-site decarbonisation. Therefore, much more needs to be done to insulate our homes (thus reducing heat demand) and to switch to less carbon intense technologies (e.g. heat pumps and low carbon generation). Although some financial incentives have been provided to date (e.g. Feed-in-Tariffs and the Domestic Renewable Heat Incentive) these fall short of significantly scaling up the decarbonisation of heat in our homes. A complementary approach could be to introduce a carbon price for heat, such as the German CO2 pricing

107 State of the Energy Market 2019 (Ofgem report). https://www.ofgem.gov.uk/system/files/docs/2019/11/20191030_state_of_energy_market_revised.pdf

108 Cost to achieve significant energy savings vary by building type and measures needed. The £20k figure is based on projects implemented to date and estimates from large housing providers, e.g.: <https://www.insidehousing.co.uk/news/housing-association-says-zero-carbon-will-cost-20000-per-home-66885>

109 <https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/1730/1730.pdf>

110 Spot prices are currently around £40/MWh and the UK government contracted to pay the difference between spot price and strike price to the operator of Hinkley Point C.

111 <https://www.nao.org.uk/wp-content/uploads/2017/06/Hinkley-Point-summary.pdf>

112 <http://www.cied.ac.uk/wordpress/wp-content/uploads/2018/06/CIED-Warm-Home-Report.pdf>

113 <https://www.theiet.org/media/5276/retrofit.pdf>

model¹¹⁴, which came into force on 1 January 2021. Sweden introduced carbon pricing to consumers in 1991.

These measures are geared to reduce operational carbon emissions and running cost. However, there is an intrinsic value of our existing buildings that is hardly ever accounted for (either at individual building level or at national level): the embodied carbon of our homes can be up to 70% of the building's total lifetime carbon footprint.¹¹⁵

The retrofit business case should account for the embodied carbon and not just operational carbon. For homes to benefit from the embodied carbon premium we must ensure they are fit for the future. If we only focus on carbon / energy efficiency we will fail to bring homes to a good standard as they may still have access issues or health hazards; and for some properties the comfort adaptation required may be beyond a retrofit approach. In some areas, increased density that would be possible through demolish-rebuild could still outweigh the loss of embodied carbon in existing homes.

Improved health: the cost of poor housing on the NHS is estimated to be at least £1.4 billion per year, rising up to £2.5 billion.¹¹⁶ And the human cost is very significant too: in 2018 an estimated 17,000 people died due to cold homes.¹¹⁷ The all-party parliamentary group for healthy homes and buildings recommends to “make renovation of current housing stock and infrastructure a Government priority and develop plans for retrofitting that takes a holistic approach to maximising health and wellbeing.”¹¹⁸ In its 2018 White Paper ‘Building our Future’ it calls for a national renovation strategy to improve existing homes.

A concerted effort of upgrading our homes to a good standard will not only future-proof our building stock but also create thousands of jobs and save thousands of lives as we will be living in warmer, healthier homes. The significant resulting carbon emission reduction completes the triple bottom line: good, warm homes leading to economic growth, healthier people and a better environment.

114 <https://www.bundesregierung.de/breg-en/issues/nationaler-emissionshandel-1685054> - the CO₂-price starts at 25 EUR/tonne, rising to 55 EUR/tonne by 2025 and post 2026 index-linked to actual emission. In Sweden such a system has already been in action since 1991 with a current cost of 115 EUR/tonne to set a pathway to net zero by 2045 – additional cost to consumers are (partially) offset by reduction in income tax.

115 Embodied carbon can account for between 30-70% of a building's total lifecycle emissions. <https://www.arup.com/perspectives/publications/research/section/net-zero-carbon-buildings-three-steps-to-take-now>

116 <https://data.gov.uk/dataset/7e5361a6-8ee8-4811-b086-4e870fdaff6/the-cost-of-poor-housing-to-the-nhs> - the £1.4bn is based on improving all homes with HHSRS Category 1 hazards; the £2.5bn includes remediation of HHSRS Category 2 hazards.

117 <https://www.e3g.org/news/17000-people-in-the-uk-died-last-winter-due-to-cold-housing/>

118 <https://healthyhomesbuildings.org.uk/wp-content/uploads/2018/10/HHB-APPG-White-Paper-V1.pdf>

Non-monetary barriers and opportunities by tenure type

Whilst this briefing paper is focused on financing for home improvements, there are a number of other reasons why property owners may be reluctant to invest. This is explored in more detail in a parallel Inquiry paper, however, some key points are included here for context:

a) Social landlords

Retrofit investment programmes are increasingly in place for social housing, a sub-sector where the proportion of non-decent homes is also smallest. This sector benefits from larger portfolios that are professionally managed by housing providers (HAs, LAs, ALMOs). It is in this sector that we also see investment in innovative schemes that have significant potential to go to scale as well as becoming a test bed for solutions that are transferable to owner-occupiers and private landlords, e.g. Energiesprong.

Remaining barriers are:

- Split incentive¹¹⁹ as rent cannot be increased due to regulation – potential solution could be ‘comfort package’ which charges for home comfort not energy consumption (e.g. the Energiesprong model similar to mobile phone bundles)
- Mixed tenures in apartment blocks – potential solution could be buy-back offers or solutions that can be bought into by ‘pepper-potted’ owner-occupiers
- Right-to-Buy is still a major barrier for investment – there are potential problems concerning the safeguarding of investment in the asset or forward selling of investment to people who want to exercise their Right-to-Buy
- Prioritisation in view of reduced income (e.g. rent cuts), including the dilemma of either investing in smaller measures for a larger number of homes (e.g. single measures with only very limited efficiency upgrade) versus investing in whole-house solutions for a smaller number of residents, thus only achieving full coverage over time

b) Private landlords

The private rental sector is very diverse and ranges from ‘accidental’ or ‘amateur’ landlords (often renting out only single properties) to professional organisations owning and managing large portfolios. The quality and condition of homes managed by large organisations is generally good. Non-decent

¹¹⁹ The split incentive refers to the landlord investing in the property with the tenant benefiting in cost savings (e.g. from reduced energy usage).

homes are more often to found among small and micro landlords' stock.

Remaining barriers are:

- Split incentive, though this could be resolved by increasing rent
- Regulation is potentially counter-productive, in particular in tight housing markets where sitting and prospective tenants often cannot make choices based on things such as energy performance for fear of retaliatory evictions (e.g. when reporting repair needs and/or requesting efficiency upgrades)
- Potential investment in wrong measures just to achieve landlord compliance. For instance, installed appliances may achieve EPC minimum compliance but are more expensive to run and thus increase cost for the tenant without a direct benefit
- Potential lock-in of negative equity for landlords, creating 'stranded assets' as a result of underinvestment over time combined with subdued housing markets (e.g. significant regional variation with increasing viability issues for Northern regions)

c) Owner-occupiers

Retrofit initiatives to date have not yet mobilised the 'able-to-pay' owner-occupiers at any scale, either because incentives provided are measure-specific or financially unattractive. Behavioural change and nudge theory can play a larger role to achieve investment as we move the conversation on from energy efficiency to a desirable product. By comparison, nobody feels the need to make an investment case for a new kitchen. Value uplift due to increased desirability of the property is more important than purely focusing on cost/energy bill savings.

Remaining barriers are:

- Owner-occupiers may be asset rich but cash poor; payback for a relatively small investment in energy efficiency might be achieved through direct savings through reduced fuel cost; small scale loan schemes might be sufficient, but these risk energy savings not being delivered due to poor execution of the measures installed. A mitigation for this could be energy/performance contracting
- Variation in regional/local housing markets. For example, homeowners in certain areas might be trapped in negative equity due to their local housing market and thus won't invest in their property unless a significant value uplift could be achieved
- Sub-set of owner-occupiers are ex-RTBs where a large proportion of owners cannot afford to invest in the maintenance of their property. A potential solution is to increase LA buyback schemes (and remove RTB risk for homes brought back into social LA/HA ownership)

APPENDIX 1: KfW energy efficiency programmes for existing buildings

- Difficulty to identify quality solutions and get them installed; a Good Home Agency could be the solution
- Lack of professional assessment for whole-house strategies with a pathway to net zero (phased investment, toolkit approach); again, a Good Home Agency could be the solution
- Value uplift from energy efficiency investment is still negligible; in bullish housing markets better energy efficiency has little or no impact on property value; in bearish housing markets energy efficiency might just achieve a value preservation on quality grounds compared to worse performing homes in the same area (but still not lead to an increase in value)

Across all tenures some solution issues are also linked to the building type, e.g.:

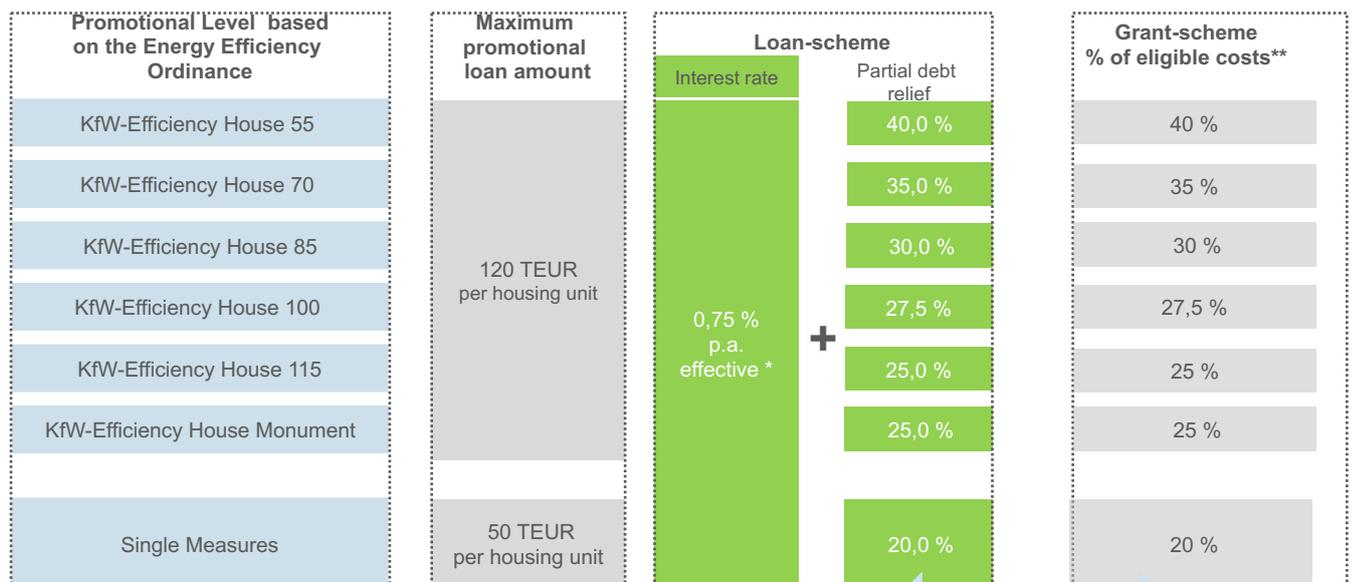
- Individual house (freehold, detached or semi-detached): great freedom to undertake works as no further party involved in agreeing measures; no economies of scale.
- Apartment buildings: lesser freedom to undertake works as consent is required (for most works) from all leaseholders; likely to be mixed tenures; economies of scale.

In addition, there are also technical solution issues by building typology. These are not explored in the context of this paper which is focused on financial (and implicitly legal) issues that are barriers and opportunities for retrofit.

APPENDIX 2: KfW energy efficiency programmes for existing buildings

»»» Promotional programs for residential buildings – Set-up Energy Efficient Refurbishment – incentives as a success factor

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