DECARBONISING

THE HOUSING ASSOCIATION SECTOR

COSTS AND FUNDING OPTIONS

savills

Contents

1. Executive Summary

The housing association sector is committed to playing its part in England's journey to achieving the decarbonisation of the economy by 2050, and to do so while reducing fuel poverty and improving comfort for tenants. Assuming a fully decarbonised electricity grid, decarbonising social housing will require replacing gas-fired heating systems with heat pumps or other forms of electric heating. Fabric improvements, principally insulation, will be required to many homes to avoid increasing fuel costs, and to enable clean heat technology to adequately heat the home. The extent of the fabric improvements required will depend on how heat pump technology improves, and on the trajectory for electricity prices, over the next thirty years.

We explore two principal options. Firstly, achieving EPC-C through improving the fabric by 2030, replacing gas heating with heat pumps 2030-2050 and counting on the costs of electricity and gas being rebalanced and improving heat pump technology to avoid fuel poverty. Secondly, achieving EPC-C by 2030, replacing gas heating with heat pumps 2030-2050 and continuing to improve the fabric to ensure that residents experience minimal difference in expenditure on heating, assuming minimal change to electricity pricing and heat pump technology. A third option explored is installing photovoltaic panels (PV) in addition to the other measures. This has the advantage that it will reduce the costs of running heat pumps longer term. There are of course a myriad of intermediate options and different solutions will be preferred for different archetypes.

Following a survey of the literature and opinion amongst stakeholders we explored the net costs (in addition to current stock investment plans) of three options for achieving the decarbonisation of the 2.7m homes owned by the sector with improved energy efficiency to mitigate the increased energy costs for residents: -

Scenario	Cost ex VAT and On-costs
1. **Base case** – achieve EPC-C by 2030 and then replace gas heating with heat pumps 2030-2050. Under the current SAP methodology, the substitution of electricity for gas will reduce the EPC rating, in some cases below C.	£35,821,593,596
2. **Central case** - achieve EPC-C by 2030, replace gas heating with heat pumps 2030-2050 and continue to improve the fabric to ensure that the EPC rating remains at C or better and residents experience minimal difference in expenditure on heating.	£48,762,026,596
3. **Maximum energy efficiency case** – retrofit homes to achieve maximum practically achievable SAP and minimise energy demand and then replace gas heating by 2050.	£58,271,526,596

The challenges of executing such a programme are explored, based on Savills experience of delivering decarbonisation strategies.

The next step was to explore implications for the economic viability of the stock and its mortgage ability. Additional costs at this scale will have a significant impact on Net Present Values and hence may affect loan security valuations. Measures to mitigate these impacts are explored.

The cost scenarios have been modelled through a global business plan for the sector based on the Global Accounts published by the Regulator of Social Housing. This demonstrates that whilst associations can raise additional borrowings to cover a proportion of the costs, they will need external support to meet the costs in full. It is important to note than continuing to develop sustains the financial health of the sector long term. Ultimately a combination of funding options is recommended for further investigation:

- Reductions in VAT on energy efficiency measures
- Government guarantee on borrowings for retrofit
- Grant to contribute to the costs of retrofit
- Review of accounting conventions for expenditure on decarbonisation
- Renegotiation of sector standard interest cover covenants with lenders

2. Introduction and Objectives

2.1. Introduction

The NHF has commissioned two pieces of research towards creating a decarbonisation plan for the housing association sector:

- a high-level decarbonisation strategy, roadmap and toolkit, which it will adopt and publish;
- costings and funding options for decarbonisation of the social housing stock, which is the subject of this independent report.

2.2. Objectives

The research will be used to:

- influence policy;
- make the case for funding;
- shape funding schemes to maximise impact and minimise costs to the sector;
- engage the sector;
- engage stakeholders, and
- build reputation.

2.3. Approach

2.3.1. Literature review

We have undertaken a review of UK and EU literature to summarise current and past theory and practice of funding decarbonisation works. The review sought to capture the latest thinking on funding initiatives from government, utilities, financial institutions, the energy supply chain, and the (building fabric) supply chain. The output provides context to the funding strategy and informed the sector engagement process.

2.3.2. Engagement and data gathering

We undertook interviews to fill in gaps in knowledge identified from the Literature Review. We interviewed representatives from:

- Government
- Lenders
- Savills Energy
- Contractors
- Universities active in the field

In order to gauge sector opinion, the NHF has run a series of Task and Finish Groups, which Savills attended.

2.3.3. Costing the Programme

We have worked up 3 scenarios for the energy efficiency works to support net zero heating technologies to derive the net additional costs over the provision for capital expenditure in current business plans. We have expressed costs by component and as a simple range and an average reflecting the range of archetypes in the social housing stock.

2.3.4. Economic assessment and asset management strategy

The additional costs will have a significant impact on the economic performance of stock, as measured by the Net Present Value. This will then drive Asset Management Strategy, including disposals and redevelopment.

2.3.5. Funding options

The report takes the costing scenarios and likely asset management strategies into account to explore a range of funding options for the decarbonisation of social housing stock, including but not limited to:

- Self-funding options
- Grant and incentive schemes
- Changes to rents to reflect reduced energy costs (known as “Warm Rents”)
- Loans/3rd party investment with and without the benefit of Government Guarantees
- Alternative sources including supply chain initiatives
- Changes to the accounting standards

We consider suspending development, and current levels of development e.g. 180,000 over 2021-26 backed by Government funding of c.£12bn through the Affordable Housing Programme, plus an assumed level of nil grant Section 106. For simplicity we assume that development costs reflect Future Homes Standards.

2.3.6. Exclusions

The project did not examine how the sector builds new homes to a net zero standard. We assume that the 20% of the stock in 2050 to be developed over the next 30 years will be built to “Net Zero” standards.

The research has not examined: -

- The costs of decarbonising social housing owned by local authorities
- The costs of fire safety works required under the Building Safety Act, which is a prior call on the resources of associations;
- The embedded carbon in the materials used to decarbonise the stock, on the assumption that manufacturers either employ Zero Carbon processes or offset their emissions;
- Wider sustainability issues such as how we make homes flood resilient;
- How we make our estates and developments greener and more bio-diverse.

3. Literature Review

3.1. Introduction

The vast majority of the decarbonisation that has been achieved within UK borders has been driven by the power sector. In many ways, these could be considered to be the "low-hanging fruit" of policy, with many of the more challenging decisions yet to be engaged with. Future action on emissions will need to be more wide ranging, and the built environment is at the forefront of this. The recently published Sixth Carbon Budget includes calls for low carbon solutions such as electric heating, and a national program to improve insulation to reduce demand for carbon intensive heating.

Housing associations are well placed to lead this transition. The quantity and variety of stock in the sector means it is able to innovate and deliver change at scale. This will have a beneficial impact for the whole residential sector, as it will contribute to building up supply chains and capacity at greater speed. However, decarbonisation will require significant investment beyond existing asset management plans, at a time when housing associations are already facing increased spending on their stock to comply with fire safety standards. Innovation will be required, which will expose the sector to risk. Therefore, new investment and government support will be needed to deliver decarbonisation works. This literature review sought to capture the latest thinking on funding initiatives from government, financial institutions, and the energy supply chain, and draw on European examples of best practice.

The Green Finance Institute has identified several financial barriers for councils and housing associations aiming to deliver social housing retrofits:[1]

- **Limited Funds:** a retrofit program is just one of many demands on budgets
- **Access to capital:** can be a challenge for smaller housing associations
- **Planning horizons:** Short-term government grant programmes are difficult to reconcile with longer term stock improvement plans
- **Interest rates**: Housing associations have the highest share of stock. They face marginally higher borrowing rates than local authorities because the latter enjoys an implicit Government guarantee.

The UK Green Building Council identified several similar challenges:[2]

- **High upfront costs**
- **A lack of finance mechanisms** and a lack of a coherent offerings for institutional investors
- **No fiscal incentives**
- **Limited loan and grant schemes** that have prioritised specific measures, and prevented a whole house approach

In addition, leaseholders and owners of properties purchased under the Right to Buy are not compelled to permit or contribute to changes, which can suppress the economies of scale the sector should be able to benefit from.

[1] *Financing energy efficient buildings: the path to retrofit at scale*, Green Finance Institute June 2020 https://www.greenfinanceinstitute.co.uk/wp-content/uploads/2020/06/Financing-energy-efficient-buildings-the-path-to-retrofit-at-scale.pdf

[2] *The Retrofit Playbook*, UK Green Building Council, February 2021 https://www.ukgbc.org/wp-content/uploads/2021/02/Retrofit-Playbook.pdf

3.2. Existing Practice in the UK

BEIS estimated in 2019 that an investment of £65 billion is required to achieve the UK government's then stated ambition to improve as many homes as possible to an Energy Performance Certificate (EPC) rating of C by 2035.[3] To set the £65 billion investment in context, the size of the home repair, maintenance and improvement (RMI) market in the UK was £28.8 billion in 2019.

3.2.1. Government and Policy

Details were released in November 2020 of the Government's 10-point plan to progress towards net zero emissions, establishing the foundations for a green industrial revolution: creating up to 250,000 green jobs and stimulating long term economic growth. Positioning the green agenda at the centre of economic recovery, this 10-point plan will mobilise £12 billion of government investment to develop clean technologies, new industries, supply chains and jobs in the regions, addressing the levelling up agenda. £500 million has been allocated to developing hydrogen power, supporting industry to begin a pilot hydrogen town by 2030. There is also a focus on making homes and buildings more energy efficient by scaling up, supporting 50,000 jobs by 2030 as well as a target to install 600,000 heat pumps yearly by 2028. The government's election manifesto committed to a new £3.8 billion Social Housing Decarbonisation Fund over ten years from 2021/22, focused on supporting housing associations to renovate their stock up to a standard equivalent to EPC C by 2030. With EU withdrawal, access to the European Regional Development Fund – a major source of capital for renovation in the most deprived regions of the UK – will no longer be possible. The applicability of its replacement, the UK Shared Prosperity Fund, for social housing renovation remains to be seen.

In terms of funding targeted directly at housing, the Government launched the £2 billion Green Homes Grant scheme in September 2020. Private homeowners and private and social landlords were invited to apply for up to £5,000 per property towards energy efficiency improvement works. The programme also includes a £50 million Social Housing Decarbonisation Fund Demonstrator for 2,200 social housing retrofits. As part of the Government's 10-point plan, the Green Homes Grant scheme was extended by £1 billion for a year after the initial programme became heavily over-subscribed but was closed to new applicants in March 2021.

[3] *Green Finance Strategy: Transforming Finance for a Greener Future* BEIS, July 2019
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/820284/190716_BEIS_Green_Finance_Strategy_Accessible_Final.pdf

The scheme was criticised for its lack of capacity to mobilise the supply chain as planned. Oral evidence given to the Environmental Audit Committee from local authorities and industry bodies stated that the short-term nature of the funding would not give small retrofit providers sufficient confidence to scale up production.[4] Criticism was also made of the distinction between primary and secondary energy efficiency measures, and the point at which funding could be received for the measures; this caused confusion and limited the extent to which measures could be installed in homes. Coupled with delays in the funding vouchers being issued, the effect was for suppliers to retract due to ongoing uncertainty rather than expand capacity.[5] The key recommendation from the Select Committee was that the scheme should be overhauled and extended to provide a multi-year programme that will give suppliers the confidence to expand capacity. The same ethos should underpin all Government efforts to deliver net zero goals.[6]

A similar critique of the wider UK policy landscape has been made by the Green Finance Institute, which stated in December 2020 that it "has yet to provide the market signals required to scale supply chains, jobs and investment in zero carbon heating solutions".[7] The same theme emerges in the Sixth Carbon Budget pathway document, with the first policy recommendation being to set a clear direction and standards for decarbonisation.[8]

A £50m Social Housing Decarbonisation Fund (SHDF) for demonstrator projects was launched in September 2020. A second round, "Wave 1", with £160m match funding was launched in September 2021 with bids due in Oct 2021. Although it is too early to assess the success of the scheme, the response to it has been mixed. Respondents praised the high level of funding available per property, enabling a comprehensive approach. However, the scheme requires a cost reduction of 5-30% at the demonstrator stage, which was stated by some to be too high a bar for initial projects.[9] Tying funding to innovative approaches to decarbonisation also exposes social housing providers to increased risk.

Most recently a coalition including Citizens Advice, the Federation of Master Builders, the Aldersgate Group and Which? has written to the Prime Minister expressing concern that the process of installing low-carbon heating, upgrading insulation or putting in smart technologies is "time consuming, confusing and stressful"10. They ask for better information, consumer protection and financial support. This suggests a need for a centre for excellence to issue advice and/or a new agency investing directly in heat pump / insulation manufacture to assure quality.

[4] *Energy Efficiency of Existing Homes*, Environmental Audit Committee, March 2021, p22 https://committees.parliament.uk/publications/5171/documents/52521/default/

[5] ibid, p24

[6] ibid, p28

[7] Green Finance Institute, *Turning up the Dial on Investment,* December 2020 p46 https://www.greenfinanceinstitute.co.uk/wp-content/uploads/2020/12/Financing-zero-carbon-heat-turning-up-the-dial-on-investment_Green-Finance-Institute.pdf

[8] Climate Change Committee, *The Sixth Carbon Budget, Buildings*, p58

[9] Op. cit. 4, p30

[10] Open letter to the Prime Minister, 25th August 2021

3.2.2. Utility Companies

Energy suppliers are required under the Energy Company Obligation (ECO) scheme to contribute to efforts to reduce carbon emissions and reduce fuel poverty. This is the main retrofit policy instrument and since the ECO scheme was launched in January 2013, 2.3 million energy efficiency measures have been installed in approximately 1.8m homes, with the aims of making homes more energy efficient, saving carbon and making the energy system more resilient. The third iteration of the ECO scheme, due to run until March 2022, focusses entirely on low income and vulnerable households. Government's consultation on the fourth iteration has just closed

Current eligibility[11] centres on:

- Private tenure households in receipt of certain means-tested benefits, or a combination of benefits, with a household income threshold for Universal Credit and Tax Credits;
- Private tenure households identified by a local authority as living on a low income and vulnerable to the cold or in fuel poverty; and
- Social tenure households living in properties with an EPC band rating of E, F or G, with extra limits on eligible heating measures

However, funding for measures which deliver innovation in energy efficiency can be extended to social housing properties with an EPC rating of D or below.

While this offers a route for funding retrofitting that doesn't add to housing providers' balance sheets or require government grant, landlords have less control over the nature of the improvements made to their properties. Tom Jarman (Low Carbon Journey) noted in March 2021 that "many landlords allowed the Energy Company Obligation (ECO) funding programmes to define the parameters of work carried out on their homes – instead of what needed to be done. This has had a negative impact on how useful those programmes ultimately have been."[12] The eligibility limits of the scheme based on existing EPC ratings prevent landlords from taking a comprehensive approach across their portfolio.

Other assessments of the ECO scheme have concluded that it is underfunded, ineffective in targeting fuel-poor homes and too slow to deliver retrofit at scale. IPPR analysis found that since the funding model was amended for 2018-2020, the rate of insulation installation has slowed, and is averaging 7% of the number required to meet net zero by 2050 in the housing sector.[13] The funding source of the scheme has also been criticised; as it is funded through on-bill financing, poorer consumers end up paying more as a proportion of their income, meaning any attempt to increase funding through this mechanism would be highly regressive.[14]

[11] *Energy Company Obligation ECO3: 2018-2022,* BEIS, p19
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/696448/ECO3_consultation.pdf

[12] https://www.insidehousing.co.uk/insight/insight/how-will-the-housing-sector-finance-decarbonisation-of-its-stock-69925

[13] *All Hands to the Pump*, IPPR, July 2020, p22 https://www.ippr.org/files/2020-07/all-hands-to-the-pump-july20.pdf

[14] Ibid, p22-23

3.2.3. Financial Institutions

The Green Finance Institute identified nine lenders offering Green Mortgages and Retrofit Loans at the end of 2020.[15] This source of funding is however primarily aimed at the owner occupier market. Dedicated financial offerings from the private sector for social housing providers are focused on larger landlords, most notably the Ritterwald Certified Sustainable Housing Label that unlocks opportunities to raise capital from green, social and sustainability bond investors.[16] It provides evaluation criteria for measuring the green and social impact of housing companies, giving investors greater comfort that their finance will have a defined impact.

To develop the green finance market further, it has been suggested that both industry and policy makers need to build on this idea of having greater transparency and openness. Proposals from the Green Finance Institute include reviewing the Standard Assessment Procedure to fairly reflect the benefits of new technologies in homes and developing common benchmarks to facilitate accurate reporting to showcase relative performance of Green REIT portfolio assets.[17] According to the Energy Efficiency Infrastructure Group, a standardised methodology and data framework for Building Renovation Passports is needed from Government, critical to building investor confidence.[18]

Bond markets are increasingly developing products focused on sustainability. Sustainability-Linked Bonds such as those recently issued by Clarion Housing[19] in November 2020 open up opportunities for low interest rates and long-term capital to fund retrofit programmes. These bonds commit the issuer to improvements in sustainability outcomes within a predefined timeline, tying funding to specific targets.[20] Clarion's bond issue raised £300m, and was significantly oversubscribed, suggesting that there is considerable further appetite from investors.

[15] Op. cit. 7 p33 https://www.greenfinanceinstitute.co.uk/wp-content/uploads/2020/12/Financing-zero-carbon-heat-turning-up-the-dial-on-investment_Green-Finance-Institute.pdf

[16] http://www.sustainable-housing.eu/

[17] Op. cit. 15, p34-35

[18] Energy Efficiency Infrastructure Group, *Rebuilding for Resilience* June 2020 p27 https://www.theeeig.co.uk/media/1096/eeig_report_rebuilding_for_resilience_pages_01.pdf

[19] http://www.clarionhg.com/news-research/2020/november-2020/clarion-housing-group-raises-300m-in-latest-sustainable-bond-issue/

[20] ICMA Group *Sustainability Linked Bond Principles* https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/June-2020/Sustainability-Linked-Bond-PrinciplesJune-2020-100620.pdf

Finance can also be provided by dedicated Green Banks through debt, equity, guarantees and credit enhancements. A 2020 report found that there are 27 green banks operational globally, with $24.5 billion invested while attracting private investment of £45.4 billion. In the UK, the Green Investment Bank was launched in 2012 by the UK Government, and later sold to Macquarie. Its primary focus was investing in renewable energy, mobilising over £12 billion of investment by 2017 and having a catalytic impact on offshore wind generation. The Green Finance Institute argues that setting up a similar government bank aimed at the built environment would have a transformative impact on investment for social housing retrofit; a credit guarantee scheme would unlock lower cost finance[21]. The OECD estimates that credit guarantee schemes can bring in £5-10 of private capital for every £1 of public capital over a 5-10 year timeframe. Similarly, the UK100 campaign Financing Local Energy proposes a National Net-Zero Development bank and demonstrates that £5bn of government development capital could unlock £100bn of private investment.[22]

3.2.4. Warm Rents

Energy efficiency works in the social housing stock suffer from split incentives, as the tenants who benefit from the efficiency improvements do not pay for them directly. However, some landlords do take into account energy efficiency when setting rent structures for new properties. In Scotland, where social landlords are required to demonstrate how affordability influences rent setting, a points system has been used by Almond Housing Association to calculate the rental value which takes into consideration the benefits associated with new developments or major refurbishment where the average energy efficiency rating over all properties is 80 or above.[23] However, the impact of energy efficiency in this overarching rental calculation is likely to be minimal. This approach to rent setting is not applicable for social homes in England because the Rent Standard prohibits increases following renovation works.

3.3. Existing Practice in the EU

Before the Covid-19 crisis, Housing Europe found that social housing providers in Europe aimed to dedicate around €23 billion per year, 40% of their total spending, on the renovation and maintenance of existing stock.[24] As part of the European Green Deal, introduced in 2019 as an ambitious roadmap towards a more sustainable EU economy, the EU announced a “Renovation wave”. This will aim to remove structural, informational, market and other barriers to energy efficiency renovations in the building sector and incentivise investment in making buildings and districts more energy efficient. The renovation of social housing will be promoted, as it will have the added impact of addressing energy poverty. Additionally, the 2020 EU Recovery Package agreed in July 2020 allocates 30% of funding to green projects that are determined within each member state and could be used for housing retrofitting.[25]

[21] Green Finance Institute, *The Role of a UK National Infrastructure Bank in a Green Recovery,* December 2020, p4 https://www.greenfinanceinstitute.co.uk/wp-content/uploads/2020/12/GREEN-FINANCE-INSIGHTS-PAPER-1.pdf

[22] UK100 *Accelerating the Rate of Investment in Local Energy Projects,* p36 https://www.uk100.org/sites/default/files/publications/UK100_Accelerating%20the%20Rate%20of%20Investment%20in%20Local%20Energy%20Projects.pdf

[23] https://www.almondha.org.uk/uploads/2020-06-11-17-10-20-RentSettingPolicypdf-14241.pdf

[24] https://www.housingeurope.eu/resource-1393/what-is-needed-to-strengthen-the-renovation-efforts-within-the-social-cooperative-and-public-housing-sector

[25] OECD *Social housing: A key part of past and future housing policy,* 2020 p21 https://www.oecd.org/social/social-housing-policy-brief-2020.pdf

3.3.1. Germany

Under the Energy-efficient Refurbishment programme run by the KfW, the government supports the renovation of buildings by covering up to 40% of the costs.[26] The KfW is a national development bank, and its largest business unit focuses on housing and environmental protection. The KfW banking group covers over 90% of its borrowing needs in the capital markets, mainly through bonds that are guaranteed by the federal government.

The scheme provides grants, subsidies, and discounted loans to homeowners, social landlords and local government.[27] One in three housing retrofits in Germany are funded through KfW, and 30-year loans are offered at competitive market rates with early repayment subsidies. To be eligible for funding, a retrofitted building generally needs to achieve at least a benchmark annual primary energy consumption of 160% and a transmission heat loss of 175% when compared to a calculated reference building.

3.3.2. The Netherlands

In The Netherlands, energy efficiency efforts have been led by Energiesprong, which has brokered a deal between housing associations and contractors to upgrade 110,000 homes, and currently retrofits around 1,000 units per year.[28] The programme has created a network of contractors, suppliers, housing providers and financiers, with the aim of reducing the cost of net zero retrofitting and increasing the pace of growth of the sector.

The Energiesprong upgrades are designed to pay for themselves over 30 years. The one-off retrofitting costs required to meet net zero are paid off through a combination of a reduction of future maintenance costs and lower energy bills.[29] One such repayment model includes a tenant paying an “Energy Plan” charge to the landlord which replaces payments that would have previously been made to an energy supplier. The upfront capital in the Netherlands has been supplied by WSW social bank, providing €6 billion to underwrite government backed 40-year loans to housing associations. The scheme has also been supported by the European Climate Foundation and the EU subsidy programmes Horizon2020 and Interreg North West Europe.[30]

The scheme has expanded to other countries, including France, Germany, Italy, and the USA. A pilot scheme in the UK was carried out with Nottingham City Homes. The aspiration is that through economies of scale, an Energiesprong home can be retrofitted for £40,000, but the cost per unit for the 10 home pilot was £65,000.[31]

[26] https://www.bmwi.de/Redaktion/EN/Dossier/enhancing-energy-efficiency-in-buildings.html

[27] https://www.kfw.de/nachhaltigkeit/KfW-Group/Sustainability/Unser-Anspruch/Finanzierung-F%C3%B6rderung/Klimawandel/

[28] https://energiesprong.org/?country=the-netherlands

[29] https://www.cibsejournal.com/case-studies/a-forward-leap-how-dutch-housing-process-energiesprong-guarantees-performance/

[30] https://energiesprong.org/aboutstroomversnelling/

[31] Op. cit. 29

3.3.3. France

France's post Covid-19 recovery plan is closely tied to sustainability, with €7 billion of a €33 billion green recovery fund set aside for building retrofitting. Subsidies are available for improving home insulation or upgrading to a more energy efficient boiler. There has also been a boost of €2 billion to the MaPrimeRénov scheme, with grants available to all households, including landlords. Renovations are for all houses regardless of their energy performance, but increased amounts are available for the 4.8 million households with an F or G EPC classification. The total amount of funding obtained through the MaPrimeRénov' scheme may not exceed a maximum threshold of €20,000 per household over a five-year period.

3.3.4. Ireland

In Ireland, a £222 million capital fund has been set up for the Sustainable Energy Authority of Ireland (SEAI) residential and community retrofit programmes. £65 million has been allocated for social housing retrofit. A National Retrofit Office has been created in the SEAI, with the expectation that public bodies will lead by example. Through this plan, social housing will become a testbed for project aggregation and reducing costs, whilst also ramping up supply chains for wider retrofit across all tenures.

This funding approach is linked closely to governance and a place-based strategy. The Midlands Retrofit strand is a programme to support the energy efficient retrofit of local authority homes in the eight Midlands Local Authorities across Ireland. The Local Authorities are selecting clusters of homes for retrofit, and SEAI are assessing applications on proposals to collaborate to deliver the retrofit of private homes alongside, increasing the benefits of aggregated delivery. The scheme will provide up to 80% of the cost of upgrading the worst performing homes, and up to 50% of the total blended cost of a scheme.[32]

3.4. Alternative Proposals

3.4.1. IPPR: All hands to the Pump

The think tank IPPR set out proposals in 2020[33] for an investment programme to deliver retrofits across the UK within the context of economic recovery from Covid-19. Under the proposed model, government would fund through grant half the total cost of a national retrofit programme, with the remainder delivered via private finance. IPPR frames the public investment as part of a clean recovery package using historic low interest rates to invest in a scheme that should also create new employment opportunities.

Under their calculations, a public Retrofit Fund for England would require £5.3bn per year to 2030 & £3.5bn per year thereafter, of which £1.8bn should be reserved for social housing, with a more rapid uptake in social housing sector helping to develop supply chains & accelerate new technology. To leverage the required additional private finance, the Bank of England would have to work with financial institutions to ensure that the risk profile of retrofit activity is reduced, reflecting the long-term environmental benefits it brings. The environmental credentials of public works, which would include the retrofit of activities of social housing providers, should become a key lending criterion. Once retrofits are complete, a proportion of the energy bill payments from the retrofitted properties are paid back to the private investors. Crucially, any indirect payments to investors through energy bills would have to

[32] https://www.seai.ie/grants/national-home-retrofit/National-Home-Retrofit-Scheme-Guidelines.pdf

[33] IPPR, *All Hands to the Pump*, July 2020 https://www.ippr.org/files/2020-07/all-hands-to-the-pump-july20.pdf

be more than offset by reductions in energy bills due to lower running costs for homes with the new low-carbon heating systems and energy efficiency upgrades.

Alongside this, a new framework would need to be developed that helps local authorities and social housing providers aggregate areas of homes then securitise the investment in low-carbon heat technologies as a means of attracting private finance. The government could also play a role in securing low interest rates for the loans by using the UK Guarantees Scheme, which is currently used to lower interest rates for large infrastructure projects.

3.4.2. Green Finance Institute: The Path to Retrofit at Scale

The Green Finance Institute has produced several policy papers tackling the issue of increasing investment in sustainable and climate resilient property. Their demonstrator ideas that are applicable to the social housing sector include:

- **Community Municipal Bond** - Utilising a crowdfunding approach to create an efficient, scalable and cost-effective source of funding for local authorities to finance projects that address the climate emergency. Developed by Abundance Investments, this model uses a crowdfunding approach to move beyond conventional sources such as the Public Works Loan Board. Adoption of this model offers a financing route for the two-thirds of Local Authorities that have declared a climate emergency [34]
- **Insurance Backed Comfort Plans** - An insurance-backed performance guarantee for deep retrofit projects. This would increase the certainty of energy savings, reducing the risk of individual projects and improving the access and cost of financing from sources of private capital. This could give social landlords more certainty on the benefit for tenants when adopting new technology and could also drive growth in the supply chain and create economies of scale that support retrofits across all tenures.[35]
- **Government Guaranteed Social Housing Finance[36] -** a guarantee mechanism to support deep retrofits in the social-rented sector, underpinned by the UK government. This would offer a base to develop the supply chain to meet the needs across all tenures. Furthermore, the creation of skilled jobs would contribute towards the UK's economic recovery following the COVID-19 crisis

3.4.3. LSE: Financing a just transition to net zero emissions in the UK housing sector

LSE published a policy paper[37] assessing how climate action in the housing sector in the UK can be designed to produce a positive social impact and is seen to be fair. Their funding proposals include:

- Create a National Investment Bank with a mandate to support the decarbonisation of housing, by providing long-term low-cost capital as well as vital quality assurance, including labour standards.
- Issue green sovereign bonds to channel savings into a just and sustainable recovery programme, with a major focus on housing retrofit and clear impact reporting on social benefits for workers, communities and consumers.

[34] Op. cit. 1, p50

[35] Ibid, p50

[36] Ibid, p51

[37] https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2020/07/Financing-a-just-transition-to-net-zero-emissions-in-the-UK-housing-sector.pdf

3.5. Conclusions

While some positive steps have been made in government policy towards decarbonising housing stock, the lack of a roadmap has hindered efforts. A long term and consistent approach is necessary to incentivise suppliers to expand capacity, and also for private finance to invest in this area. Where public sector investment has been made, the primary criticism is that the timescales for bidding and installation have been too short, and the efficiency expectations for developing technology have been too high.

As recommended by the Environmental Audit Select Committee, a multi-year programme of government investment would improve contractor capacity, while clearer requirements and a standardised data framework would be likely to draw increased private investment. The review shows that there is considerable appetite from financial institutions to invest in decarbonisation, but more transparency around the performance of their investments would be needed to build scale.

The European examples have shown that the social housing sector can act both as the catalyst for wider decarbonisation across all housing stock and as a test bed for innovative technology. However, this has always been supported by significant government investment, either through direct grants or through state backed loans. Germany and The Netherlands have both taken the approach of providing long term loans via a government backed bank. The Green Finance Institute and LSE recommend this approach is also used to scale up retrofitting in the UK rather than relying on private investment.

However, there are still several areas that the literature does not address which require further consideration. Many funding mechanisms propose using the housing sector as the pilot trialling decarbonisation at scale, but do not address the risk this poses to housing associations if new technology or processes do not perform as expected. Either direct government investment in the heat pump supply chain or an insurance scheme against the risk needs to be investigated. In the meanwhile, focus on lower risk fabric improvement will give time for innovation. There is also little information available from contractors around the types of savings that could be achieved through retrofit at scale, and whether this varies with a place or portfolio-based approach. Finally, while it is clear that greater transparency and data is needed to secure the confidence of private finance, there is no consensus around the form a reporting framework should take.

The most recent publications focus on the need to capitalise on wide public support for decarbonisation by providing public information and sponsoring simple low risk solutions.

4. Interviews

4.1. Introduction

Interviews were conducted with key stakeholders from the following groups:-

- Policymakers
- Academics
- Housing associations, whose views were recorded at the Task and Finish Group meetings
- Contractors
- Finance

The objective was to fill in gaps identified through the Literature Review, bring the debate up to date and add some colour to the findings. An interview schedule was prepared, and the responses recorded. What follows is a summary of the findings against the broad headings in the schedule.

4.2. Summary of Responses

4.2.1. Lessons from the Past

Respondents felt that the delivery of the Decent Homes Standard provided a number of lessons

- A new standard is required to focus effort.
- Resident involvement is critically important.
- A programme of pilot projects with science research councils would be beneficial.
- Good stock condition data will be essential to support programming and model the financial impact.
- Post-completion monitoring was important
- There will need to be a flexible approach to Value for Money to overcome problems with the shortage of skilled personnel and weaknesses in the supply chain.
- Knowledge sharing would be beneficial.

4.2.2. Preferred definition of Net Zero

All respondents agreed that a definition was needed urgently. EPC/SAP rating (rather than Band) was acknowledged as the simplest and most widely accepted target, subject to adjusting the perverse incentives inherent in the fuel cost factors. Any definition needed to be accompanied by changes to tariffs to recognise the decarbonisation of electricity.

4.2.3. Data standards

These go along with any definition and new standard. It was anticipated that the Regulator of Social Housing (RSH) may want to collect emissions data and decarbonisation strategies.

The Good Economy Sector Standard was welcomed. It was hoped that the standard would be widely adopted but it was recognised that it may be difficult for some housing associations to meet the requirements immediately. In future, lenders may well get to a point where meeting the standard is a requirement of funding. Incentives may well be in reductions in margins of c 5bps.

4.2.4. Delivery

There was a dilemma between taking a whole house approach and "fabric first", which implied two phases of work. This would be disruptive for residents and present risks of damaging the fabric on the second visit but possibly fits best with associations' business plan assumptions.

4.2.5. The benefits of delivering retrofit at scale

Respondents felt that scale was absolutely essential, firstly to manage the high costs of set-up, preliminaries and design and then manage down procurement costs.

4.2.6. Place/local area-based approach to retrofitting

Providers recognised the difficulties presented by pepper potted property and the potential benefits of area-based approaches. They were effective if working with pre-existing community networks and invaluable to deliver district heating and to reach agreement with planners. They were considered one approach to driving economies of scale.

4.2.7. Funding routes and options available

Providers noted the number of potential funding mechanisms, including private sector mechanisms such as ECO. On the one hand, the mix of schemes could be confusing; on the other hand, may provide resilience.

There was some criticism of the Green Homes Grant scheme, specifically the criteria for funding, the timetables for delivery and the failure to incentivise whole house treatment and scale. It was thought that the experience of the scheme could be built on.

Any successful scheme must include a long-term commitment to give time to tackle skills shortages and drive effective procurement and programming.

4.2.8. Charging "Warm Rents"

Some providers would contemplate charging an increase so long as it was less than the reduction in energy costs following retrofit. It was acknowledged that no change would happen before the 2025 rent settlement, when it may be coupled with reform of the regulatory framework.

4.2.9. Disposals

Providers were actively debating the part disposals might have to play in reaching Net Zero. This was driven by hard-to-treat stock, and restrictive planning and conservation policies. Other stakeholders were less convinced and wanted to participate in the debate.

4.2.10. Data and benchmarking for lenders to have confidence to invest

Lenders would like consistent data on stock type and energy efficiency across the country. The measurement of impact on emissions would be ideal, but hard to achieve.

4.2.11. VAT rates

Rates on energy efficiency works needed urgent clarification.

4.2.12. Government guarantee

There was a strong consensus that government guarantees over borrowing for investment in decarbonisation would be highly effective.

4.2.13. Leasehold and properties acquired under the Right to Buy

Gaining the consent of owners will present an obstacle. Respondents questioned when landlords would need to impose solutions, as with fire safety. A solution may emerge from the proposals for the private sector.

4.3. Conclusions and Observations

Housing associations and their stakeholders are enthusiastic about decarbonising their stock. The literature review and the outcome of the interviews provide an agenda for action, which will be explored in the conclusions of this report. In particular, respondents emphasised:

- Need for certainty – multiyear programme to tackle skills shortage and support programming and planning
- Scale and support for regional/area-based approaches
- Support for government guarantees and funding
- Impact on economic performance of stock stimulating a debate on solutions

5. Costing the programme

5.1. Introduction

Savills has worked on the costs of decarbonisation against the background of a fast-changing policy framework. During the course of this work: -

- The CCC has issued a further report;
- Government has launched the Social Housing Decarbonisation Fund Wave 1;
- The Heat and Buildings Strategy has been delayed.

Savills has based its costing on its work with 17 Registered Providers owning 378,872 homes across England. It has used tendered costs experienced over the last 2 years as well as the tender returns received to support applications of the first Social Housing Decarbonisation Fund.

5.2. Assumptions

The following assumptions have been made:-

- Decarbonisation of the electricity grid by 2050
- Gas heating will be replaced by electrically operated heat pumps with current rates of efficiency
- The costs of electricity will reduce but will still be higher than burning gas at 2021 costs
- To avoid increasing fuel poverty, energy costs will need to be reduced by investment in “fabric first”
- Energy generation via Photovoltaic panels (PV) may be installed as an additional measure to further reduce costs and increase the EPC rating, at a cost of £3,500 pu
- The opening position is that 39% of housing association stock is at EPC-D or below, as per the English Housing Survey
- All properties built since 2000 are at EPC-C or better
- All properties built from 2020 will achieve Net zero (SAP 85 or better)
- Unit component costs revealed by the recent tenders will be reduced by 20% to reflect supply chain management and procurement at scale over the course of the programme.
- VAT needs to be added at an average discounted rate of 10%
- On-costs will be at 12% plus VAT.

The on-costs experienced to date are particularly high because of the need for customised design solutions and to achieve approvals from building control and planning; this is a key area for work to drive down costs.

15% of the stock will be redeveloped or disposed of and replaced with new stock meeting the net zero standard. This is comparable to the rate of 0.6% pa in the period 2013 and 2018 (see Section 6.4.1). The likely disposal and redevelopment programme is explored in the section on asset management.

The programme will achieve EPC-C by 2030 and the target of net zero by 2050.

5.3. Component Costs

Table 1 sets out the costs of components employed in the scenarios to bring properties up to EPC-C. They are net of VAT and on-costs. Not all measures will be adopted in all homes (i.e. cavity wall insulation will suffice in some properties rather than external wall insulation) and therefore these are very much average costs.

Flats

Improvement	Typical Cost EST
Dual immersion cylinder	£950
Low energy lighting for all fixed outlets	£100
Ground floor insulation	£0
New insulated entrance doors	£1,200
Replace windows with double/triple glazed	£3,500
Loft insulation + misc.	£0
Ventilation system	£2,100
Replace boiler with air source heat pump	£7,000
New low temp radiators + improved controls	£1,400
Internal/external wall insulation	£8,000
TOTAL	£24,250

Houses - Based on a 3-bed semi-detached house

Improvement	Typical Cost EST
Dual immersion cylinder	£950
Low energy lighting for all fixed outlets	£100
Ground floor insulation	£4,000
New insulated entrance doors	£1,800
Replace windows with double/triple glazed	£4,500
Loft insulation + misc.	£1,200
Ventilation system	£2,100
Replace boiler with air source heat pump	£7,000
New low temp radiators + improved controls	£1,400
Internal/external wall insulation inc scaffold	£14,000
TOTAL	£37,050

Table 1 : Component Costs

5.4. Scenarios

All scenarios achieve net zero by 2050 through the installation of electrically powered heat pumps. The scenarios reflect three levels of energy efficiency and hence represent three steps to relieving fuel poverty unless electricity prices are reduced to that of gas. They also manage the risk of embracing new technology by deferring installation until after 2030. The scenarios are:-

1. Base case – achieve EPC-C by 2030 through investment in the fabric and then replace gas heating with heat pumps 2030-2050. This scenario requires reform of electricity pricing and SAP methodology, as on current definitions the substitution of electricity for gas will reduce the EPC rating, in some cases below C;
2. Central case - achieve EPC-C by 2030, replace gas heating with heat pumps 2030-2050 and continue to improve the fabric to ensure that the EPC rating remains at C or better and residents experience minimal difference in expenditure on heating, assuming minimal change in the policy environment or electricity pricing;

3. Maximum energy efficiency case – retrofit homes to achieve maximum practically achievable SAP and minimise energy demand and then replace gas heating by 2050.

Housing associations will have existing plans for Stock Investment Programmes for the period to 2050. These will include replacement of building components such as boilers, windows, doors etc. at a cost in the region of £70bn. The **additional** cost of decarbonisation in each scenario is the cost of the investment less the cost on the same components contained within existing plans.

For each scenario the investment has been profiled consistent with the known profile of replacement of heating systems to give an estimated additional annual spend for each year 2022-50.

The unit numbers to feed into the two scenarios are at Appendix 1.

5.5. Results

The build-up of the net costs of decarbonisation for each scenario is set out at Appendices 3-5. In summary the costs are set out in table 2.

	Scenario 1		Scenario 2		Scenario 3	
Category	**Total**	**Unit Ave**	**Total**	**Unit Ave**	**Total**	**Unit Ave**
Costs to upgrade units built since 2000	£5,783,360,000	£6,820	£5,783,360,000	£6,820	£8,751,360,000	£10,320
Costs to ensure flats meet EPC C prior to 2030 but will be held post 2050	£9,157,821,542	£19,923	£2,758,020,000	£6,000	£2,758,020,000	£6,000
Costs to upgrade flats already at C	£2,346,080,000	£6,820	£13,253,175,942	£16,491	£16,066,020,942	£19,991
Costs to ensure houses meet EPC C prior to 2030 but will be held post 2050	£15,424,412,054	£25,314	£4,874,640,000	£8,000	£4,874,640,000	£8,000
Costs to upgrade houses already at C	£3,109,920,000	£6,820	£22,092,830,654	£20,738	£25,821,485,654	£24,238
SUM	**£35,821,593,596**		**£48,762,026,596**		**£58,271,526,596**	

Table 2: Net costs of decarbonising the housing association stock

There are differences in timing of spend to meet the different objectives, which will be explored in the next section. The range of costs is an additional 36% over Scenario 1 to achieve affordable thermal comfort and 62% to reach the highest standard.

5.6. Cash Flows

The scenarios throw up different cash-flows.

Scenario	2022-2024	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049
1	£6,484,370,099	£10,807,283,498	£5,240,033,333	£5,240,033,333	£5,240,033,333	£2,809,840,000
2	£8,365,497,653	£11,724,858,780	£7,436,796,173	£7,716,387,735	£6,817,428,993	£6,701,057,262
3	£9,637,901,331	£13,332,792,779	£9,156,254,046	£9,500,489,831	£8,393,683,294	£8,250,405,315

Table 3: Cash-flow of net costs of decarbonising the housing association stock

In each case the heaviest expenditure arises in the period to 2030 in order to achieve the objective of reaching EPC-C by that date. The front loading has significant effects on business plans, which are more robust in the later years. However, it is essential to undertake these works before installing heat pumps to avoid increasing fuel poverty.

5.7. Reservations

The scenarios may be affected by:-

- The Government's Heat and Buildings Strategy, which is anticipated shortly;
- Changes to VAT rates on the supply and installation of components.
- Failure to achieve cost savings against current prices

5.8. Conclusions

Savills recommends Scenario 2 as the minimum expenditure to decarbonise the housing association stock without increasing fuel poverty. The risk with Scenario 1 is that if electricity prices don't reduce sufficiently and the efficiency of electric heating does not improve, then the benefits system or some other form of subsidy would need to bear the extra energy costs. Scenario 3 achieves net zero, maximizes energy efficiency and contributes to the energy economy, but is likely prohibitively expensive. None of the options contemplate off-setting such as planting trees, although the manufacturers of materials and equipment may have to off-set any unavoidable carbon emissions from their manufacturing processes.

The costings assume that the sector can quickly mobilise to achieve net zero by 2050 whilst driving down costs by c20% from the 2021 level. There are very significant logistical challenges. Partnership with local authorities will be needed to achieve scale and area-based approaches. Then, there are 1500 weeks to 2050, which means work on 4% of the stock or 94,000 dwellings per year/1,800 per week nationwide with expenditure of c£2.2bn pa inclusive of VAT and on-costs but ignoring inflation.

It should be noted that planned stock condition re-investment work must still run in parallel. Integrating the programmes will present a further challenge.

6. Economic assessment and asset management strategy

6.1. Modelling the impact of zero carbon investment across England

Savills maintains a database of the economic performance of c500,000 units, derived from evaluation work over the last four years. This provides benchmark data for measuring the impact of the costs of decarbonisation on Net Present Value (NPV), which is a measure of economic performance that can be used to develop asset management strategy. Because social rents are significantly lower than market rents, the NPV of social rent homes are lower than the same home would be in the private sector. The significant additional costs of decarbonisation, which are not recouped via rents, mean that NPVs will reduce across the sector, and significantly more homes will have negative or low NPVs. Homes with negative NPV are expected to cost more over the analysis period (usually 30 years) than they will generate in rents. Homes with negative or low NPVs pose difficult challenges for housing associations. This section explores some of the drivers and implications of this.

6.2. Drivers of NPV performance

It is certain that the additional costs of decarbonisation will suppress NPVs across the sector. Remedies are explored in the next section.

The calculation is highly sensitive to the profile of spend; front-loaded expenditure – as modelled to reach EPC C by 2030 - depresses NPVs more than back-loaded spend.

Equally, there is some inevitable uncertainty about modelling the impact of decarbonisation investment. The level of investment required will vary greatly between landlords. The level of VAT payable will vary based on delivery approach. The timescales landlords are working to will vary with some working in areas with accelerated targets to decarbonise by 2030, 2038 etc. All these will have a bearing on the impact on NPV performance.

6.3. Loan Security Valuations

NPVs are a proxy for loan security valuations on the Existing Use Value – Social Housing basis, although they apply different assumptions. The scale of investment will put downward pressures on valuations unless accounting conventions are changed.

Savills explored the impact of energy efficiency on valuations in the Revalue Project – see https://revalue-project.eu/. This led to RICS advice that permits valuers to take this into account, but the results to date are disappointing.

6.4. Disposals

The economic and financial models undertaken in this report require an assumption to be made for the number of disposals and demolitions undertaken by housing associations for whatever reason over the period 2021-2050. Future rates of disposals will be highly sensitive to government policy changes and external factors, and therefore for the purposes of this modelling we have simply assumed that disposals continue at their current rate.

Disposals will reduce the need for stock investment and deliver receipts for reinvestment. It is assumed that where receipts are invested in new social housing stock it will be delivered to net zero standards.

6.4.1. Historic trends

The SDR summary report 2017/18 reports disposals by large housing associations 2013 – 2018. It is the last report with a detailed breakdown; the requirement to seek approval for disposals was replaced by a reporting requirement thereafter. Analysis gives a rate of disposal for large associations as follows.

Year	Stock	Disposals	%	Disposals ex RtB	%
2013	1,920,301	11,295	0.588189	8,580	0.446805
2014	1,934,389	13,303	0.687711	8,468	0.437761
2015	1,973,869	10,551	0.534534	5,768	0.292218
2016	2,014,195	11,819	0.586785	7,329	0.363867
2017	2,056,970	12,198	0.593008	6,819	0.331507
2018	2,083,240	13,827	0.663726	8,603	0.412963

Table 4: Disposals by larger housing associations

The average is 0.6% pa. The impact of Right to Buy (RtB) is a moot point. On the one hand Government has a manifesto commitment to further pilot the voluntary RtB scheme for housing associations and there are still households with preserved RtB. Any RtB case will be at least 3 years old and likely much older because of the combined effect of the time for a household to improve its economic position, the annual increase in discount and the cost floor. Consequently, the homes sold are likely to need investment. Numbers were increasing to 2018.

6.4.2. Forward Projection of disposal

Projecting forward, the rate of disposals will be strongly influenced by Government policy:-

- Costs of building safety, which may be part funded by receipts of disposals in the early years;
- Costs of decarbonisation unless covered by Government funding;
- Decline in number of households with Preserved RtB, unless Government extends the Voluntary RtB programme;
- Wider policy changes – for example in planning, regulation in other tenures, and the nature of any regulatory changes in the social housing sector.

In addition, receipts will be affected by house price inflation and the market generally.

A prudent estimate going forward based on the average over recent years would be 0.5% pa, or 15% over 30 years. In the absence of Government support the outturn is likely to be higher.

6.5. Conclusions

It is inevitable that without financial support the additional costs of decarbonisation will reduce NPVs and increase the proportion of stock with poor or marginal economic performance across the sector. In many cases this will mean landlords have a significant proportion of their stock with negative or marginal NPVs. While the average decarbonisation costs for flats is lower than that for houses, the lower starting NPV for flats means that landlords with a higher proportion of flatted stock are likely to be faced with higher proportions of stock with poor or marginal performance compared with landlords with a greater proportion of houses. Where landlords have a higher proportion of new build stock the impact will be considerably less.

The large proportion of existing stock impacted means that tackling this issue through active asset management interventions alone (e.g. disposal, regeneration) would have a very significant impact on the shape of the social housing sector.

Gearing covenants have rarely constrained sector borrowing in the past. A substantial reduction in loan security values will put pressure on covenants and may have an impact on the ability of associations to raise loan finance.

To maintain the sector's economic health and borrowing capacity financial support for investment in decarbonisation will be essential. To enable associations to maximise their contribution there will need to be a new settlement for loan covenants and associated accounting conventions. There should also be consideration of the proposed timetable for investment to avoid front-loading.

6.6. Asset Management Strategy and Investment Planning

Once the population of properties to be treated has been identified the next step will be for associations to develop Investment Plans and refine the costs and the cash-flow. There will need to be extensive consultation with residents, especially where internal wall and floor insulation is contemplated as this will be highly disruptive to residents. There are various options: -

- Worst first, treating properties rated EPC D-G. This is being advocated by Government but may conflict with the desirability of achieving scale and creating efficient work packages;
- There are choices about undertaking whole house treatment or improving energy efficiency to EPC-C and then installing heat pumps. The former may require residents to move out temporarily; the latter will result in repeated disruption and additional costs from altering components installed in the first phase.

The investment plan that emerges will have a profile: -

- Front-loaded – to achieve decarbonisation sooner
- Steady, in line with existing programme
- Backloaded.

7. Funding options

7.1. Funding model

Savills Housing Treasury team maintains a business plan model of the housing association sector based on the Global Accounts published by the Regulator of Social Housing and projecting forward income and costs over the next 30 years. It has been used to estimate the financial impact of the investment on decarbonisation and then the incremental effect of a range of funding options.

7.1.1. Assumptions

The additional costs of decarbonisation in the central scenario have been introduced into the model. As with the NPV's, front-loaded programmes have profound impacts on the cash-flow.

Inflation is applied in line with Treasury projections.

VAT is added at an average rate of 10% and on-costs at 12% plus VAT to give the cash impact on the sector business plan.

The costs of achieving net zero in the 200,000 leasehold flats are included because they will be incurred by associations. No provision has been made for leaseholders paying the costs via their service charges over time.

7.2. Funding options

The following policy options were put through the model to measure their incremental effect in reducing the financial impact.

1. Reduced costs of work through reducing VAT from 10% to 5% on all decarbonisation expenditure.
2. Reduced cost of funds through:-
    i. ESG-style lending at a typical discount of 2.5-5bps
    ii. Group/consortium borrowing based on rates achieved by aggregators
    iii. A Government guarantee based on the current Affordable Homes Guarantee Scheme (AHGS) 2020 scheme
3. Rent Increase (Warm Rents) – a one-off permanent increase to all rents in the first year of the plan, which would then be subject to the rent inflation formula
4. Grant – the quantum of grant that, combined with other measures, would bring the global model into balance, ie the sector business plan is viable and fundable and can still deliver new homes.
5. Development – the base model assumes current levels of development e.g. 180,000 over 2021-26 backed by Government funding of c.£12bn through the Affordable Housing Programme, plus an assumed level of nil grant Section 106. Impact of ceasing new development.
6. Negotiating carve out of the expenditure from the borrowing covenants.

Comments on some of the options follow.

7.2.1. Reduced Cost of Funds

Savills Treasury maintains a database of the interest rates of borrowings available to housing associations in the market.

Group/consortium borrowing arranged by aggregators is at the sector median rates.

ESG lenders promise a discount of 2-5 bps if key performance measures are met.

The Affordable Homes Guarantee Scheme delivers a very significant discount to borrowing costs, driving rates close to government borrowing; a combination of Gilts, a market-determined liquidity premium, the lender's arrangement and management services fee. The current scheme operated by MHCLG is limited to borrowing for new development and amounts to £3 billion. It would need to be extended to guarantee loans to pay for decarbonisation and be increased in scale to cover the amount of investment not met by grant.

7.2.2. Warm Rents

The core idea of "Warm Rents" for English social housing is that an amount is added to the rent up to the reduction in energy costs following decarbonisation. In addition, tenants will benefit from greater thermal comfort. This was first proposed as a way to increase rental income to help housing associations cover the cost of improving the energy efficiency of properties. More recently it has been suggested as a model that could raise funds for decarbonisation of the stock.

Warm Rents are unlikely to be justified for Scenario 1 because the combination of achieving EPC-C and installing heat pumps is likely to increase energy costs. Scenario 2 is designed to achieve a neutral position across all property types. Only Scenario 3 will deliver reductions in costs to tenants at significant additional cost that might justify an increase in rent.

Arriving at a new rent settlement to help fund decarbonisation is complex because it would need to take into account:-

- Different costs of decarbonisation;
- Different impacts of decarbonisation on household energy costs;
- Different impacts on welfare benefits.

Savills has explored Warm Rents in detail; copies of a paper on the subject is available on request. For modelling purposes, the simplest approach was adopted of a one-off permanent £1 pw increase to all rents in the first year of the plan, which would then be subject to the rent inflation formula.

7.2.3. Grant funding

The terms and conditions of grant and the conventions for accounting for it will make a significant difference to its effectiveness. Wave 1 of the Social Housing Decarbonisation Fund announced in August 2021 is primarily intended to achieve EPC-C. It suggests that most properties already at C, even a low C, will not be eligible for funding until all those at EPC D/E/Fs have been treated. Savills recommends that the objective should be more ambitious to ensure that residents are not driven into fuel poverty when electric heating is installed.

Providers hope to access the £3.8bn (or more) allocated to this scheme this decade. BEIS expects it to contribute to bringing 380,000 social homes up to EPC C. There are c1m homes below EPC-C and our findings suggest that some providers will need support to install heat pumps.

7.2.4. Development

The impact of reducing development has been modelled. Contrary to common assumptions, investment in development improves the sector business plan long term because it delivers income generating assets. In addition, developing new net zero homes enables replacement of older properties with a low EPC/SAP rating.

7.2.5. Carve-outs

Lenders to the sector have shown themselves ready to exclude the costs of fire safety works from the calculations of Earnings Before Interest Tax Depreciation and Amortisation – Major Repairs Included (EBITDA-MRI) interest cover covenants so long as other covenants such as gearing are not broken. They may be prepared to do the same for the costs of decarbonisation. However, this approach depends on the consent of multiple lenders, who may withdraw it, and the cumulative effect of fire safety and decarbonisation. There will be fees and potentially increased interest rates.

7.2.6. Other options and combinations

There are many other potential options that we have not felt able to model:-

- Carbon budgets
- Energiesprong or similar types of comfort plan finance
- Regulated Asset Base model – essentially introducing utility style economic regulation
- Escrow arrangements.

7.3. Results

The impact of **Scenario 2**, the central costing scenario, on Net Peak Debt and Interest Cover is set out in Table 5.

Scenario	Peak Debt as % of Status Quo	Viable Interest Cover
Status Quo with no additional spend on fire safety or decarbonisation	100%	√
Base with no funding interventions	200%	X
1. Reduced costs of work through reducing VAT from 10% to 5% on all decarbonisation expenditure.	Reduced by 5%	X
2. Reduced cost of funds through: -		
a. ESG-style lending at a typical discount of 2.5-5bps	Reduced by 5%	X
b. Group/consortium borrowing based on rates achieved by aggregators	Base assumption	X
c. A Government guarantee based on the current AHGS scheme	Reduced by 24%	X
3. Warm Rents – to simplify, say a one-off permanent £1 pw increase to all rents in the first year of the plan, which would then be subject to the rent inflation formula.	£1pw reduces debt by 8%	X
4. Grant – an amount that, combined with other measures, would bring the global model into balance, i.e. the sector BP is viable and fundable and can still deliver new homes.	Reduced	Depends on accounting conventions
5. Development – base model assumes current levels of development e.g. 180,000 over 2021-26 backed by Government funding of c.£12bn through the Affordable Housing Programme, plus an assumed level of nil grant Section 106. Impact of ceasing new development.	Reduced by 87%	X. Development improves the business plan long term because it delivers income generating assets.
6. Negotiating carve out of the expenditure from the EBITDA-MRI covenants.	Increase of 22%	√ but realism of carving out £72bn of debt is debatable

Table 5: Results of financial modelling

It is well established that the principal constraint on the sector's global business plan is compliance with EBITDA-MRI interest cover covenants. In the model the expenditure on decarbonisation is classed as day-to-day revenue expenditure and hence impacts the ratio of EBITDA-MRI to interest costs. The test of viability is an interest cover ratio better than 110%

None of the scenarios gets close to the maximum gearing ratio of 65%. The model does not consider the likely reduction in valuations caused by the increased in spend. For some associations the gearing ratio is already a constraint.

The Maximum spend scenario shows similar results.

7.4. Conclusions

As anticipated, the sector will not be able to absorb the costs of decarbonisation without support. The front-loaded profile of spend has significant impacts. Development improves the sector's position over the long term and so should not be substituted by investment in achieving net zero. An optimal solution is likely to comprise a combination of: -

- Increased borrowing by associations to the limit sustainable within their covenants
- Reductions in VAT on energy efficiency measures
- Government guarantee on borrowings for retrofit
- Significant grant funding, with appropriate accounting treatment.

Changes to rent (so-called Warm Rents) can make a contribution to reducing peak debt, whether targeted at retrofitted homes specifically or implemented across all homes. They must obviously be balanced against affordability and the scale of increases to cover the full costs would not be viable. A potential solution would be to link rent increases to the installation of PV, which would have a direct impact on tenants' energy costs, as modelled in the Maximum scenario.

7.5. Reservations

The accounting conventions for any grant will need to be resolved. The scenarios adopt the standard convention for SHG. However, if the grant is sourced from BEIS and accounted for as a revenue contribution to defray the costs of retrofit it could be discounted from the EBITDA-MRI computation, relieving pressure on the covenant.

Alternatively, spend on decarbonisation may be capitalised on the grounds that if it is not spent then homes will become unlettable and/or there will be a return from Warm Rents. This scenario has been modelled by assuming the expenditure on decarbonisation will be carved out of EBITDA MRI covenants.

Spend may be deferred by leasing (or similar) heat pumps and the PV installations included in Scenario 3.

Leaseholders may be required to repay the costs of spend on Net zero. This would marginally improve the position by introducing income via service charges. On the other hand, this will only affect 7% of the stock, all of which will be flats. Government may decide to relieve leaseholders of these costs and in any event, there may be a high level of unrecoverable costs. This potential income stream has therefore been ignored for the purposes of modeling.

The scenarios may be affected by the Government's Heat and Buildings Strategy.

8. Summary and conclusions

8.1. Summary

This report approaches the development of a plan for the decarbonisation for the housing association sector through exploring: -

- The literature on the subject
- Stakeholders' views, including a reference group established by the NHF from amongst its members
- Costing three scenarios for decarbonisation. This is the core of the report, and it captures the different views about the target for decarbonisation;
- Economic impacts and the derivation of asset management strategies
- A business plan model for the sector showing the stresses that the expenditure imposes and the scale and efficacy of different funding options.

Along the way we have flagged up a number of challenges that need to be addressed.

8.2. Conclusions

Savills conclusions are based on its extensive experience of planning and delivering investment programmes, analysing the performance of housing stock and providing advice on treasury strategy. It recommends adopting the central costing case - achieve EPC-C by 2030, replacing gas heating with heat pumps 2030-2050 and continuing to improve the fabric to ensure that the EPC rating remains at C or better and residents experience minimal difference in expenditure on heating. The latter point is critical to Savills clients who wish to avoid increasing fuel poverty amongst their tenants. However, this level of expenditure may prove unnecessary if in the medium term the cost of electricity is significantly reduced, and heat pumps become much more efficient.

The impact of a range of funding options has been measured. The sector cannot retain its financial viability and ability to develop new homes if it is asked to shoulder the full burden of the costs of decarbonisation. It can lever its asset base to raise a proportion of the additional peak debt. We suggest the following are explored further as potential contributors to meeting the balance: -

- Reductions in VAT on energy efficiency measures
- Government guarantee on borrowings for retrofit
- Significant additional grant
- Reform of the accounting treatment of decarbonisation works.

It is important to note than continuing to develop sustains the financial health of the sector long term.

8.3. Action Plan

Savills work suggests an action plan for the sector and individual associations.

The sector/NHF should: -

- Settle on a realistic target for social housing stock, based on SAP and a revised definition of EPC;
- Press the case for a funding package comprising a multi-year commitment to the Social Housing Decarbonisation Fund, guarantees on borrowings on the model of the successful Affordable Homes Guarantee Scheme (AHGS) 2020 and seeking a settlement on a reduction in VAT for the works;
- Urgently open discussions on the accounting standards with the IFRS and the lenders to the sector to agree the accounting treatments for grant support from BEIS and then negotiate contractual terms for the funding to align with the accounting definitions;
- Take action to address the lack of understanding of decarbonisation amongst residents and stakeholders exposed by the recent report lead by Citizens Advice;
- Work up design guidance to help drive down on-costs;
- Seek blanket Permitted Development Rights for External Wall Insulation (EWI) except in conservation areas;
- Work with the construction sector to address skills shortages and build the supply chain to achieve long term cost reductions;
- Encourage associations to develop area-based approaches and investment programmes at scale;
- Continue the work to develop and implement a reporting framework for progress towards net zero.

Individual associations should: -

- Ensure that they have an up-to-date stock and energy survey with sufficient information about heating and insulation systems to specify effective programmes of decarbonisation and energy efficiency;
- Develop an investment plan to deliver decarbonisation;
- Where possible, collaborate with other landlords to achieve economies of scale and area-based programmes;
- Analyse the impact on the economic performance for each asset group and identify candidates for disposal or redevelopment;
- Commence consultation programmes with residents and stakeholders;
- Adjust the business plan to include the additional expenditure, making assumptions about available financial support.
- Prepare to raise finance and negotiate suitable carve outs with lenders.

9. Important Note

Finally, in accordance with our normal practice, we would state that this report is for general informative housing associations only and does not constitute a formal valuation, appraisal or recommendation. It is only for the use of the persons to whom it is addressed and no responsibility can be accepted to any third party for the whole or any part of its contents. It may not be published, reproduced or quoted in part or in whole, nor may it be used as a basis for any contract, prospectus, agreement or other document without prior consent, which will not be unreasonably withheld.

Our findings are based on the assumptions given. As is customary with market studies, our findings should be regarded as valid for a limited period of time and should be subject to examination at regular intervals.

Whilst every effort has been made to ensure that the data contained in it is correct, no responsibility can be taken for omissions or erroneous data provided by a third party or due to information being unavailable or inaccessible during the research period. The estimates and conclusions contained in this report have been conscientiously prepared in the light of our experience in the property market and information that we were able to collect, but their accuracy is in no way guaranteed.

10. Appendices

10.1. Appendix 1 - Unit Numbers for Costing Scenarios

Units for Investment to reach Zero C	Units (000)	Units (000)	Notes
Opening Units 2020 per Global accounts	2717		
NB Of which SO	200		These are distributed amongst the new and older stock of flats. Costs will be incurred and recharged to leaseholders
Built since 2000	848		These will be at >EPC-C but need new electric heating from 2030
43% flats built since 2000	364.64		These will be at >EPC-C but need new electric heating from 2030
57% houses built since 2000	483.36		These will be at >EPC-C but need new electric heating from 2030
Stock >20 years old	1869		
Of which built before 2000 and <EPC-C	1059.63		Assumes English House Survey of 39% at EPC-D and worse
15% to be disposed or redeveloped; all <EPC-C	407.55		
	Total	**<EPC-C**	
After 15% to be disposed or redeveloped; all <EPC-C	1461.45	652.08	Disposals take place at 0.5% pa. Depending on the Heat and Buildings strategy, some of these may need treatment before disposal, but we can exclude for now.
43% flats	628.4235	280.3944	
57% houses	833.0265	371.6856	

10.2. Appendix 2 – Costs Scenario 1

Description	Unit No.	Assumptions 1	Ongoing Lifecycle Costs	Net zeroCarbon Costs	Net value of Ongoing Lifecycle Costs - Net zeroCarbon Costs	Assumptions 2	Cost to Upgrade to EPC C (per property)	Total Cost
Opening Units 2020 per Global accounts	2,717,000	-						
Units built since 2000	**848,000**	Assumed lifecycle costs; one boiler and radiators	£3,500	-	£6,820	Assumed all units built since 2000 have gas. It has been assumed that all gas boilers will be kept until 2035	-	£5,783,360,000
		Assumed installation of ASHP	-	£10,320				
Stock >20 years old	**1,869,000**	-						
43% flats	344,000	Assumed lifecycle costs	£3,500	-	£6,820	*N/A*		£2,346,080,000
		Flats already at EPC C Assumed minimum work scope of air source heat pump	-	£10,320				
	459,670	Number of flats below EPC C and to be held post 2050	£9,627	£29,550	£19,923	Net cost of Fabric measures to meet low band EPC C + ASHP	£19,923	£9,157,821,542
	-					Net ZC and EPC C costs		£11,503,901,542
57% houses	456,000	Assumed lifecycle costs	£3,500	-	£6,820	*N/A*		£3,109,920,000
		Houses already at EPC C assumed min work ASHP only	-	£10,320				
	609,330	Number of houses below EPC C and to be held post 2050	£9,627	£34,941	£25,314	Net cost of Fabric measures to meet EPC C + ASHP	£25,314	£15,424,412,054
	-					Net ZC and EPC 'C' Costs	-	£18,534,332,054
							TOTAL	**£35,821,593,596**

Please note that the above calculations are exclusive of any oncosts and VAT.

10.2.1. Scenario 1 – Cash flow

Category	2022-2024	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	Total	Unit Ave
Costs to upgrade units built since 2000			£1,445,840,000	£1,445,840,000	£1,445,840,000	£1,445,840,000	£5,783,360,000	£6,820
Costs to ensure flats meet EPC C prior to 2030 but will be held post 2050	£2,258,577,053	£3,764,295,089	£1,044,983,133	£1,044,983,133	£1,044,983,133	-	£9,157,821,542	£19,923
Costs to upgrade flats already at C			£586,520,000	£586,520,000	£586,520,000	£586,520,000	£2,346,080,000	£6,820
Costs to ensure houses meet EPC C prior to 2030 but will be held post 2050	£4,225,793,045	£7,042,988,409	£1,385,210,200	£1,385,210,200	£1,385,210,200	-	£15,424,412,054	£25,314
Costs to upgrade houses already at C			£777,480,000	£777,480,000	£777,480,000	£777,480,000	£3,109,920,000	£6,820
SUM	£6,484,370,099	£10,807,283,498	£5,240,033,333	£5,240,033,333	£5,240,033,333	£2,809,840,000	**£35,821,593,596**	
Please note that the above calculations are exclusive of any oncosts and VAT.								

10.3. Appendix 3 – Costs Scenario 2

Description	Unit No.	Assumptions 1	Ongoing Lifecycle Costs	Net zeroCarbon Costs	Net value of Ongoing Lifecycle Costs - Net zeroCarbon Costs	Assumptions 2	Cost to Upgrade to EPC C (per property)	Total Cost
Opening Units 2020 per Global accounts	2,717,000	-						
Units built since 2000	**848,000**	Assumed lifecycle costs; one boiler and radiators	£3,500	-	£6,820	Assumed all units built since 2000 have gas. It has been assumed that all gas boilers will be kept until 2035	-	£5,783,360,000
		Assumed installation of ASHP	-	£10,320				
Stock >20 years old	**1,869,000**	-						
43% flats	803,670	Assumed lifecycle costs	£9,627	-	£19,923	*N/A*		£16,011,195,942
		Assumed work scope includes fabric measures EWI, loft and floor insul, new W+D, new ASHP, ventilation	-	£29,550				
	459,670	Number of flats below EPC C and to be held post 2050	*N/A*			Costs to ensure all properties meet EPC C prior to 2030 assuming 800,000 (or 42.8%) of properties already meet EPC C	£6,000	£2,758,020,000
	-					Net ZC and EPC C costs	-	£13,253,175,942
57% houses	1,065,330	Assumed lifecycle costs	£9,627	-	£25,314	*N/A*		£26,967,470,654
		Assumed work scope includes fabric measures EWI, loft and floor insul, new W+D, new ASHP, ventilation	-	£34,941				
	609,330	Number of houses below EPC C and to be held post 2050	*N/A*			Costs to ensure all properties meet EPC C prior to 2030 assuming 800,000 (or 42.8%) of properties already meet EPC C	£8,000	£4,874,640,000
						Net ZC and EPC 'C' Costs	-	£22,092,830,654
	Please note that the above calculations are exclusive of any oncosts and VAT.-							

10.3.1. Scenario 2 – Cash flow

Category	2022-2024	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	Total	Unit Ave
Costs to upgrade units built since 2000	£773,833,381	£977,891,705	£1,045,716,797	£1,085,031,253	£958,625,172	£942,261,691	£5,783,360,000	£6,820
Costs to ensure flats meet EPC C prior to 2030 but will be held post 2050	£1,034,257,500	£1,723,762,500	-	-	-	-	£2,758,020,000	£6,000
Costs to upgrade flats built prior to 2000	£1,773,320,344	£2,240,941,394	£2,396,369,706	£2,486,462,903	£2,196,790,113	£2,159,291,481	£13,253,175,942	£16,491
Costs to ensure houses meet EPC C prior to 2030 but will be held post 2050	£1,827,990,000	£3,046,650,000	-	-	-	-	£4,874,640,000	£8,000
Costs to upgrade houses built prior to 2000	£2,956,096,428	£3,735,613,180	£3,994,709,670	£4,144,893,578	£3,662,013,707	£3,599,504,090	£22,092,830,654	£20,738
SUM	£8,365,497,653	£11,724,858,780	£7,436,796,173	£7,716,387,735	£6,817,428,993	£6,701,057,262	**£48,762,026,596**	
Please note that the above calculations are exclusive of any oncosts and VAT.								

10.4. Appendix 4 – Costs Scenario 3

Description	Unit No.	Assumptions 1	Ongoing Lifecycle Costs	Net zeroCarbon Costs	Net value of Ongoing Lifecycle Costs - Net zeroCarbon Costs	Assumptions 2	Cost to Upgrade EPC (per property)	Total Cost
Opening Units 2020 per Global accounts	2,717,000	-						
Units built since 2000	**848,000**	Assumed lifecycle costs; one boiler and radiators	£3,500	-	£6,820	Assumed all units built since 2000 have gas. It has been assumed that all gas boilers will be kept until 2035. Addition of PV panels to each property	£3,500	£8,751,360,000
		Assumed installation of ASHP	-	£10,320				
Stock >20 years old	**1,869,000**	-						
43% flats	803,670	Assumed lifecycle costs	£9,627	-	£19,923	Additional measures to increase EPC rating	£3,500	£18,824,040,942
		Assumed work scope includes fabric measures EWI, loft and floor insul, new W+D, new ASHP, ventilation	-	£29,550				
	459,670	Number of flats below EPC C and to be held post 2050	*N/A*			Costs to ensure all properties meet EPC C prior to 2030 assuming 800,000 (or 42.8%) of properties already meet EPC C	£6,000	£2,758,020,000
	-					Net ZC and EPC C costs	-	£16,066,020,942
57% houses	1,065,330	Assumed lifecycle costs	£9,627	-	£25,314	Addition of PV panels to each property	£3,500	£30,696,125,654
		Assumed work scope includes fabric measures EWI, loft and floor insul, new W+D, new ASHP, ventilation	-	£34,941				
	609,330	Number of houses below EPC C and to be held post 2050	*N/A*			Costs to ensure all properties meet EPC C prior to 2030 assuming 800,000 (or 42.8%) of properties already meet EPC C	£8,000	£4,874,640,000
	-					Net ZC and EPC 'C' Costs	-	£25,821,485,654
	Please note that the above calculations are exclusive of any oncosts and VAT.							

10.4.1. Scenario 2 – Cash flow

Category	2022-2024	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	Total	Unit Ave
Costs to upgrade units built since 2000	£1,170,961,949	£1,479,742,287	£1,582,374,978	£1,641,865,474	£1,450,588,237	£1,425,827,075	£8,751,360,000	£10,320
Costs to ensure flats meet EPC C prior to 2030 but will held post 2050	£1,034,257,500	£1,723,762,500	-	-	-	-	£2,758,020,000	£6,000
Costs to upgrade flats built prior to 2000	£2,149,688,642	£2,716,557,264	£2,904,973,574	£3,014,188,090	£2,663,035,345	£2,617,578,028	£16,066,020,942	£19,991
Costs to ensure houses meet EPC C prior to 2030 but will held post 2050	£1,827,990,000	£3,046,650,000	-	-	-	-	£4,874,640,000	£8,000
Costs to upgrade houses built prior to 2000	£3,455,003,241	£4,366,080,728	£4,668,905,495	£4,844,436,267	£4,280,059,712	£4,207,000,211	£25,821,485,654	£24,238
SUM	£9,637,901,331	£13,332,792,779	£9,156,254,046	£9,500,489,831	£8,393,683,294	£8,250,405,315	**£58,271,526,596**	
Please note that the above calculations are exclusive of any oncosts and VAT.								

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